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Access Economics

Modelling the value of unpaid work and care

Office for Women, Department of Health and Human Services

12 October 2018

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Acknowledgement

This paper uses unit record data from the Household, Income and Labour Dynamics in Australia (HILDA) Survey. The HILDA Project was initiated and is funded by the Australian Government Department of Social Services (DSS) and is managed by the Melbourne Institute of Applied Economic and Social Research (Melbourne Institute). The findings and views reported in this paper, however, are those of the author and should not be attributed to either DSS or the Melbourne Institute.

Glossary

Acronym	Full name
ABS	Australian Bureau of Statistics
CALD	Culturally and linguistically diverse
DAE	Deloitte Access Economics
DHHS	Department of Health and Human Services
e.g.	For example
Etc	Etcetera
GCC	Greater capital city
GDP	Gross domestic product
GSP	Gross state product
HILDA	Household, Income and Labour Dynamics in Australia
IRSAD	Index of relative socio-economic advantage and disadvantage
OFW	Office for Women
ROS	Rest of state
SEIFA	Socioeconomic Indexes for Areas

Executive summary

The value of unpaid work and care in Victoria, 2017-18

Replacement cost method

$206.25 billion

The cost of 'buying' an equivalent amount of unpaid work and care from the market

63.3 %
Household and domestic work
$130.5bn

6.7 %
Caring for the ill, disabled and elderly
$13.7bn

26.7 %
Caring for children
$55.0bn

3.4 %
Volunteer or charity work
$7.0bn

$24,774 per male

$39,662 per female

Opportunity cost method

$205.58 billion

Earnings that could be made if time spent on unpaid work and care could be spent in the paid workforce

60.6 %
Household and domestic work
$124.6bn

5.9 %
Caring for the ill, disabled and elderly
$12.1bn

30.1 %
Caring for children
$61.9bn

3.4 %
Volunteer or charity work
$7.0bn

$28,317 per male

$35,986 per female

Drivers analysis – Selected findings

Impacts on categories of unpaid work and care

People of lower socioeconomic status spend 0.6 more hours per week on household and domestic work than those of medium or high socioeconomic status.

People from culturally and linguistically diverse backgrounds spend 0.9 more hours per week caring for the ill, disabled and elderly than people who are not.

People experiencing a high degree of difficulty finding a place at a childcare centre of choice, spend 3.9 more hours per week caring for children than people experiencing a low to medium level of difficulty.

People living outside Greater Melbourne spend 1.3 more hours per week on volunteer and charity work than people living in Greater Melbourne.

Demographic impacts

Gender

After accounting for all other drivers, women spend 13.8 more hours per week on unpaid work and care than men, with women spending 9.3 additional hours on childcare than men.

This means women spend an additional 4 working months' worth of time per year on unpaid work and care than men, and 1.4 additional working months on paid and unpaid work combined.

While women in aggregate spend more time on unpaid work and care, men spend 3.5 hours more per week on outdoor tasks then women.

Age

Time spent on unpaid work and care peaks in the 35 to 44 year old age group at 23.3 hours per week.

Household structure

People who are part of a couple with dependent children spent 34.1 more hours per week on unpaid work and care than those without dependent children.

Lone parents with dependent children spend 0.6 more hours per week on unpaid work and care than people who are part of a couple with dependent children.

All reported numbers are average estimated impacts, holding all else constant.
The results presented here are a selection from the full drivers analysis results provided in Section 4.

1 Introduction

In December 2016, the Victorian Government launched Safe and Strong, the state's first Gender Equality Strategy (the Strategy). The Strategy was developed by the Office for Women (formerly the Office of Prevention and Women's Equality) which supports the Minister for Women and Prevention of Family Violence. The Office for Women is also responsible for the implementation of the Strategy.

Safe and Strong considers how gender inequality is present and affects outcomes across a person's life cycle. For example the Strategy finds gender stereotypes start taking effect from a very young age, with children being quick to define jobs and activities as specific to boys or girls. The Strategy even finds that the gender pay gap is apparent during childhood, where girls on average receive 11 per cent less pocket money than boys. As children grow, behaviours, study choices, ambitions and views about relationships are all found to be affected by gender norms. The effects of this flow on to adulthood, where despite more women graduating from higher learning than men, they receive a lower than average graduate salary. Safe and Strong states that Victorian women now earn 87.6 cents to every dollar earned by men, and also undertake significantly more unpaid work than men.

Safe and Strong also presents the 'case for change' by discussing the costs of gender inequality, along with the benefits that gender equality can provide to the economy, to society and through reducing violence against women and girls.

By considering the consequences of gender inequality, the case for change, and interventions that have worked both in Australia and internationally, Safe and Strong presents a set of founding reforms that outlines the actions to be taken by the Victorian Government. These actions aim to lay the groundwork for improving and sustaining gender equality across Victoria. The reforms and actions cover several domains, one of which is to "address the economic dimensions of gender inequality". Within this domain, founding reform 8.3 sets out a commitment to "develop a model for valuing unpaid work and care and its impact on the Victorian economy". In order to implement reform 8.3, the Office for Women has engaged Deloitte Access Economics to assist with the development of this model.

Through this engagement, Deloitte has worked with the Office for Women and other key Victorian Government stakeholders to provide this report, along with an Excel-based model. This report outlines the current state of unpaid work and care in Victoria, its value to the Victorian economy, and identified drivers.

The Excel-based model has been designed to assist in estimating the value of unpaid work and care in Victoria for ongoing use and updating by the Office for Women going forward (the Model). The Model has estimated the quantity, unit value and economic drivers of each type of unpaid work and care occurring in Victoria. This information will enable business cases, cost benefit analyses and policy proposals to include unpaid work and care (and its contributions to the economy) as an additional consideration, going forward. This will make such analyses and cases more complete and accurate in future, particularly when it comes to considering gender inequality.

The Model will enable the Victorian Government to periodically estimate how the value of unpaid work and care can be impacted by policy, social and economic changes[1]. This will enable the Victorian Government to take an evidence-based approach to more fully understand and effectively address the economic dimensions of gender inequality.

[1] Sensitivities of the components of unpaid work and care to policy, social and economic changes are included in the Model. This enables analysis of the response of the value of unpaid work and care to changes in these factors, holding all else constant. Relationships between policy, social and economic drivers are not captured in the Model.

2 What is unpaid work and care, and why does it matter?

2.1 What is unpaid work and care?

For the purposes of the model and report, four major categories are included in the definition of unpaid work and care in Victoria. They are household or domestic work, caring for the ill disabled or elderly, caring for children, and volunteer or charity work.

Each of the four categories may be defined in several ways, and definitions of what 'counts' as unpaid work and care under each category are often quite subjective. This research has relied upon data from the Household, Income and Labour Dynamics in Australia (HILDA) survey to measure and analyse the quantity of unpaid work and care in Victoria. Therefore, the HILDA survey's definitions of unpaid work and care (displayed in Figure 2.1) have been adopted for this research.

Figure 2.1 Unpaid work and care category definitions

Household or domestic work

All housework, errands and outdoor tasks

- Housework such as preparing meals, washing dishes, cleaning house, washing clothes, ironing and sewing.
- Errands such as shopping, banking, paying bills, and keeping financial records (but not driving children to school and to other activities).
- Outdoor tasks including home maintenance (repairs, improvements, painting etc.), car maintenance or repairs and gardening.

Caring for the ill, disabled or elderly

Caring for a disabled spouse or disabled adult relative, or caring for elderly parents or parents-in-law.*

Caring for children

All care provided to your own children and to the children of others.

- Caring for your own children including playing with your children, helping them with personal care, teaching, coaching or actively supervising them, or getting them to child care, school and other activities.
- Looking after other people's children aged under 12 years.

Volunteer or charity work

Volunteer or charity work such as canteen work at the local school or unpaid work for a community club or organisation.

*While the HILDA survey only measures care provided to disabled or elderly *relatives*, this research considers care provided to all ill, disabled and elderly persons by scaling the relevant HILDA data. For further details please see Section 3.3.

2.2 Why does the value of unpaid work and care matter?

Unpaid work is a major contributor to most global economies, although it is very rarely explicitly valued or reported on, if at all. Unpaid work and care contributes significantly to economic activity, as well as to the well-being of individuals, families and societies (Stiglitz & Fitoussi, 2007).

In 2009-10, the value of unpaid work and care in Australia (excluding care for people with disabilities) was estimated to be just over $650 billion, which is equivalent to over half of Australia's entire Gross Domestic Product (GDP) at the time (Hoenig & Page, 2012).

Despite being such a large sector, there is significant gender disparity in unpaid work and care. All estimates suggest that women provide significantly more unpaid work and care than men in Australia. This also means that women spend much more time on unpaid work and care than men do (Workplace Gender Equality Agency, 2016). This disproportionate distribution of unpaid work is believed to be the largest contributor to the gender gap in workforce participation, which currently sits at over 10 percentage points in Victoria (State of Victoria, 2016).

Despite the significant contributions that unpaid work and care makes to economies and societies, it is not included in official economic measures. This omission is likely to contribute to why unpaid work and care continue to be 'undervalued' within society. Furthermore, when unpaid work and care is not reported in economic analysis, it adversely impacts the effectiveness of policies that seek to address a range of socio-economic issues, including but not limited to those related to gender inequalities (Ferrant, Pesando & Nowacka, 2014).

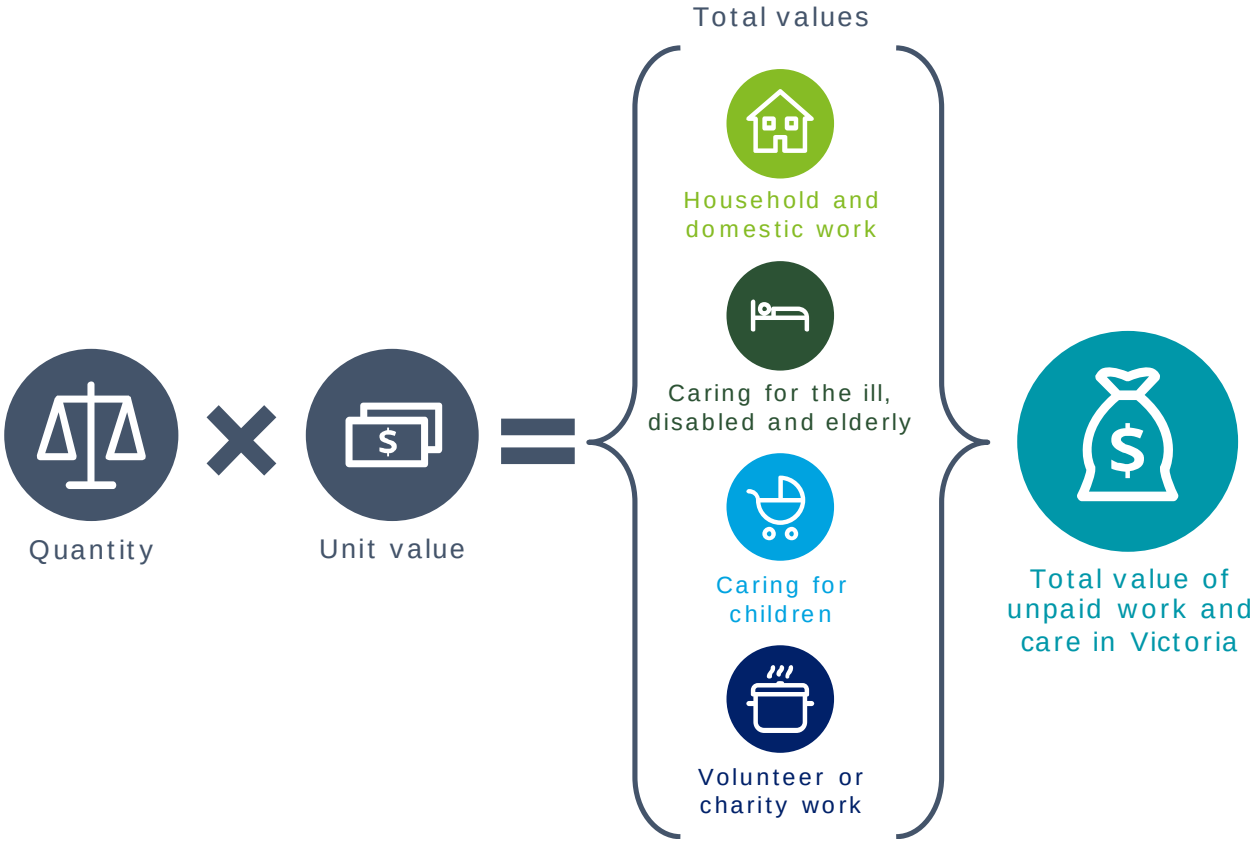
As Marilyn Waring bravely cited in the 1980s in her seminal text, Counting for Nothing, it is irrefutable that the 'invisibility, inaccuracy and damage' caused by the lack of valuation of unpaid work inhibits progress towards equality for women in society. Further to this, Paquette (2014) states that 'because national accounts are considered for the application of public policy, this bias (not including unpaid work) will exist in policymaking decisions'. As Victoria progresses towards the achievement of gender equality, it is important to recognise this bias and address it, in order to make meaningful gains on the objective of achieving gender equality.

3 Valuing unpaid work and care in Victoria

Estimating the value of unpaid work and care will help the Victorian Government more fully understand and effectively address the economic dimensions of gender inequality. This section presents the estimated value of unpaid work and care in Victoria along with its components and the estimation approach used.[2]

Any total value can be broken down into two components, quantity and unit value. Estimates of these two core components, for each of the categories of unpaid work and care, were used to build up to the total value of unpaid work and care in Victoria, as demonstrated in Figure 3.1.

Figure 3.1 Estimation framework – valuing unpaid work and care in Victoria



Source: Deloitte Access Economics

[2] This section relates to the 'current level' or 'CL' sections of the Excel Model.

3.2 Unit values

Unit values refer to the value provided by each hour of unpaid work and care i.e. dollars per hour. These unit values were multiplied by quantities (in hours per year terms) to obtain the total value of unpaid work and care for 2017-18.

In order for this research to be as holistic and practical as possible, both the replacement cost method and the opportunity cost method were used to estimate unit values of unpaid work and care. This means the research provides two alternative estimates of the value of unpaid work and care. The exception to this is the volunteer and charity work category for which only the opportunity cost was measured. The rationale for this is provided in Section 3.2.1.

3.2.1 Replacement cost method

The replacement cost method measures the cost of 'buying' an equivalent amount of care from the market i.e. the cost of a domestic cleaner or of childcare. This methodology is the most often used in the context of unpaid work and care, and is based on the assumption that unpaid and paid work are the same or of equal value if, in the absence of the unpaid contribution, a paid worker would need to be hired in to meet the need.

Occupations that could be considered as paid substitutes for each category of unpaid work and care were selected from the Australian and New Zealand Standard Classification of Occupations (ABS, 2013). Unit Group or 4-digit occupation classifications were used, as these are the most specific level of occupation for which earnings data is available. The selected occupations are listed in Table 3.1.

Volunteer and charity work

No unit value was estimated for the volunteer or charity work category under the replacement cost methodology.

This category contains a very large degree of variation in the tasks that are covered by its definition. Volunteering could include coaching a local sporting team, serving food at a school canteen, firefighting or any manner of other tasks. It is therefore not valid to align the category with a discrete set of occupations.

Instead, the opportunity cost method was used to estimate a unit value for this category. Therefore, any figures given for the total value of unpaid work and care (inclusive of all categories) under the replacement cost method, use the opportunity cost method estimate of unit values for the volunteer or charity work category.

Table 3.1 Occupations selected as potential paid substitutes for unpaid work and care categories

Category	Occupation
Household and domestic work: Housework	Cooks
	Domestic cleaners
	Housekeepers
	Laundry workers
	Other cleaners
Household and domestic work: Errands	Accounting clerks
Household and domestic work: Outdoor Tasks	Gardeners
	Car detailers
	Handypersons
Caring for the ill, disabled or elderly	Aged and disabled carers
	Nursing support and personal care workers
Caring for children	Early childhood (pre-primary school) teachers
	Child carers

The average earnings for each of the occupations listed above were used to estimate unit values for each category under the replacement cost method.

The estimated unit values under the replacement cost method for each category of unpaid work and care are presented in Figure 3.2.

Figure 3.2 Estimated unit values – replacement cost method (dollars per hour)[3]

Source: Deloitte Access Economics analysis of ABS data

*The two sub-categories of caring for children were assigned the same unit value under the replacement cost method. Hence, only the one value for the total of category is displayed.

Figure 3.2 shows that the value per hour of unpaid work and care (under the replacement cost method) is similar across categories. There are greater differences within the household and domestic work category, where housework has by far the lowest market value at $22.91 per hour. This is based on the comparatively low earnings of cooks, cleaners, housekeepers and laundry workers.

As a point of comparison, average hourly earnings for people across all occupations in Australia are $42.2.[4] Average earnings for all occupations that could be considered as paid substitutes for unpaid work and care (listed in Table 3.1), are significantly lower than the average across all Australian occupations. In particular, earnings of people in housework related occupations are almost half the $42.2 average across all occupations, while earnings in childcare occupations are around a third lower than the average.

Care-based occupations are typically dominated by women. 71.0% of people employed in community and personal service occupations are women, which includes child carers, aged and disabled carers and nursing support workers (ABS catalogue 6291). This share is even higher (79.4%) for part-time employees.

The much lower than average earnings of people in these care-based occupations (mostly women), reflects the systemic undervaluing of work that has typically been done by women, even in the paid sector. Hence, while the replacement cost method is a useful means for valuing unpaid work and care, it carries the undervaluing of paid care-based work, through to the value of unpaid work and care.

3.2.2 Opportunity cost method

The opportunity cost method measures the productivity losses associated with unpaid work and care, as time devoted to these responsibilities is time that cannot be spent otherwise in the paid workforce. This methodology is the second most commonly used in the context of unpaid work and care, and assumes that unpaid work and care, and the paid workforce are substitutable.

Average labour market earnings were used to represent the opportunity cost of unpaid work and care. Rather than assuming direct (i.e. one for one) substitution, average earnings were multiplied by participation rates, to account for varying propensities to take up paid work in the absence of unpaid work and care.

[3] The accuracy of unit value estimates is dependent on the accuracy of the underlying data. The standard errors of ABS average earnings estimates for occupations listed in Table 3.1, are approximately 7% of the point estimates, on average.
[4] Estimated using the same ABS data as that used for replacement cost estimations (detailed in Appendix A).

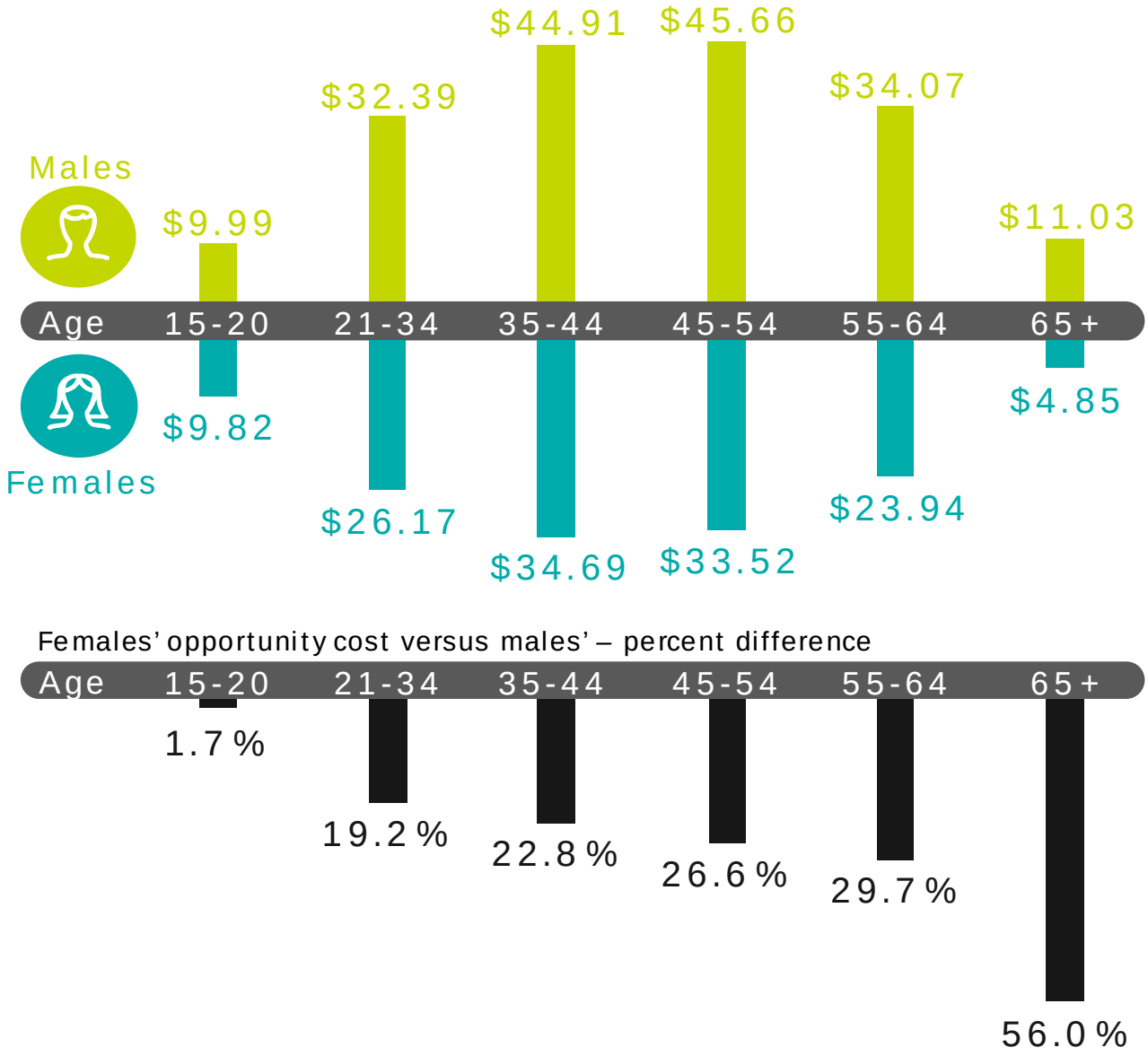
To add further depth to the analysis, under the opportunity cost method, separate unit values were estimated for the male and female genders, as well as for various age cohorts. The same unit values are applied to all categories of unpaid work and care under this method.

Use of a binary (male or female) classification of gender, limits this analysis by not recognising nor considering the circumstances of people with non-binary gender identities. Both ABS and HILDA data used for this analysis only provide gender in a binary format. Hence, this analysis and the Excel Model are restricted to using the same classification of gender.

For further details on the method and data used to estimate unit values under the opportunity cost method, please see Appendix A.

The estimated unit values under the opportunity cost method are presented in Figure 3.3.

Figure 3.3 Estimated unit values and gender gap – opportunity cost method (dollars per hour)[5]



Source: Deloitte Access Economics analysis of ABS data

[5] The accuracy of unit value estimates is dependent on the accuracy of the underlying data. The standard errors of ABS average earnings estimates for gender and age cohorts, are approximately 5% of the point estimates, on average.

Figure 3.3 shows that the opportunity cost per hour of unpaid work and care is lower for females than it is for males across all age groups. This is a consequence of both the gender pay gap and higher labour force participation by men. These two factors are heavily related, given when labour market earnings are higher, people are more likely to forgo other uses of time in favour of participating in the labour market.

The percentage gap in opportunity costs between men and women increases with age, starting below 2% for those aged 15 to 20, and reaching over 50% for persons aged 65 and over. The numbers also show that men's opportunity cost increases for longer, not declining until the 55 to 64 age group, while women's opportunity cost begins to decline during the 45 to 54 age group.

3.3 Quantities

Quantities of time-use are typically measured in terms of hours per week. This research measured time spent on each category of unpaid work and care in hours per week, then multiplied by the number of weeks per year (52) to provide estimated hours of unpaid work and care per year. Total hours spent on each category of unpaid work and care in Victoria were estimated by combining the average hours per week spent on various tasks with latest Victorian population estimates.

HILDA data were used to estimate the average hours per week spent by Victorians on each category (and sub-category) of unpaid work and care. Separate estimates of average hours were obtained for the same gender and age cohorts used in the opportunity cost method for unit value estimation. This was done so that unit value and quantities could be easily combined, as well as to add further depth to the analysis.

HILDA data is collected annually, but only data from the latest available year (2016) was used to estimate average hours spent on unpaid work and care. This was done so the estimates would be as applicable as possible to the present day. It is for the same reason that average hours were estimated in HILDA and then multiplied by latest (2018) population estimates, rather than using 2016 HILDA data to estimate total hours of unpaid work and care.

In the HILDA dataset, hours spent on unpaid work and care are only measured for persons 15 years and older. This means the estimated quantity, and subsequently the total value, of unpaid work and care in Victoria does not include unpaid work and care provided by children aged 14 and below. Given that some Australian children are required to provide unpaid work and care at home, it is likely that the results presented in this research underestimate the quantity and total value of unpaid work and care in Victoria.

In 2015, the Australian Bureau of Statistics' (ABS) Survey of Disability, Ageing and Carers found 1.3% of Australians aged 14 and below provided informal care to someone with a disability or an elderly person. It is therefore reasonable to assume that some children are also required to provide informal childcare to siblings, and contribute to housework such as cooking and cleaning. Unfortunately, the contribution of these people aged 14 and under to Victoria's unpaid work and care is not able to be captured in this research due to a lack of data.

Caring for the ill, disabled and elderly

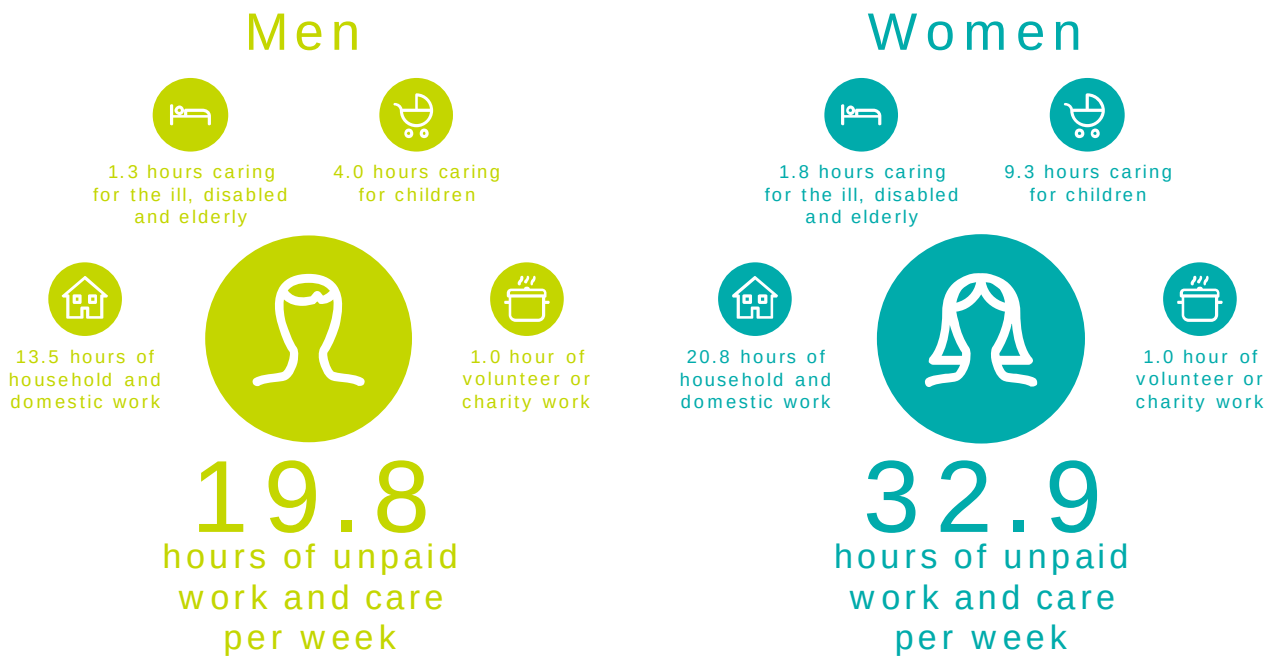
Within HILDA, the caring for the ill, disabled or elderly category is restricted to people caring for family members. This means the quantity of this category of unpaid work and care captured in HILDA does not include people caring for non-family members on an unpaid basis.

To ensure this analysis captured the entire quantity of unpaid work and care, the average hours per week spent caring for ill, disabled or elderly family members (extracted from HILDA) were scaled up using the estimated proportion of primary unpaid carers in Australia that provide care to a family member. This proportion was estimated as 96% and is sourced from the ABS Survey of Disability, Ageing and Carers.

For further details on the method and data used to estimate the quantity of unpaid work and care, please see Appendix A.

Average quantities of unpaid work and care done by men and women, respectively, are shown in Figure 3.4.

Figure 3.4 Estimated hours per week of unpaid work and care by gender



Source: Deloitte Access Economics analysis of HILDA data

On average, Victorian women do 13.1 additional hours per week of unpaid work and care than men, which adds up to 681 additional hours per year. This is a difference of approximately 85 working days (or 4 whole working months) per year of unpaid work and care[6].

While Victorian men on average do spend more time in paid employment than women, the gender difference in average hours of paid work, is around two-thirds of the difference in average hours of unpaid work (8.7 hours per week)[7]. This means that women spend 28.6 additional working days (or 1.4 additional working months) per year on unpaid and paid work combined, than men. This leaves women with significantly less time for leisure and other activities.

> Women spend an additional 4 working months' worth of time per year on unpaid work and care than men, and 1.4 additional working months on paid and unpaid work combined.

The average hours per week spent caring for children (presented in Figure 3.4) are averages for all Victorian men and women respectively, including those who do not have dependent children. For those who do have dependent children, the average time spent caring for children per week is 23.4 hours for women and 11.2 hours for men.

More detailed quantity estimates are presented in Figure 3.5 (overleaf), showing average hours per week spent on each category of unpaid work and care, split by gender and age cohorts.

[6] Assuming 8 hour working days and 5 working days per week.
[7] HILDA data were also used to measure average time spent on paid work

Figure 3.5 Estimated hours per week of unpaid work and care by gender and age cohort

Source: Deloitte Access Economics analysis of HILDA data

Household and domestic work accounts for the largest proportion of time spent on unpaid work and care across both genders and all age groups. Women on average spend several more hours per week on household and domestic tasks across all age groups with the exception of 15 to 20 year olds. Within this age group, men spend around half an hour per week more on outdoor tasks and errands respectively than women, while women spend half an hour more on housework. Men's average time spent on household and domestic work increases with age, and this holds across all three sub-categories. Women's average time spent on errands and outdoor tasks also increases steadily with age, but time spent on housework takes a slight dip after the 35 to 44 age group, before peaking in the retirement age group.

Among the younger age groups, only a very small proportion of Victorians (less than 2%) spend any time caring for the ill, disabled or elderly on a regular basis. This means average hours spent on this task capture a large number of people spending zero hours per week. Estimates of average hours spent on this task increase significantly once the 45 to 54 year old age group is reached, and more people spend time regularly caring for the ill, disabled or elderly, often parents or spouses.

Women aged 55 and older spend around two hours per week more than men of the same age caring for the ill, disabled or elderly. However, men aged 21 to 34 and 45 to 54, spend approximately half an hour

more time on this task than women of the same age. Findings presented in Section 4.3.3 suggest some of the gender gaps in time spent caring for the ill, disabled and elderly arise from differences in labour force participation rates and earnings.

Average hours spent caring for children peak in the 35 to 44 year old age group for both men and women. Women in this age cohort on average spend almost three times as many hours caring for children as men do. Time spent caring for children in total declines significantly among the older age groups, although time spent caring for the children of others increases, often as people become grandparents.

The gender gap in time spent volunteering or doing charity work is relatively smaller than in other unpaid work and care categories. In fact, among most age cohorts men on average spend slightly more time than women on volunteer or charity work. Among the younger age groups in particular, this is likely driven by men volunteering as sporting coaches for local school or community teams. Among the 35 to 44 year old age cohort, the gender gap in average hours spent on volunteer or charity work is the largest, with women doing around twice as many hours per week as men. This corresponds with the age at which many people have young children going to school. Thus the gap is likely driven by mothers volunteering at school activities or events.

3.4 The value of unpaid work and care in Victoria

To derive the total value of unpaid work and care in Victoria, the quantity and unit value components outlined above were combined, for each age and gender cohort and category of unpaid work and care respectively. This was done separately with unit values estimated using the opportunity cost method and those estimated using the replacement cost method. Thus, two total values of unpaid work and care in Victoria were estimated.

The estimated value of unpaid work and care in Victoria for 2017-18, is $206.25 billion using the replacement cost method, and $205.58 billion using the opportunity cost method.

Figure 3.6 shows that under both methods, household and domestic work accounts for more than half of the total value of unpaid work and care in Victoria, at $130.48 billion under the replacement cost method and $124.58 under the opportunity cost method. This is due to the category's similarly large share of the quantity of unpaid work and care.

Caring for children accounts for more than one quarter of the total value of unpaid work and care, at $55.00 billion (replacement cost) or $61.87 billion (opportunity cost).

Under both methods, caring for the ill, disabled and elderly is valued at more than $12.00 billion, while volunteer and charity work (only valued using the opportunity cost method) is estimated at $7.04 billion in the Victorian economy.

Why are the two values so similar?

As discussed in Section 3.2.1, average earnings for caring professions are much lower than those across all occupations on average. It is these lower than average earnings that are used, in the replacement cost method, to represent the cost of replacing an hour of unpaid work or care with an hour of equivalent paid work.

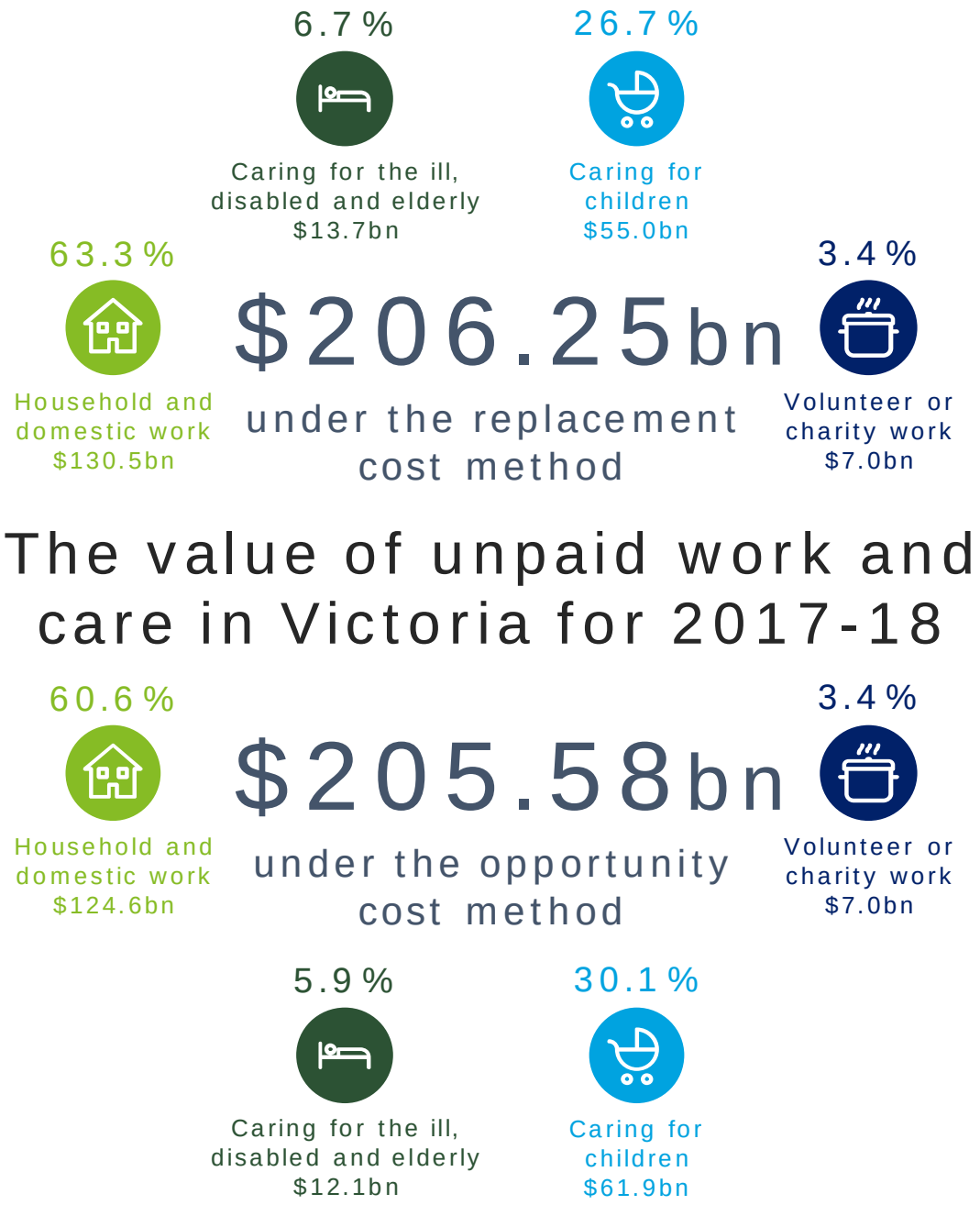
Under the opportunity cost method, average earnings from all occupations are included, and are split by age and gender. With the exception of the 15 to 20 year old age group, average earnings for each of the gender and age cohorts are all higher than the average earnings of the mostly caring-based occupations used in the replacement cost method.

Thus, while earnings under the opportunity cost method are reduced once multiplied by participation rates, they begin significantly higher, so become approximately equal to earnings under the replacement method once participation rates have been considered.

For example, unit values under the replacement cost method range from $22.91 to $34.54 per hour. Women in the middle portion of age groups (21 to 64 years old) account for around half the estimated quantity of all unpaid work and care in Victoria. The average of estimated opportunity costs among this group, is $29.58. This is very close to the average of all estimated unit values under the replacement cost method.

The $205.58 billion estimated value of unpaid work and care in Victoria (using the opportunity cost method) is equivalent to exactly 50% of Victoria's estimated Gross State Product (GSP) for 2017-18[8].

Figure 3.6 The value of unpaid work and care in Victoria[9]



Source: Deloitte Access Economics

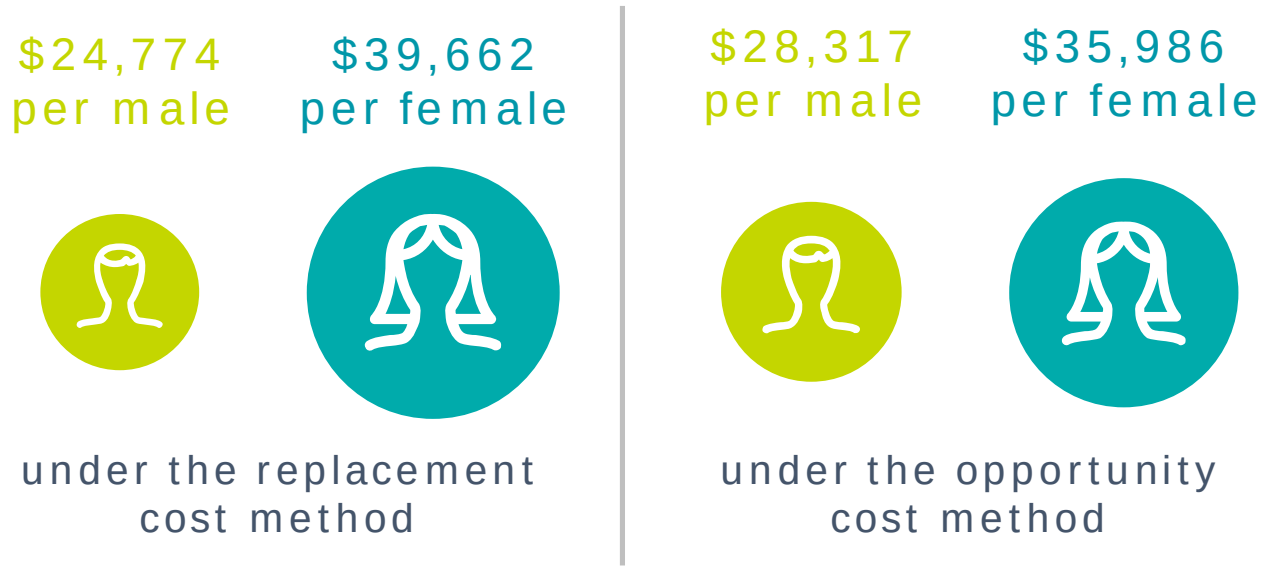
[8] GSP estimate was derived from the Victorian Government's economic outlook presented in 2018-19 Budget Paper 2.
[9] Value estimates are presented as single numbers instead of ranges for ease of use. However, all estimates are subject to error based on underlying data and methods used. A 10% change (in either direction) in unit values under both methodologies, leads to a change of around $20 billion in the total value estimates. The same difference in total value estimates results from a 10% change in quantities.

These estimates of the total value of unpaid work and care in Victoria correspond with an average value of over $32,000 per year provided by each Victorian aged 15 and older. Figure 3.7 shows that the per person value of unpaid work and care provided in Victoria, differs significantly between men and women.

Under the replacement cost method, the value of unpaid work and care provided by each Victorian woman per year, is 60.1% or $14,890 higher than that provided by each Victorian man. The unit values for each category of unpaid work and care are the same for men and women under the replacement cost method. Therefore, the difference per person total values is driven entirely by the gender difference in average hours spent on each type of unpaid work and care.

Under the opportunity cost method, the value provided per woman is 27.1% or $7,669 higher than that provided per man. The gender gap in the per capita value of unpaid work and care is significantly different between the two methods because women's opportunity cost of not participating in the paid labour force is much lower than that of men. This is driven both by women's lower labour market earnings, and by lower labour force participation rates.

Figure 3.7 Average value of unpaid work and care contributed per Victorian



Source: Deloitte Access Economics

The gender gaps in both earnings and participation rates contribute to women's propensity to spend such a higher amount of time on unpaid work and care. For example, when a heterosexual couple make a decision on who should stay home (sacrificing paid work) to look after a new baby (or spend time on other unpaid tasks), the couple consider, amongst other things, which option will be the more profitable outcome. More often than not, this results in the woman staying at home, and the man continuing participation in the labour force due to his already higher income. This in turn, becomes a self-perpetuating cycle, as women's lower participation and time diverted to vital unpaid work and care contribute to the prolonged presence of a gender pay gap. This emphasises the need for an understanding and consideration of unpaid work and care in order to effectively address the economic dimensions of gender inequality.

4 Analysing the drivers of unpaid work and care

Analysis of the economic and social drivers of unpaid work and care was used for the three key purposes displayed in Figure 4.1.

Figure 4.1 Drivers analysis - purposes

4.1 Enabling scenario analysis within the Excel Model

The Model provided to the Office for Women was designed not just to value unpaid work and care in Victoria, but also to allow analysis of the value under differences in economic and social conditions, referred to as drivers.[10]

Drivers were considered separately for unit values and quantities, allowing analyses within the Model to build-up to the total estimated value of unpaid work and care in the same way as done under the baseline value (displayed in Figure 3.1).

All impacts of drivers incorporated into the Model were estimated holding all else constant. Thus, when values of the drivers are adjusted in the Model to conduct scenario analyses, the implicit assumption is that all other drivers remain constant. This is known as a *ceteris paribus* assumption.

[10] This relates to the 'driver impacts' or 'DI' sections of the Excel Model.

4.1.1 Unit Values

The drivers of unit values are their core components; earnings and participation rates. The unit value in the opportunity cost method is driven by average earnings multiplied by participation rates for the age and gender cohort of the person providing unpaid work or care. The unit value in the replacement cost method is driven by the average earnings of those in each occupation group who would provide the unpaid work or care if those currently providing it were not able to do so.

These components were incorporated into the Model as drivers by enabling direct edits to be made when conducting scenarios. When an edit is made to earnings or participation rates under a scenario, the unit values under the relevant method recalculate within the Model and flow through to estimate a new scenario value of unpaid work and care in Victoria.

The drivers of unit values within the Model enable the following analyses:

- How would the value of unpaid work and care change, if average earnings for women were the same as those for men, ceteris paribus?
- How would the value of unpaid work and care change, if earnings inequality (across gender and/or age groups) significantly widened, ceteris paribus?
- How would the replacement value of unpaid work and care change, if the cost of outsourced childcare was higher, ceteris paribus?
- How would the replacement value of unpaid work and care change, if the cost of outsourced aged and disabled care was higher, ceteris paribus?

Given average earnings for selected occupations (listed in Table 3.1) were used to represent the cost of 'replacing' unpaid work and care with paid work, scenario edits made to these earnings may be used to represent higher or lower costs of childcare, aged and disabled care, housework etc.

Within the Model, participation rates and earnings were treated independently. For example, if the cost of outsourcing childcare is edited under a scenario, there is no automatic corresponding change in participation rates. However, direct edits may be made to both participation rates and earnings (as well as to the drivers of quantities discussed in Section 4.1.2) under the one scenario. While there are likely strong relationships between participation rates, labour market earnings and the costs of outsourcing various services, estimating these relationships and incorporating them into the Model would add significant complexity and is beyond the scope of this analysis.

While the components of unit values are treated independently of one another in the Model, their impact on the quantity of unpaid work and care is estimated and included in the Model. For further details on this please see Section 4.1.2 and Section 4.3.

4.1.2 Quantities

The drivers of quantities of unpaid work and care are split into two groups:

1. Key Drivers: The three key drivers are location, culturally and linguistically diverse status, and socioeconomic status. These were incorporated into the Excel Model as drivers of quantity, and were also used to split the estimated value of unpaid work and care in Victoria. These key drivers and their estimated impacts on the quantity of unpaid work and care are discussed in Section 4.2.
2. Other Drivers: These are variables for which relationships with quantities of unpaid work and care were estimated and incorporated into the Excel Model, but were not used to split the estimated value. These other drivers include the components of unit values, transfer payments, accessibility to childcare and demographic characteristics. The estimated impacts of these drivers on the quantity of unpaid work and care are discussed in Section 4.3.

HILDA data were used to estimate the relationships between each driver and the quantities of unpaid work and care. Separate econometric equations were estimated for each sub-category of unpaid work and care, where the dependent variable was the average hours of that type of work conducted per week.

In the case of caring for children, the two sub categories (caring for your own children and caring for the children of others) were combined, and one equation was estimated with the dependent variable being average hours spent on all unpaid child care. This is because average hours spent caring for the children of

others are very small (relative to other categories) and therefore do not provide enough variation for a viable estimation of the category on its own.

The equations were estimated at the individual level, allowing the modelling to consider differences between individuals as well as differences over time. For full details on the estimation sample, variable specifications and equation specifications, please see Appendix B.

The estimated relationships between each driver and the quantity of unpaid work and care for each category were included in the Excel Model. Hence, when a scenario edit is made to the value of a driver in the Model, the change gets multiplied by the estimated relationship and flows through to estimate a new scenario quantity (and subsequently total value) of unpaid work and care in Victoria.

4.2 Splitting unpaid work and care by key drivers

The three key drivers that were selected to analyse various splits of the quantity of unpaid work and care in Victoria are:

- Location split by greater capital city and rest of state.
- Socioeconomic status measured through the SEIFA Index of relative socio-economic advantage and disadvantage (IRSAD).
- Culturally and linguistically diverse (CALD) status.

The impacts of these three key drivers on quantities of unpaid work and care were estimated using the econometric equations described in Section 4.1.2 and Appendix B. The estimated impacts of the key drivers on quantities of each category of unpaid work and care, under a ceteris paribus assumption, are presented in the following charts. Where there is no bar on the chart for a category of unpaid work and care, it indicates the variable was not estimated to have a statistically significant relationship with quantity for that category.

Interpreting driver analysis charts

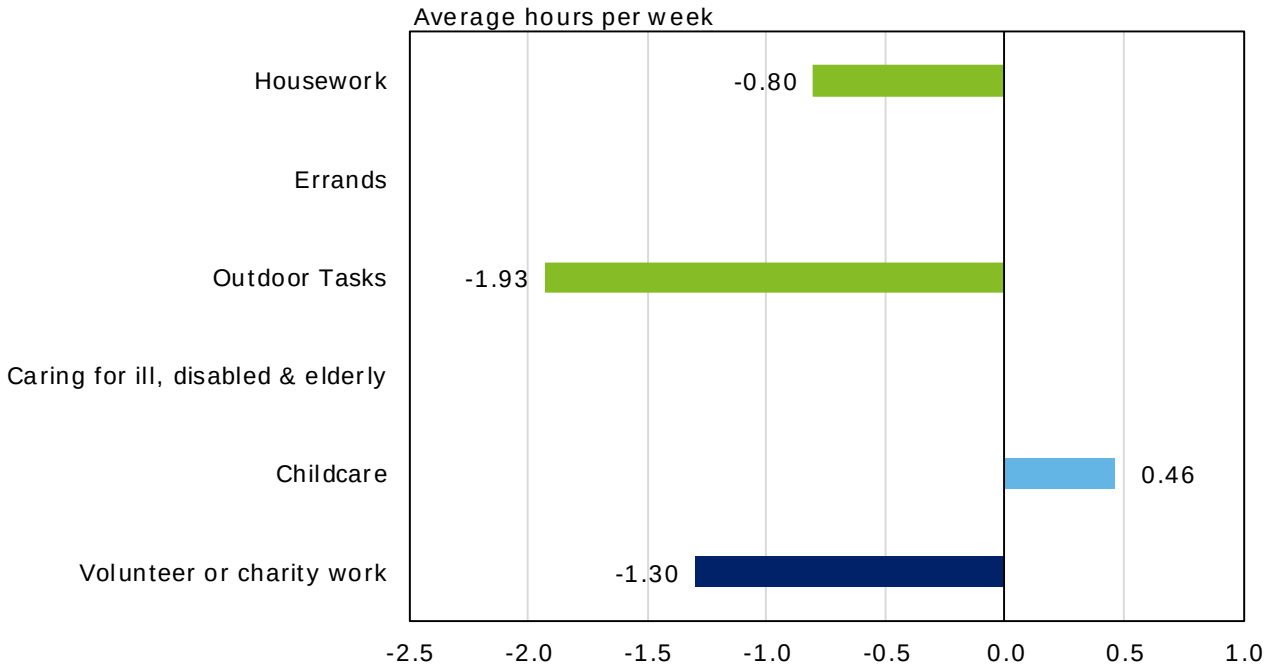
All charts in Section 4.2 and Section 4.3, present the impact of various drivers on each category of unpaid work and care.

The results are presented as the change in average hours of unpaid work and care per week, related to a specific driver.

For most drivers, the change in hours is for one group of people relative to another group of people, with both groups defined in the heading of the chart.

For continuous variables such as participation rates and earnings, the change in hours is for a one unit increase in the driver, with the relevant unit defined in the heading of the chart.

Chart 4.1 Estimated difference in quantities of unpaid work and care for people in greater capital cities, relative to people in rest of state



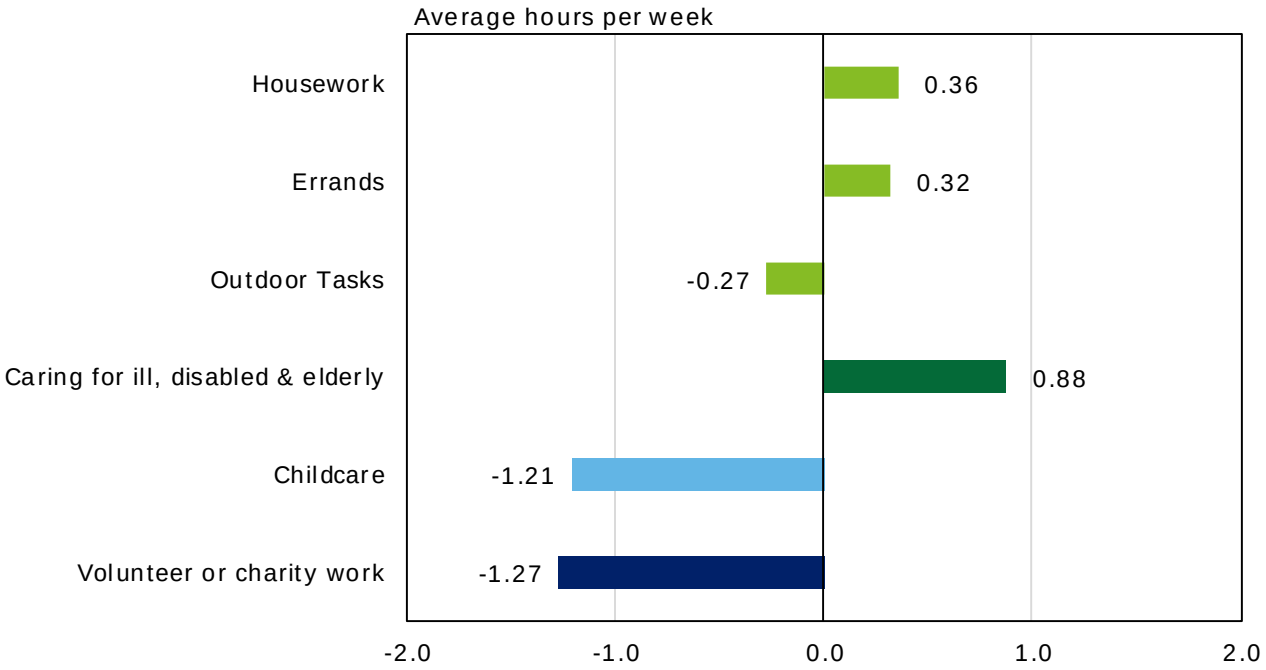
Source: Deloitte Access Economics

Chart 4.1 shows that location is significant in most categories of unpaid work and care. People living in greater capital cities are estimated to do less housework, outdoor work and volunteer or charity work than those living outside capital cities. Fewer hours spent on housework are likely due to the increased ease of outsourcing in metropolitan areas, while fewer hours spent on outdoor tasks are a result of apartments and houses in metropolitan areas having smaller (if any) garden spaces. The location-based difference in hours spent on volunteer or charity work are likely a reflection of higher engagement in local charities and community organisations among people living in rural and regional areas.

Unexpectedly, it is also estimated that people living in greater capital cities spend slightly more time on average caring for children. This likely arises because the estimations already control for labour force participation rates, which account for one of the largest differences between people living in and outside of greater capital cities. People living in Greater Melbourne have a six percentage point higher participation rate than those living in the rest of Victoria (ABS catalogue, 6291). As described in Section 4.3, labour force participation rates have a strong negative estimated relationship with average hours spent caring for children. Once the negative impact of labour force participation is controlled for, the remaining impact of living in a metropolitan location is that of slightly more time spent caring for children.

Research carried out by Deloitte Access Economics in 2015 for Carers Australia, found that informal carers of an ill, disabled or elderly person were more likely than the general Australian population to live in regional and remote locations, as opposed to major cities. However, Chart 4.1 shows that no significant relationship has been estimated between location and time spent caring for the ill, disabled or elderly. As with childcare, the explanation may lie in other drivers or control variables. For example, differences in age structures, family structures, socioeconomic status and opportunity costs are picked up by other variables in the estimation.

Chart 4.2 Estimated difference in quantities of unpaid work and care for culturally and linguistically diverse people relative to non-culturally and linguistically diverse people



Source: Deloitte Access Economics

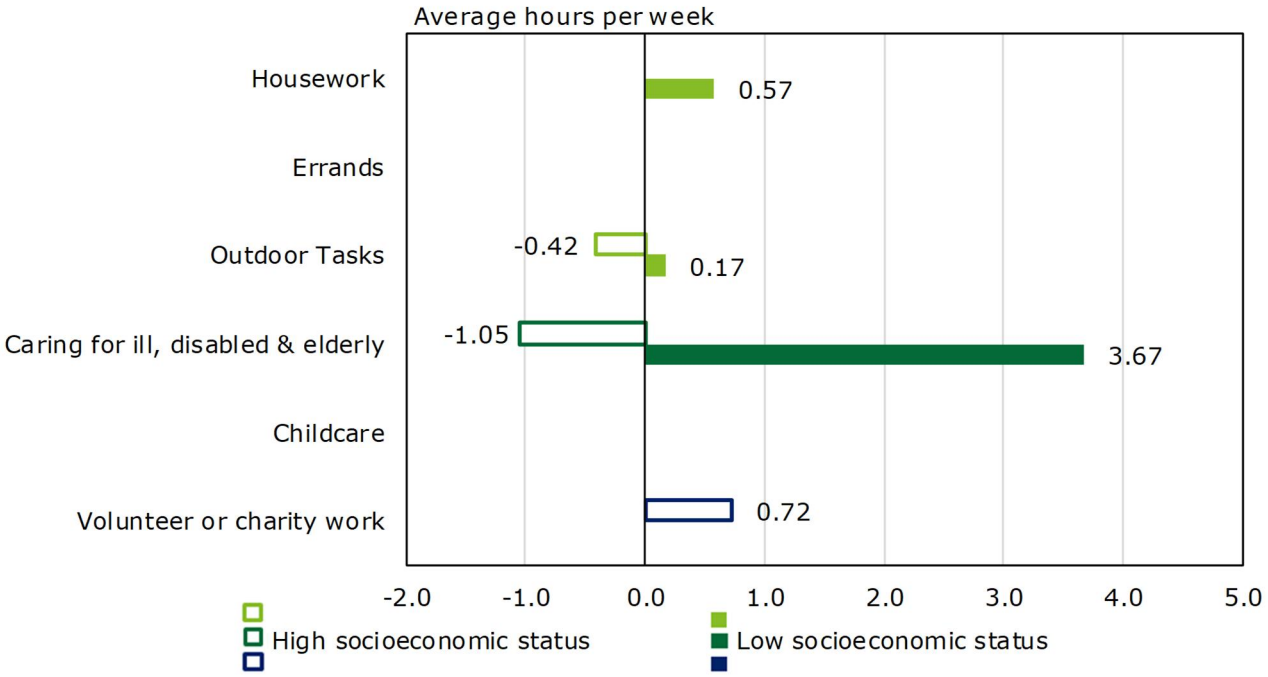
People of CALD backgrounds are estimated to spend slightly more time on housework and errands than their non-CALD equivalents. They are also estimated to spend almost one additional hour per week caring for the ill, disabled or elderly. This could reflect differences in family and household structures, cultural values and expectations of responsibilities.

It is also estimated that on average, people of CALD backgrounds spend less time on volunteer or charity work. This is an unexpected result and could potentially reflect differences in what people of various backgrounds define as volunteer and charity work.

Another unexpected result is that, on average, people of CALD backgrounds spend less time caring for children. When nothing else is controlled for, people of CALD backgrounds in fact spend more time caring for children (6.9 hours per week) than those of non-CALD backgrounds (6.5 hours per week). This means the underlying reasons for differences in time spent caring for children have been picked up by other drivers or control variables.

For example, a higher proportion of people of CALD backgrounds, relative to the rest of Victorians, are part of a couple with dependent children. As discussed in Section 4.3, people who are part of a couple with dependent children are estimated to do more hours per week of unpaid childcare than any other household/family type. Given this positive impact is already controlled for in the equation, it is not captured in CALD status. Further, people experiencing a high level of difficulty accessing childcare are estimated to spend almost four additional hours per week caring for children. Of people currently or recently accessing childcare, people of CALD backgrounds are more likely to experience a high level of difficulty finding a place at the childcare centre of choice than people with non-CALD backgrounds (23.3% versus 18.2%).

Chart 4.3 Estimated difference in quantities of unpaid work and care for high and low socioeconomic status relative to medium socioeconomic status



Source: Deloitte Access Economics

Socioeconomic status is estimated to have a significant relationship with quantities for some categories of unpaid work and care. The only category for which socioeconomic status is estimated to have an impact of greater than one hour per week, is caring for the ill, disabled and elderly. Persons of low socioeconomic status are estimated to do almost four more hours per week of caring for the ill, disabled or elderly than persons of medium socioeconomic status. Further, people in the 'high' socioeconomic status group are estimated to do one less hour of caring for the ill, disabled or elderly than those in the medium group.

These estimates suggest that people of lower socioeconomic status face more barriers to outsourcing care for the ill, disabled or elderly. This aligns with the finding presented in Figure 3.2 that, of the four categories of unpaid work and care, the replacement cost per hour is highest for caring for the ill, disabled or elderly. Therefore, time spent caring for the ill, disabled or elderly (on an unpaid basis) is most likely to be affected by a person's socioeconomic status.

The results also show that, as expected, people of lower socioeconomic status spend relatively more hours per week doing their own housework and outdoor tasks (rather than outsourcing them), and people of higher socioeconomic status spend relatively more hours per week doing charity and volunteer work.

4.3 Understanding how economic and social conditions affect unpaid work and care

Along with the three key drivers discussed above, the impacts of other relevant drivers on quantities of unpaid work and care were estimated using the econometric equations described in Section 4.1.2 and Appendix B. These drivers comprise the components of unit values, receipt of relevant transfer payments, accessibility of childcare and demographic characteristics such as age, gender and relationship within household.

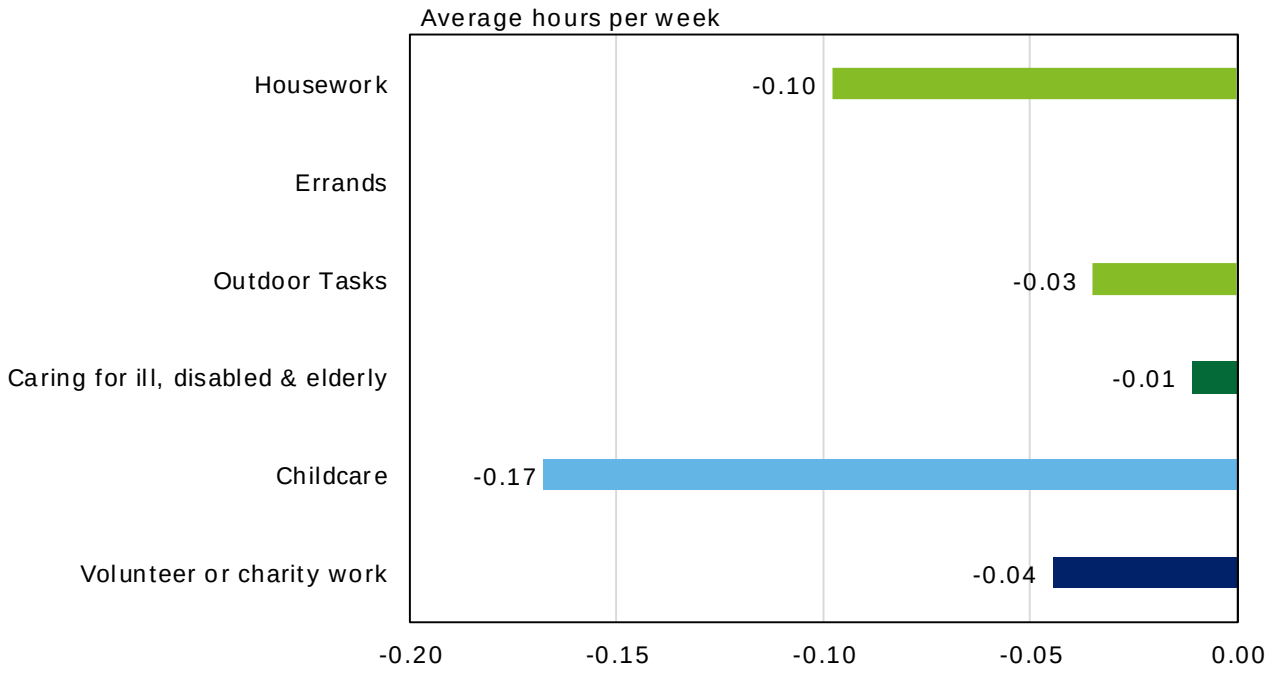
For reasons described in Appendix B, the estimations also controlled for State and Territory of residence and year of the HILDA survey (from 2002 to 2016). Therefore, the impacts of State and Territory and time on quantities of unpaid work and care have also been estimated.

4.3.1 Unit values

As explained in Section 3.2, two methods were used to estimate the unit values of unpaid work and care. The opportunity cost method multiplies average earnings for each gender and age cohort by labour force participation rates for that cohort, representing potential earnings if time was not devoted to unpaid work and care responsibilities. The replacement cost method uses average earnings for occupations that could be considered as paid substitutes for each category of unpaid work and care, to represent the cost of buying an equivalent amount of care from the market.

The following charts present the estimated impacts of these components of unit values on quantities of each category of unpaid work and care, under a ceteris paribus assumption.

Chart 4.4 Estimated difference in quantities of unpaid work and care for a one percentage point higher participation rate in each age and gender cohort



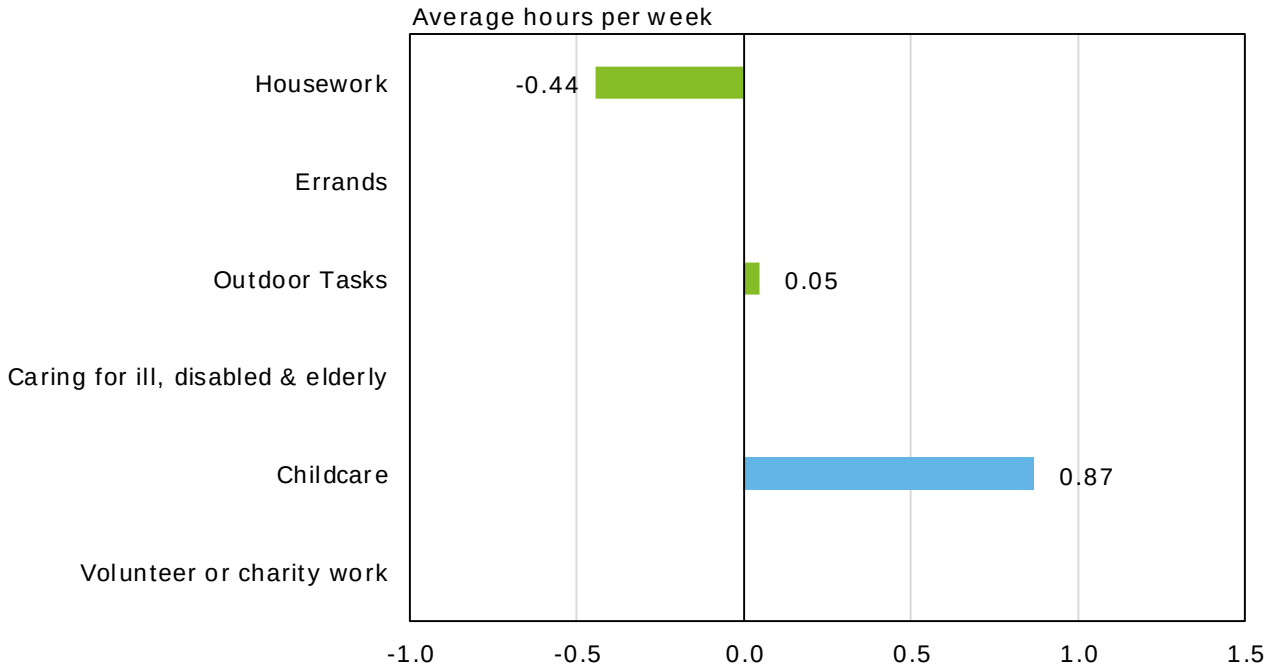
Source: Deloitte Access Economics

Chart 4.4 shows that labour force participation rates for a person's age and gender cohort are negatively related to average hours spent on all categories of unpaid work and care. The exception is the category of errands, for which no significant relationship with participation rates was estimated. Average hours spent caring for the ill, disabled or elderly appear to be significantly less sensitive to participation rates than hours spent on most other categories. This is likely a reflection of there being a large proportion of Victorians who do not spend any time on this task on a regular basis.

The estimates indicate that when participation rates are lower, people spend more time on outdoor tasks and volunteer or charity work. Understandably, the category that has the largest negative relationship with participation rates is childcare. People (particularly women) often sacrifice participating in the labour force in order to care for a child or children.

Spending a significant proportion of time caring for children often brings with it increased time spent on housework such as cooking and cleaning. This helps explain the negative relationship estimated between participation rates and time spent on housework, along with the fact that the more hours are spent participating in the paid workforce, the fewer hours are available for unpaid housework.

Chart 4.5 Estimated difference in quantities of unpaid work and care for one dollar higher hourly earnings in each age and gender cohort

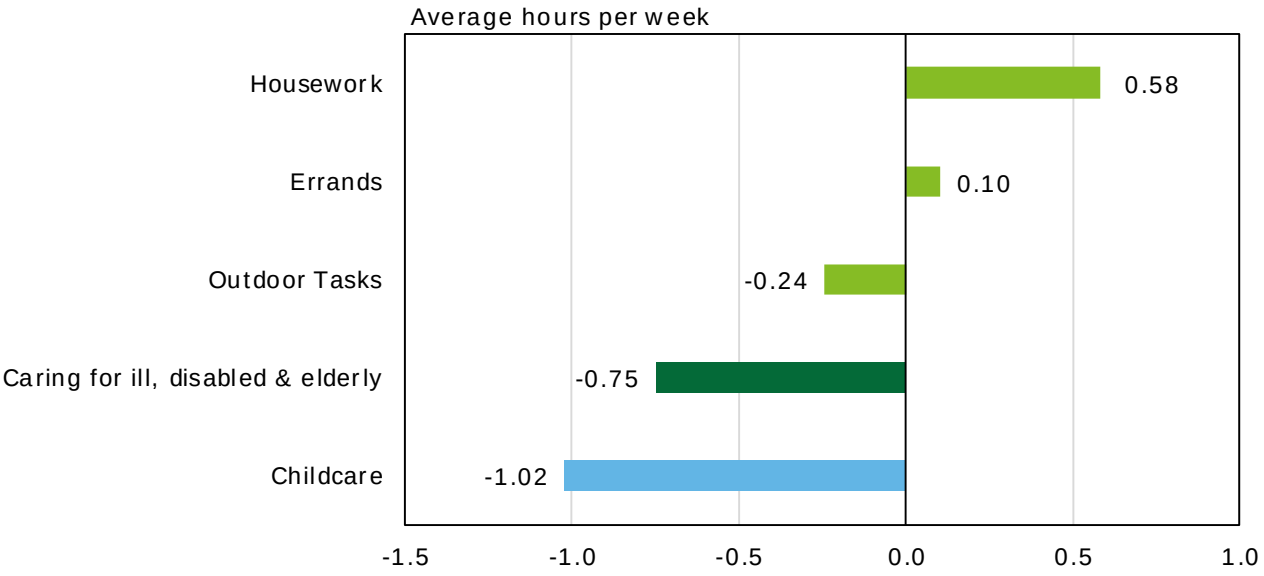


Source: Deloitte Access Economics

Intuitively, it is expected that when labour force earnings for a particular age and gender cohort increase, the hours of unpaid work done by that cohort decrease as more people opt to participate in the paid labour market. However, the impact of labour force participation has already been accounted for through the inclusion of participation rates. Therefore, the estimated impacts of earnings on hours of unpaid work and care (displayed in Chart 4.5) should be interpreted holding participation rates constant but, for those participating, hours worked in the paid workforce may vary as earnings change.

The estimates shown in Chart 4.5 suggest earnings have no significant impact on quantity for most categories, a negative impact on hours spent on housework, and a positive impact on hours spent on childcare. One potential explanation for the housework category is that as people earn more, they outsource more of their housework. Further, as people earn more they may also decide they can afford to spend more time with their children and fewer hours at work.

Chart 4.6 Estimated difference in quantities of unpaid work and care for a one dollar higher hourly earnings in selected (replacement) occupations



Source: Deloitte Access Economics

When the cost of a service increases, demand for that service typically falls. In cases where 'doing it yourself' is possible, higher market prices often lead to a decline in outsourcing, and an increase in people providing the service themselves. Given that average earnings in selected occupations (discussed in Section 3.2.1) represent the replacement cost of each category of unpaid work and care, it is expected that increases in these earnings would lead to a decline in the outsourcing of unpaid work and care. This would be reflected in people spending more time on unpaid work and care themselves.

However, as demonstrated in Chart 4.6, this relationship has only been found to hold for the housework and errands categories. The estimates for outdoor tasks, caring for the ill, disabled and elderly, and childcare categories are counterintuitive. They suggest that as the cost of replacement increases, people spend fewer hours on those tasks themselves. These unexpected results may reflect other factors, such as growing Victorian preferences to outsource yard work and caring despite higher costs.

Providing care to children and to people who are ill, disabled or elderly is a necessity. However, cost of living pressures also mean that most people cannot simply drop out of the paid workforce, or dramatically reduce their working hours in response to fluctuations in the cost of outsourcing care services. Even when the cost of care services increases, the need for those services remain. This may explain why negative relationships have been estimated between replacement costs and quantities of unpaid work and care for the childcare and caring for the ill, disabled or elderly categories.

4.3.2 Transfer payments and access to childcare

HILDA data record whether or not survey respondents receive various Government transfer payments. Receipt of transfer payments that are directly relevant to categories of unpaid work and care, were included in the estimations as drivers of time spent on the relevant category:

- The impact of receiving Carer Allowance and/or Carer Payment was estimated for the caring for the ill, disabled or elderly category.
- The impact of receiving Parenting Payment was estimated for the caring for children category.

Estimation results indicate that recipients of Carer Allowance and/or Carer Payment spend 25.3 more unpaid hours per week caring for the ill, disabled or elderly on average, compared to those who receive neither of the transfers. This is equivalent to more than three standard working days worth of time per week. Recipients of Parenting Payment are estimated to do an average of 10.9 more hours of unpaid childcare per week than persons not receiving the transfer.

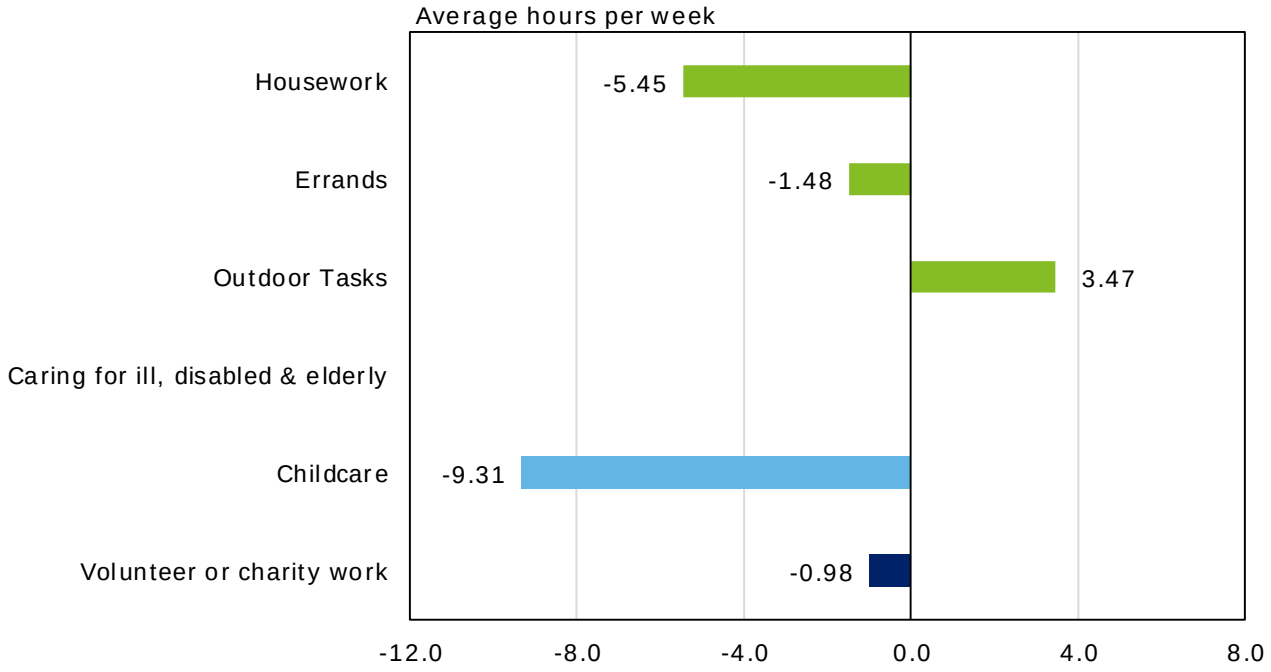
The HILDA survey also asked respondents the level of difficulty they experienced finding a place at the childcare centre of choice. This information was used to split people into three categories; people who do not require access to childcare, people experiencing a low to medium level of difficulty accessing childcare, and people experiencing a high level of difficulty accessing childcare. These categories were included as drivers of quantity for the childcare category.

The results showed that people experiencing a high degree of difficulty finding a place at the childcare centre of choice, spend 3.9 more hours on average caring for children than people experiencing a low to medium level of difficulty. It was also estimated that people who do not require access to childcare spend an average of 9.5 fewer hours caring for children than those in the low to medium level of difficulty category.

4.3.3 Demographic characteristics

The uneven split in the value of unpaid work and care by gender is presented and discussed in Section 3.4. The following chart presents the estimated gender difference in quantities of unpaid work, holding all else constant.

Chart 4.7 Estimated difference in quantities of unpaid work and care for men relative to women

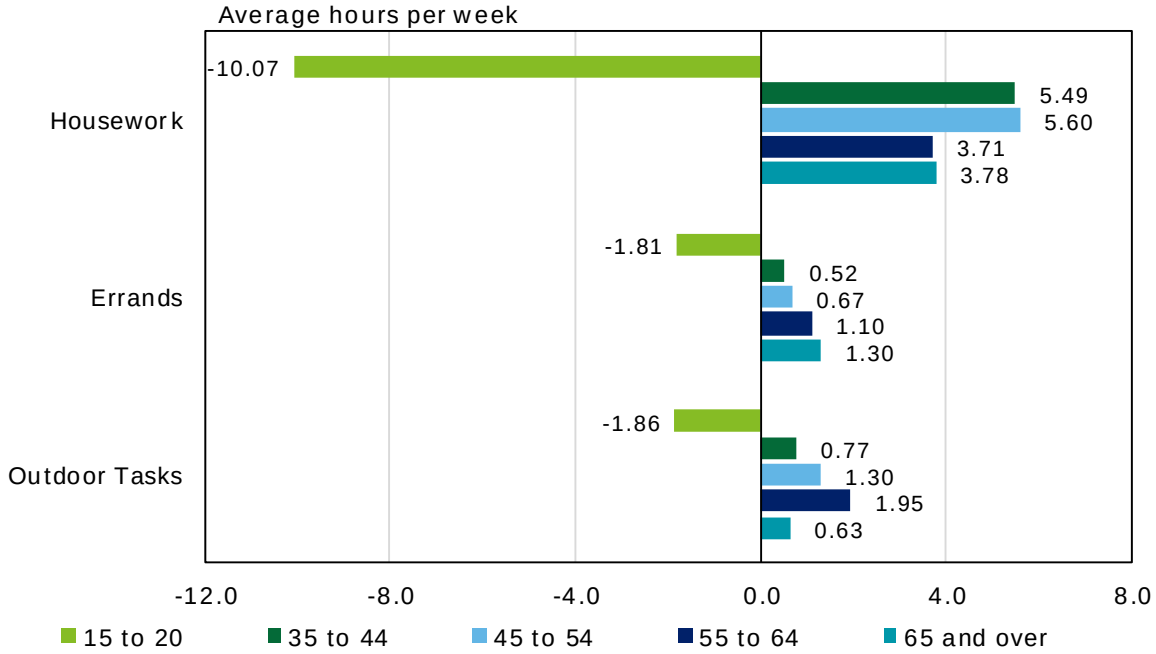


Source: Deloitte Access Economics

Chart 4.7 shows that men are estimated to do fewer hours of most types of unpaid work and care than women. The exceptions are caring for the ill, disabled and elderly and outdoor tasks. Once other drivers including participation rates and labour market earnings for a person's age and gender cohort are controlled for, gender is not estimated to have a significant impact on time spent caring for the ill, disabled or elderly. Outdoor tasks is the only category of unpaid work and care where men spend more time than women (3.47 hours per week). With respect to the other categories, women spend 17.22 more hours per week than men on unpaid work and care, holding all else constant.

Large differences in average hours spent by men and women are estimated for the housework and childcare categories, with men doing substantially fewer hours than women, on average. This is particularly significant given the impacts of participation rates and earnings have already been taken into account. Even after controlling for the large gender gap in the opportunity cost of doing unpaid work and care, there is still a large difference in time spent by men and women on housework and childcare. This is assumed to reflect current social norms.

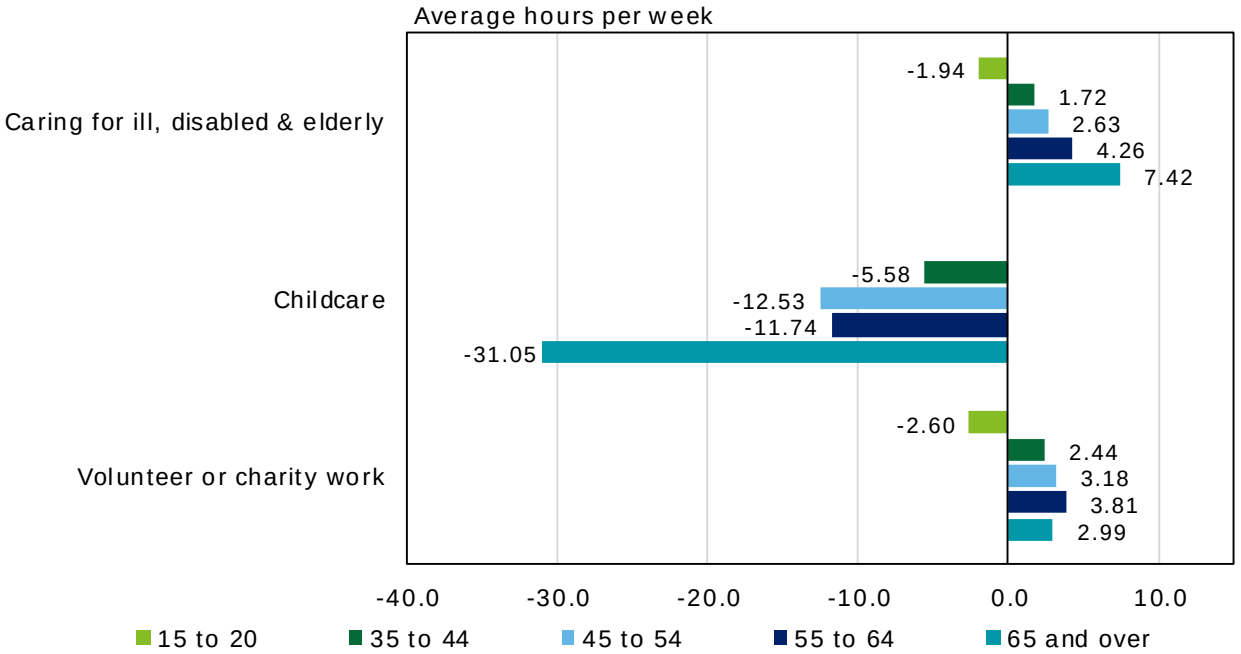
Chart 4.8 Estimated difference in quantities of unpaid work and care for age cohorts relative to 21 to 34 year olds, household and domestic work categories



Source: Deloitte Access Economics

Chart 4.8 and Chart 4.9 show that age has an estimated impact on quantities of unpaid work and care across all categories. All age categories are compared to the 21 to 34 year old age group. Estimated differences in time spent on unpaid work and care due to age, are particularly large for housework. 15 to 20 year olds are estimated to spend 10.07 fewer hours per week on housework than 21 to 34 year olds. People in the 35 to 44 and 45 to 54 age cohorts are estimated to spend more time on housework than any other age cohort.

Chart 4.9 Estimated difference in quantities of unpaid work and care for age cohorts relative to 21 to 34 year olds, caring and volunteer categories

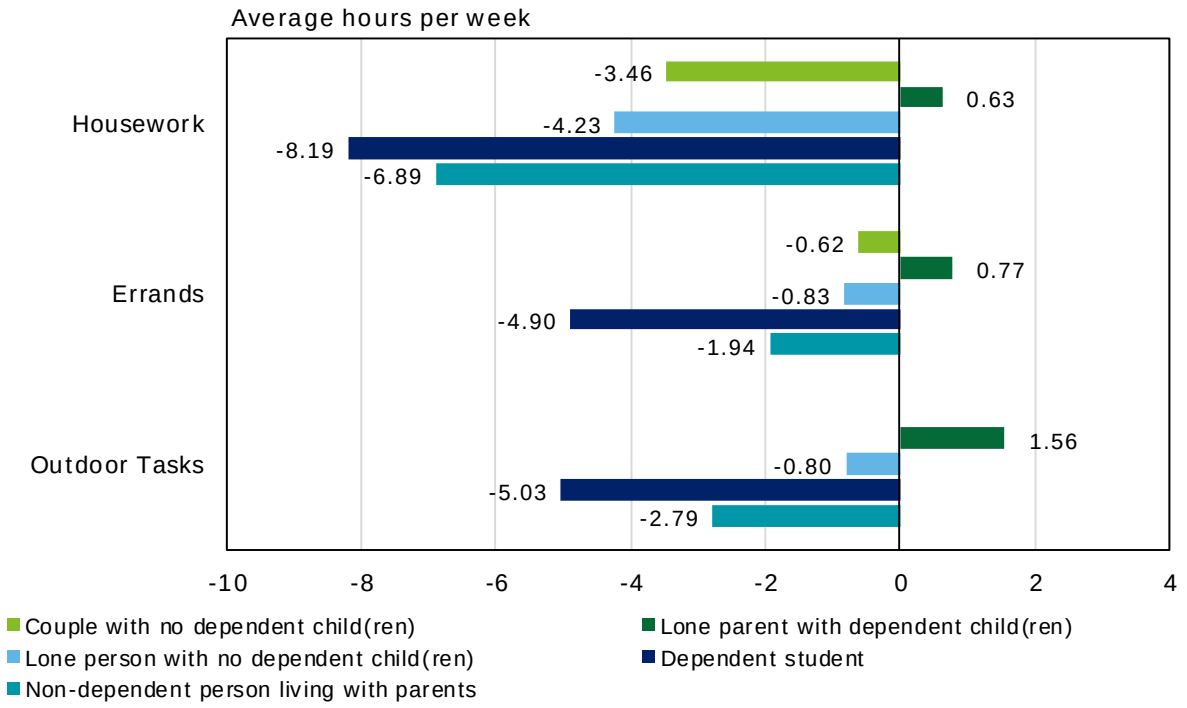


Source: Deloitte Access Economics

The only category for which the estimated impacts of age on average hours per week are larger than for housework, is caring for children. There is no significant difference estimated in time spent caring for children between 15 to 20 year olds and 21 to 34 year olds. However, average time spent caring for children then decreases significantly in the 35 to 44 and 45 to 54 age groups, followed by a slight lessening of the negative difference in average hours in the 55 to 64 age group, which is attributable to 55 to 64 year olds spending relatively more time regularly caring for the children of others (potentially their grandchildren).

Across all categories except for childcare, people in the 15 to 20 year old age group are estimated to spend less time on unpaid work and care than those in all other age groups. People aged 65 and over are estimated to spend 7.42 hours per week more on average, caring for the ill, disabled and elderly than people aged 21 to 34. This gap larger than for any other age cohort in that category, and is equivalent to almost a full standard working day's worth of time per week.

Chart 4.10 Estimated difference in quantities of unpaid work and care for type of relationship within household relative to couple with dependent child(ren), household and domestic work categories

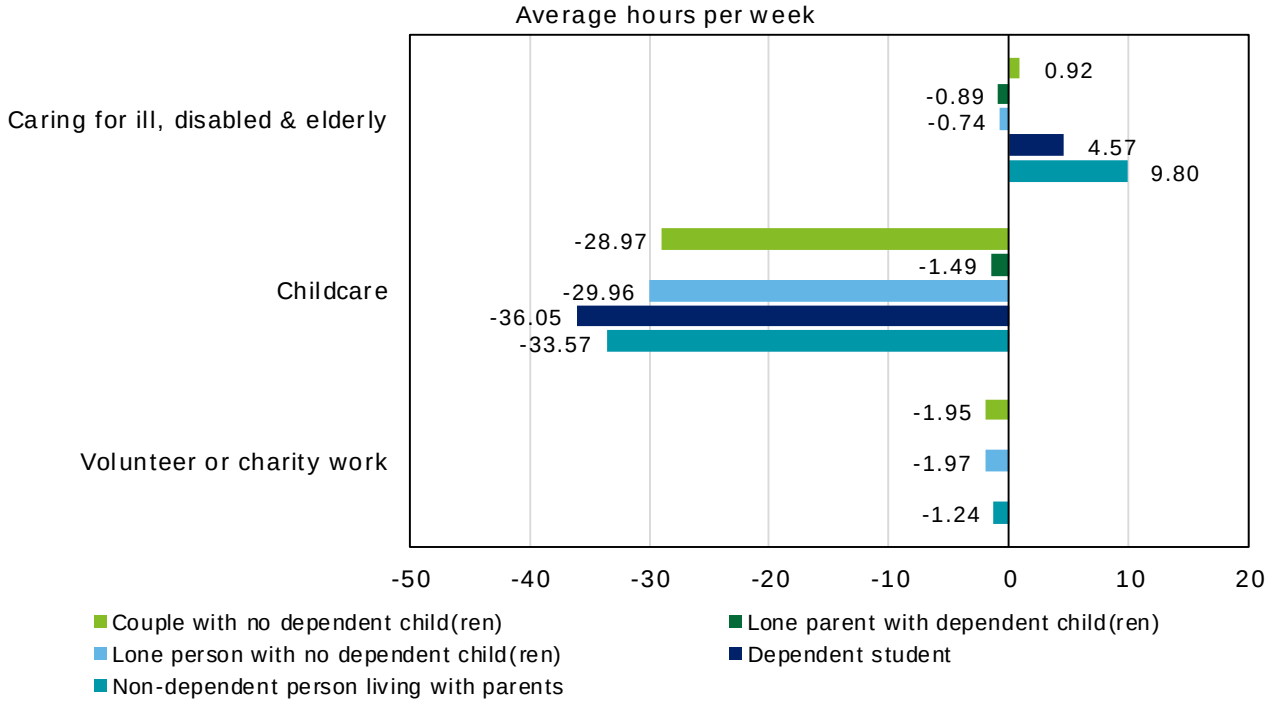


Source: Deloitte Access Economics

Chart 4.10 shows that a person's relationship within a household has a significant impact on the average hours they spend on all household and domestic work categories. Each type of relationship within a household is compared to someone who is part of a couple with at least one dependent child. Only one type of person is estimated to spend more hours per week on each type of household and domestic work than couples with dependent children, and that is lone parents with dependent children. This indicates that while time spent or housework, errands and outdoor tasks may not be evenly split between a couple, there is at least some sharing of tasks and economies of scale occurring. Given that lone parents do not have a partner with which to share household and domestic work responsibilities, they must spend more time on average on these tasks themselves.

All people without dependent children are estimated to spend significantly less time on housework, errands and outdoor tasks than both couples and lone parents with dependent children. The least hours are invested by dependent students, followed by non-dependent persons living with their parents. Note that non-dependent persons are those aged 15 and older who are not full time students.

Chart 4.11 Estimated difference in quantities of unpaid work and care for type of relationship within household relative to couple with dependent child(ren), caring and volunteer categories



Source: Deloitte Access Economics

Chart 4.11 shows that both couples and lone parents with dependent children spend around 30 hours per week more time caring for children than people without dependent children. Lone parents are estimated to spend marginally less time caring for children than couple parents. This may reflect a need to spend slightly more time in paid work.

Dependent students and particularly non-dependent people living with their parents, are estimated to spend the largest amount of time per week caring for the ill, disabled or elderly. This suggests that a large proportion of people providing care to the ill, disabled or elderly, are providing it to a parent.

4.3.4 States and Territories

Controlling for State or Territory of residence in the quantity equations, revealed some differences in time spent on unpaid work and care between people living in different States and Territories, holding all else constant.

The largest differences were estimated for time spent caring for the ill, disabled or elderly, while average hours spent on errands and caring for children are relatively similar across States and Territories.

The estimated differences between States and Territories may be explained by weather, local preferences and cultural factors.

Figure 4.2 Estimated difference in quantities of unpaid work and care for States and Territories relative to Victoria, average hours per week

	Housework	Errands	Outdoor Tasks	Caring for ill, disabled & elderly	Childcare	Volunteer or charity work
New South Wales		0.15	-0.35			-1.00
Queensland	0.33			2.07		-1.42
South Australia		-0.27	0.30	-1.21	-0.97	
Western Australia	0.40		0.68	0.65		-1.04
Tasmania				2.02		-1.59
Northern Territory	-1.23			-4.07		
Australian Capital Territory				-0.72		

No statistically significant difference	Higher average hours than Victoria	Lower average hours than Victoria

Source: Deloitte Access Economics

4.3.5 Time effects

Data from 2002 to 2016 were used to estimate the impacts of drivers on quantities of unpaid work and care. Variables controlling for each year of data were included in the estimations to capture any significant changes over time in quantities of unpaid work and care, not captured by any of the included drivers.

No statistically significant relationships between time (over the 2002 to 2016 period) and quantity of unpaid work and care were estimated for housework and caring for children. This suggests that all factors causing major differences in time spent on these tasks have already been captured by other variables included in the estimations.

The estimation for average hours spent on volunteer or charity work indicates some differences have occurred over time. In particular, it was estimated than in 2006 and 2010, people spent around 1 additional hour per week on volunteer or charity work, compared with 2016.

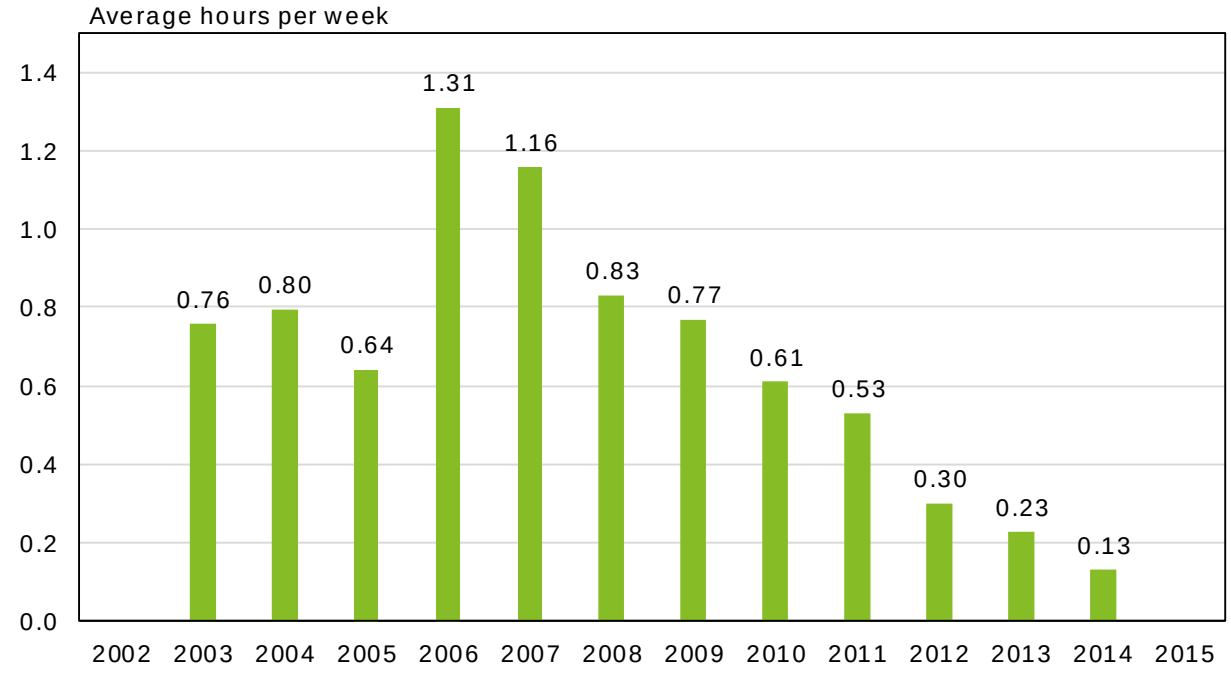
For outdoor tasks, estimates show that between 2002 and 2005, people spent around 1 less hour per week than in 2016.

The only consistent differences in quantities over time, not captured by the other included variables, occurred in the estimates for errands and caring for the ill disabled or elderly. These estimates are presented in Chart 4.12 and Chart 4.13 respectively.

Chart 4.12 indicates average time spent on errands has steadily declined since 2006, when quantity peaked at 1.31 hours higher than in 2016 on average. This is probably linked to the rise of online shopping along with an increased ability to complete tasks such as paying bills online.

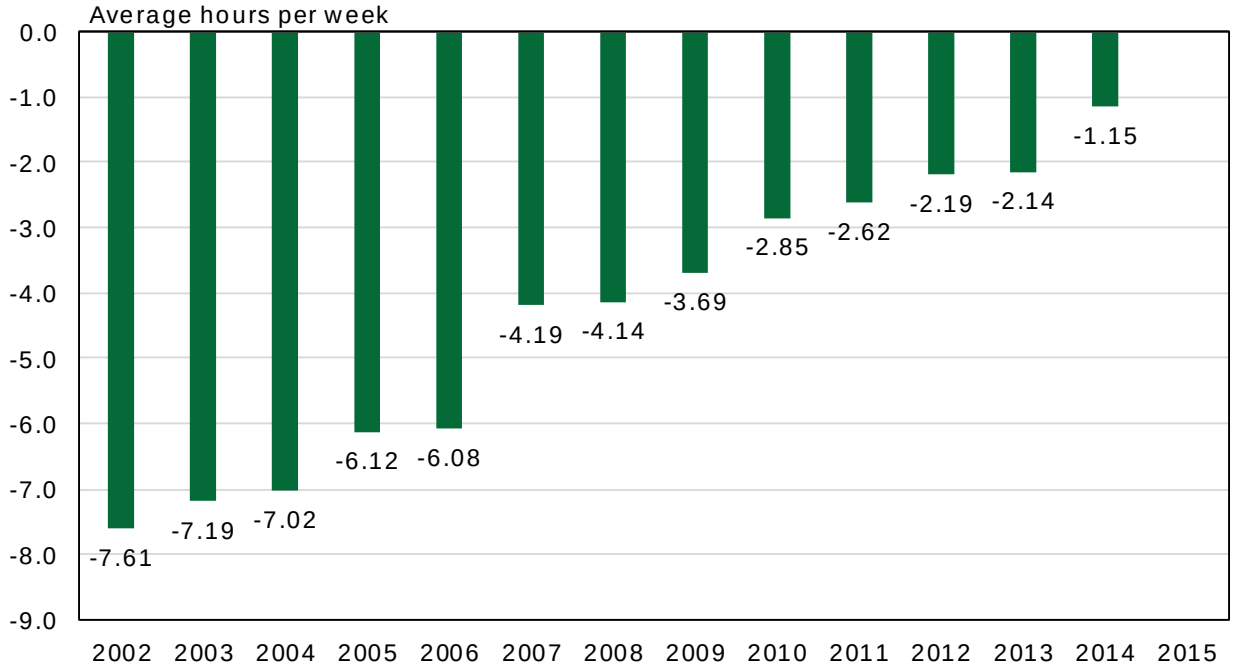
Chart 4.13 demonstrates the opposite has occurred for caring for the ill, disabled or elderly. Since the beginning of the estimation period (2002) average time spent caring for the ill disabled or elderly is estimated to have increased by almost 8 hours per week (up to 2016). This is likely a consequence of Australia's ageing population.

Chart 4.12 Estimated difference in hours spent on errands over time relative to 2016



Source: Deloitte Access Economics

Chart 4.13 Estimated difference in hours spent caring for the ill, disabled and elderly over time relative to 2016



Source: Deloitte Access Economics

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Appendix A Methodology details: Valuing unpaid work and care

This appendix provides further details of the data and methodology described in Section 3, used to estimate the value of unpaid work and care.

A.1. Unit values

Both the replacement and opportunity cost methodologies rely on detailed earnings data. Publically available earnings data at the level of detail needed (for both methodologies) is only available every two years and in weekly earnings terms, from ABS catalogue 6306.0.

To transform weekly earnings into hourly earnings (to align with the units of quantity data), weekly earnings were divided by 'average hours per week paid for'. For the opportunity cost method (using earnings by gender and age) the transformation from weekly to hourly earnings was straightforward since average hours paid for data is available for each required gender and age cohort. For the replacement cost method (using earnings by 4-digit occupation), hours paid for data is only available at the 1-digit occupation level. An assumption that average hours worked are the same across all 4-digit occupations that fall within each 1-digit occupation was required to transform weekly earnings by 4-digit occupation into hourly earnings.

The latest release of detailed earnings (and hours paid for) data is for May 2016. More frequently released (every 6-months) aggregate earnings data from ABS catalogue 6302.0 was used to scale the detailed earnings data, bringing earnings closer to 'present day' figures. The rate of growth in aggregate earnings between May 2016 and May 2018 was derived, then applied to detailed earnings data to escalate them into May 2018 terms.

The precise data sources used to estimate the unit values of unpaid work and care, under both the replacement cost and opportunity cost methodologies, are described in Table A.1. Further details regarding the methodologies for the replacement cost and opportunity cost estimations are provided in Section A.1.1 and Section A.1.2 respectively.

Table A.1 Data sources and uses – unit value estimation

Data description	Source	Use
Average weekly total cash earnings by 4-digit ANZSCO occupation, Australia	ABS 6303 Data Cube 11, May 2016	Average earnings for the occupations listed in Table 3.1 were used to estimate unit values under the replacement cost method.
Average weekly total cash earnings by age and gender, Australia	ABS 6303 Data Cube 1, Table 2, May 2016	Average earnings for age and gender cohorts were used for the earnings component of unit values under the opportunity cost method.
Average weekly total hours paid for by 1-digit ANZSCO occupation, Australia	ABS 6303 Data Cube 4, Table 5, May 2016	Average hours paid for by 1-digit occupation were used to transform weekly earnings for occupations listed in Table 3.1 into earnings per hour, as at May 2016.
Average weekly total hours paid for by age and gender, Australia	ABS 6303 Data Cube 4, Table 2, May 2016	Average hours paid for by age and gender were used to transform weekly earnings for age and gender cohorts into earnings per hour, as at May 2016.
Aggregate average weekly earnings, Victoria	ABS 6302 Data Cube 16, May 2018	Growth in total average earnings for Victoria between May 2016 and May 2018 was multiplied by detailed hourly earnings as at May 2016, escalating the data to May 2018.
Labour force participation rates by age and gender, Victoria	ABS 6202, GM-1, July 2018	Labour force participation rates by age and gender were multiplied by average hourly earnings (escalated to 2018 terms) for corresponding cohorts to estimate unit values under the opportunity cost method.

A.1.1. Replacement cost method

Earnings at the 4-digit occupation level, for occupations listed in Table 3.1, were used to construct the replacement cost for each unpaid work and care category. Separate replacement costs were not estimated for 'caring for your own children' and 'caring for the children of others' as these is no rationale to suggest these are distinct services. The same replacement cost was applied to both sub categories.

For each category of unpaid work and care except errands, two or more occupations were used to construct replacement costs. A standard average (rather than a weighted average) of the wages for each relevant occupation was used to get the replacement unit cost for each category. Using a non-weighted average assumes that each 4-digit occupation would be hired in equal quantity to replace the relevant category of unpaid work and care (e.g. replacing unpaid child care would be done with 50% child carers and 50% early childhood teachers). A non-weighted average was used as there was no information, nor data, to suggest that providing each occupation with an equal weighting was not appropriate.

However, a weighted average was used to derive the replacement method unit cost for the total household & domestic work category. The weighting was based on the respective number of hours per week spent on each of the three sub-categories by the total Victorian population.

The following equation describes the calculation used to estimate unit values under the replacement cost method:

$$Unit\ Replacement\ Cost\ = \boldsymbol{Hourly\ Earnings}_{\left(\substack{Per\ 4-digit \\ Occupation}\right)}\ x\ \boldsymbol{Escalation}$$

$$= \frac{Detailed\ Weekly\ Earnings\ (May\ 2016)}{Weekly\ Total\ Hours\ Paid\ For\ (May\ 2016)}\ x\ \frac{Avg.\ Weekly\ Earnings\ (May\ 2018)}{Avg.\ Weekly\ Earnings\ (May\ 2016)}$$

A.1.2. Opportunity cost method

Earnings data split by gender and age were multiplied by participation rates for the same age and gender cohorts to estimate the opportunity cost of unpaid work and care. The same opportunity cost estimates were applied to all categories of unpaid work and care.

The data used dictated the following age cohorts for unit values under the opportunity cost method:

- 15 to 20
- 21 to 34
- 35 to 44
- 45 to 54
- 55 to 64
- 65 and over

Note that earnings data actually groups together the last two age categories i.e. stops at 55 and over. Therefore, the same earnings figures were applied to the '55 to 64' and '65 and over' age groups, but were multiplied by separate participation rates given the participation rate dramatically changes once retirement age is reached.

The following equation describes the calculation used to estimate unit values under the opportunity cost method:

$$Unit\ Opp.Cost\ = \boldsymbol{Hourly\ Earnings}_{\left(\substack{Per\ age\ / \\ gender\ split}\right)}\ x\ \boldsymbol{Escalation}\ x\ \boldsymbol{Participation\ Rates}_{\left(\substack{Per\ age\ / \\ gender\ split}\right)}$$

$$= \frac{Detailed\ Weekly\ Earnings\ (May\ 2016)}{Weekly\ Total\ Hours\ Paid\ For\ (May\ 2016)}\ x\ \frac{Avg.Weekly\ Earnings\ (May\ 2018)}{Avg.Weekly\ Earnings\ (May\ 2016)}\ x\ Participation\ Rate$$

$$Participation\ Rate\ = \frac{Employed\ full-time + \text{Employed part-time} + Unemployed}{Employed\ full-time + \text{Employed part-time} + Unemployed + Not\ in\ Labour\ Force}$$

A.2. Quantity

Average hours per week for each type of unpaid work and care (including sub-categories), for each gender and age group, were extracted from HILDA. Only data from the last available wave (2016), for Victorians were used. The same age groups as those outlined in Section A.1.2 were used so that unit values and quantities could be easily combined.

Average sample sizes for each required gender and age cohorts of Victorians in the 2016 wave of HILDA data were on average around 300 individuals. This is approximately 0.07% of the actual Victorian population. When estimating averages, HILDA's cross-sectional population weights were used to ensure representativeness of the Victorian population.

To estimate total quantity of unpaid work and care occurring in Victoria for 2017-18, estimated average hours spent on each task per week were multiplied by latest Victorian population estimates and the number weeks per year. This is demonstrated in the following equation:

$$Quantity_s = Avg.hours\ of\ unpaid\ work\ (per\ week)_s\ x\ No.of\ weeks\ per\ year$$

$$x\ Victorian\ population_{\ s}$$

Where *s* represents the various gender and age segments of the Victorian population. The total quantity of unpaid work in Victoria is equal to the sum of the quantities for all gender / age segments.

A.3. Time period

The above sections noted that several data sources were used to estimate the value of unpaid work and care in Victoria. These data sources were released at varying frequencies and the latest period available ranges from May 2016 (detailed earnings data) to July 2018 (labour force participation rates).

To the two key data components that have a major bearing over the time period of the estimates are:

- Earnings data used to estimate the unit values of unpaid work and care
- Population data used derive total quantity of unpaid work and care

Given detailed earnings information is currently only available for May 2016, and is provided in nominal terms, it was scaled up to May 2018 dollars using aggregate earnings data which is released more frequently. Hence, current estimates were based on the value of the dollar as at May 2018.

The latest available population dataset (to the level of detail required) is for December 2017. This is the main determinant of the time period selected for the estimates.

Given Dec 2017 is close to the mid-point for the 2017-18 financial year, the current estimate of the value of unpaid work and care (in dollars per annum terms) is for 2017-18.

Appendix B Methodology details: Analysing the drivers of unpaid work and care

This appendix provides further details of the data and methodology described in Section 4, used to analyse the drivers of unpaid work and care.

B.1. Unit values

Section 4.1.1 outlines how the components of unit values were incorporated into the Model as drivers by enabling direct edits to be made when conducting scenarios. When an edit is made to earnings or participation rates under a scenario, the unit values under the relevant method recalculate (as per the equations provided in Appendix A) within the Model to estimate a new scenario value of unpaid work and care in Victoria.

The incorporation of this functionality into the Excel Model required consideration of the following:

1. The impact of participation rates on labour market earnings
2. The impact of participation rates, labour market earnings and selected occupation earnings on the quantity of unpaid work and care

In relation to the first consideration, if labour force participation rates were to change significantly, average earnings may also be different, either as a cause or a consequence of movement in participation rates. If there are substantially fewer people in the workforce because the supply of labour is less (e.g. constraints on working visas), earnings may be driven up, and if there are more people in the workforce due to an increase in labour supply (e.g. higher fertility such as in the period after the “Baby Bonus” ultimately increasing the cohort of work entrants two decades later), earnings may be driven down. Conversely, if high demand for labour drives earnings up (e.g. in a mining boom), then participation rates may also be driven up, and if low demand for labour drives earnings down (e.g. in a recession), then people may drop out of the workforce.

However, the relationship between participation rates and earnings is a circular one (i.e. each influences the other) making it extremely difficult to estimate and incorporate into the Excel Model. Therefore, when participation rates are adjusted in any scenario analysis, it should be noted that this is independent of earnings in the Model, to avoid such endogeneity issues. The implicit assumption is that, in any scenario analysis where participation rates were changed, such a change would be assumed to be at any given earnings rate.

The second consideration relates to impacts of the components of unit values, not on one another but rather, on the quantity of unpaid work and care. These relationships have been estimated and incorporated into the Model by including time series of participation rates, average earnings by age and gender, and replacement unit values as explanatory variables (drivers) in the quantity equations. For further details on the analysis of the drivers of quantity please see Section 4.1.2 and Appendix B.2.

B.2. Quantities

Section 4.1.2 outlines how drivers of quantities of unpaid work and care were incorporated into the Model. HILDA data were used to estimate the relationships between each driver and the quantities of unpaid work and care. Separate econometric equations were estimated for each sub-category of unpaid work and care, where the dependent variable was the average hours of that type of work conducted per week. The estimated relationships between each driver and the quantity of unpaid work and care for each category were then included in the Excel Model. Hence, when a scenario edit is made to the value of a driver in the Model, the change gets multiplied by the estimated relationship and flows through to estimate a new scenario quantity (and subsequently total value) of unpaid work and care in Victoria.

This appendix section provides details of the estimation sample, variable specifications and equations specifications for the equations used to estimate the relationships between drivers and quantities of unpaid work and care. For estimation results, please see Section 4.3.

B.2.1. Estimation sample

All individuals surveyed by HILDA who provided a response to the number of hours per week they spend on the relevant category of unpaid work and care were included in the estimation sample. This provided each estimation with approximately 180,000 observations. Individuals from all States and Territories were included, as were observations for every year of HILDA data available, except for 2001. The first survey wave of HILDA (2001) did not collect detailed information on the number of hours spent on unpaid work and care, and was therefore not used for this analysis.

While the analysis focused on Victoria in the present day, individuals from all States and Territories and all years (excluding 2001) were included to provide a sufficiently large sample size with which to identify statistically significant relationships.

Individuals who do not do any unpaid work and care were included in the estimations. This was required for the results of the estimations to be incorporated into the Excel Model in a way that facilitates drivers analysis within the Model.

B.2.2. Explanatory variables

Three types of explanatory variables were used in the econometric equations:

1. Control Variables: These were not incorporated into the Excel Model as drivers of quantity, but were included in the equations purely for control purposes.
2. Key Drivers: These are the three key variables that were incorporated into the Excel Model as drivers of quantity, and were also used to split the estimated value of unpaid work and care in Victoria.
3. Other Drivers: These are variables for which relationships with quantities of unpaid work and care were estimated and incorporated into the Excel Model, but were not used to split the estimated value.

B.2.3. Control variables

Table B.1 outlines the specifications of each of the control variables used. The same set of control variables were used in the equations for each category of unpaid work and care.

All of the control variables were either binary or categorical i.e. they take on a discrete set of values. For all binary and categorical variables, a base category must be specified. For each value of the explanatory variables not used as the base category, the output of econometric estimations, provides the estimated average difference in the dependent variable (in this case number of hours spent on unpaid work and care) for people with the given value, relative to people with the base category value. In other words, all groups that are not specified as the base, are compared to the base category.

Table B.1 indicates the value of each control variable selected for the base category. In some cases, the normative category of most interest (e.g. Victoria and the most recent year 2016)[11] were selected as the base. For variables without a clear normative category (e.g. gender and age group), the largest category was selected.

Table B.1 Control variables

Description	Type	Values
Gender	Binary	Female (base); or Male.
Age group	Categorical	15 to 20; 21 to 34 (base); 35 to 44; 45 to 54; or 65 and older.
Indigenous status	Binary	Of Aboriginal and/or Torres Strait Islander descent; or Of neither Aboriginal nor Torres Strait Islander descent (base).
Relationship within the household	Categorical	Couple with dependent child(ren) (base); Couple without dependent child(ren); Lone parent with dependent child(ren); Lone person without dependent child(ren); Dependent student; or Non-dependent child
Home ownership	Categorical	Owns home (base); Rents home; or Lives rent free.
Disability status	Binary	Has a long-term health condition, impairment or disability; or Does not have a long-term health condition, impairment or disability (base).
State of residence	Categorical	NSW; VIC (base); QLD; SA; WA; NT; TAS; or ACT.
Wave i.e. year	Categorical	2002 through 2016, with 2016 as the base.

Note that labour market status was tested as a control variable but was excluded due to correlation with the variable representing participation rates by age and gender cohort (outlined in B.2.5). Cohort participation rates were kept in the equations instead of labour market status at the individual level because estimates for the former were required for the Excel Model.

[11] For state of residence and year, Victoria and 2016 were respectively selected as the base categories. This is because the analysis is focused on Victoria in the present day, making Victoria and the latest available year of data (2016) the normative categories for the purposes of this research.

B.2.4. Key drivers

The specifications and other details of the three variables used as 'key drivers' are as follows:

- Greater capital city: This is a binary variable where each person lives either in a Greater Capital City (GCC) or in Rest of State (ROS), defined by the Australian Statistical Geography Standard. Within HILDA, people living in Tasmania and the Northern Territory are not split into GCC and ROS – neither are people living in the ACT (because all of the ACT is classified as GCC). Therefore, under the greater capital city/rest of state variable, all people living in Tasmania and the Northern Territory were classified as 'Rest of State'. Using this definition, 66% of Australians, and 77% of Victorians in the HILDA sample live in a GCC area (after adjusting for population weights).
- Socioeconomic status: The SEIFA Index of relative socio-economic advantage/disadvantage (IRSAD) was used to measure socioeconomic status. IRSAD is recorded in HILDA as deciles, but for the purposes of this modelling was transformed into a categorical variable with three groups; low, middle and high where middle was used as the base category. The 'low' category comprises people in the bottom three deciles of IRSAD, the 'middle' category comprises people in the middle four deciles, and the 'high' category comprises people in the top three deciles. Under this definition, 28.3% of Victorians fall into the low socioeconomic status group, 37.7% into the middle group and 34.0% into the high group.
- Culturally and linguistically diverse (CALD) status: As per the Australian Institute of Family Studies definition, CALD was defined as people who were born, or have at least one parent who was born, in a country where English is not the main language. Under this definition, 31% of the Australian population, and 33% of the Victorian population are CALD.

These three key driver variables were used to estimate the difference in average hours of unpaid work/care undertaken by various groups of people e.g. the difference in average hours of unpaid work/care between people living in cities and those living outside of cities. As previously stated, these impacts were estimated separately for each sub-category of unpaid work and care, using separate econometric equations for each.

The estimated difference in average hours done by the selected groups was combined with the proportions of the Victorian population in each group, and the total hours spent on the relevant category of unpaid work/care by the entire Victorian population to derive the total hours for each group. This allows the Model to split the 'current state' estimate of the value of unpaid work and care by each of the specified groups, but not by multiple categories at once. For example, the value of unpaid work may be split by socioeconomic status groups or it may be split by CALD/non-CALD, but it may not be split by both at the same time.

B.2.5. Other drivers

The relationships between the 'other drivers' and quantities of unpaid work and care, were estimated and incorporated into the Excel Model for scenario purposes. However, these drivers were not used to split the outputs in Excel Model output.

The other drivers used in the analysis (described in more detail below) were:

1. Transfer payments
2. Level of difficulty accessing childcare
3. Participation rates by age and gender cohort (used for unit values under the opportunity cost method)
4. Earnings by age and gender cohort (used for unit values under the opportunity cost method)
5. Earnings by occupation (used for unit values under the replacement cost method)

With respect to transfer payments, HILDA records whether or not respondents receive the Carer Allowance, Carer Payment and/or the Parenting Payment. A binary variable recording whether someone receives either (or both) of the Carer Allowance or Carer Payment, was included as an explanatory variable in the quantity equation for caring for the ill, disabled or elderly. A binary variable recording whether someone receives the Parenting Payment was included in the caring for children equation.

Accessibility of childcare was also considered as a driver in the caring for children equation. HILDA asks people who are currently accessing (or have recently accessed) paid childcare services, their level of difficulty 'finding a place at the childcare centre of choice'. Level of difficulty was measured on a scale of 0 (not a problem at all) to 10 (very much a problem.

To incorporate the accessibility of childcare measure into the econometric modelling, and subsequently the Excel Model, it was transformed into a categorical variable, with the following three categories:

- Not currently, nor recently, accessing childcare (this category was included to account for people for whom access to childcare is not relevant)
- Low to medium level of difficulty finding a place at the childcare centre of choice (0 to 6 on the difficulty scale)
- High level of difficulty finding a place at the childcare centre of choice (7 to 10 on the difficulty scale)

The low to medium level of difficulty category was used as the base. This enabled simple comparison of people in the high level of difficulty group to those in the low to medium group.

To include participation rates and earnings as drivers of quantities, relevant ABS data were collected and then merged into the HILDA dataset. For participation rates, average annual rates for males and females, in five-year age cohorts were used. Annual averages were required, given HILDA data is of an annual frequency.

To merge age and gender cohort earnings (opportunity cost) and selected occupation earnings (replacement cost) into HILDA, a time series was required i.e. a collection of earnings values for each year from 2002 to 2016. This was a straightforward task for participation rates as they were already available from the ABS in a times series format. However, detailed earnings data is only released every two years, and the type of data released has evolved significantly over time. This means that not all of the information used to develop age and gender cohort earnings and selected occupation earnings for the 'current state' estimation was available for every year of required history. To deal with this issue, the ABS's 6-monthly Average Weekly Earnings release was used to estimate average annual growth in aggregate earnings over time. These growth rates were then applied to the age and gender cohort and selected occupation earnings estimates for 2018 (previously estimated and incorporated into the Excel Model). This derived the required earnings data back through history on an annual basis.

As with participation rates, annual earnings data were then merged with the HILDA dataset to be used in the quantity equations as drivers.

B.2.6. Estimation specification

Using the explanatory and dependent variables described above, the estimated quantity equations each took the following form:

$$Average\ hours\ per\ week_{i\,c} = Constant + \beta C \times Control\ variables_i + \beta K \times Key\ drivers_i + \beta O \times Other\ drivers_i$$

Where:

- i represents a given individual included in the estimation sample
- c represents the given category of unpaid work and care
- βC is a matrix of estimated coefficients for the control variables
- $Control\ variables$ is a matrix containing all control variables listed in Table B.1
- βK is a matrix of estimated coefficients for the key drivers
- $Key\ drivers$ is a matrix containing all key drivers listed in Section B.2.4
- βO is a matrix of estimated coefficients for the other drivers
- $Other\ drivers$ is a matrix containing all other drivers listed in Section B.2.5

A Tobit model was used to estimate this equation for each category of unpaid work and care. This was chosen instead of a standard linear regression in order to deal with the censored distribution of the dependent variable. Hours of unpaid work and care cannot take on a value lower than zero. This causes the distribution of unpaid work and care hours to be skewed, and to stop abruptly at 0. The Tobit model accounts for the censored distribution of unpaid work and care hours, providing more accurate estimates.

Adjusted standard errors were estimated in each quantity equation, to account for clustering at the individual level. This was required as the estimations pool observations of individuals across multiple years. The pooling of data often gives rise to correlation of error terms at the individual level i.e. correlation between unobservable factors for observations of the one individual across multiple years. Adjusting the standard errors to account for clustering relaxes the usual requirement that the observations be independent. It still requires that the observations are independent across groups (individuals) but not necessarily within groups (one individual over multiple years).

Limitation of our work

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