The standard of living and well-being of individuals - a case study of older Australians

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The Standard of Living and Well-being of Individuals – A Case Study of Older Australians

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Abstract

This thesis is about the measurement of the standard of living and well-being at an individual level. It contributes to a growing literature challenging the dominant economic paradigm that relies on disposable income and GDP as proxy individual and national standard of living indicators. Two lines of conceptual and empirical inquiry are explored. The first develops a more comprehensive measure of economic resources in line with the economic theory of consumption. The second develops a multi-dimensional well-being indicator framework based on sociological references to individual well-being. Both approaches are applied using data from Wave 10 (2010) of the Household, Income and Labour Dynamics in Australia (HILDA) survey to assess and compare the standard of living and well-being of older Australians, aged 65 years and over.

The economic standard of living approach is operationalised by combining fuller income and wealth economic resource components into a set of money-based metrics that determine individual potential consumption possibilities. The findings indicate that augmenting disposable income with income streams from non-cash services and annuitised wealth (particularly home wealth) substantially improves the absolute and relative economic position of older Australians. A multi-dimensional well-being indicator framework which emphasises the inter-relationship between economic and non-economic (sociological) dimensions is then constructed at an individual level. The findings indicate that, while older Australians have slightly lower overall well-being compared to non-older adults, driven primarily by declining physical health and to a lesser extent mental health, they maintain strong personal relationships, engage actively as community members and within their neighbourhood environment. There are two distinct categories of older Australians who simultaneously experience economic resource and multi-dimensional well-being advantage and corresponding disadvantage. Specifically, non-pensioners or tertiary educated older people experience an advantage; while renters, non-English speaking born or separated/divorced older people experience a corresponding disadvantage. Comparison of the two approaches shows that, for many older Australians, their measured economic resource position is only weakly associated with objective multi-dimensional well-being assessments.

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Thesis Abstract

This thesis is about the measurement of the standard of living and well-being at an individual level. It contributes to a growing literature challenging the dominant economic paradigm that relies on disposable income and GDP as proxy individual and national standard of living indicators. Two lines of conceptual and empirical inquiry are explored. The first develops a more comprehensive measure of economic resources in line with the economic theory of consumption. The second develops a multi-dimensional well-being indicator framework based on sociological references to individual well-being. Both approaches are applied using data from Wave 10 (2010) of the Household, Income and Labour Dynamics in Australia (HILDA) survey to assess and compare the standard of living and well-being of older Australians, aged 65 years and over.

The economic standard of living approach is operationalised by combining fuller income and wealth economic resource components into a set of money-based metrics that determine individual potential consumption possibilities. The findings indicate that augmenting disposable income with income streams from non-cash services and annuitised wealth (particularly home wealth) substantially improves the absolute and relative economic position of older Australians. A multi-dimensional well-being indicator framework which emphasises the inter-relationship between economic and non-economic (sociological) dimensions is then constructed at an individual level. The findings indicate that, while older Australians have slightly lower overall well-being compared to non-older adults, driven primarily by declining physical health and to a lesser extent mental health, they maintain strong personal relationships, engage actively as community members and within their neighbourhood environment. There are two distinct categories of older Australians who simultaneously experience economic resource and multi-dimensional well-being advantage and corresponding disadvantage. Specifically, non-pensioners or tertiary educated older people experience an advantage; while renters, non-English speaking born or separated/divorced older people experience a corresponding disadvantage. Comparison of the two approaches shows that, for many older Australians, their

measured economic resource position is only weakly associated with objective multi-dimensional well-being assessments.

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List of Abbreviations

ABS	Australian Bureau of Statistics
ACPQ	Australian Community Participation Questionnaire
ACOSS	Australian Council of Social Services
ASNA	Australian System of National Accounts
AUD	Australian Dollar
ANDI	Australian National Development Index
BLI	Better Life Index
CACP	Community Aged Care Packages
CAD	Cumulative Advantage/Disadvantage
CAE	Conseil d'Analyse Économique
CFA	Confirmatory Factor Analysis
CFI	Comparative Fit Index
CIW	Canadian Index of Well-being
CUPSE	Community Understanding of Poverty and Social Exclusion
CURF	Confidentialised Unit Record File
EACH	Extended Aged Care at Home Program
EFA	Exploratory Factor Analysis
ELS	Economic Living Standard
EU	European Union
EU-SILC	European Union Statistics on Income and Living Conditions
FaHCSIA	Department of Families, Housing, Community Services & Indigenous Affairs
FIS	Fiscal Incidence Studies
GCEE	German Council of Economic Experts
GDP	Gross Domestic Product
GFS	Government Finance Statistics
GNP	Gross National Product
GPI	Genuine Progress Index
GSS	General Social Survey
HACC	Home and Community Care
HDI	Human Development Index
HES	Household Expenditure Survey

HIES	Household Income and Expenditure Survey
HILDA	Household, Income and Labour Dynamics of Australia
ICW	Income, Consumption and Wealth
IEWB	Index of Economic Well-being
INSEE	National Institute of Statistics and Economic Studies
IsssA	International Survey Data for Multivariate Analysis
LIMEW	Levy Institute Measure of Economic Well-being
LCH	Life Cycle Hypothesis
LIS	Luxembourg Income Study
LWS	Luxembourg Wealth Study
MCS	Mental Component Summary
MIW	Multi-dimensional Individual Well-being
MIS	Minimum Income Study
MLE	Maximum Likelihood Estimation
MTAWE	Male Total Average Weekly Earnings
OECD	Organisation for Economic, Co-operation and Development
OLS	Ordinary Least Squares
PBLCI	Pensioner and Beneficiary Living Cost Index
PEMA	Poverty and Exclusion in Modern Australia
PCS	Physical Component Summary
PWI	Personal Well-being Index
RBA	Reserve Bank of Australia
RMSEA	Root Mean Square Error of Approximation
SCQ	Self-Completion Questionnaire
SIH	Survey of Income and Housing Costs
SLI	Life Situation Index
SNA	System of National Accounts
SoL	Standard of Living
SPI	Social Progress Index
TLI	Tucker Lewis Index
UN	United Nations

1 Introduction

1.1 Introduction

Consider two stylistic representations of an older Australian. The first individual is a 74 year old male, who owns his house, receives the Age Pension and a small income from his superannuation fund. He suffers from a health condition that limits his physical functioning, impacting his ability to leave his house and socialise with his family and friends. The second individual is a 74 year old female who lives in a government subsidised apartment and is completely reliant on the Age Pension to meet daily living costs. She is physically active, is part of a vibrant local community and has regular contact with her family and friends.

Objectively, how can we determine whose life is better? From an economics stand point, the first individual has a higher standard of living than the second. He is financially better off, even if his health is ailing and he leads a socially isolated life. On the other hand, the second individual is more financially constrained but with her good health and an active life, she appears to have an engaged and rewarding life. To the lay person at least, her overall well-being may seem better.

These stylistic representations are purposefully put together to draw attention to the complexity involved in trying to reach objective determinations of well-being. They are also the central issues addressed in this thesis. The act of deciding what counts towards human well-being, how important are different aspects of well-being and how to measure human well-being is not new. Since as far back as Plato and Aristotle's enquiry into the nature of 'a good life' for individuals and society, people have sought a resolution both to the substance of 'a good life' (whether articulated as well-being, the standard of living or quality of life) and an assessment of it.

This thesis is far more modest in ambition than the classical Greek philosophers. It is not a philosophical treatise promoting a particular view of a 'good' life; neither does it suggest that the existence of conceptual complexity precludes quantification. The thesis investigates the possibility of operationalising concepts relating to the standard of living and well-being of individuals that 'do justice to the richness of the idea' (Sen, 1993a: 32), and yet are measurable as analytical frameworks within the constraints of survey data. Although the standard of living and well-being lack precise definitions and are sometimes used interchangeably (Manderson, 2005; McGillivray and Clarke, 2006), they are utilised in this thesis as distinct terms. The standard of living as an economic term and well-being as a sociological term, aligned with their conventional treatment in the literature.

The distinction is sought as a way of the delineating the two forms of conceptual and empirical inquiry explored in this thesis. The first inquiry expands the definition and measurement of economic resources in line with the economic theory of consumption for economic standard of living assessments. The second inquiry formulates a multi-dimensional well-being indicator framework based on sociological references to individual well-being. The central aim of this thesis is to investigate and compare economic measures of the standard of living and multi-dimensional measures of well-being at the level of the individual, for the purpose of examining whether assessments change depending on the conceptual and methodological approach.

1.2 The analytical context

1.2.1 Defining older people

The study is set within the demographic context of an ageing population. It applies the dual analytic frame to an assessment of the standard of living and well-being of older Australians. The primary hypothesis is that the substantive conclusions we draw about the standard of living and well-being of older people changes, depending on the metric employed.

As an initial step, it is necessary to be explicit about what is meant by ageing and an older person.[1] This thesis follows Bury (2000) and Närvänen (2004) in conceptualising ageing as a process through the life course embedded in biographical and historical

[1] Although the terms 'older people', 'the aged', 'geriatrics' and 'the elderly' are often used synonymously to refer to the same group of people, the labeling is imbued with different social and cultural connotations (Öberg, 2004; Reed et al., 2004). Öberg (2004) argues that the label 'the elderly' is often used in derogatory manner contibutive to ageism, while Reed et al. (2004) claims that the label 'geriatric' is based on a medial speciality framed around disease and illness. In this thesis, the term 'older people' is adopted in keeping with social science tradition.

time. Biographical time refers to the events and experiences that mark an individual's life, including aspects that are unique to the individual and those influenced by the social context in which an individual lives. Historical time recognises the generational outcomes of particular historical contexts. In other words, individuals belong to different age cohorts that are influenced by time-based historical periods, such as the generation born during World War II.

A life course perspective allows for an inter-disciplinary approach that is inclusive of alternative and overlapping definitions of ageing (Bury, 2000; Närvänen, 2004). Närvänen (2004) outlines the different types of ageing processes: biological and psychological, social, and chronological ageing. Biological and psychological ageing are the natural consequences of physical and mental health brought on by the onset of senescence related to a decline in biological function, cognitive ability and changes in personality. It is a conventional view of ageing framed around an individual's biography over his/her life course.

The last two definitions view ageing as social and cultural constructions framed around the relations between an individual's biographical and historical time. Social ageing refers to age norms that prescribe behaviours, expectations and obligations according to socially defined life phases (such as childhood, youth, early and late middle age, and old age), each imbibed with different meanings and the potential to influence an individual's self-image (ibid).[2] Chronological age, on the other hand, is related to a calendar time line that places an individual in a prescribed social structure with differing social status. For example, this describes the voting age or the pension eligibility age.

It is still possible, however, to decide on a set of specific markers along the trajectory of ageing that distinguishes older people as an analysis category from other age-groups in the population. The most common approach amongst the social sciences, and the one adopted here is to use the pension age eligibility as a chronological age

[2] This includes, for example, the social schedule governing when people are expected to marry and have children, and the resulting consequence on a person's self-image if these social expectations are not met.

demarcation. Hence, older people in this thesis are defined as 65 years and over based on the current minimum qualifying age for the public Age Pension in Australia.[3]

Defining older people through their formal relationship with the labour market is not perfect as it essentially conceals individuals without a formal labour status and assumes equivalence with biological ageing (Victor, 1987; World Health Organisation, 2009). However, using the pension eligibility age threshold introduces a policy focus to manage the regulated transition from an independent (part of the labour force) to a dependent (not in the labour force) status. It is still possible to consider the biographical variation in individual's experiences and events, the influence of historical contexts of individuals born within two to three decades of each other and the intricate nature of the ageing process (Bury, 2000; Närvänen, 2004). Zaidi (2008: 29) points out that since age is an 'exogenous attribute of individuals', this definition is free from discriminatory ageing myths and beliefs. It provides a simple instrument for counting and comparison purposes. The definition is precise, unambiguous and transferable across policy domains.

1.2.2 Australia's ageing context

It is predicted that by 2055 over 22 cent of the Australian population will be aged 65 years and over, compared to 13.5 per cent in 2010 and 8.3 per cent in 1970 (Australian Government, 2010, 2015). Numerically, this equates to a nearly tripling from 3 million in 2010 to 8.9 million in 2055. The number of the very old (aged 85 years and over) is predicted to more than quadruple from 0.4 million in 2010 to 1.9 million in 2055 (ibid). The projections indicate an increasing number of centenarians, with almost nine times the number in 2055 compared to 2015 (approximately 40,000) (Australian Government, 2015). The changing demographic composition is a consequence of the post-World War II baby boom, an increase in life expectancy and in the last fifty years, a decrease in fertility rates (DESA, 2015). It is also predicted that the number of working age people (aged 18-64 years), available through the tax system, to support

[3] Historically, for females it was 60 years, however, from 2005 the female age was progressively indexed for all those born between 1935 and 1949, so that by 2013 the eligibility age was 65 years for females and males. Appendix A provides a brief description of Australia's retirement income and aged care system.

every older person (aged 65 years and over) will fall from 5 in 2010 to 2.7 in 2055 (Australian Government, 2010, 2015).

The ageing of the population is postulated as having a profound effect across all sectors of society. As Harper writes:

> This will have significant implications for labour supply, family and household structure, health and welfare service demand, patterns of saving and consumption, provision of housing and transport, leisure and community behaviour, networks and social interaction, and even, it has been suggested, the geopolitical order of the new century. (Harper, 2004: 1)

At a macro-level, consideration is given to the challenge for government to mitigate the decreased economic productivity from declining labour force participation rates (as more people enter retirement) with the increasing fiscal pressures on publicly funded retirement income, health and aged-care systems (Australian Government, 2014; Productivity Commission, 2011). At a micro-level, consideration is given to maintaining social cohesion across and within generations and the quality of life of individuals, with governments playing a critical role in the design and implementation of policies to ensure equity and prosperity to both older and younger Australians (Australian Government, 2014; Australian Treasury, 2009; Productivity Commission, 2013). For older Australians, a key consideration is maintaining the quality of an individual's standard of living and well-being over the duration of his remaining life span; which for many, will see them live for decades beyond the official retirement age of 65 years (Harmer, 2009; Kimberley and Simons, 2009; Productivity Commission, 2011, 2013; The Senate, 2008).

Within this context, statistical metrics are powerful tools framing public discourse, shaping conceptualisation of what social and human well-being is and should be, guiding action around policy responses and in an environment of accountability and transparency used to assess decisions made. Consequently, it is important to be clear about what we measure. It follows the line of reasoning articulated by the Commission on the Measurement of Economic Performance and Social Progress[4] that 'what we measure shapes what we collectively strive to pursue – and what we pursue determines what we measure' (Stiglitz et al., 2009: 67). Having a broad conception of what the objective well-being of individuals is, has the potential to significantly impact the development and implementation of policies; ultimately with important consequences on the quality of individual lives, including those of older people.

In this thesis, it is argued that with respect to the two lines of inquiry mentioned above, there is scope for a set of metrics measured at the level of the individual that provides a more expansive account of an individual's economic resource position and further to that, an account of their individual well-being position that is integrated and holistic across the different dimensions that constitute their well-being. It hopes to contribute to the broad social and multi-disciplinary movement that over the course of five decades has challenged the dominant paradigm to use income or more broadly economic resources as a proxy indicator for the standard of living or well-being, and have sought alternative ways to frame and measure the well-being of individuals and society (Land, 1983; Sen, 1987; Stiglitz et al., 2009). The following section provides a brief background outlining the rationale for adopting this position.

1.3 Background to the research

The range of empirical studies employing the phrase the 'standard of living' when referencing economic-based assessments is testament to its treatment as an economic concept relating predominantly to monetary measurement (Sen, 1987; Slesnick, 2005; Smeeding et al., 1993; Wolff, Zacharias, Masterson, et al., 2012). The standard of living is treated as a function of consumption levels; the higher the consumption dollars, the higher the standard of living attained (Clarke and Islam, 2004; Slesnick, 2005).

The regular collection of household income data by national statistical agencies and the harmonisation of income variables for cross country comparisons has meant that most empirical studies in rich nations rely on household disposable income as a proxy for household (and through equivalisation, individual) standards of living (ACOSS,

[4] From here on, this is referred to as the Sarkozy Commission.

2013, 2014; Disney and Whitehouse, 2002; Harding et al., 2002; Harmer, 2009; Hurd, 1990; OECD, 2009a, 2013c; Saunders and Bradbury, 2006; Saunders and Hill, 2008; Whiteford and Bond, 2000; Wilkins, 2007, 2013c, 2013d; Zaidi et al., 2006). This commonly refers to cash earned and received privately and from direct government benefits, minus personal tax (ABS, 2007b, 2012a). However, even though the importance of disposable income to the standard of living is undisputed as it presents the primary source of current individual purchasing power, it remains an insufficient indicator. Boarini and Mira d'Ercole write:

> …income measures do not provide a full picture of "command over resources": they neglect [the] individual's ability to borrow, to draw from accumulated savings and to benefit from help provided by family or friends as well as consumption of public services such as education, health and housing. For these reasons, income provides only a partial description of the individual's ability to enjoy an acceptable life. (Boarini and d'Ercole, 2006: 10)

In seeking to overcome the narrowness of the income metric, scholars have expanded the disposable income measure by imputing a rent for owner-occupied dwellings (ABS, 2008(b); Callan and Keane, 2009; Frick and Grabka, 2003; J R Rodgers, 2010; Saunders and Siminski, 2005; Smeeding and Weinberg, 2001; Wilkins et al., 2011; Wolff and Zacharias, 2009; Yates, 1994); and imputing the value of in-kind public benefits and services received (ABS, 2012a; Callan and Keane, 2009; Garfinkel et al., 2005; Harding et al., 2006; Smeeding et al., 1993; Travers and Richardson, 1995; Whiteford and Bond, 2000). These income components confer unique benefits to older people along the life course trajectory as recipients of public age-related health and aged care services; and the housing services that would otherwise be paid as a rental expenditure, if it were not for the high incidence of outright home ownership amongst older people (Bradbury, 2010; Danzinger et al., 1984; Korenman and Remler, 2013; Moon, 1977; Quinn, 1987; Smeeding et al., 1993).

Nevertheless, they are still incomplete in capturing the range of economic resources that provide the full array of potential consumption possibilities on which the economic standard of living is based, because they fail to take into account the role of wealth. Wealth confers economic security and is a potential source of current and future consumption (Stiglitz et al., 2009; Wolff, 1988). While some income generated from wealth is picked up in measured income, and income metrics can include imputed rent estimates from home ownership, other capital income, such as realised capital gains, is generally not recorded as income but will affect consumption possibilities (Hurd, 1990; Stiglitz et al., 2009). Individuals can increase consumption through dis-savings (reducing wealth) or borrowing irrespective of current income levels (Sabelhaus and Schneider, 1997). This is particularly important for older people who typically have lower incomes than the working population, but who may have had more time to accumulate wealth over their lifetime (Whiteford and Bond, 2000).

The majority of empirical studies investigate the relationship between income and wealth whilst maintaining the respective income (flow) and wealth (stock) unit status (Billing et al., 2010; Bradbury, 2010; Creedy and Tan, 2007; Dvornak and Kohler, 2003; Radner, 1990; Sierminska et al., 2006). Less prevalent are studies that convert income and wealth into the same flow/stock unit to allow aggregation; in most cases by supplementing income with a wealth annuity (Brandolini et al., 2009; Frick and Headey, 2009; Weisbrod and Hansen, 1968; Wolff and Zacharias, 2009; Wolff, Zacharias, Masterson, et al., 2012). Aggregation of income and wealth into a single metric is advantageous because it enables analysis of the joint distribution of income and wealth at the household and (through equivalisation) individual level. A single metric encapsulates the fuller range of economic resources people have at their disposable, inclusive of income and the economic opportunities provided by wealth, while still retaining the general benefits commonly associated with using income as a living standard indicator. That is, as a universal numerical money-based metric comparable over time, across demographic groups and a benchmark to set policy targets.

This approach has international (Stiglitz et al., 2009) and national endorsement (ABS, 2009b). The ABS in its ‘Low Consumption Possibilities Research Project’ (ABS, 2009b; Billing et al., 2010) canvas the idea of creating a single index, called ‘equivalised wealth adjusted income' (EWAI) to identify Australians at risk of economic hardship. However, to date no actual results have been published. In Australia, apart from the initial pioneering work conducted by Travers and Richardson (1993) in the early 1990s there is no current evidence of empirical attempts to combine an expanded measure of income with wealth into a single metric at the household and (through equivalisation) individual level. Understanding how the full range of economic resources can collectively affect an individual's economic living standards in providing potential consumption possibilities is particularly important in an Australian context, given the high rates of home ownership, the superannuation system and the provision of public in-kind benefits and services. Consequently, the first line of inquiry in this thesis seeks to redress this gap by adapting current best practice models (Smeeding and Weinberg, 2001; Wolff and Zacharias, 2009) to an Australian context.

The second part of this thesis, however, argues that 'the economic', whether limited to income or expanded to include the full range of economic resources, nevertheless represents but one facet of an individual's overall standard of living. The standard of living should be conceived as a multi-dimensional concept inclusive of the non-economic aspects of an individual's life, in a way that allows for the inter-related aspects to be examined. In doing so the language shifts from the 'standard of living' towards 'well-being', a protean concept whose elusiveness provides the space to provide a more holistic perspective on how we view and measure individual and social progress. This argument follows the line of reasoning articulated by Travers and Richardson (1993: 117) to not assume that an individual with a high level of material resources necessarily has a high level of overall well-being, and furthermore, to not assume implicitly that what is not measured in economic terms has no importance.

There is considerable literature focussed on providing a more integrated perspective by combining economic and non-economic dimensions through the compilation of social indicators as representative of different dimensions. There are broadly two categories of literature. There are reports that present a dashboard of indicator statistics. For example, the EU's 'Sustainable Development' report (Eurostat, 2015); the OECD 'How's Life? Measuring Well-being' report (OECD, 2015), 'Life in the UK' reports (ONS, 2015), ‘Sustainable Development in Germany Indicator’ reports (Statistisches Bundesamt, 2014), and the ABS ‘Measure of Australia’s Progress’ series (ABS, 2013b).

In addition, there are reports that aggregate indicators/dimensions into a unitary composite index. These aggregate data for each indicator across the range of individuals/households and then aggregate across the indicators. For example, the Human Development Index (UNDP, 2015), the OECD Better Life Index (Durand, 2015) and the Canadian Index of Well-being (Canadian Index of Wellbeing, 2012). In both categories of literature, the compilation of country or regional aggregate data from a range of data sources means that well-being assessments are at the macro-level, usually involving the ranking of countries, tracking trends or assessment against specific policy priorities.

The approach in this thesis differs from this literature in one major respect. It is concerned with multi-dimensional well-being at the level of the individual. The individual is the unit of analysis and indicators are person-based well-being outcomes. The micro-level well-being composite indices constructed, in contrast to the macro-level composite indices described above, involve aggregating procedures across the indicators for each individual, before being aggregated to meso and/or macro-levels. A micro-level composite index provides an evaluative space to consider the complexity of dimensions that constitute an individual’s well-being. This is especially pertinent for older people for whom good health and the quality of relationships, for example, may have greater resonance with their overall well-being than their economic standard of living as they move into different phases along the life course trajectory. In contrast, the siloed presentation of indicators for indicator dashboards cannot capture the inter-relationship between dimensions. Nor can the aggregate level data in macro-level composite indices capture the variation in well-being outcomes within a population, or examine the distribution of overall well-being outcomes at the individual level.

The literature on multi-dimensional well-being composite indices constructed at the level of the individual is extremely limited (Bijl et al., 2010; Boelhouwer, 2002). In Australia the long-standing commitment to the ABS ‘Measure of Australia’s Progress’ series (2004, 2006, 2010, 2012c, 2013b) is evidence that different societal actors recognise the importance of multi-dimensional accounts of well-being to policy discourse and for a national understanding of how Australia is faring and for whom it is faring better or worse. However, to date, no Australian studies have attempted to develop a composite well-being index at the level of the individual that intentionally integrates the different dimensions that constitute their well-being. The second line of inquiry, hence seeks to redress this gap by assessing the well-being of older Australians using a multi-dimensional individual well-being indicator framework.

In pursuing these two lines of inquiry, specific attention is paid to the following three research questions:

- How does the measured relative economic position of older people and demographic sub-groups of older people change when different economic resources metrics are used?
- How does the measured relative well-being of older people and demographic sub-groups of older people change when a multi-dimensional well-being approach is adopted?
- What is the relationship between an economic standard of living perspective and a multi-dimensional well-being perspective?

1.4 Structure of this thesis

In Chapter 2, two conceptual approaches are outlined: the economic approach and the social indicator approach. The first relates to the relationship between income and wealth in determining potential consumption possibilities. Modigliani's life-cycle hypothesis is drawn on to understand the changing relationship between income and wealth along an age trajectory of changing needs and circumstances. The second describes the progression of social indicators from a social research movement to a conceptual approach, one which broadly involves the development and assessment of indicators along various dimensions that emanate from a particular field of inquiry. The chapter also discusses the articulation of the standard of living as an economic term linked to the first approach, and well-being as a sociological term linked to the second approach.

Chapter 3 follows the conceptual narrative of Chapter 2 and reviews the literature in two parts. The first part critically reviews economic applications that situate the standard of living in money terms relating to the measurement of income, wealth and consumption. The second part applies the same critical lens to multi-dimensional well-being indicator frameworks that belong to the tradition of social indicators. Studies are categorised as indicator dashboards, macro-level composite well-being indices and micro-level composite well-being indices. Each part concludes by outlining the research gap that this thesis addresses.

The remaining Chapters 4 to 7 follow the same organisational structure as the previous chapters with two lines of inquiry. Chapters 4 and 5 that compromise Part 1, focus on the development and assessment of metrics relating to an economic standard of living approach. Chapters 6 and 7 that compromise Part 2, focus on the development and assessment of metrics relating to a multi-dimensional individual well-being indicator framework. In Chapter 4, the methodology to construct a set of money-based metrics that combines income and wealth resource components is set out. Justification and description of the Household, Income and Labour Dynamics in Australia (HILDA) Survey is provided. Economic resource concepts are defined, together with a detailed operationalisation of how to estimate them.

Chapter 5 presents the empirical analysis of the economic standard of living for older Australians using Wave 10 (2010) of the HILDA dataset. The chapter begins by describing the demographic context of older Australians. Imputation results of key economic resource components are analysed. The main focus is on investigating the measured relative economic position of older Australians and sub-groups of older people when expanded economic resources metrics are used.

Similar in purpose to Chapter 4, Chapter 6 presents the methodological framework to operationalise a measure of individual well-being, drawing on the principles of the social indicator approach. The construction of a multi-dimensional well-being indicator framework aimed at analysis at the individual level is outlined. This includes providing a detailed operationalisation of the measurement models, choice of dimensions and indicators and the construction of dimension scores and a composite well-being index.

Chapter 7 presents the second empirical analysis based on Wave 10 (2010) of the HILDA dataset. The multi-dimensional well-being of older Australians is assessed using broadly similar criteria employed in the analysis of the economic standard of living. The chapter describes the well-being of older Australians and considers the findings in light of dimension-specific older-person related literature. The last part of the chapter investigates the relationship between the two different approaches advocated in this thesis, through comparisons of non-older adults to older people.

Chapter 8 presents the summary and conclusion to this thesis. A synopsis of the preceding chapters and synthesis of the methodological approaches and main findings is provided. The chapter returns to some of the over-arching themes discussed in this chapter and illustrates the contribution of this thesis in the context of expanding assessments of individual economic standards of living and well-being. It highlights the limitations of this study and recommends future research opportunities and challenges.

2 Conceptual approaches

2.1 Introduction

How is and how should the 'standard of living' be differentiated from 'well-being'. As the literature review in Chapter 3 will indicate, empirical studies reveal a shift away from an economic focus towards those that represent a convergence across disciplines (economics, sociology, psychology, health and philosophy). In doing so, there is a gradual shift in the language from the standard of living towards well-being. A preliminary step, therefore, is to determine if there is a useful distinction between the standard of living and well-being. This is the subject matter of Section 2.2.

The remaining sections of the chapter outline the two conceptual approaches that frame this thesis: the economic approach and the social indicator approach. It is shown that although inter-related, each conceptual approach offers fundamentally alternative perspectives to framing and measuring the standard of living and well-being of individuals. The 'standard of living' is linked as an economic term to the first approach and 'well-being' is linked as a sociological terms to the second approach.

Section 2.3 outlines the economic approach to the standard of living based around monetary measurement. The role of income and wealth in determining the set of consumption possibilities is discussed. The reasons behind the continued reliance on economic resources as indicators of the standard of living are outlined. Sections 2.4 chronicles the development of social indicators from a movement intent on providing a holistic perspective of social and individual well-being to a conceptual approach that is underpinned by a set of principles latent within its empirical practice. The conclusion in Section 2.5 summarises the two conceptual approaches.

2.2 Distinguishing well-being from the standard of living

The phrase, 'the standard of living', has become an accepted part of the vernacular in almost any economic discourse relating to economic-based assessments on living conditions and the quality of life. Indeed, as Sen succinctly and eloquently writes:

> It is hard to think of an idea more immediate than that of the standard of living. It figures a good deal in everyday thought. It is, in fact, one of the

> few economic concepts that is not commonly greeted with the uncommon scepticism reserved for the other concepts of economics. (Sen, 1987: 1)

Indeed the range of economic studies employing the terminology 'standard of living' is indicative of its credence as an economic concept (Berthoud et al., 2009; Slesnick, 2005; Smeeding et al., 1993; Wolff, Zacharias and Masterson, 2012). With the evolution of studies that seek to combine economic and non-economic perspectives to provide an integrated perspective on the standard of living, there has been a shift in focus towards well-being. Both terms are ubiquitously referred to across the literature. Well-being is often used interchangeably with terms such as happiness, human development, quality of life and life satisfaction (Kahn and Juster, 2002; McAllister, 2005; McGillivray and Clarke, 2006). The standard of living is often used in relation to economic deprivation, income poverty and economic inequality (Atkinson, 1985; Perry, 2002). Both terms are also often used interchangeably with each other (Manderson, 2005; McGillivray and Clarke, 2006). Yet, is well-being different to the standard of living?

Drawing explicit differences is important, especially as a conceptual understanding of the two concepts informs the choice of measures in empirical applications with consequences for policy research and development. In the context of this thesis there are two caveats. Firstly, clear intractable demarcations are not truly possible, so this is not an exercise in either semantic precision or conceptual exactitude. Secondly, is recognising that in many of the references cited in this chapter and will become evident in the literature, the term 'well-being' is used rather loosely. This cannot be undone. The delineation between concepts is employed to provide a way of justifying the parameters around what constitutes the standard of living versus the well-being of individuals applicable for this thesis.

Well-being has now become firmly entrenched as an academic and policy term utilised across sociological, health, economic and philosophical disciplines. However, there is general agreement amongst scholars that wellbeing is a broad, ambiguous and somewhat elusive protean concept without a universally accepted definition that clearly distinguishes it from other sociological concepts (Camfield et al., 2008; Laderchi et al., 2003; McAllister, 2005; McGillivray and Clarke, 2006). In a review of the applicability of well-being to health promotion, Seedhouse writes that:

> either (a) 'well-being; is an empty notion, or (b) 'well-being' is an important and meaningful term which conveys meanings no other term conveys, or (c) 'well-being' is 'essentially contested' – its meaning and content fluctuates dependent on *who* is using it, and *why* they are using it. (Seedhouse, 1995: 65)

Furthermore, McGillivray and Clarke (2006: 3) state that because 'well-being cannot be directly observed, it cannot be directly measured'.[5] Yet, notwithstanding these contentious issues, the empirical evidence suggests support for Seedhouse's (1995) third option (Camfield et al., 2008; Decancq and Schokkaert, 2015; O'Hare and Gutierrez, 2012). As an umbrella term, the key contribution of well-being as a concept to social science discourse lies in its ability to offer the twin advantages of adaptability and inclusiveness.

The particular meaning of it can be constructed from its application within a specific context. For example, well-being within a psychological dimension is often related to questions on the quality of life, sense of self and happiness (Kahn and Juster, 2002). While well-being within a health dimension is often defined according to the prevalence of disease and disability, an individual's life expectancy and attitudes towards health (ibid). Economic well-being is commonly framed around: income summary statistics, income poverty lines and income inequality estimates (Sumner, 2006). Moreover, it can be defined with respect to negative deficits, positive attributes or on a continuum from negative to positive (Pollard and Lee, 2003). It can be defined at the level of the individual or from a society viewpoint and it can be subjectively determined or researcher observed and measured (McAllister, 2005).

In addition, the concept embraces multiple influences, hence providing a discursive space to cross disciplinary divides and create a multi-dimensional integrated

[5] This limitation is applicable to the standard of living as well.

perspective. In proposing a framework to measure the progress of societies, Giovanni et al. (2011) treat well-being as a hierarchy. At the core (micro-level) is human well-being which is about the kind of life each person pursues and the freedom he has to pursue it. It compromises physical and mental health, knowledge and understanding, work, material well-being and freedom and self-determination. This is situated within a meso-level social well-being, the social aspects that make human well-being possible and is comprised of the dimensions: social connections, social participation and inter-personal trust. Both individual and social well-being are embedded within macro level domains: economy, culture and governance. The totality of these levels is the 'human system' which exists symbiotically with the 'ecosystem'. Societal progress occurs 'when there is an improvement in the "sustainable and equitable well-being of a society"'(ibid: 106).

Providing a solely person-centred conceptualisation of well-being, White (2009) defines well-being intuitively as 'doing well - feeling good'. This is framed through three inter-dependent dimensions. The material dimension includes assets, welfare and the standard of living; the relational dimension deals with personal and social relations including relations with the state; and the subjective dimension focuses on individual assessments on the quality of his/her life and his/her cultural values and ideologies. Well-being is diagrammed as a pyramid with material and relational dimensions at the base and the subjective dimension at the apex to express both the inter-dependence of the dimensions and to reinforce the importance of cultural groundings to the way material and relational dimensions are contextualised. White (2009) argues that well-being is a process and must be treated as aspirational, holistic and person-centred.

Nussbaum (2005), on the other hand, frames well-being specifically to provide a political and social force to ensure the basic rights of citizens in a pluralistic society. She specifies ten universal and thematically cross-cutting human capabilities. The ten central human capabilities are: life (living the length of a normal human life), bodily health, bodily integrity, senses, imagination and thought, emotions, practical reason, affiliation, other species, play, political and material control over one's environment (ibid: 41). These encapsulate basic functioning requirements (such as food, shelter, good health) and extend to 'conditions for higher-level functioning' (Manderson, 2005: 16) (including emotional attachment, political and material control, intellectual creativity and play). Huppert (2005) (from (Camfield et al., 2009: 97)) sums up the potential for inclusivity and inter-connectivity in the concept, writing that 'well-being is, therefore, about how people function and relate to others, as much as what they have, or how they report their well-being at a single moment in time'.

With this in mind, the stance taken in this thesis is to adopt Sen's (1993a: 36-37) treatment of the distinction as a 'funnelling of the evaluative space'.[6] The broadest space is that of *agency achievement*, which refers to 'the person's success in the pursuit of all the objectives that he has reason to promote'. Goals may sit outside those that improve her actual individual well-being. A narrower space is that of *well-being achievement* which refers to 'the constituent elements of the person's being seen from the perspective of her own welfare'. This includes elements that may affect other's lives so long as they 'operate through some feature of the person's own being'. The narrowest space is that of *living standards achievement*, which is concerned with 'those influences on well-being that come from the nature of his own life, rather than from 'other-regarding' objectives or impersonal concerns'. Sen (1993a) cites the freeing of political prisoners in different countries as an example of an achievement that can potentially enhance a person's well-being without necessarily enhancing a person's standard of living.

In other words, the standard of living includes those factors that directly relate to and instrumentally affect the quality of an individual's life, and which arise from sources within his own life. It is directly linked to the actual characteristics of a person's living (Sen, 1993b). The standard of living henceforth can be regarded as something narrower, contained within and necessary to (understanding) the broader and more over-arching concept of well-being. Assessing the standard of living of an individual is

[6] The 'evaluative space' is a term coined by Sen (1993a: 32) to describe the conceptual parameters within which the objects of evaluation are identified.

necessary for and can be the same, but need not always be the same, as assessing the well-being of an individual (at least with reference to Sen's 'evaluative space').

However, in a theoretical sense, both terms are flexible and expansive enough to recognise the complexity of a person's life. Sen addresses this complexity by writing:

> You could be well off, without being well. You could be well, without being able to lead the life you wanted. You could have got the life you wanted, without being happy. You could be happy, without having much freedom. You could have a good deal of freedom, without achieving much. (Sen, 1987: 1)

In the remaining sections, the standard of living and well-being are employed as distinct concepts aligned with the conceptual approaches that they are conventionally associated with; the standard of living in economic terms and well-being in broader sociological terms. The distinction provides a way of delineating the two forms of conceptual and empirical inquiry explored in this thesis.

2.3 The economic approach

As discussed above, Sen (1984, 1987) in writing about the standard of living, contends that as a 'notion of welfare' the contribution of economists such as Alfred Marshall (1890), Arthur Pigou (1932) and Adam Smith (A. Smith, 1789) has meant that it has traditionally been treated as an economic concept. Pigou (1932) drew a distinction between social welfare and economic welfare, writing that:

> The one obvious instrument of measurement available in social life is money. Hence, the range of our inquiry becomes restricted to that part of social welfare that can be brought directly or indirectly into relation with the measuring-rod of money. This part of welfare may be called economic welfare. (Pigou, 1932: 11) [7]

[7] Sen (1984) argues instead that notions of social welfare cannot be separated into independent and mutually exclusive self-contained parts. In this and later work, he critiques the notion of living standards in terms of utility, arguing instead that the standard of living should be perceived in terms

The economic theory is that individuals as rational agents, will consume a good or undertake an activity, subject to financial limitations, to maximise their utility (or welfare) (Clarke and Islam, 2004; Slesnick, 2005); and that the welfare of society is improved increasing the utility levels of all its individuals.[8] Theoretically, utility is inclusive of material and non-material aspects; however, as Clarke and Islam (2004: 12) write, 'economics was able to determine the material but not the non-material aspects, but as there was an 'unverified' probability that this relationship was positive, determining economic welfare was sufficient'. Hence, utility measurement was reduced to a focus on measuring the consumption of commodities (Clarke and Islam, 2004; Easterlin, 2000b). Alternatively specified, the standard of living is treated as a function of consumption levels and consequently the amount of money representing consumption levels (Atkinson, 1989; Clarke and Islam, 2004; Easterlin, 2000b; Zaidi et al., 2006).

In tracing the historical development of the standard of living concept since the 1800s, Easterlin (2000b) states that in the post-World War II period, the material emphasis within the concept led to the use of Gross Domestic Product (GDP) as an indicator of economic living standards at the national/macro-economic level and a proxy for household or individual standards of living. GDP is the monetary valuation of all final goods and services produced by a nation during a specified period.[9] It is widely acknowledged as a measure of the economic activity of a nation and is a commonly cited metric to analyse the size and growth rate of a country's economy over time and compared to other countries (Stiglitz et al., 2009).

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of freedoms. This forms the basis for his influential philosophical framework, the capability approach. It is discussed in Section 2.4.

[8] Bentham (1789) is credited with the idea of describing human behaviour as motivated by pleasure and pain with the net satisfaction being labelled 'utility'. Hence, the goal of individuals was to maximise utility. The welfare of society is the sum of these individual utilities, such that social welfare is improved if the greatest number of people maximise their utility.

[9] In some cases, closely related measures such as Gross National Product (GNP) are used. GNP measures the total value of final goods and services produced by the citizens of a country irrespective of their domestic or foreign residency. GDP and GNP are conceptually interchangeable in their relationship to the standard of living concept (Clarke and Islam, 2004).

Many economists, however, have highlighted the shortfalls of real GDP per capita as a measure of economic living standards (Clarke and Islam, 2004; de Leon and Boris, 2010; Osberg and Sharpe, 2002; Stiglitz et al., 2009). The thrust of these arguments centre on the inability of GDP to: account for distributional variations hence obscuring inequalities; include the value of non-marketed output such as home production and caring labour; account for other aspects intrinsic to living standards such as leisure, literacy, life expectancy and health; correctly treat national expenditures that have no direct impact on individual living standards (such as monies spent on the police, prisons and national defence); and account for the costs to the natural environment. Moreover, in practice, the growth rates of real GDP per capita are not always accompanied by similar patterns of growth in real equivalised household income (Stiglitz et al., 2009).

Clark (2004: 17) captures the difficulty in analysing the distribution of social or national economic well-being as proxies for household income indicators with the quote from Stoler (1975: 34), 'when you say that the standard of living will double does that mean that those who have one car will have two and that those who have none will still have none?' Consequently, even though GDP is an often cited statistic used as a yardstick to assess the economic health of a nation and has a vital role within national accounting systems, most contemporary economic studies do not use GDP per capita for analysis done at the household or person level.

2.3.1 The consumption of goods and services

Instead, the theoretical paradigm of individual utility maximisation is observed through the consumption of goods and services at the household and person level. In principle, consumption is defined broadly to include the flow of all goods and services that are necessary to achieving and maintaining a particular standard of living (Slesnick, 2005; Travers and Richardson, 1993). Hence, goods such as leisure; public goods like education, police, public infrastructure; in-kind transfers; and the ownership of one's homes and consumer durables (such as cars, major appliances and so on) that are reflective of longer-term services received are theoretically included. However, because consumption cannot be measured comprehensively and directly, the focus instead is on conceptualising the range of resources that enable current and potential consumption of goods and services.

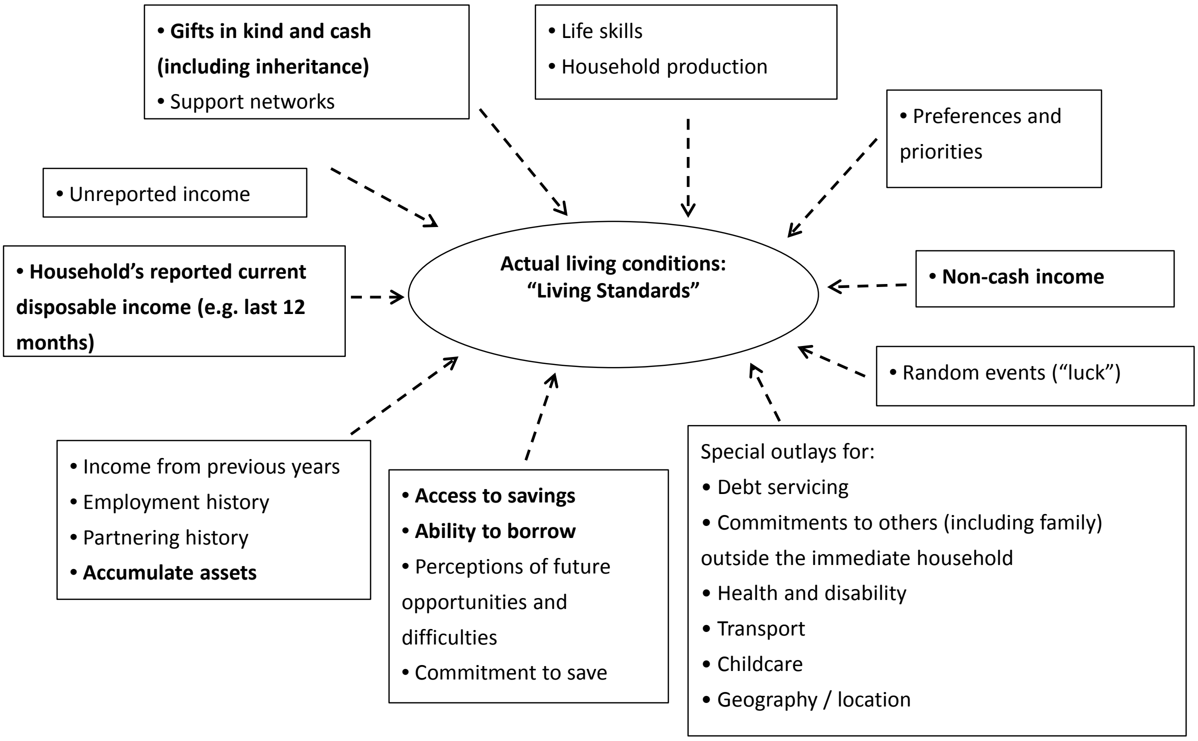
Although resources extend beyond a financial focus to include all social, personal and civil resources, a distinction is made between the broader range of resources that influence consumption per se by creating an environment that supports consumption needs, and the specific resources necessary to obtain consumable goods and services. The ABS (2009; 2010) makes this distinction clear in their recent work on developing a conceptual framework to integrate the multi-dimensional factors that influence a household's standard of living.

Their Low Consumption Possibilities Framework (ABS, 2009b; Billing et al., 2010) distinguishes between an inner and outer framework. In the inner framework, income and wealth are prescribed as the financial resources used to assess the level of economic well-being attained or able to be attained (that is, consumption possibilities). The outer framework includes contributory factors that influencing economic living standards. These include: human and social capital; the economic environment; an individual's life-cycle stage; individual circumstances and behaviours; and life-style choices.

Similarly, Lister (2004) refers to the asset pentagon; the full range of interconnected resources beyond the financial that influence consumption potential. The list includes: financial assets (income and wealth); personal assets (human capital through skills, knowledge and health); social assets (social capital through social networks, family and community relations); natural assets (from the environment); and collective and individual physical assets (such as state infrastructure, political voice and the law). Perry's (2002) schematic diagram (Figure 2.1) illustrates the assortment of economic factors (such as income, assets, non-cash income and gifts) and non-economic factors (such as household production, life-skills, support networks and risk preferences) within an individual's control that affect actual living conditions.[10]

[10] Hulchanski and Michalski's (1994) also refer to the five spheres from which households can obtain cash and non-cash resources to meet their living standard needs: the domestic economy, the informal economy, the social economy, the market economy and the state economy.

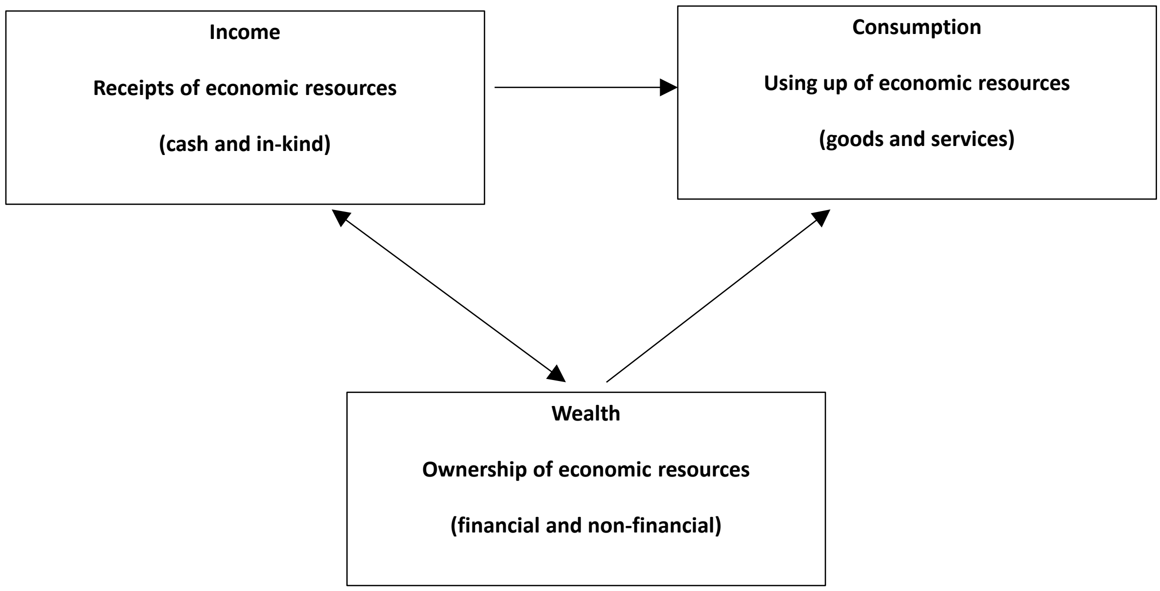
Figure 2.1 Actual 'economic' living standards



Source: Perry (2002: Figure 1)

Consequently, even though the importance of *full* resources is conceptually clear as influencing *full* consumption, as an analytical and assessment approach, the focus is on the 'inner framework'; assessing a household or individual's command over economic resources that are either earned, received or owned which enable the potential purchase of goods and services available for sale in a monetised economy (ABS, 2001b). Collectively referred to as 'the means' of living, the emphasis herein is on the notions of income (flows) and wealth (stock) as providing the full array of consumption possibilities that determine the economic standard of living (ABS, 2001b: 184; Stiglitz et al., 2009: 115). The ABS (2001b) encapsulate the inter-relationship between income and wealth in supporting potential consumption possibilities diagrammatically in Figure 2.2.

Figure 2.2 ABS 'Means' of living



Source: ABS (2001b: 184)

The income-consumption-wealth framework used by the ABS (1995, 2001b) is related to the classical Haig-Simons (Haig, 1921; Simons, 1938) definition of income as 'the money value of the net accretion to one's economic power between two points of time (Haig, 1921: 27). This is often expressed as the sum of consumption and the change in net worth in a period. Income is inclusive of current and capital receipts, irrespective if they are irregular or non-recurring receipts; consumption is restricted to the spending on goods and services; and net worth is the difference between assets and liabilities. The ABS, however, following economic household survey data convention and the recommendation of the Canberra Expert Group on Income Statistics (2001), restrict income concepts to those relating to current receipts that are available for current consumption without any reduction in net worth. They write:

> Economic well-being is determined by all economic resources available to the household. It encompasses the household's access to goods and services through its current income and its capital receipts whether they are receive in cash or in-kind. It also includes the notional dissaving value of the household's net stock of assets and liabilities, otherwise referred to as the household's net worth. (ABS, 1995: 4)

The relationship between income, wealth and consumption as it relates to age is formally captured through the Modigliani life-cycle hypothesis of consumption and saving (LCH) (Browning and Crossley, 2001; Deaton, 2005). Developed in the 1950s in collaboration with Brumberg (Modigliani and Brumberg, 2005) and Ando (Ando and Modigliani, 2005), Modigliani proposed a theory to understand the pattern of individual consumption over time and with age, relating it to savings (wealth accumulation) and income earning potential. The hypothesis is consistent with conventional consumer-choice theory on individual utiliy maximisation but assumes a lifetime utility function. Individuals seek to maximise their utility over their lifetime subject to financial constraints and in the process will smooth or adjust their consumption over their life-cycle. Consumption smoothing is a critical component of the hypothesis.

The theory posits that individuals will choose a path of consumption by adjusting the pattern of income and wealth accumulation according to various life-stages and work histories to maintain their marginal utility of consumption over their lifetime (Haider et al., 2000). Within a conventional life course trajectory, the expectation is that when income is higher during the primary working years, assets are accumulated and when earned income from labour force participation ceases, the stock of wealth accumulated over a lifetime is purposefully run down to finance consumption in retirement, until all resources are fully exhausted at the time of death (Zaidi, 2008).

Represented graphically, the age-wealth profile in the hypothesis is 'hump-shaped' or an inverted 'V' with a linear increase in wealth until retirement and constant annual consumption over time. The basic model assumes that income is constant until retirement, zero post-retirement and consumed over the lifetime; retirement age and longevity are known with certainty; the interest rate is zero and there are no bequests. In later versions of the model, the assumption of zero interest rate was replaced with a constant positive return, resulting in an inverted 'U' shape (Wolff, 1988).[11]

[11] It is the shape of this age-wealth profile that is at the heart of the hypothesis and the subject of many empirical investigations attempting to support or refute the theory. These discussions lie outside the scope of the thesis, however, readers can refer to: Barazini (2005), Browning and Crossley (2001), Haider et al. (2000), Hurd (1990), Hurst (2008), Torrey (1986) and Wolff (1988).

The theory rests on two premises: that individuals save for their old age and that individuals take into account not only their current financial resources but those that they expect to have in the future to determine their current and future consumption behaviour. Both income and wealth are subject to temporal fluctations and reflect transient, point in time, positions. However, the potential for consumption smoothing when older but asset rich, makes consumption a better proxy for longer term economic living standards than following either income or wealth patterns (Whiteford and Bond, 2000).[12]

The feasibility of the hypothesis in empirical applications is limited by three assumptions. Firstly, that individuals have full knowledge to plan current and future consumption needs and preferences. This includes certainty about their: life expectancy and retirement age; future family sizes; future income prospects; capital value of assets in a fluctuating economy; and borrowing capacity in the capital market (Haider et al., 2000; Wolff, 1988; Zaidi, 2008: 44). Secondly, that individuals intentionally and easily dispose of all their resources during their lifetime irrespective of: the degree of risk aversion to unexpected financial shocks; illiquidity constraints that restrict the conversion of assets into income streams; current life-styles; and concern for their long term health and social care needs (R. L. Clark et al., 2004; Elsinga and Mandič, 2010; Reed et al., 2004). Third, that people attach different social meanings to asset types and that these complex 'social, psychological and normative interactions' between individuals and assets, affect the treatment of assets and their potential as fungible financial resources (Price, 2008: 136). This is especially true of the emotional attachment and the significant psychological inheritance value attached to one's home (J. D. Fisher et al., 2007; Hurd, 1990; Lockwood, 2012; Price, 2008; Rowlingson, 2006).

[12] This footnote is adapted from the Nobel Prize award ceremony speech given by Bentzel (1992) as a tribute to F. Modigliani. Bentzel said that the life-cycle hypothesis is a major contribution to micro and macro-economic theory. The cornerstone economic theory until the 1950's was Keynes's (1936) theory of saving. This theory stipulated that individual's current consumption and saving behaviour is related to their disposable income in a given period. The fundamental 'psychological law' is that consumption will increase as income increases, but not as much as income increases (Baranzini, 2005). Kuznets (1942) showed that that this did not occur over time. The life-cycle hypothesis was able to improve on Keynes's theory of consumer demand by situating it within a time perspective and introducing an age dynamic.

Browning and Crossley (2001: 3), however, emphasise that the life-cycle model allows economists to think about the 'inter-temporal allocation of time, effort and money' and facilitate the modelling of life-cycle choices to do with consumption and savings, but also to do with education, human capital, marriage, fertility and labour supply in a way that minimises uncertainty and individual preferences. They argue that there is 'no such thing as the life-cycle model, only particular life-cycle models' (ibid). As a theoretical framework, the life-cycle model provides a flexible way of linking consumption, income and wealth in an intuitive and logical manner along an age trajectory of changing needs and circumstances.

Income is a source of current individual purchasing power. It is the primary method to obtain those elements necessary to ensure a good standard of living such as good health, decent education and adequate housing. Moreover, as Islam (2001: 52) writes '[it] provides other socio-economic opportunities and benefits such as power, liberty, wealth, happiness and good social relations' (quoted in Clarke and Islam, 2004: 75). The basic assumption is of a correlation between those who lack an adequate income and those who are materially deprived in other dimensions (such as lack of access to health services, inadequate housing or restricted employment opportunities (Laderchi et al., 2003).

At a broader institutional level, income forms the basis of social service provision, as most benefits are income means tested (at least in Australia), and consequently a yardstick with which to compare and measure welfare systems. As Jensen et al. (2007) points out, state income support systems are designed to provide a safety net in recognition that irrespective of an individual's capacity to earn a market income, a minimum income level is required to alleviate hardship. The right to a minimum income is advocated by Atkinson (1991: 8): individuals as citizens are endowed with a universal right to a basic minimum income, irrespective of how they spend it, as a prerequisite for participation in society and a guarantee of positive freedoms.

Another source of economic resources, conferring similar economic power and security as income, is wealth. Assets can be sold releasing money or the equity leveraged to borrow funds or gifted to other people across many scenarios: to maximise the ability and timing of different types of consumption; as insurance in case of emergencies; or to improve the economic position of other household or family members. Headey et al. (2008: 66) write that 'this is plainly just as true for the housing one lives in, or fine paintings on the wall, as for shares or savings accounts which generate direct cash income'.

Hence, the starting point for the work in the following chapters begins with unpacking the notion of *income* and *wealth* in a fuller sense as explanatory determinants of potential consumption possibilities. *Full income* conceptually involves extending the notion of income as cash earned and received privately and from direct government benefits (ABS, 2007b, 2012a), to include the value of all goods and services received by an individual. Income in its fullest sense incorporates the value of in-kind government benefits through government spending on social services such as education, health care, physical and service infrastructure; the value of in-kind private benefits such as through unpaid housework and child-care, though household production and leisure time, and through employer-provided fringe benefits; and also including the value of services received from the ownership of assets (including household durables and one's home) (ABS, 2001b, 2007b; Smeeding and Weinberg, 2001; Travers and Richardson, 1995).

Defining full wealth conceptually, on the other hand, is slightly more problematic (Quinn, 1985; Sierminska, 2005). Wolff (1990: 180-182) proposes three alternative notions of wealth. The most expansive called 'augmented wealth' closely follows neo-classical theory to encapsulate the present value of all future income, including some valuation of human capital and of pension rights. It is indicative of potential future consumption, rather than current consumption. The most restricted notion is 'capital wealth', limited to assets retained for their income-producing potential (such as financial investments and equity in real estate). It is considered a measure of the economic and social power of the household.

A middle ground is the notion of 'household disposable wealth'. Wealth is defined following a standard accounting framework of adding assets and deducting liabilities that are directly or indirectly fungible and within a household's direct control. In addition to home ownership and superannuation, that are considered primary components in Australia (Kelly et al., 2004), other components include: financial and other real-estate investments; capital goods such as art and jewellery, consumer durables and household inventories; the accumulation of cash; and the cash surrender value of life insurance policies and pensions plans (Clarke and Islam, 2004; Wolff, 1990). This notion of wealth is the most commonly applied in empirical research because it is amenable to numerical measurement and provides a measure of current potential consumption possibilities at the household level (Sierminska, 2005).

2.3.2 Contribution

There are many reasons for basing standard of living assessments on an economic approach which measure the economic resources that enable consumption possibilities. As Sen (1987) alludes to, an economic approach continues to retain saliency within policy circles in government and academia and also within the broader community. Economic resources, and in particular income, play an inextricable role in understanding and operationalising concepts relating to disadvantage. Chapter 3 will illustrate the extent to which results on income distribution, income poverty and to a lesser extent wealth distribution are routinely presented by international and national policy and statistical analysis institutions. Second, the reliance on a money metric is obvious given the role of money as an enabler of purchasing opportunities and benefits necessary to ensure a good standard of living, including the purchase of health and education services and housing, and is a source of economic and social power across the vast majority of societies (Clarke and Islam, 2004).

Third, Sumner (2006: 62) notes, that as a numerical metric, economic measures are amenable to quantification implying a certain level of precision, objectivity and robustness and also lending itself to statistical aggregation and analysis. These practical advantages in combination with the conceptual importance of economic resources, has led to the frequent collection of household economic data by national statistical agencies. More recently, the harmonisation of economic variables across countries (such as the Luxembourg Income Study, the Luxembourg Wealth Study and the European Union Statistics on Income and Living Conditions) has enabled more rigorous comparative analysis within and across countries and over different time periods (Förster et al., 2004).

Finally, income provision remains a vital policy lever available to government in their capacity to impact social welfare outcomes and also assess the effectiveness of social and economic policy (Harmer, 2008). Saunders and Bradbury (2006: 343) write that 'the *instrument* of policy is thus often income, even if the goal is to combat deprivation, promote capability fulfilment or reduce living standard disparities'; hence it is important to retain economic metrics and to strive for accuracy.

Yet, notwithstanding these advantages, viewing the standard of living solely through an economics prism is conceptually narrow. It assumes that individual utility maximisation focused on a single 'money' indicator is an adequate proxy for well-being, to the exclusion of other non-economic resources (such as good health, access to education, access to transport, social relations, a positive outlook or a safe and secure environment). Some of these resources may not be marketed, and even if they are, they cannot be perfectly captured through income, wealth and consumption measures (Laderchi et al., 2003) or their intrinsic value cannot be converted to imputable prices (Stiglitz et al., 2009: 41).

The focus on the individual does not fully account for the role of social institutions and social interactions, except for the technical concern over the scaling of economic resources according to household structures. Economic resources are not always used in way that contributes to an individual's own material consumption. Some instances of this are: cash donations to charity; income assistance to family members; and purposefully living below income levels to save for the future needs of other family members (as part of precautionary or bequest motives) (Krishnan et al., 2002).

Moreover, the focus on potential consumption possibilities represents the ability to purchase marketable goods and services, thereby serving as an indicator of the 'means to' rather than the 'ends of' actual living standards. Ringen (1988: 356) argues that the modern welfare state embodies the 'principle of equality of result' since it not only distributes income but also social services and regulates market provision to enable an equality of result. The implication being that the standard of living needs to be conceived beyond a uni-dimensional economic framing and measured more directly in terms of living standard outcomes and conditions. To do this, we need to look beyond economics to other sociological and philosophical conceptualisations.

2.4 The social indicators approach

A key impetus in the pursuit to find alternative ways of measuring the progress of societies and individuals stemmed from two factors. First, as discussed above, the inadequacy of GDP (or related measures such as GNP) as a measure of individual economic living standards. Second, is the inability of GDP to be representative of the overall state of society and the overall well-being of individuals (de Leon and Boris, 2010; Easterlin, 2000b; Scrivens and Iasiello, 2010; Sen, 1987; Stiglitz et al., 2009; Wiseman et al., 2006).

Eight decades ago, Kuznets (1934) cautioned that ‘the welfare of a nation can scarcely be inferred from a measurement of national income’ (Kuznets, 1934). However, possibly the most famous exposition on the shortcomings of GNP was delivered in a speech by Robert Kennedy in 1968.

> [It] counts air pollution, and cigarette advertising, and ambulances to clear our highways of carnage…It counts the destruction of the redwoods and the loss of our natural wonder in chaotic squall...Yet, [it] does not allow for the health of our children, the quality of their education, or the joy of their play… It measures neither our wit nor our courage neither our wisdom nor our learning, neither our compassion nor our devotion to our country. It measures everything in short except that which makes life worthwhile. (Kennedy, 1968)

In the decades since, the development of social indicators by pioneers such as Raymond Bauer, Otis Duncan and Kenneth Land (Land, 1971, 1983), the capability approach by philosophers Amartya Sen and Martha Nussbaum (Nussbaum, 2001; Sen, 1987), and the conceptual emergence of subjective well-being by psychologists Warner Wilson, Angus Campbell, Ed Diener and Daniel Kahneman (Diener, 1984;

Diener et al., 1999; Sirgy et al., 2006) have sought to encapsulate either philosophically or empirically the essence of Robert Kennedy's call to look beyond GNP towards multi-dimensional components of well-being.[13] The common presumption amongst these scholars is that well-being cannot be reduced to a single monetary figure (Sirgy, 2011), and that it is necessary to legitimatise empirically the inter-dependency and inter-relationship between different aspects that encapsulate the substance of human (and more broadly social) well-being.

However, unlike the subjective well-being or the capability approaches, the social indicator approach did not originate either from a specific disciplinary field or from a theory of human behaviour but evolved out of a movement interested in the measurement of social progress. Although the use of social indicators dates back two centuries (Cobb and Rixford, 1998; Noll, 2002), the resurgence began in the late 1960s in the United States. This was initiated by the publication 'Social Indicators' (Bauer, 1966), as an outcome from a NASA[14] initiative to understand the impact of the space program on American society, and by two other U.S. government led publications: 'Towards a Social Report' (USDHEW, 1969) and 'Indicators of Social Change' (Sheldon and Moore, 1968) (Cobb and Rixford, 1998; Land et al., 2007; Noll, 2002; Scrivens and Iasiello, 2010).

Cobb and Rixford (1998) chart the history of social indicators opining that the proliferation of social indicator reporting in the 1970s suggested the sense of a movement. One broadly governed by the need to identify and integrate a range of economic, social, environmental and cultural indicators to assess if society was moving in the right direction, be tools for guiding public policy and act as a counterpoint to economic reports on the state of the nation. There were national publications in Sweden ('Swedish Level of Living Survey', 1968), Great Britain ('Social Trends', 1970), France ('Données Sociales', 1973), Norway ('The Norwegian Level of Living Study', 1973-1974) and the Netherlands ('The Social and Cultural Report;, 1974). There were

[13] The capability approach and the concept of subjective well-being are discussed further in this section and addressed again in Chapter 6.

[14] NASA refers to the American National Aeronautics and Space Administration.

international publications by statistical agencies such as the OECD's 'OECD List of Social Indicators' (OECD, 1982) and the United Nations 'Towards a System of Social and Demographic Statistics' (United Nations, 1975); and in academia through the establishment of the 'Social Indicators Journal' in 1974 (Cobb and Rixford, 1998; Noll, 2002; Scrivens and Iasiello, 2010).

Although the use of social indicators waned during the 1980s in an era of economic efficiency and government conservatism (Cobb and Rixford, 1998) this was short-lived. The reaction against economic rationalism and recognition of the social costs of economic growth in the 1990s led to a renewed interest in monitoring societal progress and formulating what it means to have individual and social well-being (Noll, 2002). Amidst this changing economic and political climate was the growing widespread popularity and theoretical appeal of the capability approach and the concept of subjective well-being. While they are not specifically drawn upon in this thesis, they are considered important approaches to describe because they greatly revived interest in the need for social indicators, and influenced the nature of social indicator development. These are very briefly discussed in the boxes below.

Subjective well-being (SWB)

SWB encapsulates the psychological notion of gauging an individual's cognitive evaluation of their life and their feelings of enjoyment and upset associated with life circumstances – such as life events, aspirations, achievements, social relations, failures and moral environment (Rojas, 2006). At an operational level, subjective well-being consists of three inter-related concepts: a high level of life satisfaction; a high level of positive affect; and a low level of negative affect (Deci and Ryan, 2008; Veenhoven, 2008). It encompasses both cognitive (what a person thinks) and affective (what a person feels) appraisals of life (Diener et al., 1999; Veenhoven, 2008). It is these two distinct states that are related to the two most frequently asked survey-based questions in reference to subjective well-being: life satisfaction (cognitive) and happiness (affective).

There have been many theoretical contributions and debates on the subject of SWB. For instance, are SWB measures more aligned with a hedonic interpretation of well-being versus eudemonic? Hedonic well-being refers to the pleasure or happiness as experienced through the mind and body. Eudaimonic well-being consists of ‘the process of fulfilling or realising one’s daimon or true nature’ (Ryan and Deci, 2001: 143).[15] There is the distinction between bottom-up and top-down theories to explain SWB outcomes (Diener, 1984; Diener et al., 1999). Bottom-up theories posit that so long as a person’s life circumstances (for example, external events and demographics) enable fulfilment of basic human needs then happiness is achievable. Top-down theories focus on the mechanisms within a person (for example, personality traits) that determine how he/she perceive his/her life.

There are theories relating to adaptation, such as the ‘multiple discrepancy theory’ (Michalos, 1985), that individuals compare themselves to multiple standards – what one wants, what one has had in the past and what relevant others have. There are theories to interpret results, such as ‘subjective well-being homeostasis’ (Cummins et al., 2003) which asserts that while global SWB (that is, overall satisfaction with life questions) fluctuates temporarily, it generally hovers around a set-point, which is controlled and maintained by psychological devices determined through personality types.[16]

The valuable contribution of SWB to social indicators is now universally unquestioned; even if debates over operational form, the determinants of happiness and life satisfaction and the relationship to objective indicators continue. SWB is increasingly being adopted across economic, health and social science disciplines (Diener and Suh, 1997; Easterlin, 2000a; OECD, 2013b; Rojas, 2006; Schokkaert, 2007; Sirgy, 2011;

[15] Hedonic and eudaimonic well-being offer different views of human nature (Deci and Ryan, 2008; Ryan and Deci, 2001). The maximisation of pleasure is the ultimate source of happiness and the goal of life with the hedonic view. Eudaimonic theory asserts that not all pleasure producing outcomes yield positive well-being, as well-being is about the congruence of people’s life activities with deeply held values. Even though SWB is generally associated with the hedonic view, it is argued that the life satisfaction component in the current operational form also incorporates an eudaimonic perspective (Ryan and Deci, 2001).

[16] Kahneman (2006; 2004) also argues that global SWB questions are inaccurate as they are subject to temporariness, incur retrospective bias and are not specific enough. Instead, the characteristics of SWB measures should seek to: represent actual hedonic and emotional experiences directly; be aligned with the duration of different segments of life; and be minimally influenced by the context and standards of comparison (Kahneman et al., 2004: 430).

Veenhoven, 2008). Happiness and life satisfaction questions are part of the catalogue of routine questions asked in social-surveys. The United Nations General Assembly (2011) has formally passed a resolution inviting member states to identify indicators that can measure the pursuit of happiness and use these to guide public policy. As an individual-level concept, it provides an inductive approach to understanding what makes a good society (Veenhoven, 2008: 11). It is a useful counterpoint to sociological and philosophical theoretical notions on the subject and to the preoccupation with objective measurement to analyse human well-being. Diener and Suh (1997: 213) write that 'Ultimately, we can comprehend quality of life fully only if we understand the interplay between social indicators in a society, and the subjective reactions of the citizens of that society'.

Capability approach (CA)

The capabilities approach has been instrumental in changing the language and focus of social policy discourse by introducing "a sociological turn" in economics (Robeyns, 2006: 371). Over the course of two decades (1970s – 1990s), Sen (1984, 1985, 1987, 1993a, 1999, 1980) developed and refined the moral philosophical argument that well-being assessments should be about gauging the freedom and opportunities that people have to lead the lives they have reason to value.

Sen writes of functionings, the capability set and commodities. Functionings represents those things that a person actually 'manages to do or be in leading a life'. The capability set reflects 'the alternative combination of functionings the person can achieve, and from which he or she can choose one collection'. Commodities represent the economic and non-economic resources to enhance functioning opportunities (Sen, 1993a: 31). Hence, functionings represent achievements, capabilities describe opportunities and commodities act as the conduit to enable achievements. Sen argues that the conceptual analytical focus should be on assessing the capability set, as opposed to the actual choices (achieved functionings) made or the commodity bundle (resource inputs).

By extending the evaluative exercise beyond resources (economic and non-economic), the capability approach emphasises the cumulative effect that individual attributes (choices, constraints and circumstances) and the social context have on the set of potential functionings and the final achieved functionings. The global impact of the capability approach is undisputed. It is the conceptual framework on which the United Nation's Human Development Index is based and is a guiding influence within official government conceptual frameworks, such as on well-being in Australia (Gorecki and Kelly, 2012: 31) and on poverty in Germany (Ardnt and Volkert, 2011). Stiglitz et al. (2009: 42) point out that the approach is grounded by notions of social justice, ethical considerations and moral principles that value the achievement of 'human ends'; recognise the diversity of human needs, values and priorities; the inter-dependency between various functionings; the importance of freedom of choice; and the influence of social and cultural contexts.

The timely confluence of the capability approach and the subjective well-being approach with disenchantment over macro and micro-economic reliance led to a social indicator era that over the last twenty five years has a produced a voluminous literature ranging from descriptive social reports to comprehensive suites of indicators to composite indices. These are discussed in the literature review in Chapter 3. Two notable developments in the first decade of this century promoting the empirical application of social indicators are the Istanbul Declaration at the OECD World Forum on Statistics, Knowledge and Policy (OECD, 2007) and the Commission on the Measurement of Economic Performance and Social Progress commissioned by the Sarkozy government and chaired by Nobel Laureates Stiglitz, Sen and Fitoussi (Stiglitz et al., 2009).

The Istanbul Declaration formalised an agreement between various international statistical, political and development agencies[17] to actively pursue the measurement of societal progress and well-being. They write of 'the need to undertake the measurement of societal progress in every country, going beyond conventional economic measures such as GDP per capita' and 'to produce high-quality, facts-based

[17] These included the European Commission, the OECD, the UN, the UNDP, the Organisation of the Islamic Conference and the World Bank.

information that can be used by all of society to form a shared view of societal well-being and its evolution over time' (OECD, 2007: 1).

Likewise, the Sarkozy Commission regarded its report as 'an important venue for a discussion of societal values, for what we, as a society, care about, and whether we are really striving for what is important' (Stiglitz et al., 2009: 18). They urge for international and national initiatives to identify indicators and pursue the development of metrics to enable better assessment of social progress.

2.4.1 Social indicator principles

It is perhaps clear from the historical development of social indicators (and will become more evident in the literature review), but it is nevertheless worthwhile emphasising that 'social indicators' are not articulated from a particular theoretical position. Hence, in attempting to set out the salient principles that underpin the approach, preference is given to given to the roughly agreed upon set of guidelines latent within its empirical practice. It is envisaged that as the diversity of empirical applications increase and improve over time, a conceptual framework will be articulated more formally. For now, the principles are formative, provisional and not exhaustive. Moreover, as they intersect closely with methodological principles, they are only briefly discussed here with more extensive discussions deferred to Chapter 6.

The first principle acknowledges that 'social indicators' is not situated within a singular unifying theory based on the functionings and aspirations of human beings and society. Initially seen as a major weakness, Sheldon and Freeman (1970: 102 - 103) argue that there is no 'social theory, even of a tentative nature, which defines the variables of a social system and the relationships between them', and that such as theory is necessary to provide a set of social accounts to parallel an economic one. Sheldon and Freeman's (1970) critique is possibly raising the bar too high on what social indicators can realistically be expected to deliver. Enquiries into the nature of a good life have been a relentless human pursuit for 1000s of years, from classical Greek philosophers, ancient Eastern religious philosophies to contemporary deliberations amongst sociologists, psychologists and economists. Smith ((1980) from (Sirgy et al., 2006: 355)) captures this enduring search by writing, 'Yet we cannot let the matter rest, so long as we care about improving the quality of our lives. When we ask what it is to live a good life, we are concerned with what is, in many ways, the most important question of all'.

In contemporary contexts, the role of social indicators is not only more modest but more fluid and adaptable. Pluralistic interpretations of well-being pave the way for flexible social indicator frameworks that can borrow from alternative and sometimes disparate theories. Land (1983) for instance, classifies applications that existed early on in the development of social indicators as emanating from two theoretical frameworks: micro-economic theory and enlightenment theory.[18] Many scholars have relied on the contribution of modern theorists, from Sen and Nussbaum's capability theory to Rawl's theory of justice to Doyal and Gough's theory of basic human needs to theories on subjective quality of life to guide the choice of parameters when conducting social indicator studies (Alkire, 2002; Sirgy, 2011).

The second principle is that of multi-dimensionality. The literature review in Chapter 3 will attest to the numerous accounts of multi-dimensional lists. The Sarkozy Commission (Stiglitz et al., 2009) reinforce the innate multi-dimensional nature of social indicators They write that 'to define what well-being means, a multi-dimensional definition has to be used' (ibid: 14). The well-being framework they propose draws from different theoretical notions of well-being: subjective well-being, capabilities and fair allocation.[19] Each located within different disciplines: psychology, moral philosophy and welfare economics. Following a review of academic research and policy initiatives, the Sarkozy Commission propose the following dimensions: material living standards (income, consumption and wealth); health; education; personal activities

[18] Land (1983) points out that normative welfare indicators focus on 'direct measures of welfare', treating indicators as outcomes linked to policy inputs, and emanate from micro-economic theory based around the expenditure required to achieve policy imperatives. Descriptive social indicators in contrast are 'indexes of social conditions', tracking change over time and across population groups. Indicators assume an enlightenment role as they contribute to a general understanding of social conditions and the social change required.

[19] Fair allocation is a welfare economic idea that weights 'the various non-monetary dimensions of quality of life (beyond the goods and services that are traded in markets) in a way that respects people's preferences' ((Stiglitz et al., 2009: 42).

including work, political voice and governance; social connections and relationships; the environment; and insecurity of an economic and physical nature.

The third principle is that of a system of indicators. Indicators are the pillars which anchor social indicator frameworks as they are the conduit through which conceptual notions are translated into measurable assessments of well-being. As Frønes writes:

> The model or theory applied is the source of the meaning assigned [by] the indicators. The complex relationship between indicators and the phenomenon indicated is especially profound in areas such as quality of life and well-being. … Phenomena such as poverty, well-being, happiness, or marginalization are not created by indicators, but they are defined by them. (Frønes, 2007: 13 - 14)

Bauer (1966: 1) initially defined social indicators as 'statistics, statistical series, and all other forms of evidence – that enable us to assess where we stand and are going with respect to our values and goals'. More recently, the ABS (2001b: 10) writes that 'social indicators [are] not just items of data, but statistical constructs … designed to inform social debates'. These definitions suggest that indicators have a normative role to facilitate improvements in well-being; differentiating them from statistics, as they are not neutral or descriptive in interpretation ((W. Van den Berghe, 1988) referred to in (Scrivens and Iasiello, 2010)).

A system of indicators is required because each individual indicator cannot sufficiently represent the dimension (Frønes, 2007; Maggino and Zumbo, 2012). The complex relationships between indicators, dimensions and the social indicator framework is mediated through a range of operational models (ibid). Following a review of methodological literature and empirical applications, Maggino and Zumbo (2012: 202) label the process within social indicator frameworks from concept to measurement a 'hierarchical design'. The process involves articulation of the conceptual model; the latent variables (or dimensions) that define well-being; leading to a system of indicators. Indicators are interpreted with respect to its position within the hierarchical structure and each is imbibed with a unique meaning in relation well-being.

The fourth principle relates to the treatment of commodities (inputs) and functionings (outcomes) in a manner that is fundamentally different to the capabilities approach. The capabilities approach, as discussed in Section 2.4, is premised on evaluation of the capability set, not the achieved functionings or commodities. Sen (1984) emphasises that it is the ability of a person to transform commodities into valuable functionings that determines her well-being, so that individuals with the same combination of commodities may not achieve comparable well-being outcomes.[20]

Commodities (in other words, economic and non-economic resources) are instrumentally important but lack intrinsic value as they are a means to an end and not an end in themselves. Robeyns (2006) points out that in practice, the empirical estimation of functionings may condense the capabilities approach to a list of multi-dimensional indicators, not dissimilar to a social indicator approach. However, the focus on the conversion from commodities to functionings in the capability approach is not necessarily reflected in the social indicator approach. The latter is concerned with relationship between dimensions and the collective evaluation well-being.

The final principle relates to an attribute consistent throughout most empirical applications: the flexibility of the approach to include ideas contested in the literature, such as constructing a composite index or the use of subjective versus objective well-being indicators. A composite index is formed when individual indicators are synthesised into a single index (Nardo et al., 2005: 8). Composite indices are possible at various stages during the hierarchical process from conceptualisation to measurement.[21] The main contention in the literature is the rationale and legitimacy of an overall composite index that converts the over-arching multi-dimensional phenomenon, with all its complexity and ambiguity, into a uni-dimensional number (Atkinson et al., 2002; Maggino and Zumbo, 2012; Saltelli et al., 2004; Salzman, 2003).

[20] For example, Sen (1999) outlines five factors that affect the conversion of household income into material living standards: personal heterogeneities, environmental diversities, economic setting, social norms and distribution within the household.

[21] The various methods to construct composite indices are briefly discussed in Chapter 3 and in more detail in Chapter 6.

Sharpe sums up the debate between a composite index and the dashboard presentation of indicators, writing that:

> The aggregators believe there are two major reasons that there is value in combining indicators in some manner to produce a bottom line. They believe that such a summary statistic can indeed capture reality and is meaningful, and that stressing the bottom line is extremely useful in garnering media interest and hence the attention of policy makers. The second school, the non-aggregators, believe one should stop once an appropriate set of indicators has been created and not go the further step of producing a composite index. Their key objection to aggregation is what they see as the arbitrary nature of the weighting process by which the variables are combined. (Sharpe, 2004: 5)

There are also other considerations. The conceptual clarity and interpretation of the index given its multi-dimensionality is problematic, so too are the implicit trade-offs or compensability between items in the index (Ravallion, 2010; Saltelli, 2007). On the other hand, a composite index provides a viable alternative to an income-based measure with similar statistical benchmarking properties (such as, tracking differences across groups, across countries and over time). There is no resolution to this debate however, there are increasingly more applications that construct a composite index while acknowledging its limitations (Booysen, 2002; O'Hare and Gutierrez, 2012).

Similar contestability regards subjective well-being (SWB) indicators. SWB indicators are occasionally included as a dimension within social indicator applications (Bradshaw and Richardson, 2009; Hagerty et al., 2001). Or stand-alone studies, that measure a collective set of SWB indicators, are categorised as a particular line of development within the social indicator movement (Cummins et al., 2003; Hagerty et al., 2001). However, detractors point out that despite the synergistic focus on well-being outcomes in the SWB and social indicator approaches, relying solely on subjective well-being is nevertheless problematic.

There are issues over the temporal nature of self-perceptions; the inability of people to discern aspirations from daily realities; and the extent to which their self-assessments are influenced by personality type, a reference group or a process of adaptation (Chiappero-Martinetti, 2000; C. Graham, 2010; McAllister, 2005; Stiglitz et al., 2009). While these issues remain unresolved, there is an emerging consensus that objective and subjective well-being indicators serve complementary roles within the broad ambit of social indicators (Boelhouwer, 2010; Diener and Suh, 1997; Hagerty et al., 2001; International Wellbeing Group, 2013; Land et al., 2007; OECD, 2013b; Stiglitz et al., 2009).

2.4.2 Contribution

The social indicator approach can be regarded as offering a cross-cutting perspective across a range of conceptual notions relating to the welfare of society and individuals. In particular, the choice of indicators within each dimension and the choice of dimensions provide a flexible evaluative space to be as constraining or accommodating as required. With respect to assessments of individual well-being, adopting a social indicator framework offers many benefits.

It gives explicit recognition to a range of non-economic factors in addition to economic factors that shape well-being. By providing an integrated perspective on well-being, it offers the scope to examine the inter-related and inter-dependent aspects of people's lives. It is both input and output based, concerned with the resources to achieve an acceptable level of well-being and analysing the end result. It is individually and structurally situated in recognition of the role of social contexts in affecting individual choices and circumstances. It can be objectively and/or subjectively orientated, including subjective indicators as a cross-cutting dimension of well-being, or in a stand-alone capacity as a validation of objective well-being measures. Finally, it allows for an evaluation across the spectrum of well-being, from a focus on the negative (deficits to minimise) to the positive (assets to enhance) (Lippman et al., 2009).

Social indicators are now credited as an established and plausible way of framing, measuring, and evaluating well-being at an individual level, in addition to measuring the well-being of society. As methodological techniques improve to allow for the complexity multi-dimensionality introduces, and statistical agencies respond to the growing demand by compiling a litany of non-economic focussed indicators across a range of subject matters, the potential to construct comparable metrics to economic-based ones improves. This does not invalidate conventional economic measures however it does provide a useful counterpoint to assess if the same conclusions are reached if a multi-dimensional lens is applied. As Kroll (2011: 1) writes, '[it has] the potential to bring about a real paradigm shift concerning what we as a society consider to be progress and how, as a consequence, we will shape how we live together'.

2.5 Conclusion

In this chapter, the conceptual approaches that guide the two lines of empirical inquiry that form Part 1 and Part 2 of this thesis are outlined. The chapter began by differentiating the standard of living from well-being; arguing that the conventional treatment of the standard of living as an economic concept, provides a narrower conceptual focus than pluralistic understandings of well-being. The elusiveness and protean nature of well-being has meant that, across various non-economic disciplines, it provides a wider berth to include aspects of life that are not restricted to monetary measurement. Consequently, in this thesis the two terms are aligned distinctively with two alternative approaches; the standard of living with reference to the economic approach and well-being with reference to the social indicator approach.

The first conceptual approach is based on the economic theory that individuals as rational agents, will consume goods or undertake activities subject to financial limitation, to maximise their utility, and that maximisation of utility by the greatest number of individuals will consequently improve the utility (or welfare) of society. Section 2.2 illustrates how despite the theoretical intention to include the flow of all goods and services embedded within 'consumption', assessment is whittled down to a focus on income and wealth, as enabling the set of potential consumption possibilities that determine the economic standard of living achievable.

The second conceptual approach is based on the application of social indicators to the concept of well-being. The salient principles embodied within the social indicator movement are provisionally set out as latent within its empirical practice. These include: the flexibility of social indicator frameworks to accommodate a range of social theories on social progress, human development and well-being; the emphasis on multi-dimensionality which explicitly recognises the role of economic and non-economic factors in shaping well-being; the operationalisation of conceptual models through a system of indicators that follow a 'hierarchical design'; the lack of a distinction between resources (commodities) and outcomes (functionings); and the diversity of operational models to include ideas contested in the literature, such as composite indices versus indicator dashboards or objective versus subjective well-being indicators. For analysis of individual well-being, social indicators can accommodate the complexity between dimensions hence allowing for the inter-related and inter-dependent aspects of people's lives to be examined.

In the following chapters, the economic approach with its focus on potential consumption possibilities, paves the way for the operationalisation and analysis of the economic living standard approach in Chapters 4 and 5. The social indicator approach with its holistic outlook, paves the way for the operationalisation and analysis of the multi-dimensional well-being indicator framework in Chapters 6 and 7 aimed at the individual. However, to situate these conceptual approaches empirically, the next chapter reviews the literature identifying the research gaps that this thesis addresses.

3 From economic studies to multi-dimensional studies – the empirical application of concepts

3.1 Introduction

In the following review, studies are constrained to and grouped by the two broad perspectives on the conceptualisation of the standard of living and well-being discussed in Chapter 2: economic applications to measuring the standard of living and social indicator applications to measuring well-being.[22] The two perspectives are inter-related; however, organising the literature in this manner illustrates the shift away from an economic focus towards a multi-dimensional conceptualisation that explicitly encapsulates sociological, health and psychological dimensions, in addition to an economic dimension.

The chapter is in two parts. Part 1 critically reviews Australian and international studies that situate the standard of living within an economics measurement perspective. The literature is organised by economic resource type in keeping with the conceptual narrative of Chapter 2. It reviews the large volume of empirical work comparing the relative economic position of countries or specific population groups and tracking changes over time to provide summary standard of living assessments. It shows that although the role of wealth is widely acknowledged, there are few applications that integrate income and wealth into a single metric. Finally, it emphasises the importance of an expanded economic resource focus to assessing the standard of living in an Australian context and a research area worthy of further investigation.

Section 3.2 begins by reviewing empirical studies using household disposable income, leading to a discussion on the conceptual and practical problems inherent in relying on cash income as a standard of living indicator and the steps that can be taken to

[22] This review does not analyse the vast enormous literature surrounding the well-being of older people. If well-being is interpreted as all that affects a person's life, that undertaking would be beyond the scope of this thesis. It would involve almost every discipline and field (from economics to health and from gerontology to the built environment), and it would include a range of methodologies (such as qualitative, mixed methods and record data analysis). The review is structured around methodological approaches to the standard of living and well-being with the understanding that, wherever necessary throughout the thesis, specific literature on older people pertinent to that discussion is referred to.

address these concerns. This includes taking into account income from non-cash sources. Section 3.3 discusses studies that examine consumption-based measures, including a focus on consumption expenditure and most importantly the role of wealth in affecting living standards. Section 3.4 concludes Part 1 and introduces the shift from the economic literature to the wider social-science literature with its emphasis on multi-dimensionality.

Part 2 critically appraises studies that employ multi-dimensional indicator frameworks in line with the broad principles of social indicators. They specifically introduce non-economic dimensions as a way of providing a more holistic and integrated understanding of the various tenets that comprise well-being. Some studies are located within particular academic disciplines. For example, studies that stem from a psychological discipline frame well-being subjectively through individual self-assessments on the quality of life. Alternatively, other studies use the capability approach to articulate a philosophical view of well-being centred on the freedom to choose and the importance of individual values attached to choices. Commonality exists however, as all in practice involve the compilation of dimensions and indicators.

Section 3.5 examines the emergence of indicator dashboards published by the statistical arms of national and international organisations, leading to a discussion on the inadequacies of these initiatives to provide substantive assessments on the well-being of older people. Section 3.6 profiles the use of composite indices that integrate multiple dimensions of well-being into a unitary index. The discussion illustrates that despite the proliferation of well-being indices generally and specifically to older people, the majority use inter-personal aggregation to make comparisons across country and population groups and to track trends, with limited quantitative assessments on measuring well-being at the individual level. The conclusion in Section 3.7 argues that both conceptually and methodologically there is a need to construct indices of well-being emanating from the individual and capable of encompassing the complexity and totality of a person’s life.

Part 1: Economic applications to measuring the standard of living

3.2 Income

Historically and conventionally, measures of economic living standards are based on household disposable income. This commonly refers to cash income from employment; business income; investment and property income; regular income received from other private sources (including superannuation, annuities, scholarships and foreign pensions); cash income, received in the form of government social assistance benefits; and a deduction for personal tax (ABS, 2007b, 2012a).[23] The collection and harmonisation of comparable income surveys through the OECD, the EU and the development of the Luxembourg Income Study (LIS) has permitted a substantial body of research devoted to cross comparative analysis of household disposable income.

In Australia, the majority of studies rely on the Australian Bureau of Statistics (ABS) Survey of Income and Housing (SIH) and Housing Expenditure Surveys (HES) and since 2000 from the Melbourne Institute (but government funded) Household, Income and Labour Dynamics in Australia (HILDA) survey. Studies analyse trends in disposable income growth (Harding et al., 2002; Harmer, 2008, 2009; Whiteford and Bond, 2000; Wilkins, 2013d) and changes to the income poverty rate over time and by demographic compoisition (ACOSS, 2013, 2014; Harding et al., 2001; Saunders and Bradbury, 2006; Saunders and Hill, 2008; Tanton et al., 2009; Wilkins, 2007, 2013d). Although there are slight methodological differences in each study with respect to equivalence scales, time-periods, unit of analysis and income definitions, the prevalent findings are that the relative income position of older Australians has not improved substantially over time.[24]

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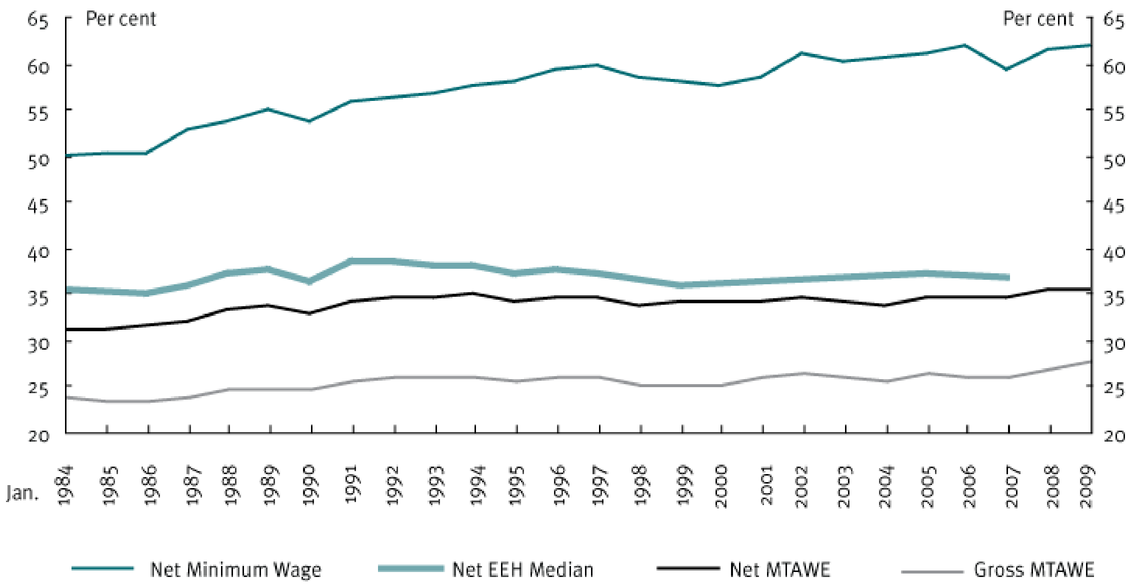
[23] Definitions of household disposable income are dealt with in much greater detail in Section 4.3.2 when describing the methodology to estimate economic resources in Chapter 4.

[24] These terms are dealt with in more detail in Chapters 4 and 5, however, to aid interpretability in this section brief definitions are provided here:

Equivalisation refers to a technical adjustment to household survey income, wealth and expenditure data to take account of household sizes and compositions. The 'modified' OECD equivalence scale is commonly used. It assigns a weight of 1 to the head of the household, weights of 0.5 to subsequent adults and 0.3 to each child aged under 15 (OECD, 2013d).

The Australian Pension Review Report (often referred to as the Harmer Report (Harmer, 2008, 2009)) compares the value of the single Age Pension relative to different earnings measures from 1984 to 2009 using data from the ABS Survey of Employee Earnings and Hours (Figure 3.1). The four earning measures used in the denominator are: take home earnings of a single worker on the minimum wage (top line); net median earnings of a full-time adult non-managerial employee (second top line); after-tax average weekly earnings of a single male worker (third line); gross average weekly earnings of a single male worker (bottom line).

Figure 3.1 Value of the single age pension relative to different earnings measures, 1984 – 2009



Source: Harmer (2009: Chart 4).
Notes: Calculations based on Australian Bureau of Statistics Survey of Employee Earnings and Hours, Catalogue No. 6306.0 and 6302.0. EEH = employee earnings and hours; MTAWE = male total average weekly earnings.

Figure 3.1 indicates that in 25 years, the relativity of the single Age Pension to different earnings measures was maintained and in the case of the net minimum wage improved by more than 10 percentile points. Yet despite this, the single Age Pension rate at 2009 was still at least 35 per cent less than the minimum wage for a single

Unit of analysis refers to individuals within a family, household or shared income group.

Relative income poverty is defined as the proportion of the population (or sub-groups) with incomes below a poverty line. The poverty line is set as a percentage of mean or median equivalised income of the population (World Bank Institute, 2005).

worker (top line: 61.8 per cent). It was 65 per cent less than net male total average weekly earnings (MTAWE) (third bottom line: 35.1 per cent in 2009). This is the measure against which the pension is currently benchmarked.

Earlier studies by Harding et al. (2002) and Whiteford and Bond (2000) reach similar conclusions although relativity is measured differently in each study. Harding et al. (2002) examine the disposable incomes of older Australians between 1986 and 1997 using ABS income surveys compared to those considered to be in their prime working age (35-54 years). The relative incomes of older people grew from an average of 54 per cent in 1986 to 55 per cent in 1997. In Whiteford and Bond's (2000) study, the relative average equivalised income of pensioners was around 60 per cent compared to non-pensioners across the three ABS income surveys (1986: 57.8; 1990: 61.7; 1995-96: 57.6). In the decade between 1986 and 1996, almost half of all pensioners remained in the lowest 30 per cent of the income distribution.

The approach to measuring old age income poverty in most contemporary Australian reports follow intenational convention (Burkhauser, 2009; OECD, 2009a, 2013c; Smeeding, 2004) and use a relative income approach that estimates a poverty line based on 50 or 60 per cent of median equivalised household income (ACOSS, 2013, 2014; Saunders and Bradbury, 2006; Saunders and Hill, 2008; Saunders et al., 2008; Tanton et al., 2009; Wilkins, 2007, 2013d).[25] The OECD (2009a: 12) claims that relativity is captured in two dimensions: as 'a yardstick dependent on median household incomes'; and 'against the prevailing norms for living standards in a particular country at a particular time'.

Wilkins (2007) reports that over a 20 year period spanning from 1982 to 2005, the risk of poverty increased markedly for those aged 65 years and over from 6.2 per cent in 1981-82 to 15.8 per cent in 2001-02 using a 50 per cent median (modified OECD) equivalised income poverty line. Saunders et al. (2008) estimated a 6 percentage point

[25] In most current poverty studies the median is preferred to the mean because the median is less sensitive to the existence of outliers at the top end of the income distribution (Burniaux et al., 1998; Förster et al., 2004). An Australian exception to this is the study by Harding et al. (2001). They rationalise that in times of rising inequality, the average better captures the relative position of the bottom income earners to the top income earners than the median, which effectively ignores the rise of the top income earners.

increase in the poverty rate for older people from 17.7 per cent in 2003-04 to 23.9 per cent in 2005-06 using a similar poverty threshold and equivalence scale to Wilkins (2007). An older study by Harding et al. (2001) also showed increasing poverty rates amongst older Australians. The rate increased from 7.3 per cent in 1990 to 11.2 per cent in 2000, with associated increases in the proportion of older Australians living in poverty, from 9 per cent in 1990 to 13 per cent in 2000.

A critique of the numerical estimation of income poverty rates is the dichotomous nature in which a person is identified as being in poverty or not depending on where the poverty threshold is set (Lister, 2004). The clear dividing line implies that very marginal differences in income can differentiate two individual's poverty status irrespective of the similarity in their living standards and experience of poverty. The poverty status of older Australians is particularly vulnerable to this issue because of the high degree of concentration of older people's incomes around 50 to 60 per cent of median incomes, especially for those whose only source of income is the Age Pension. Hence, some income studies assess the sensitivity of poverty rates to the poverty threshold (ACOSS, 2013, 2014; Harmer, 2009; Saunders and Hill, 2008; Saunders et al., 2008; Tanton et al., 2009; Whiteford and Kennedy, 1995).

The Australian Council of Social Services (ACOSS, 2013) showed that the risk of poverty was 13.8 per cent for age pensioners using a 50 per cent threshold and 38.1 per cent if a 60 per cent threshold is used based on ABS SIH 2009-10 data. It increased to 15.7 per cent and 39.2 per cent respectively based on ABS SIH 2011-12 data (ACOSS, 2014). It only takes a small dollar increase to move those older people close to the poverty line, in and out of poverty depending on which threshold is used. The difference between the poverty lines and the average of incomes for those who fall below it is a $5 gap from $86 per week using a 50 per cent poverty line, to $81 per week using a 60 per cent poverty line based on 2009-10 data (ACOSS, 2013), and from $93 to $95 respectively based on 2011-12 data (ACOSS, 2014).[26]

[26] An additional concern with income-based poverty measures is the inability to provide any assurance of who the poor are in a way that elucidates the lived experience of poverty (Lister, 2004; Ringen, 1988). Neither is it synonymous with identifying the factors causing poverty in a way that automatically guides poverty-alleviation policy. Many scholars have begun to apply the relative

International studies tend to compare the adequacy of different pension policy systems to prevent poverty in old age and ensure that living standards are maintained post retirement (Disney and Whitehouse, 2002; Hauser, 1998; Hurd, 1990; OECD, 2009a, 2013c; Walker, 1993; Whiteford and Bond, 2000; Whiteford and Kennedy, 1995; Zaidi, 2010; Zaidi et al., 2006). Countries are usually ranked according to income poverty rates and median income rates. It is difficult to reach any definitive conclusions regarding Australia's ranking, as these studies differ methodologically with reference to equivalence scales, poverty thresholds, the income unit, sample definitions of older people and the range of countries Nevertheless, across a number of studies the incomes of older Australians are a much lower proportion of population incomes with higher income poverty rates compared to other OECD countries.

The OECD (2013c) compare the incomes and poverty rates for older people aged 65 years and over across country.[27] Older people have on average 86.2 per cent of population incomes across all 27 OECD countries. However, there is significant variation across country, with rates as low as 65.4 per cent in Australia to as high as 97.2 per cent in France (Australia ranks second last before Korea). Wide variations similarly occur with income poverty, from less than 5 per cent for Hungary, Luxembourg and the Netherlands to above 25 per cent for Australia, Korea and Mexico, compared to the OECD average of 12.8 per cent. Australia also ranks second last, just above before Korea.

In terms of results by older person demographic sub-group, there is evidence of declining income living standards within older age cohorts (Harding et al., 2002; Hauser, 1998; OECD, 2009a; Whiteford and Kennedy, 1995). The OECD (2013c) report a 10 point difference between income poverty among 'younger old' (66-75 years) and 'older old' (75 years and over) Australians (poverty rates are 31.2 and 41.5 per cent

income poverty in conjunction with the deprivation approach to provide a more comprehensive understanding of poverty and social disadvantage (Mack and Lansley, 1985; Nolan and Whelan, 1996; Pantazis et al., 2006; Perry, 2002; Saunders, 2011, 2013). The deprivation approach is concerned with identifying and measuring essential items (or necessities) that cannot be met because of a lack of money (Mack and Lansley, 1985; Saunders et al., 2007). It is referred to in Chapter 6.

[27] The 'modified' OECD equivalence scale is used. The poverty threshold is set at 50 per cent of median equivalised household income.

respectively). A similar difference is reported in the relative incomes, as a proportion of population incomes, for the two age groups (69.3 and 60.0 per cent respectively). Whiteford and Kennedy (2000) showed that the decrease in relative average income from pre-retirement at 55 to 64 years (106 per cent) to post-retirement at 65 to 74 years (73 per cent) is steep and continues with old age so that the oldest Australians aged 75 years and over have the lowest relative incomes to any other age group (72 per cent).

There is evidence of lower income living standards for single older people compared to those in a partnered relationship (Disney et al., 1998; Harding et al., 2002; OECD, 2009a; Saunders, 2013; Saunders et al., 2008; Whiteford and Bond, 2000; Whiteford and Kennedy, 1995; Wilkins, 2013d; Zaidi, 2010; Zaidi et al., 2006). Comparing ABS SIH (2003-04 and 2005-06) data, Saunders et al. (2008) demonstrate that single older people have the highest incidence of poverty compared to older couples. The 2005-06 poverty rate for older singles of 46.9 per cent is nearly 3 times the estimated rate of 17.8 per cent for older couples. In a more recent study using ABS SIH 2009-10 data, Saunders (2013) shows that although the increase in the single rate of pension in 2009 (as recommended by the Harmer Report) has reduced the poverty rate for older singles, it is still nearly two times higher than the rate for older couples (37.5 per cent compared to 20.1 per cent respectively).

The increasing feminisation of aged poverty is also well-documented in the literature (Burkhauser et al., 1994; OECD, 2009a; Price, 2008; Wilkins, 2013d; Zaidi, 2010; Zaidi et al., 2006). Wilkins (2013d) examines the variation in poverty rates by family type between 2001 and 2010 using HILDA data. Older single females had the highest comparative poverty rate, despite decreases in the absolute value between 2009 and 2010 for older singles following the increase to the single Age Pension (from 41.1 to 35.8 per cent for females and from 36.8 to 31.7 per cent for males).

Disaggregated poverty rates by gender in the OECD (2009a) report indicate that, on average across OECD countries, the income poverty rate for older women is higher than that of older men (15 per cent compared to 10 per cent respectively).[28] Studies by Zaidi et al. (2010; 2006) estimating the risk of income poverty for older people across the EU reach similar conclusions. Results based on 2007 EU-SILC data indicate a 6 percentage point difference between the average poverty risk rate for older women compared to older men (22 per cent compared to 16 per cent respectively). The poverty risk is consistently higher amongst older females aged 75 years and over (24 per cent) and single older people (28 per cent).

The (OECD, 2009a: 70 - 71) posit three explanations for the gendered poverty experience. The *cohort* effect favours those with longer working histories and conversely disadvantages those with shorter career histories. The largest cohort affected are older old women; a generation that started families earlier with (and bigger) care responsibilites that either left them out of the paid work-force or with reduced paid work-force opportunities (lower earnings, shorter working hours, longer career breaks and fewer career advancements). Their pension entitlements are not only lower but also reliant on their husband's pension contributions. The *age effect* is a consequence of policies for indexing pensions to prices and not average earnings in some countries (excluding Australia). This means that pensioners fall below the relative poverty threshold as they get older. This is exacerbated amongst older old women given their longer life span on average than men. Related to this is the *compositional* effect. The increased longetivity of women to men implies a higher incidence of widowhood with women living in single households.

At an analytical level the Australian and international compararative literature suggests a lower relative economic standard of living for older people as measured against the population or a subset of the working population. There is evidence that living standards decline with age, status as a single older person and for women. Although these groups are independently affected they are not mutually exclusive and in many cases describe the same set of individuals – older widowed women.

[28] Note that this pattern is not replicated in gender comparisons amongst working-age people (18-65 years). Average working-age poverty rates across countries are 9.8 per cent for women and 8.8 per cent for men.

At a conceptual level, it is also suggestive of the impact of the analytical metric on substantive conclusions with obvious policy implications. In the Australian context, the Harmer Report (2009) was established in conjunction with the Senate *Inquiry into the cost of living pressures on older Australians* (The Senate, 2008) because of concerns that using an income benchmark may be insufficient to meet the living standard needs of all older Australians. The Harmer Report shows how conclusions drawn about the adequacy of the Australian Age Pension depends on the choice of the relative income line with higher replacement rates against the minimum wage (Figure 3.1: top line - 61.8 per cent in 2009) and much lower replacement rates against male total average weekly earnings (Figure 3.1: third bottom line and the measure against which the pension is currently benchmarked - 35.1 per cent in 2009). The establishment of the *Pensioner and Beneficiary Social Living Cost Index* in 2009 following the Harmer Report is targeted towards directly including the living costs of pensioners more comprehensively than the Consumer Price Index (ABS, 2009a).

To emphasise this further, the OECD (2009a) report compares the inadequacy of certain social security systems, such as Australia, to provide pension amounts above the income thresholds necessary to alleviate older-age poverty. 'The full Age Pension in 2005 was AUD 12,700 a year, lower than the poverty threshold of AUD 14,770 for a single person' (2009a: 63). However, the monetary gap between benefit levels and poverty levels is subject to where the poverty threshold is set. Increasing the poverty line to 60 per cent for instance would increase the dollar margin poverty gap and the poverty rate. Furthermore, the Age Pension is not the sole source of income for many older people, neither is it the only component in the social security system. Correct assessment of the adequacy of social provision systems requires comparisons between all sources of cash and non-cash income to the income stream.

3.2.1 Non-cash income

The exclusion of non-cash resources from conventional income measures is widely criticised in the literature (Atkinson and Marlier, 2010; Callan and Keane, 2009; Price, 2008; Radner, 1997; Smeeding and Weinberg, 2001). Smeeding et al. define these non-cash resources as:

> These include health care, housing, education, child care, transportation, food and other subsidies from governments or from third parties (i.e. employers), production for own consumption by farmers and by other individuals living mainly in rural areas and in-kind transfers received from relatives, friends and others in the form of food, clothing and/or shelter. (Smeeding et al., 1993: 230)

Scholars argue that the value of services and benefits received in-kind confer unique benefits to older people along the life course trajectory (Danzinger et al., 1984; Korenman and Remler, 2013; Moon, 1977; Quinn, 1987; Smeeding et al., 1993). The onset of increasing health and care issues leads to a larger provision of in-kind public health services (Danzinger et al., 1984; Korenman and Remler, 2013). Older people are also recipients of government services from housing provision, transportation and welfare programs (ABS, 2007b).

Changing environmental factors such as the increase in time for leisure and non-market productive activities, and the decrease in work-related expenses that accompanies retirement directly affects living standards (Hurst, 2008). Based on the structure of different living arrangements, older people who live within extended family units benefit from the transfer of intra-family household resources (Quinn, 1987; Smeeding et al., 1993). Conversely, those who live in smaller households (as singles or couples) share resources between fewer members (Danzinger et al., 1984). Older people also have the opportunity to accumulate more assets over the life course. Home ownership, in particular, provides a housing service that would otherwise be a rental expenditure paid out of income.

The endorsement by the United Nations (1977), the Canberra Expert Group on Income Statistics (2001) and the ABS (1995) has increasingly led to two forms of non-cash resources being included as income components in income distributional analysis: imputing rent for owner-occupied dwellings (ABS, 2008(b); Callan and Keane, 2009; Frick and Grabka, 2003; J R Rodgers, 2010; Saunders and Siminski, 2005; Smeeding and Weinberg, 2001; Wilkins et al., 2009; Wilkins et al., 2011; Wolff and Zacharias, 2009; Yates, 1994; Zaidi, 2008); and imputing the value of public in-kind benefits and services

(ABS, 2012a; Callan and Keane, 2009; Garfinkel et al., 2005; Harding et al., 2006; Smeeding et al., 1993; Travers and Richardson, 1995; Whiteford and Bond, 2000; Whiteford and Kennedy, 1995). The inclusion of these non-cash forms considerably alters assessments of the relative economic position of older people.

Imputed rent[29]

Imputed rent is understood as the notional difference between the rent a homeowner would pay to rent their home in the private market and the costs actually incurred to maintain and secure ownership of their home (Pech, 2011: 7). The ABS (2008(b)) examine the impact of imputed rent on the income distribution using data from the 2003-04 and 2005-06 SIH and 2003-04 HES. The inclusion of imputed rent decreased the proportion of outright homeowners in the lowest income deciles and conversely increased the proportion of mortgagees. The proportion of households with a reference person aged 65 and over (couple and single) in the lowest income quintile decreased with imputed rent; however, there is little impact on the top deciles.

Saunders and Siminski (2005) find that imputed rent has an equalising effect on the income distribution on the population except for the top deciles. Using 1998-99 ABS HES data, the greatest impact was to decrease the incidence of low-income (bottom 20 per cent of income distribution) among older households aged 55 years and over. The low-income rate (that is, the percentage that falls in the lowest quintile of the income distribution) fell from 18 to 10 per cent for households with a reference person aged 65-74 years and from 24 to 8 per cent for households with a reference person aged 75 years and over using equivalised disposable income and equivalised disposable income plus imputed rent respectively.[30] Similarly, low income rates fell for outright homeowners (19 to 11 per cent) and public renters (51 to 38 per cent) and rose for purchasers (17 to 21 per cent) and private renters (24 to 34 per cent).

[29] A more detailed discussion on the methodologies and issues associated with the estimation of imputed rent is contained in Section 4.4.2 in Chapter 4.

[30] Results reported here are calculated using the modified OECD equivalence scale and a gross imputed rental return of 4.994 per cent, although sensitivity of the results was tested using the Henderson equivalence scale and against a higher gross rate of 7.5 per cent. The results are robust to either of these changes. Gross imputed rental return is explained in Section 4.4.2. in Chapter 4.

Notwithstanding the conceptual importance of accounting for the benefits of housing services, it is debatable if it is more accurate to include housing benefits as a wealth component within an asset-income-consumption framework, rather than the conventional treatment of including imputed rent as an income component within an income framework (Atkinson and Marlier, 2010). The former recognises the non-pecuniary, inter-generational and borrowing benefits stemming from the home asset that are not fully transposed within an income framework. Or, if analysis is better served comparing after-housing cost income measures (Bradbury, 2013; Bradbury and Gubhaju, 2010; Saunders et al., 2015). This deducts actual housing costs to compare disposable income levels available to support non-housing consumption needs; effectively providing a level playing field for comparison across owners, purchasers and renters (Bradbury, 2013).

There are also other conceptual and measurement issues. These include: the assumption of a direct relationship between the assumed housing service and actual housing needs (Atkinson and Marlier, 2010); choices over the most appropriate rental equivalence methods to obtain market values (Eurostat (2006) cited in ABS, 2008(b)); accounting for depreciation of buildings and appreciation of land value (Yates, 1991); and internationally, comparability between different housing markets (Atkinson and Marlier, 2010). Saunders and Siminski (2005) argue however, that comparisons between different housing tenures and other demographic characterisations are made more transparent as monetising housing services for homeowners provides a visible rent.[31] The inclusion of imputed rent is widely regarded as necessary to a fuller accounting of income resources beyond cash income. It draws attention to the fact that income poverty does not necessarily imply asset poverty, and to the close association between home tenure-ship and life-cycle stages (that is, renting in young adulthood, holding mortgages in prime adulthood and outright home ownership in retirement (ABS, 2008(b)).

[31] This is also true for international comparisons given the variation in home ownership rates and different public and private housing markets across countries.

Public in-kind benefits and services[32]

Imputation of the second non-cash resource, public in-kind benefits and services (or social transfers in-kind) on the other hand, facilitates analysis of the income distribution inclusive of the redistributive nature of government welfare policies (Canberra Group, 2001: 24). Scholars have long argued that reliance on cash income measures provides a distortionary picture of the impact of government policies especially if governments have sought to redistribute welfare through non-cash means (Harding et al., 2006; Smeeding et al., 1993; Smeeding and Weinberg, 2001). Niemitz (2011) points out that irrespective of whether in-kind benefits and services are targeted to low-income groups or universally provided, a distributional effect will occur that elevates lower incomes relatively more.

Garfinkel, Rainwater and Smeeding (2005) illustrate the role of public in-kind transfers to economic living standards by comparing household cash income available through LIS with a derived income estimate, ‘full income’, that includes imputed public in-kind health care and education benefits and subtracts the indirect taxes to finance these benefits. In comparing the mean net benefits as a percentage of equivalent full income by household quintiles for all households, they found that in Australia net transfer benefits accounts for 80 per cent of full income in the lowest income quintile and in contrast, those in the highest quintile lose approximately 30.5 per cent of full income to welfare state transfers.

In Australia, the Fiscal Incidence Study (FIS) (ABS, 2001a, 2007b, 2012a) gives formal recognition to the significance of public in-kind transfers as a component in income analysis. The value of in-kind benefits paid directly by the government to households for specific functional categories: education; health; housing; electricity, social security programs and child benefits and indirect taxes (renamed to taxes on production) is allocated to households recorded in HES Surveys. Indirect taxes refer to all the taxes involved in the production, delivery and sale of goods and services, payable by producers but passed on to consumers (ABS, 2012a: 65).

[32] As with imputed rent, a more detailed discussion on the methodologies and issues associated with the estimation of public in-kind benefits and services is contained in Section 4.4.1 in Chapter 4.

The FIS (ABS, 2012a) results also reinforce the redistributive effect of government intervention as welfare state expenditure (in cash and non-cash form) is targeted towards those in the lower income deciles.[33] The proportionate increase in the average income of households with the inclusion of public transfers in-kind was much higher for households in the lowest income quintile (weekly disposable income is $358 and final income is $520) compared to those in the highest income quintile (weekly disposable income is $1,768 and final income is $1,775). Notably, the relative income position of older people in general, and specifically for single and couple only households, improves with the inclusion of public in-kind transfers. For these two demographic sub-groups, equivalised disposable income is 84 per cent and 76 per cent respectively of the average income for all households, but increases to 97 per cent and 89 per cent respectively using final income.

Whiteford and Kennedy (1995) use LIS data to compare the living standards of older people, aged 65 years and over, based on a continuum from the 'standard cash income' measure, to two expanded 'final income' measures. 'Final income 1' includes the net value of non-cash health and education benefits. 'Final income 2' adds the value of imputed rent from owner-occupied housing and non-cash housing subsidies to 'Final income 1'. The improved economic position of older people using both adjusted income measure is equally evident through the prism of replacement rates and poverty.[34] For Australia the replacement rate increased from 73 to 76 per cent (Final income 1) and to 86 per cent (Final income 2), and the poverty rate decreased from 30

[33] The impact of non-cash transfers does not diminish the importance of public cash transfers which continue to be the main mechanism to effect welfare redistribution (ABS, 2012a; Harding et al., 2006). Income distributional analysis by the ABS (2012a) shows that the lowest income quintile receive 30 per cent of in-kind transfers but 58 per cent of cash transfers compared to 14 per cent and 2 per cent respectively received by those in the highest quintile. Taxes work in the opposite direction with those in the highest income quintile incurring higher rates of personal income tax and taxes on production.

[34] Replacement rates are generally used to compare the adequacy of pension entitlements across different pension policy systems. There are a range of different numerator and denominator choices: from comparing the average income of older people to the average income of the working-age population; to comparing pension benefits when retired to individual earnings when working; to comparisons that take into account taxes and compulsory private pensions (OECD, 2009a, 2013c). In the Whiteford and Kennedy (1995) study, the replacement rate is calculated as the average income of older people to the average income of the total population.

per cent to 6.8 per cent (Final income 1) and further to 4.9 per cent (Final income 2).[35] A later Australian study by Whiteford and Bond (2000) shows that the net effect of government benefits (health, housing, education and other welfare services) and indirect taxes improved the relative income position of older people to the whole population from 54 to 66 per cent.

As with most imputations, including the value of public transfers in-kind is not without methodological concerns. The standard practice assigns the value of specific public expenditures and indirect taxes as recorded in national accounts to households and individuals based on targeted criteria, such as age, gender and in some cases need (for example, public housing). This is the method employed by the ABS in FIS. There are however, issues over coverage, allocation and inclusion of indirect taxes (Harding et al., 2006). Coverage concerns 'indivisible' public expenditures and indirect tax categories such as defence, public safety, corporate tax and capital gains tax which provide benefit to all of the population, with no clear basis for allocation to households and individuals. Allocation refers to the correct method to apportion values to households: average utilisation rates by demographic classification or by actual usage. Finally and perhaps most contentious, is the rationale recognising the financing of public benefits and services through inclusion of public taxes on products and the production process (indirect taxes) in final income measures. None of these are insurmountable issues preventing endorsement by statistical agencies and expert groups (Canberra Group, 2001).

3.2.2 Income data issues (a short note)

This note on income data issues is not in keeping with the organisation of literature by economic resource type. It is included because it has relevance to the practical estimation and reliance of the disposable income metric for standard of living assessments as measured through household income surveys. A key concern rests with the reliability and accuracy of data provided by the self-employed and those on the lowest income decile (ABS, 2002, 2003; Brewer et al., 2006; Nolan and Whelan, 1996; Saunders et al., 2008).

[35] The poverty threshold is set at 50 per cent of mean equivalised income.

Recent work by Saunders and Hill (2008), and in an earlier version Saunders, Hill and Bradbury (2008), suggest that removing self-employed households and those with zero or negative incomes from analysis slightly lowers poverty rates. Using 2003-04 ABS HES data the poverty rate declined from 9.9 to 9.0 per cent and 19.8 to 19.6 per cent against a 50 per cent and 60 per cent poverty threshold respectively. The self-employed potentially misreport their income because of complications in separating their business and personal income and may often report very low incomes or even negative incomes as a result of business losses (Saunders and Hill, 2008). Niemitz (2011) points out that income streams of self-employed people are more uneven and volatile leading to differences between recorded income at a point in time versus a typical household income situation.

The ABS (2002, 2003) acknowledges that some respondents fail to report all of their income, by either failing to account for all income sources or by understating the dollar amount. The ABS (2004: 63) states that there is a significant mismatch between the amount of income those with the lowest incomes (in the bottom 10 per cent of the income distribution) report, with the amount that would be available to them if they were recipients of income government support and against their levels of expenditure, which in most cases is much higher than people in the second and third deciles. They attribute the reluctance to provide accurate income data to ‘privacy concerns, difficulties in remembering income details, and [an] unwillingness to reveal fraudulent or other illegal activity’(ABS, 2003: 4).

In response, the ABS excludes households in the bottom decile of the income distribution from its analyses of ‘low income households’. This includes exclusion from the financial hardship indicator in their Measures of Australia’s Progress (MAP) reports (2004, 2006, 2010). However, the decision to exclude the entire 10 per cent is itself problematic. Even though the ABS emphasise that the approach should not be interpreted as indicating the absence of low-income people in the lowest decile of the income distribution, it potentially excludes from analysis those people who are truly disadvantaged.

Saunders and Bradbury (2006: 346) argue that it is reasonable to exclude the bottom three or four income percentiles but not the remaining seven or six percentiles because the relationship between income and expenditure is expected given consumption smoothing. They show using 1998-1999 ABS HES data, that higher expenditure levels than income levels for the bottom 30 percentiles of the equivalised disposable income distribution is not unexpected. As discussed in Chapter 2, income may reflect temporary variations compared to the smoother pattern of consumption expenditure because of the ability to borrow or access savings or run down assets. However, the mean expenditure in the bottom 3 income percentiles (with mean income ranging from over minus AUD $200 to over AUD $100) exceeded expenditure levels in the remaining 97 income percentiles.

In a later analysis using 2003-04 ABS HES data, Saunders et al. (2008) found that amongst those households identified as below the income poverty line, equivalised expenditure to poverty line ratios exceeds 1 for half of poor households and exceeds 2 for around one-fifth of poor households. The results clearly suggest an anomaly between reported levels of expenditure, reported incomes and the incomes required to reach the poverty line.[36] Similar conclusions are reached by Brewer et al. (2006) using British expenditure data from the 2001- 2002 Expenditure and Food Survey and income data from the Family Resources Survey. Median equivalised weekly spending of those in the bottom 1 per cent of the income distribution (£192 per week) was, on average, more than any spending up to the 31st income percentile. The authors of these studies all reason that the results are likely due to greater measurement errors in the recording of income data compared to expenditure data at the bottom of each distribution.

The quality of Australian income data has also been impacted more generally by issues surrounding the collection and methodology of household survey instruments.

[36] The results are consistent when the income poverty line is set at 50 or 60 per cent of median equivalised disposable income. Expenditure items include most items reported in HES except for income tax, mortgage principal repayments, superannuation and life insurance. Households below the income poverty lines are ranked by the value of the ratio of equivalised weekly total expenditure amounts to the poverty line. Households with zero or negative income are excluded. This does not alter the findings because any household with positive income, irrespective of amount is included.

Saunders (2005) states that the long processing times delay public access to the data by several years, weakening the policy impact of poverty and standard living research that is focused on the 'now'. Siminski et al. (2003) has drawn attention to the inconsistency in the timing of income data collection, changes to survey methodology and changes in weighting and benchmarking procedures that have reduced the ability to make valid comparisons over time. Although these data issues are recognised, so too is a level of pragmatism as there are inherent issues involved in the collection of any large set of quantifiable economic and non-economic data.

3.3 Consumption

Analogous to income analysis are studies that utilise consumption measures as an alternative approach to measuring living standards (Brewer et al., 2006; Hurd, 1990; Meyer and Sullivan, 2010; Sabelhaus and Schneider, 1997; Saunders and Bradbury, 2006; Slesnick, 2005; Travers and Richardson, 1993; Tsakloglou, 1996; Ulker, 2008). These consumption advocates argue that a more direct indicator of living standards is to measure the consumption of goods and services, instead of or alongside income. Travers and Richardson (1993: 24) write that '[consumption] expenditure generates the flow of services from which material well-being is derived. Income, in contrast, provides the capacity to purchase things'. Hence, income is not sought after in its own right but as a means to meet consumption needs. It represents the ability to purchase marketable goods and services, and consequently an indirect living standards indicator (Slesnick, 2005; Travers and Richardson, 1993).

Empirically, consumption studies can generally be categorised as one of two approaches. There are those that apply consumption expenditure as a proxy for actual consumption on the basis that in highly monetised western economies most goods and services are purchasable; hence track-able via expenditure data (Barret et al., 2000a; Denton et al., 2006; Meyer and Sullivan, 2010; Sabelhaus and Schneider, 1997; Slesnick, 2005). There are fewer studies that develop complex consumption measures, adjusting income to include the consumption of durable goods, in-kind benefits and services and other forms of wealth (Brandolini et al., 2009; Frick and Headey, 2009;

Weisbrod and Hansen, 1968; Wolff and Zacharias, 2009; Wolff, Zacharias, Masterson, et al., 2012). Each approach is dealt with in the review.

3.3.1 Consumption expenditure

Slesnick (2005) challenges prevailing living standards conclusions about the United States population and sub-groups (including older people) based on income analyses, arguing that consumption expenditure-based analyses suggest the contrary. Using long-trend data from the United States Consumer Expenditure Surveys from 1960 till 1995, Slesnick argued that the standard of living was not declining as indicated by stagnating family income growth rates, an increase in income inequality (measured by the Gini coefficient) and relatively high income poverty rates. The results indicated strong consumption growth, a flattening of consumption inequality and a sharper decline in consumption expenditure-based poverty support the hypothesis of improving living standards. Moreover, the standard of living index (defined as the average level of consumption expenditure per equivalent adult) for older people was higher compared to younger people under the age of 65 years.

Slesnick's findings in relation to older people resonate with conclusions reached by Meyer and Sullivan (2010) and a much older study by Sabelhaus and Schneider's (1997) (based on Canadian data). Meyer and Sullivan (2010) used United States income and expenditure data to compare expanded income and expenditure measures of poverty. [37] Expenditure data is amended to include the imputed value of public and private health insurance, the service flow from vehicles and the service flow from subsidised or public housing. Disposable income data is amended to include a few non-cash benefits (such as food stamps, housing, school lunch subsidies and imputed values of Medicare/Medicaid). Trend results between 1980 and 2008 indicate that consumption expenditure-based poverty for older people decreased by 10.96 percentage points compared to a 7.9 decrease in income poverty.

[37] Income poverty is determined using the official US poverty line from 1980 and adjusted each year. The dollar value threshold for consumption expenditure poverty is set to provide the same official income poverty rate for 1980 and then adjusted each year using a CPI index.

In Australia Barret et al. (2000a) compare a range of income and consumption expenditure inequality indices using four ABS HES datasets between 1975 and 1993.[38] The analysis is limited to households headed by individuals aged between 25 and 59 years, hence specific conclusions to older people cannot be drawn. Nevertheless, as generalised findings they show that over the 18 year period, income and consumption inequality increased but there is less inequality when the latter metric is used. The Gini coefficient increased by 17 per cent for income and 9 per cent for consumption expenditure. Moreoever, the Gini coefficient for income is higher than consumption expenditure (0.302 compared to 0.221 respectively) and the ratio of the 90th to 10th percentile is also higher (4.433 for income compared to 2.869 for consumption expenditure). They reason that income inquality is greater than consumption expenditure inequality and growing over time because of an increase in transitory fluctuations in income that households are able to smooth to maintain consumption.

Studies using expenditure data, however, provide a limited application of the theoretical notion of actual consumption (Krishnan et al., 2002; Zaidi, 2008). Although Slesnick (2005) defines consumption as theoretically inclusive of goods such as leisure; home production; public goods like education, police, public infrastructure; and in-kind transfers, these are excluded from the expenditure data. Barret et al. (2000a) only focus on non-durable expenditure items: food; alcohol and tobacco; fuel; clothing; personal care; medical care; transport; recreation; and current housing.

Lanjouw and Lanjouw (2001) argue that variation in expenditure definitions can produce different poverty rates and potentially misleading living standard conclusions, irrespective of any real difference in wellbeing. They demonstrate the variance in poverty rates from using different expenditure items from data collected from the same households in three countries (Ecuador, Nepal and Brazil). In a much earlier study, Tsakloglou (1996) argues that the imbalance between 'consumption' and 'expenditure' potentially understates the living standards of older people. He writes:

[38] The four inequality metrics are: 90th-10th percentile ratio, variance of the natural logarithm for each measure, Gini coefficient and a range of Atkinson indices. Only results pertaining to the Gini coefficient and 90:10 percentile ratios are provided. The equivalence scale is the square root of the number of family members. Gross income is used because of the lack of tax data in some surveys.

> If in a particular country these services are heavily subsidised or provided free of charge by the state then ceteris paribus, the “true” relative welfare of the elderly is likely to be higher than that depicted by their recorded equivalent expenditure (or equivalent income). (Tsakloglou, 1996: 275)

Some of the difficulty arises because measuring expenditure is complex and problematic, paticularly when compared to the advanced measurement tools and methodologies available with the collection of income survey data (Price, 2008). There are technical choices over which items to include or exclude; consideration of imputation methods and assumptions about household sharing (Deaton and Zaidi, 2002; Price, 2008). In relation to the latter, Zaidi (2008) points out that individual consumption is less reliant on individual income and more reliant on the pooled income of the household and the extent of sharing amongst household members.[39] Adjusting household consumption expenditure by an equivalence scale goes some way towards dealing with the economies of scale, however, it does not fully account for the sharing of resources.

Deaton and Zaidi (2002) suggest four inclusion categories to construct consumption aggregates from household survey data: food items; non-food items; consumer durables; and housing. Food items include those from every possible source including home-produced food. Health expenditures and lumpy expenditures from non-food items (for example, marriages, funeral expenses and births) are excluded. For durable goods and housing, they suggest that purchase costs not be included but, following other scholars, they argue for the inclusion of the monetary value of services (or rental value) flowing from ownership of durable assets (Whiteford and Bond, 2000). In both the latter categories, the emphasis is on the benefits of completeness over potential measurement errors associated with imputation and assumptions, regarding for instance, interest rates, depreciation rates, longevity of durable goods and housing costs. Deaton and Zaidi (2002) argue that even though there are obvious benefits of

[39] Issues over individual or pooled income are not contained to consumption per se but apply to income as well. This is further discussed in Section 4.5.2.

leisure time and public goods and services on living standards, these are difficult items to value and hence preclude them from an empirical household consumption metric.

Another problem specific to older people is the potential inconsistency between expected consumption behaviour as determined through the theoretical notion of 'consumption smoothing' and actual consumption behaviour as determined from consumption expenditure patterns. The 'retirement consumption puzzle' is a phrase specifically coined to describe the well-known phenomenon that older people post retirement 'under-consume' their stock of available resources, contradicting expectations of dis-saving (Barret et al., 2009; Denton et al., 2006; Finch and Kemp, 2006).

Barret and Brzozowski (2009) analyse data from Waves 1 to 6 of the HILDA Survey to test for evidence of a decline in consumption expenditure amongst mature Australian households (45 years and over). The results from regression modelling show a 6 per cent fall in grocery spending and an 8-9 per cent fall in food expenditure in the transition to retirement. Following an examination of elderly Canadian couples expenditure patterns, Denton et al. (2006) conclude that expenditure patterns change as a consequence of declining income and reduced working expenditures post retirement and not because of changing tastes associated with age.

As a way of explaining the retirement consumption puzzle, a few scholars have tested and disproved the reasoning that this may be due to a cohort effect. Finch and Kemp (2006: 6) find little evidence that the decline in spending in pensioner households is associated with 'culture of frugality' but point to an 'inter-related sets of factors associated with increasing frailty and declining mobility, leading to reducing social participation and contracting social networks.' In a companion paper to Barret et al. (2000a), Barrett et al. (2000b) decompose the data by 5 year birth cohorts, reporting that the changing demographic composition (that is a cohort effect associated with the ageing of the population) has a minor role in explaining expenditure patterns and expenditure inequality.

Moreover, there are studies that challenge the very notion of the 'retirement consumption puzzle'. Hurst (2008) argues that it is only expenditure on work-related items and food that fall after retirement. This first is self-explanatory, as complementary to a post-retirement working life style; the second may not reflect a fall in actual food intake if there is an associated increase in home food production. He also points out that expenditure declines are also greatest for households with little wealth accumulation who experience involuntary retirement due to health shocks. It is these compounding effects that explain the unexpected consumption expenditure declines post retirement for some households, as opposed to a refutation of the life-cycle hypothesis. Zaidi (2008) also argues that because actual consumption levels are motivated by on-going purchasing attitudes and behaviour, irrespective of current consumption capacity, consumption measures may lag behind income measures in determining current economic living standards.

There are two other concerns with expenditure data. The first is the sensitivity of expenditure data to the time frame. Expenditure patterns do not necessarily mirror actual consumption patterns or needs (in the same way that income and consumption patterns are different). For example, expenditure time diaries will often include large one-off expenses, such as bulk grocery shopping, which is not reflective of the smoother consumption patterns of groceries over a few weeks. This artificially inflates actual individual consumption levels for the survey period (Saunders, 2004). Likewise, a washing machine purchased years ago still services a current consumption need. There are also many household goods and services self-produced or provided in-kind that are consumed daily without a reported expenditure value; for example: sewing clothes; growing vegetables; family members assisting with home maintenance and repairs; and employment perks (Krishnan et al., 2002). An absence of these items deflates actual individual consumption levels for the survey period.

The second is the difficulty and costliness in collecting data in a comprehensive, reliable and frequent manner (Sabelhaus and Schneider, 1997). Niemietz (2011: 126) points out that 'stated preferences do not always coincide with revealed preferences', particularly regarding socially stigmatised items, such as alcohol and tobacco. Diaries have been criticised for measurement error in under-reporting tobacco and alcohol expenditure compared to national account estimates and also with respect to the insufficient coverage of wealth data (Niemietz, 2011; Price, 2008; Sabelhaus and Schneider, 1997; Saunders and Bradbury, 2006). Siminski et al. (2003) show that changes to the weighting and benchmarking procedures for ABS expenditure surveys has affected comparability over time.

In summary, notwithstanding the validity and plausibility of using consumption expenditure for a living standard analysis, there remain many concerns with the practical estimation of expenditure data. Sabelhaus and Schneider (1997: 4) write that 'given that both resource-related and consumption-related indicators closely fit their underlying basic approaches, the latter could be taken as complements rather than mutually exclusive substitutes'. Following the conceptual narrative outlined in Chapter 2, which frames the standard of living around the range of economic resources that enable potential consumption possibilities, this cannot be achieved using consumption expenditure data in its current form.

3.3.2 Augmented consumption measures

Scholars that advocate the second approach, the construction of consumption measures, base their argument on the importance of wealth to the standard of living. Wealth confers economic security and is a potential source of current and future income benefits (Stiglitz et al., 2009; Wolff, 1988). The incorporation of wealth and the potential for consumption smoothing make following consumption patterns a stronger and more insightful indicator of living standards that are not necessarily revealed with income patterns. While some income generated from wealth is picked up by measured income, and income metrics can include imputed rent estimates from home ownership, other capital income, such as realised capital gains, is generally not recorded as income but will affect consumption possibilities (Hurd, 1990; Stiglitz et al., 2009).

It is plausible, therefore, that people not only take into account their current income and savings but also their potential future earnings, borrowing capacity and wealth creation over their lifetime when they make current decisions to consume. Sabelhaus and Schnieder (1997) argue that point in time income measures are susceptible to short term transitory fluctuations; however, consumption patterns may appear ‘smoother’ because individuals maintain their life-style choices by accessing liquid cash through dis-savings (reducing wealth) or borrowing irrespective of the current income levels standards. This is particularly important for older people who typically have lower incomes than the working population, but who have had the opportunity to accumulate wealth over their lifetime (Whiteford and Bond, 2000).

Empirical studies that jointly analyse income and wealth are generally in two forms. There are those that investigate the relationship between income and wealth whilst maintaining the respective flow and stock unit status (ABS, 2009b; Azpitarte, 2010a; Billing et al., 2010; Bradbury, 2010; Creedy and Tan, 2007; Dvornak and Kohler, 2003; Radner, 1990; Sierminska et al., 2006). There are fewer studies that convert income and wealth into the same measurement unit; often by supplementing income with a wealth annuity (Azpitarte, 2010b; Brandolini et al., 2009; Crystal and Shea, 1990; Frick and Headey, 2009; Weisbrod and Hansen, 1968; Wolff and Zacharias, 2009; Wolff, Zacharias, Masterson, et al., 2012)

Income and wealth profiles

The ABS in their ‘Low Consumption Possibilities Research Project’ (ABS, 2009b; Billing et al., 2010) use 2005-06 SIH data to identify households that are simultaneously in the bottom 40 per cent of both equivalised household disposable income and equivalised household net worth distributions. The effect of a combined low income-wealth distribution is to reduce the proportion of older couples and older singles (relative to each respective household type) identified as having low income and increase the proportions identified as having low wealth. Using single older people as an example, 34.8 per cent were identified as belonging to the lowest income quintile and 16.1 per cent in the lowest wealth quintile however, 22.2 per cent were identified as having income and wealth simultaneously in the lowest quintile.

Creedy and Tan (2007) show that although high income and high wealth are positively correlated at an aggregate level the relationship changes according to age. In their cross-sectional analysis of Wave 2 of the Australian HILDA Survey, they compare age and net-worth by income quintiles. For successive age groups until 65-74 years mean net worth increases as income quintiles increase; however, for those aged 75 years and over, older people in the lowest income group have more net worth than those in the second income quintile.[40]

They reason that, for older people, the income flow from wealth is actually dependent on the form and amount of wealth accumulated over the life cycle. Older people in higher income quintiles (consequently, without pension entitlements) are often associated with high net worth because their wealth portfolio may not only consist of proportionately more valuable assets (e.g. superannuation and equity investments) but also wealth forms that yield higher income streams.[41] Conversely, some older people in the bottom income quintiles may have assets levels (e.g. bank accounts) that affect pension amounts but other wealth forms that do not provide higher income streams such as the home asset; or they may have assets that fall below the asset threshold enabling the full pension entitlement.

Azpitarte (2010a) investigates the relationship between income and the ability of households to withstand income shocks and maintain consumption levels through the availability of wealth. For both income and wealth, a poverty line is specified.[42] Three vulnerable groups are identified: the 'twice-poor' group (households in income poverty without an adequate stock of wealth); the 'protected-poor' group (households in income poverty with a buffer stock of wealth to withstand income shocks); and the 'vulnerable-non poor' group (households above the income-poverty line but without an adequate stock of wealth to withstand income shocks). Comparisons are drawn

[40] For 65-74 year olds, mean equivalised net worth is $175,000 and $162,000 for income quintiles 1 and 2 respectively. For those aged 75 years and over, the corresponding values are $188,000 and $139,000 respectively.

[41] Different forms of wealth are discussed in Section 4.3.3 in Chapter 4.

[42] The wealth poverty line is set as a proportion of the income-poverty line related to the length of the living standard period experiencing the income shock. For example, if the reference period is 3 months, the income poverty line is divided by 4. This is consistent with the general approach on assessing asset-based poverty, although the reference period is arbitrarily set by scholars (Gornick et al., 2009). The income poverty line is set at 50 per cent of the median equivalised household gross income, with no adjustment for personal taxes.

between the United States and Spain with data drawn from the 2001 U.S Survey of Consumer Finances and the 2002 Spanish Survey of Household Finances.

There are two key conclusions from Azpitarte's analysis that resonate with the literature specifically analysing the economic position of older people (Brandolini et al., 2009; Crystal and Shea, 1990; Disney and Whitehouse, 2001; Whiteford and Kennedy, 1995). First, the ability to accumulate assets over the life course serves as an insurance against the risk of income poverty. There are higher proportions of older people within the 'protected-poor group' (28 per cent in the United States and 30 per cent in Spain). Second, amongst older people, single households (particularly females) are most at risk of having neither income nor any liquidity options through divestment of assets to maintain consumption levels and prevent a decline in economic living standards (6 per cent in Spain and 15 per cent in the United States are identified as 'twice-poor').

International comparative studies also confirm differences between the income and wealth profiles of older people (Bradbury, 2010; Gornick et al., 2009; Sierminska et al., 2006). Sierminska et al.'s (2006) study based on data from the Luxembourg Wealth Study (LWS) between 1999 and 2002 show that while older people have lower relative median incomes compared to all households, relative median wealth is more variable driven by differences in home ownership rates, home values in each country and the proportion of home wealth to their overall wealth portfolio.

Bradbury (2013) compares the wealth portfolio of older Australians to the countries included in LWS. Australia has much higher levels of low income-high wealth patterns amongst older people compared to the seven other OECD countries as a consequence of high home ownership rates (even amongst low-income households) and relatively low retirement incomes. The average stock of wealth amongst older Australians is 15.4 times average disposable income compared to countries such as Sweden (4.6 times) and Canada (5.3), with the highest home ownership rates (83 per cent compared to 52 per cent in Sweden and 67 per cent in Canada).

In an earlier study, Bradbury (2010) shows that the Australian home ownership pattern by age diverges post-retirement. In the 50-54 year age group, home ownership rates range from 74 to 82 per cent across country. However for the 70-74 year age group and beyond, Australian home ownership rates range from 87 to 81 per cent, but decline significantly for the other seven countries (below 76 per cent). Bradbury (2010) posits that although there is no direct evidence that the exemption of owner-occupied housing from the means tested Australian Age Pension causes the 'over-consumption of housing'; nevertheless, there is a strong incentive amongst Australian retirees to retain their home.[43]

The Australian Age Pension entitlement is based on a means testing of all income and assets, with the exception of the value of the owner-occupied home. Yates and Bradbury (2010) suggest that the exemption of the home asset has fuelled the fourth (unofficial) pillar in the three pillar approach to Australia's retirement income policy: the incentive to maintain a large proportion of wealth in the home.[44] The other three retirement pillars are the flat rate pension; compulsory superannuation and voluntary saving (refer to Appendix A).

This relationship between retirement income and home ownership is hypothesised by Castles (1988) as a trade-off between the lack of generosity of old age pensions and the extent of homeownership. Owner-occupied housing not only provides direct housing services, it also reduces expenditure on housing (rent) thus freeing up income for non-housing consumption. Castle writes:

> In other words, when individuals own their own homes, they can get by on smaller pensions. Thus if the assumption is made, almost certainly accurately, that the high ownership levels of the countries in the New World ... translate into high ownership levels free of mortgage amongst older age cohorts, it seems reasonable to suggest that we have identified

[43] A further consideration is that if they downsize to a lower valued residential property, the surplus is counted in the income/asset Age Pension test.

[44] There are a range of international studies investigating the treatment of home ownership within retirement income systems as a pivotal factor determining the unique wealth and income patterns of older people (Bradbury, 2013; Dewilde and Raeymaeckers, 2008; Disney and Johnson, 2001; Doling and Horsewood, 2003).

a factor potentially mitigating low public expenditure levels on pensions in these countries. (Castles, 1988: 3)[45]

This interplay between income (whether privately earned and/or through the pension system) and wealth (particularly home assets) has fuelled further investigation into the living standards of older people without owner-occupied housing and reliant on the public pension (Dewilde and Raeymaeckers, 2008; Harding et al., 2001; Ritakallio, 2003; Yates and Bradbury, 2009, 2010). Yates and Bradbury (2010) compare poverty rates amongst older households before and after current housing costs are taken into account across seven countries.[46/47] Current housing costs refer to the interest component of the loan. The poverty rate amongst older Australian households changed from 19.9 per cent (before housing costs) to 17.2 per cent (after housing costs).

However, there are significant discrepancies by housing tenure. The poverty rate for older homeowners dropped from 17.4 per cent (before housing costs) to 11.7 per cent (after housing costs), but it increased for older non-home owners from 35.7 per cent (before housing costs) to 51.4 per cent (after housing costs). The authors highlight the role of home ownership in ameliorating the living standards of older people, and conversely, the weakness in the Australian retirement system for those multiply disadvantaged by a lack of home ownership in conjunction with low pension incomes.

As part of the Australian Pension Review that led to Age Pension increases in 2009, Harmer (2008) also acknowledged the role of home ownership in protecting against poverty amongst older people. Drawing on 2005-06 data from FaHCSIA, the report stipulates that the poverty rate for single older people fell from 47.4 per cent to 7.0

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[45] Examples of New World countries are Australia, United States and Canada; examples of Old World countries are Germany, Switzerland and Sweden.

[46] The principal repayment is a reflection of savings because it increases the equity in the home and consequently, is a marker of future not current consumption.

[47] The analysis uses harmonised wealth data from the Luxembourg Wealth Study (LWS) between 1998 and 2002 for five OECD countries: Canada, United Kingdom, United States, Italy and Finland; and the 2003 – 2004 ABS Household Expenditure Survey. The poverty threshold is set at 50 per cent of the median for each income (before housing and after housing) definition. The equivalence scale is the square root of the household size.

per cent after accounting for housing costs and for older couples from 19.0 per cent to 4.8 per cent respectively. This collection of studies underscores the importance of including wealth to obtain a more accurate and complete assessment of the economic standard of living. For many older people, their relative economic position varies considerably if wealth is used instead of income. The next section extends investigations into the influence of wealth by reviewing recent developments to integrate income and wealth into a single index.

Integrating income and wealth

Although the conceptual validity of a consumption metric integrating income and wealth into a single index is clearly articulated within the literature, it is well recognised that it is empirically challenging to translate this in a methodologically sound manner (Azpitarte, 2010b; Brandolini et al., 2009; Moon, 1977; Radner, 1990). There is the difficulty with metric uniformity as income and wealth are different units of measurement; income is a flow variable and wealth a stock variable. The variation in the nature, risk and return of asset classes (e.g. capital assets, liquid assets, financial assets, pension assets) discourages uniform treatment.

Nevertheless, there have been a few alternative methodological attempts. For instance, Erikson and Aberg (1987) employ a very crude method to combine income and wealth into a single index to study living standards in Sweden using the Swedish Level of Living Survey. They tabulate a simple index that apportions a point for every economic asset owned. They acknowledge that the index is arbitrary as it does not assign weights to reflect the increased value of some assets versus others (such as home ownership compared to owning a vehicle). Frick and Headey (2009) convert income into a stock of wealth to compare the living standards of Australian and German retirees. Expected annual retirement income is calculated for the remaining life term of each individual (using life expectancy tables), discounted back to 2002 prices, converted into a lump sum and combined with the value of assets.

A more methodological sound method initially utilised by Weisbrod and Hansen (1968), converts the stock of wealth into a notional income flow by converting wealth into an annuity and adding this annuity value to income. Most scholars calculate a lifetime annuity; a constant stream of annual payments equal over time that last the duration of the expected remaining lifetime of the unit of analysis, for a given interest rate (real or nominal).

Crystal and Shea (1990) use this method to investigate the effect of annuitisation on the economic well-being of older people in the United States. Interest bearing assets, share equities and seventy per cent of home equity is annuitised and added to income with property income deducted.[48] The average replacement rate of older people (aged 65 and over) changes from 92 per cent using equivalised current cash income to 124 per cent using the adjusted income measure.[49] However, the degree of inequality amongst older people is higher with the adjusted income measure compared to younger age groups.[50] The authors conclude that the disproportionate share of income for those in the highest quintile compared to those in the lowest quintile suggests the emergence of a prosperous group of retirees who have benefited from the growth of the private and public pension system and an increase in asset values.

In a very simple application of the wealth annuity method but one with results specific to pensioners, Disney and Whitehouse (2001) compare the ratio of financial wealth to current income and the increase to current income if financial wealth is annuitised across OECD countries. To ensure comparable data analysis, future pension (public and private) entitlements are excluded from financial wealth. Australia has a wealth to income ratio of 5 for couples with a 67 year old household head and a 14 per cent increase in income if annuitised financial wealth is included. In contrast, in the UK the wealth to income ratio is 1.3 with a 4 per cent increase in income for a similar demographic group.

[48] The 70 per cent of home equity is intended to approximate the amount commonly available through financial instruments and be equivalent to the nominal rental value against the specific home. Property income is deducted to avoid double-counting because the annuity value already provides an income component.

[49] Income is equivalised using a nutritional equivalence scale based on the dietary adequacy of a set of food items that meet minimum nutritional standards.

[50] The Gini co-efficient is 0.393 and 0.415 for those aged 65-74 years and 75 years and over respectively. This is higher than any other age groups. Amongst older people (65 years and over), the highest quintile held over 45 per cent of their age-groups total economic resources. This is higher than the proportions held by those in the highest quintile in any other age groups.

The authors suggest that this variation may be due to differences in pension systems. In Australia, pension replacement rates are low but wealth to income ratios high, hence older people are forced to run down their assets to finance their consumption. In the United Kingdom, occupational-based pensions are provided in the form of annuities so that pension replacement rates are higher but assets are lower. Although no direct comparison can be made between Australia and the United Kingdom, they conclude that analysis of combined income-wealth measures, tends to neutralise the living standard outcomes of different systems of pension provision, than findings drawn from an analysis of income only.

This assertion resonates with Frick and Headey's (2009) study converting income into a stock of wealth. They showed evidence of similar living standards amongst Australian and German retirees once income and wealth is combined. They assert that in countries such as Germany with high compulsory contributions to national pension schemes, retirees are guaranteed higher retirement incomes but through the life course have reduced opportunities to accumulate wealth. In comparison, in countries like Australia, low pension rates and tax schemes provide incentives to save for old age via superannuation contributions and through home ownership.

The study by Wolff and Zacharias (2009) calculates the wealth-adjusted income (WI) metric by adding to annual gross income (after excluding property income and including realised capital gains and non-cash transfers), the imputed rent from owner-occupied dwellings and a constant annuity from non-home wealth.[51] All forms of non-home wealth are included: business assets; liquid assets; financial assets; and pension assets. The only exemptions are motor vehicles and the value of future retirement income. Home wealth is not annuitised because they argue that this is included in the form of imputed rent. Lifetime annuities are calculated using the average of historical rates of return specific to each asset class.

Applying these metrics to data from the U.S. Survey of Consumer Finances from 1983 to 2001, they find that wealth-adjusted income increases the relative well-being of

[51] The derivation of WI is dealt with in more detail in Chapter 4 as a comparison to the construction of the potential consumption metric that is proposed in this thesis.

older age groups relative to younger age groups. For those aged 65-74 years, the ratio of median income to the overall population increased from 0.71 for income to 0.87 for wealth-adjusted income (mean equivalents are 0.78 and 1.10 respectively). For those aged over 75 years, median ratios were 0.50 for income and 0.90 for wealth-adjusted income (mean equivalents are 0.48 and 0.67 respectively).

More recently, the Wolff, Zacharias and Masterson and colleagues (2012; 2012) have developed the Levy Institute Measure of Economic Well-Being (LIMEW), expanding beyond the initial WI metric to include four components: conventional money income; wealth in the form of a lifetime annuity; net government expenditures (both cash and non-cash transfers, public consumption, net of taxes); and household production. Household production provides a valuation of non-market household work, such as child-care, cooking and cleaning. Public consumption includes government expenditure on specific public goods that directly benefit households, such as transport, water, and sanitation. The authors position LIMEW as a 'measure of resource availability, which provides both actual and potential consumption from market, private (household) and public sources' (Wolff, Zacharias and Masterson, 2012: 198).

Using long term trend data (1959-2007) primarily from the United States Census with supplementary data from other nationally represented surveys, the relative position of older people is considerably improved using LIMEW than money income driven by higher income from wealth, non-cash transfers and lower taxes. In 2007, the ratio of mean measures of older people to non-older adults was 0.60 using money income, but 1.10 using LIMEW. The improvement in the relative position of older people also improves continuously over time using LIMEW but remains virtually flat using money income.

The mathematical procedure to create an annuity flow out of the stock of wealth, however, underestimates the consequence of the measurement choices on living standard conclusions. There are choices over the annuitisation formula, the annuity period, interest rates, the wealth components being annuitised and allowances for bequests; and precautionary savings (Brandolini et al., 2009). A shorter time period produces higher annuity value with considerable age implications for older people who have shorter life expectancies. Compounding this is that the formula disregards the life-cycle relationship between income and wealth, particularly the potential of younger people to increase their asset holdings as they age, and the capacity for older people to have accumulated assets. The effect is to increase the overall economic resource value of older people, with greater accumulated assets and shorter annuity periods, compared to younger people, with fewer accumulated assets and longer annuity periods.

Interest rates for each wealth class are not easily obtained nor can their validity be assured. Consequently, scholars have to choose between arbitrary rates versus those indexed to the market; current rates versus historical averages (if a historical average, the time period); and lastly the suitability of the interest rate to the asset type.[52/53] Weisbrod and Hansen (1968) chose arbitrary rates of 4 and 10 per cent purely to illustrate the sensitivity of the results and without any relation to the market. Disney and Whitehouse (2001) use a 5 per cent interest rate.

In contrast, Crystal and Shea (1990) follow Moon (1977) and use a rate of 2 per cent on the basis that this reflects the real rate of return an older person could expect from an annuity. In an attempt to provide a coherent reference point, Wolff & Zacharias (2009) take the weighted average of actual historical rates of returns for different asset types, with time periods varying between 14 to 40 years. Radner (1990) also points to a technical problem in the derivation of lifetime annuities. He notes that the relationship between wealth and expected remaining lifetime is not independent. As wealthier people tend to live longer, their annuities values should be spread out over a longer period than applying general age-gender population based life expectancies.

Nevertheless, despite these methodological obstacles, the integration of income and wealth as a flow metric has the conceptual advantage that it provides a single metric to encapsulate the fuller range of economic resources people have at their disposable,

[52] There is also the choice between real and nominal interest rates, although, typically the latter is not used because it includes an inflation factor that prevents comparative analysis across countries and over time.

[53] These issues are raised in further detail in Chapter 4 when discussing the choice of interest rates used in the annuitisation of wealth components.

inclusive of income and the economic opportunities provided by wealth. The limited extent of empirical investigations testing the plausibility of this approach and the potential contribution to the literature is surprising, given the regular collection of household income and wealth survey data by national statistical agencies, at least in the last two decades.

Recent international endorsement is provided by the Commission on the Measurement of Economic Performance and Social Progress who write:

> But for many purposes, it is also important to know what is happening at the bottom of the income/wealth distribution (captured in poverty statistics), or at the top. Ideally, such information should not come in isolation but be linked, i.e. one would like information about how well-off households are with regard to different dimensions of material living standards: income, consumption and wealth. After all, a low-income household with above-average wealth is not necessarily worse-off than a medium-income household with no wealth. Stiglitz, Sen and Fitoussi (2009: Recommendation 4: 14)

In Australia, apart from the initial pioneering work conducted by Travers and Richardson (1993) in the early 1990s, there is no current evidence of empirical attempts to construct a combined income and wealth metric at the micro household level. Travers and Richardson (1993: 34) combine two groups of items. The first group includes the equivalised value of: cash income; unemployed adult time; benefits in-kind; health expenses; debt repayments; and the annual value of life assurance and shares. The second group includes the unequivalised annual value of: consumer durables, items such as a boat, holiday house, caravan, house; and family assistance relating to housing and furniture. There is not much detail however, on how these items are valued and combined.

The ABS through its ‘Low Consumption Possibilities Research Project’ (ABS, 2009b; Billing et al., 2010) canvas the idea of creating a single index, called ‘equivalised wealth adjusted income’ (EWAI) to identify Australians at risk of economic hardship. However, to date no actual results have been published, with the ABS (2009: 3) only reporting that approximately 85 per cent of individuals identified using EWAI are also identified as being simultaneously located in the bottom four deciles of the equivalised income and wealth distributions. Nevertheless, it is apparent that in order to take account of the full range of economic resources that enable an individual's potential consumption possibilities, this is a research area worthy of further investigation.

3.4 From Part 1 to Part 2

This part of the chapter reviews studies that situate the standard of living within an economics measurement perspective as an enabler to meet consumption needs. Beyond the conventional focus on cash income, the review discusses empirical applications that take into account income from non-cash sources and those that examine wealth, and debates the use of consumption expenditure as an alternative to income measures. Studies specific to older people show that taking into account these other economic resource types markedly influences economic standard of living assessments.

The review also highlights that the importance of accounting for economic resources beyond cash income is well established in the literature including the Australian literature. Nevertheless, there are few applications that seek to combine the full range of economic resources into a unitary dollar metric, particularly within an Australian context. Understanding how these collectively affect an older person's economic living standards in providing potential consumption possibilities is particularly important in an Australian context, given the high rates of home ownership, the superannuation system and the provision of public in-kind benefits and services. In Chapter 4 it is shown that it is methodologically possible to redress this gap by adapting current best practice models (Smeeding and Weinberg, 2001; Wolff and Zacharias, 2009) to an Australian context.

It is evident from the review so far that the continued publication of economic-based studies is an indication that, regardless of conceptual and measurement issues, an economic perspective continues to be a dominant paradigm in standard of living analyses. The commodification of society and emphasis on economic welfare as a lever to affect social welfare relies on utilising a universal numerical metric for collection of data, demographic comparisons, tracking changes over time and for setting social policy and welfare targets.

However, in the last 50 years there is an emerging literature focussing on combining economic and non-economic dimensions to provide an integrated perspective on the standard of living. In doing so, two developments are apparent. The first is the emphasis on social indicators as opposed to economic measures. As Saunders writes, it involves:

> .. a shift away from the use of 'measures' – with all that these imply in terms of scientific objectivity, quantification and precision – towards greater reliance on using 'indicators' that help to set out the broad parameters of the problem without claiming to be definitive. (Saunders, 2011: 4 - 5)

The second is the shift in focus towards well-being, as encapsulated by Sumner:

> Over the last 50 years the debate on this subject has moved from well-being as economically determined to broader conceptualisations of poverty, from considering the "means" of well-being to analysing the "ends", from identifying "needs" to identifying "rights", from no or few indicators to many and from (at best) an afterthought to a central focus on the development discourse. In each decade since the Second World War the dominant meaning and measurement of well-being have been shaped by the prevailing context and practice of development. (Sumner, 2006: 56)

Part 2 discusses these developments together with other features that characterise and distinguish multi-dimensional frameworks. The studies included below take a broad approach to well-being and the standard of living and include those that also refer to the quality of life, human development, social progress and so on recognising that each of these have contested and blurred meanings. However, they share a commonality around the use of indicators acting as signposts, across many different dimensions stemming from different disciplines, without purporting to be exhaustive or definitive.

Part 2: Social indicator applications to measuring well-being

There are broadly two types of social indicator approaches: those that present a dashboard of indicator statistics and those that aggregate multiple dimensions of well-being into a composite index. Both approaches are dominated by studies that compile country or regional aggregate data from a range of sources to provide macro-level perspectives usually involving the ranking of countries, tracking trends or assessment against specific policy priorities, even if these are constrained to specific population groups such as older people.

3.5 Indicator dashboards

There now exists a large collection of regularly produced publications by the statistical arms of inter-governmental organisations such as the EU's 'Sustainable Development' report (Eurostat, 2009, 2013, 2015) and the OECD 'How's Life? Measuring Well-being' report (2009b, 2011a, 2011b, 2013a, 2014, 2015) presenting a dashboard of headline indicators to monitor social progress across their member states. At a country-level some national statistical offices regularly publish indicator dashboard reports of a nation's well-being such as: Measure of Australia's Progress' (MAP) series (2004, 2006, 2010, 2012c, 2013b); 'Life in the UK' reports (ONS, 2011, 2012, 2015); 'Sustainable Development' in Germany Indicator reports (Statistisches Bundesamt, 2012, 2014); the 'New Zealand Social Report' (Ministry of Social Development in New Zealand, 2001, 2004, 2007, 2010); and the 'Social State of the Netherlands' (Bijl et al., 2010, 2012). While other nationally funded institutions have begun the process of compiling well-being indicators such as the measurement initiatives undertaken by INSEE in France (CAE. and GCEE., 2010; INSEE, 2014)[54] and by the State of the USA (2010, 2015).[55]

[54] INSEE refers to the National Institute of Statistics and Economic Studies, CAE to the Conseil d'Analyse Économique and CCEE to the German Council of Economic Experts.

[55] It is worth noting the civil society initiative, the *Calvert-Henderson Quality of Life Indicators* (H. Henderson et al., 2000) in the United States, that pre-dated many national statistical initiatives advocating for a well-thought out system to assess national well-being comprehensively beyond GDP (or other traditional macro-economic indicators).

Australia has taken a leading role in the development of an institutionalised system of social indicators. The ABS publication 'Aspirations for our Nation, A Conversation with Australians about Progress' (2012d) catalogues the extent of indicator project initiatives at national and state levels, including the diversity of stakeholders across all sectors of society interested in guiding what progress means and the indicators to measure it. The most prominent indicator dashboard, the ABS 'Measure of Australia's Progress' (MAP) series (2004, 2006, 2010, 2012c, 2013b) initially involved an expert reference group in 2002, followed by an extensive community-wide consultation in 2011-2012 to ensure the legitimacy of the series as reflecting the values and interests of all Australians, rather than be specifically linked to policy inputs or be refuted as a politicised framework.

The series reports on progress or regress in the ten years preceding with respect to four domains: society; economy; environment; and governance., based on 26 indicators (ABS, 2013b). Although assessments are at the macro-aggregate level, the choice of indicators emanate from framing well-being at the person level. Examples of indicators (with domains in brackets) include: people who have family members living elsewhere that they can confide in (health); persons with a Certificate III or above or employed in a skilled occupation (economy); domestic trips involving nature activities (environment); and level of generalised trust (governance).

Similarly, the international OECD report 'How's Life? Measuring Well-being', (2011a, 2013a, 2015) is part of the 'Better Life Initiative' to draw attention to the many factors beyond GDP (or income) that shape people's well-being. Hence, even though measurement is also at the macro-aggregate level, the dimensions are purposefully people focused and the indicators outcome focused, capable of being objectively and subjectively assessed and capable of highlighting disparities in the distribution of outcomes across the population. Indicator examples range from (with dimensions in brackets): household net adjusted disposable income (income and wealth); employment rate (jobs and earnings); number of rooms per person (housing conditions); life expectancy at birth (health status); time devoted to leisure and personal care (work-life balance); perceived social network support (social connections); deaths due to assault (personal security); to life satisfaction (subjective well-being).

Analogous to these general population dashboards, is the creation of older-specific indicator dashboards. Examples of regularly produced institutionalised social monitoring reports are ‘Older Australia at a Glance’ (AIHW, 1997, 2002, 2007), the series of ‘Older Americans: Key Indicators of Well-being’ (Federal Interagency Forum on Aging-Related Statistics, 2000, 2006, 2012) and the ‘German Government Reports on Older People’ (DZA, 1993, 2001, 2010). There are also stand-alone publications such as ‘’Ageing in Ireland’ (CSO, 2007), ‘Values on a grey scale – The Elderly Policy Monitor’ in the Netherlands (van Campen, 2008) and the New Zealand report, ‘Positive Ageing Indicators’ (MSD, 2007).

The tendency in these reports is not to assess well-being from a person-based perspective or link indicators to a specific well-being outcome. ‘Older Australia at a Glance’ (AIHW, 2007) provides a descriptive summary of older people using aggregate data on a range of social statistics that cannot be interpreted as representing progress or regress. These relate to demographic profiles, social and economic context, health and functioning, use of health and aged care services, use of transport and technology and the rate of inter-generational transfer within families. In ‘Older Americans: Key Indicators of Well-being’ (Federal Interagency Forum on Aging-Related Statistics, 2012) five areas relating to population, economics, health status, health risks and behaviour and health care are tracked over time to inform policy changes.

The exception is the New Zealand ‘Positive Ageing Indicators’ (MSD, 2007) report. Indicators are chosen to be: relevant to the desired outcomes; based on broad support; grounded in research; able to be disaggregated; consistent over time; statistically sound; and timely. Thirty-four indicators are categorised across ten well-being domains: income; health; housing; transport; living in the community; Māori cultural identity; access to facilities and services; attitudes; and employment and opportunities.

Some indicator dashboards include a set of policy objectives or desired outcomes within each domain. The New Zealand 'Indicators of Positive Ageing' (MSD, 2007) describe in aspirational terms the desired outcomes for each domain such as for income, having access to adequate incomes to provide a reasonable standard of living and the choice on how to live their lives. Yet, there is no obvious or simple way of determining from the indicator estimates if outcomes are achieved. The Netherlands 'Elderly Policy Monitor' (van Campen, 2008) in contrast, specifically ties each indicator to a policy target. For example, the participation in voluntary work indicator is tied to a target of 40 or 50 per cent of older people meeting the Dutch Standard for Healthy Physical Exercise. The monitor assesses if the target is achieved, the longer term trend and which older population sub-groups have not met the target.[56]

The nature of indicator dashboards as "siloed" presentations of statistics runs the risk of ambiguity as progress in some areas is countered by regress in others and the criticism of cherry picking results to suit a particular agenda (Kroll, 2011: 20; van Campen, 2008: 114). The difficulty in drawing over-arching conclusions on the status of older people is notable in the absence of overall generalisations in most of the reports. Exceptions include conclusions drawn by the New Zealand 'Positive Ageing Indicators' (MSD, 2007) report that across most domains older New Zealanders are doing better than their predecessors, with the exception of lower usage of public transport, lower life expectancy for older Maori and higher levels of financial hardship for older single women. Similarly, the 'Older Americans: Key Indicators of Well-being' (Federal Interagency Forum on Aging-Related Statistics, 2012) report that the current health and economic current position of older Americans is improved compared to their predecessors, with higher incomes and assets and longer life expectancies. However, chronic health conditions persist and major financial disparities exist for older women and non-Africans.

The other feature characterising these indicator dashboards is that population-based aggregate estimates are usually drawn from a range of disparate data sources.

[56] The specific policy objectives that form the domains are: social participation through paid and unpaid work, income, mobility, housing, health, care dependency and dying with dignity.

Indicators typically include a combination of expenditure estimates (such as health and housing expenditure) with population incidence rates (such as the employment rate and fertility rate) together with person-directed indicators (such as feeling safe and perceived health status). Most importantly, a lacking attribute is that while indicators may be dis-aggregable by demographic profile, it is not possible to investigate the inter-relationship between the various factors that affect well-being. Hence, it is not possible to ascertain if older people with low incomes also have poor health, or if poor health is related to a lack of social participation. This limitation is noted in the Netherlands 'Elderly Policy Monitor' who write that 'while it is clear that health, work, housing, transport and care for the elderly are closely interrelated in their lives, that inter-relationship is not reflected in the set of targets' (van Campen, 2008: 113).

It may be more accurate to call indicator dashboards, social reports, as they represent 'a more or less institutionalised collection and presentation of data which enable the evaluation of the life situation and wellbeing of the population and their changes over time' (Noll, 2002: 14). The primary purpose is to serve a social monitoring role by describing changes and trends in social developments and providing information about social structures and processes to enable the consequences and preconditions of social policy to be made transparent, measurable and ultimately better understood (Noll, 2002: 14; van Campen, 2008: 117). In practice this means that they actually perform a descriptive rather than analytic role. Cobb and Rixford (1998: 2) write that while 'the descriptive approach asks "What social conditions exist?" the analytic approach raises the underlying question, "Why do those conditions exist?"'. They argue that for social indicators to have a meaningful impact in effecting social action, they need to transition from descriptive analysis to interpretative analysis.

This is an important argument in the context of this thesis. Indicator dashboards cannot provide the level of analysis aimed at investigating and understanding the well-being of older people, using direct well-being outcome measures from a person's perspective and taking into account the inter-relationship between dimensions. Decancq and Schokkaert (2015: 4) argue that 'measuring well-being is very different from creating a dashboard of indicators for evaluating policies …they should not directly enter into a measure of well-being as their impact on individual well-being may be very different, depending on the characteristics of the individual'.

Indicator dashboards are, nevertheless, an important collection of publications to acknowledge because they are widely endorsed as one of the most successful applications of social indicators (Noll, 2002). The stature of organisations and the institutional ability to synthesise data from a range of population-based sources is indicative of a collective recognition of the importance of shifting the focus beyond economic growth and is suggestive of the various data options to make this kind of measurement approach possible.

As a final note for this section, it is worth noting the Australian civil society initiative that follows the same indicator dashboard approach (with all the associated limitations). The Brotherhood of St Laurence's *Social Barometer* report (Kimberley and Simons, 2009) formulates eight dimensions around the notion of capabilities. The eight dimensions: employment; education and training; economic resources; housing; physical health; mental health; and safety and social participation are seen as the capabilities required to lead a full a rewarding life. Indicators of disadvantage for each of the dimensions are presented using national aggregate data collated from different data sources.[57] The inability to link dimensions means that over-arching conclusions are again difficult to gauge. However, they argue that there is enough evidence to indicate that many older Australians are at risk of poverty and social exclusion with the most disadvantaged demographic profile being old, single, poor female and those in private rental accommodation.

3.6 Composite indices

In part to overcome some of the challenges with indicator dashboards and provide plausible single-metric comparisons to GDP are multi-dimensional composite indices of well-being. The sheer volume has resulted in a cataloguing of lists by scholars such as Hagerty et al. (2001), Booysen (2002), Sharpe (2004), de Leon and Boris (2010) and Hagerty and Land (2012) who compare and contrast indices evaluating them according

[57] Examples of indicators include: employment participation rates, school completion rates, income distribution shares, homelessness, disability rates and the incidence of mental health disorders.

to specific criteria, including by theoretical perspective, methodological technique and assessment purpose. Composite indices can be classified into two types: those constructed from aggregate level data and across different data sources and those constructed using micro-level data from a single household or person level source.

3.6.1 Macro-level composite indices

A distinctive feature of the majority of multi-dimensional composite indices and one recognised as a disadvantage (Decancq and Schokkaert, 2015; Durand, 2015; Fleurbaey, 2009) is the inter-personal aggregative manner in which indices are constructed. These aggregate data for each indicator across the range of individuals/households and then aggregates across the indicators. Faced with the same dilemma as macro-level indicator dashboards that draw data from disparate sources and rely on country-level averages, composite indices are able to provide summary assessments of a nation's or specific population group's well-being that can be ranked across country, tracked over time or to evaluate specific policy imperatives. They are able to overcome some of the 'fuzziness' associated with indicator dashboards however they are unable to capture the total variation in well-being outcomes within a population. Nor can they elucidate on the joint distribution of outcomes at the individual level to provide any understanding on the inter-relationship between dimensions.

Nevertheless, a few examples are worth discussing because of their prominence in social indicator discourse and as a way of demonstrating the various ways indices are constructed and used.[58] The most well-known international composite index is the

[58] Composite indices that reflect only one dimension of well-being are not included in this review. For example, it excludes the Index of Economic Well-being (Osberg and Sharpe, 2002, 2005). Strictly based on economic theory it combines four components (with between 3 to 6 indicators in each): average consumption flows, net societal accumulation of stocks of productive resources, measures of household poverty and inequality, and economic insecurity (over anticipated future incomes).

Another prominent example, also grounded in economic theory and considered an improvement on GDP, is the Genuine Progress Index by the civil society organisation Redefining Progress (Talberth et al., 2007). The GPI begins with the conventional GDP framework and then adds and subtracts many social and environmental factors associating a dollar value with each. For example, adding the dollar value of time spent on housework, parenting or volunteering, the value of public infrastructure services such as streets, while subtracting the monetary costs associated with crime, divorce and loss of leisure.

United Nations Human Development Index (HDI) in existence since 1990 (Klugman et al., 2011). Framed around Sen's (1993a) capability theory, human development is based on three capabilities: the ability to have a long and health life; the ability to acquire knowledge; and the access to resources needed for a decent standard of living. Although the index is articulated in terms of the essential elements that enlarge people's choices to ensure their individual well-being, cross-sectional national rates are used as proxies. The index is the geometric mean of three normalised indices: average life expectancy at birth, an education index (based on a two-third weighted mean years of schooling and one-third weighted expected years of schooling) and gross national income per capita. Australia has consistently ranked in the top 5 out of 188 countries since 1998 and from 2010 to 2015 it has ranked 2nd (UNDP, 2015).

The public visibility and theoretical motivations of the HDI has led to intense criticisms (summarised in (Klugman et al., 2011; Kovacevic, 2011)). Many of these however are just as applicable to other types of macro-level composite indices.[59] What Ravallion (2010) refers to as 'mashup' indices. The first criticism relates to the ad hoc selection of indicators, weighting and aggregating function. This potentially gives undue influence to the producer of the index, with the final index outcome the product of a litany of methodological choices. For instance, the HDI is criticised for the reductionism of components that ignores other fundamental capabilities such as political freedom, equity, human rights and sustainability.

The second criticism is the implicit trade-offs between indicators that potentially imply nonsensical policy decisions. Ravallion (2010) argues that, in the case of the HDI, a lower monetary value is implicitly added to an extra year of life for poorer countries than rich ones. Employing the HDI for global policy decisions implies a higher investment to prolong life expectancy in rich countries than devote resources for the same purpose in poorer countries. The change from the simple arithmetic mean to geometric mean for the HDI from 2010 and onwards is intended to address the issue of substitutability between the dimensions (Klugman et al., 2011).

[59] Chapter 6 discusses in detail the challenges and criticisms of composite indices.

The third criticism is the inability of macro-level composite indices to account for the inequality of distributions within countries so that disaggregated findings on the well-being by demographic group is not possible. As a response to this criticism, three supplemental indices are now published alongside the HDI (UNDP, 2014b). The Inequality-Adjusted HDI adjusts the HDI ranking of countries for inequalities in the distribution of income, health and education (Alkire and Foster, 2010). The Gender Inequality Index addresses disadvantages facing females in reproductive health, empowerment and the labour market (Klugman et al., 2011). The Multidimensional Poverty Index identifies multiple deprivations in education, health and living standards (such as access to electricity, drinking water and sanitation) at the household level (Alkire and Santos, 2010). It measures the incidence (overlapping deprivation) and intensity (average deprivation) of multi-dimensional poverty that is capable of being broken down by demographic group (Klugman et al., 2011).[60]

Despite these criticisms, the influence of the HDI as an instrument utilised in development and social policy has encouraged the subsequent development of macro-level composite indices. The majority are treated as communication tools, constructed from collaborative networks involving academia, civil society, private organisation and sometimes governments, with the intention of engaging community-wide stakeholders in an accessible and simple manner (Durand, 2015; Stern et al., 2015).[61] For example, the purpose of the OECD's Better Life Index (BLI) (Durand, 2015) and the Social Progress Index (SPI) (Stern et al., 2015) is to provide a public platform to encourage debate and participation on the need and method to measure social progress.

The BLI is complementary to the OECD's indicator dashboard 'How's Life? Measuring Well-being' as part of the 'Better Life Initiative'. It provides an interactive web-application that allows users to calculate an index out of the dimensions and compare

[60] Each indicator is assigned its own weight so that the sum of the indicators across each dimension is weighted equally (one-third each), and a household with a deprivation score greater than 33.3 per cent is considered multi-dimensionally poor.

[61] The Australian National Development Index (ANDI) is currently under formation. The intention is for it to complement the MAP dashboard approach in much the same way the OECD's 'Better Life Initiative' consists of complementary tools, a dashboard and an index. It is endorsed as 'an idea and a tool designed to promote democracy and citizen voice' (refer to http://www.andi.org.au/).

countries based on their personal preference for the dimensions. Indicators are normalised and equally weighted within each of the eleven dimensions, but users can set the weights for each dimension by scoring the importance of the topic to their life, before countries are ranked.[62] Based on the OECD's pre-set weighting, Australia is consistently ranked amongst the top three out of 36 OECD countries.

The SPI, created by the privately funded research cooperative Social Progress Imperative, is composed of three dimensions formulated around three questions necessary for social progress (Fehder and Stern, 2013; Stern et al., 2015). Do countries provide its citizens with basic human needs? Do individuals and communities have the building blocks for well-being? Do individuals have the opportunities to reach their full potential? Each dimension consists of four components with 52 outcome-based indicators. The dimensional indices and overall SPI is calculated as simple averages with the component value calculated as the factor analysis weighted sum. As with the HDI and the BLI, the SPI also ranks Australia highly. It is 10th out of 133 countries in 2014 and 2015 with a score of 86.42 out of 100 in 2015.

Similarly, the main intent behind national indices is also as an information tool accessible to a wide audience and capable of providing transparency and accountability for public policies. The Canadian Index of Well-being (CIW) (Canadian Index of Wellbeing, 2012; Michalos et al., 2011) is constructed from eight domains: community vitality; democratic engagement; education; environment; healthy populations; leisure and culture; living standards; and time use. There are eight indicators in each domain. The methodology is based on 'an average percentage change method' (Vandivere and McPhee, 2008: 257); indicators are converted into a percentage change increase or decrease from the base year of 1994 to the year being assessed. The average of the percentage change scale for each indicator forms the domain score, and the average of the eight domain scores forms the CIW. Indicators are population based incidence rates.[63] The latest report (Canadian Index of Wellbeing,

[62] Refer to http://www.oecdbetterlifeindex.org/.

[63] For example, a community vitality indicator is the 'percentage reporting participation in organised activities', while an education indicator is the 'ratio of students to educators in public schools'.

2012), highlights the discrepancy between macro-economic growth and national well-being. Even though GDP grew from 1994 to 2012 by 28.9 per cent, the CIW grew by only 5.7 per cent. The report also shows the differential impact of the global financial crisis in 2009 on different well-being domains with declines in income living standards, leisure, health and the environment.

The range of older person-specific multi-dimensional composite indices is limited despite the global social, health and economic policy prioritisation of older people and the proliferation of older person-specific international and national indicator dashboards.[64] The Active Ageing Index (AAI) (Zaidi, 2015; Zaidi et al., 2013), the Global AgeWatch Index (Mihnovits and Zaidi, 2015; Zaidi, 2013) and the SCL/PRB Index of Well-being for Older Populations (Kaneda et al., 2011) have only been developed in the last five years.[65/66]

The AAI, developed in 2012, is the first international composite index aimed at operationalising the multi-dimensional concept of active ageing' (Zaidi et al., 2013: 1). The notion of 'active ageing' is linked to 'social ageing' to differentiate it from the traditional notion of 'demographic ageing' (ibid: 3). The latter treats ageing as the numbers of years lived or remaining years to live. The former recognises the changing

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[64] In addition to older-specific dashboards discussed in Section 3, there is the Mainstreaming Ageing: Indicators to Monitor Implementation' (MA:MI) project which identifies indicators to monitor the implementation of the Madrid International Plan of Action on Ageing (MIPAA) (refer to http://www.monitoringris.org/). There is the WHO Core Indicators for Age-Friendly Cities which identifies indicators to monitor the quality of urban environments as 'age-friendly (refer to http://www.who.int/kobe_centre/ageing/age_friendly_cities/en/). At a national level is the Irish Health and Positive Ageing Initiative (HaPAI) National Indicator Project whose mandate is develop an indicator set to monitor the progress of positive ageing policies (refer to https://hapai.net/hapai-project-resources/).

[65] The Index of Well-being for Older Australians has just been released in February 2016. While it provides a national assessment of older people that is purposefully multi-dimensional in focus, it is concerned with geographic spatial inequality in well-being outcomes. It too is also constrained by the same challenges of macro-level composite indices. The index is still in a beta version without any external vetting process.

[66] The limited range of older person-specific multi-dimensional composite indices is in contrast to the proliferation of child well-being indices that have been a major influence in the development of the social indicator movement (Ben-Arieh, 2008; Ben-Arieh and Frønes, 2011; Bradshaw et al., 2007; Bradshaw and Richardson, 2009; Lamb and Land, 2013; Lippman et al., 2011; Moore et al., 2008; O'Hare and Gutierrez, 2012). Child well-being indices are not reviewed as part of this literature review but they are briefly discussed in Sections 6.2 and 6.3 in Chapter 6 in the development of well-being dimensions.

roles and relationships along the life course as well as institutional constraints on how older people work and live as they age. It is predicated on maximising opportunities to ensure the continued participation of older people in society.

The index aggregates four domains: employment; participation in society; independent, healthy and secure living; and capacity and enabling environment for active ageing. The first three domains reflect actual expressions of current active ageing. The last domain is inspired by Sen's capability approach to capture the 'substantive opportunities and empowerments' (ibid: 7) such as health, education, social connectedness that enhance well-being. Examples of indicators include (with domains in brackets): employment rate (employment); the percentage of aged population providing unpaid voluntary work through organisations (participation in society); the percentage of aged population who engage in physical activity and sport at least five times a week (independent, health and secure living); and the remaining life expectancy achievement of 50 years at age 55 (capacity and enabling environment for active ageing).

The methodological technique is to use the arithmetic weighted average from indicators to domain scores and from domain scores to the final index with the weights apportioned to the indicators and the domains as determined by an expert group (Zaidi et al., 2013: Table 3.1). There are three main findings. The AAI is lower for females than males in most EU countries. Generally, countries with a higher GDP per capita are more successful in experiences of active ageing, such as Sweden and Denmark. Countries may be better or worse off in rankings depending on the domain. For example, while the UK ranks both 4th overall and for the employment domain, it ranks 11th and 6th when measured against the participation in society and independent living domains respectively (ibid).

There are many positive features of the AAI that attempt to overcome some of the challenges already discussed in relation to macro-level composite indices. The approach focuses on people-centred outcomes as opposed to the descriptive information or institutional arrangements reported in the majority of indicator dashboards. Indicators encapsulate aspects such as voluntary activities, political participation, mental health, social connectedness, physical access and relative median income. The indicators have a positive normative judgement so that the higher the percentage value, the higher the active ageing outcome. The utilisation of EU micro-level datasets provides the opportunity to focus on the individual. Finally, the construction of an AAI for males and females, comparable within country, can identify if there is gender disparity between well-being outcomes.

Yet, the very nature of inter-personal aggregation that aggregates across indicators based on average population rates, automatically excludes the capacity to take into account the combined distribution of active ageing outcomes at the individual level. Furthermore, it is not possible to obtain any further disaggregation of results beyond gender, such as by ethnicity, without commencing the entire process with indicator responses categorised by ethnicity.

Nevertheless, the AAI is evidence of mounting international recognition that composite indices need to be unpacked to the level of the individual to enable the delivery of connected policy solutions. It has inspired the creation of the Global AgeWatch Index (GWI) (Mihnovits and Zaidi, 2015; Zaidi, 2013) which includes Australia. The GWI focusses on the actual quality of life as opposed to the AAI's active ageing framework. Consequently indicators are outcome-based, measured in absolute terms, currently-situated (as opposed to measuring the untapped potential of active ageing) and include subjective measures (as opposed to measuring the actual activity of people making a positive contribution).

The four domains, each with between two to four indicators are: income security; health status; capability (education and employment proxies are used); and enabling environments (features that support the engagement of older people with their community). The methodological technique follows that of the HDI but uses a combination of weighting strategies. While the domain indices are weighted equally to form the overall index, each indicator within each domain is assigned a specific weight as determined by the expert panel (Zaidi, 2013: 14).

The reliance on publically available international databases (such as the United Nations, the World Bank and the International Labour Organisation) with country level statistics and not on micro-level datasets, means that in practice the GWI provides the same evaluative exercise as other macro-level composite indices. Australia ranks 14th out of 96 countries for overall quality of life, however, its position changes considerably depending on the domain. Older Australians rank very low in income security (57th), in part because three out of the four indicators are all disposable income based. Australia is surprisingly low in terms of the enabling environment (25th) given that they are subjective assessments relating to individual freedom, feeling safe and public transport; features accepted as the norm in Australia's democratic and peaceful society with a strong public infrastructure. The overall index ranking for older Australians is moderated by high rankings in relation to the health status and education and employment domains (4th).

Finally, the SCL/PRB Index of Well-being in Older Populations (Kaneda et al., 2011) appends data from the United States Health and Retirement Surveys with European data from the Study of Health, Ageing and Retirement in Europe (SHARE, 2005). Twelve indicators are categorised across four domains: material well-being; physical and cognitive well-being; social engagement; and emotional well-being. As with all the other composite indices discussed so far, it is the point at which aggregation occurs (that is, from indicators to domains) that is problematic. Although the index is promoted as providing insights by older age group, the methodological process from indicator to domains to overall index is done separately for each age group so that in effect there are three separate SCL/PRB age group indices (50-64, 65-74 and 75 years and older). Hence, it is only possible to draw comparisons across country for each age group, but not to reach any substantive findings on the well-being of older people across the life course. For example, the index ranks the well-being of older people aged 65-74 years and 75 years and older in the United States as higher than the other 11 countries, but we can't infer which of these two age groups experiences higher well-being and on account of which domains.

3.6.2 Micro-level composite indices

As we move from indicator dashboards to macro-level composite indices to micro-level indices composite indices appropriate for individual-level analysis, the volume of literature diminishes. A micro-level composite index is formed by the inter-personal aggregation of indicators for each individual. There are two initiatives that fit within these parameters: the Personal Well-being Index (PWI) (Cummins et al., 2003; International Wellbeing Group, 2013) and the Life Situation Index (SLI) (Bijl et al., 2010; Boelhouwer, 2002).

The Personal Wellbeing Index (PWI) developed by the International Wellbeing Group utilises a subjective well-being approach to monitor the well-being of the population.[67] Cummins et al. (2003: 163 - 164) contends that following the theory of subjective well-being homeostasis (described briefly in Chapter 2), the global life satisfaction question is too abstract and yet highly personalised, resulting in a loss of information about which specific components of life contribute positively or negatively to the sense of well-being for an individual.

The PWI overcomes this by adopting a minimal set of domains, described as representing a 'first-level deconstruction' of global life satisfaction. These are: living standards (perceived as economic living standards); health; achieving in life; relationships; safety; community-connectedness; and future security.[68] Theoretically, each domain is a cognitive (as opposed to an affective adjective, such as happiness) unique contribution to global life satisfaction. Empirically, each domain exhibits a unique and shared variance in a hierarchical regression predicting global life satisfaction (International Wellbeing Group, 2013: 7 - 8). The methodological technique is to convert raw scores for each domain into a standard 0-100 distribution

[67] The International Wellbeing Group administers the Australian Unity Wellbeing Index national survey annually, from which is produced the National Wellbeing Index in addition to the PWI. This index provides a 'distal (national) level' measure of subjective well-being versus the 'proximal (personal) level' of the PWI. It is the average satisfaction score of six domains of national life: economy, environment, social conditions, governance, business and national security (Capic et al., 2015).

[68] The standard form of question for each domain is "how satisfied are you with 1) your standard of living, 2) your health …. 7) your future security?". Each respondent is asked to rate from a scale of 0 to 10 if he has 'no satisfaction at all' (0) to 'completely satisfied' (10).

and then average the scores to produce a multi-dimensional measure of subjective well-being.

Over the course of 15 years since the PWI was first constructed, there are four notable results relevant to this thesis (Capic et al., 2015). First, at a population level the index is generally high hovering around 75 and relatively stable (mean scores vary by 3.2 percentage points), suggesting that people generally have a positive self-view (Cummins et al., 2003: 163). Second, at a population level, the domains with lower scores are health and achieving in life, however, there is greater variability in the long-term trend scores for the standard of living, personal safety, community connectedness and future security.

Third, disaggregated results by demographic group show that subjective well-being: generally rises with income; is higher for females; is higher for those living with a partner and lowest for people living alone or living alone with children; and is higher for those in relationships or widowed and lower for those separated or divorced. Fourth, the PWI score is highest for older people aged over 65 years and this is consistent across all domains except for health. Cummins et al. (2003: 184) postulate that these higher scores are attributable to the resilience of older people to adapt and accept changing living conditions and is keeping with homeostatic theory that people return to a set well-being level over time, despite the short term impact of negative or positive life events.

The PWI exhibits many of the properties desirable of micro-level well-being multi-dimensional composite indices. Through the PWI, well-being retains status as an individual-level yet multi-dimensional concept, deconstructable into seven unique life domains. The intra-personal aggregation mechanism provides a path for many empirical investigations. In addition to assessing differences by demographic profile, comparison over time and potentially ranking by countries, the index can be utilised in the same manner that relationships between other socio-demographic variables are analysed within individual (or household) surveys. Nevertheless, concerns over the plausibility of solely relying on subjective assessments to measure well-being, generally raised in respect to single-item measures (where people are asked to rate overall life satisfaction or happiness), are also relevant to a multi-item scale such as the PWI.

Some of the theoretical debates on the motivations and interpretations contested within the notion of subjective well-being have already been broached in Chapter 2 (summarised in (Chiappero-Martinetti, 2000; C. Graham, 2010; McAllister, 2005; Stiglitz et al., 2009)). There are questions over the influence of mood and circumstance to temporarily affect satisfaction levels. The role of aspiration, adaptation, social comparison and ideological motivators versus the actual conditions of life means that scales provide different interpretations to different individuals. The importance of unobservable personality traits restrains the ability of public policy to mitigate against negative well-being outcomes. Finally, the tenuous relationship to objective indicators remains unresolved.

Two findings in relation to this last point are worth noting. The first called the 'Easterlin paradox' show that the positive relationship between high income and high subjective well-being at a point in time, is not sustained over time with happiness remaining constant despite increases in income (Easterlin, 2000a). More recently, with the availability of large extensive datasets, a number of scholars have refuted this claim (Headey et al., 2008; Headey and Wooden, 2004; Stevenson and Wolfers, 2013).

The second regards the paradoxical tendency for older people to report high financial satisfaction levels despite lower levels of income compared to younger people (Hanson, 2008; Hsieh, 2003). General explanations are that with ageing: older people downwardly adjust their needs and aspirations; they have reduced financial needs as family responsibilities diminish; and cohorts of current older people have a sharper contrast between childhood and adulthood financial circumstances (ibid). However, there is evidence that once wealth is accounted, the 'satisfaction paradox' dissipates, except for the group of low income/low wealth older people (Hanson, 2008).

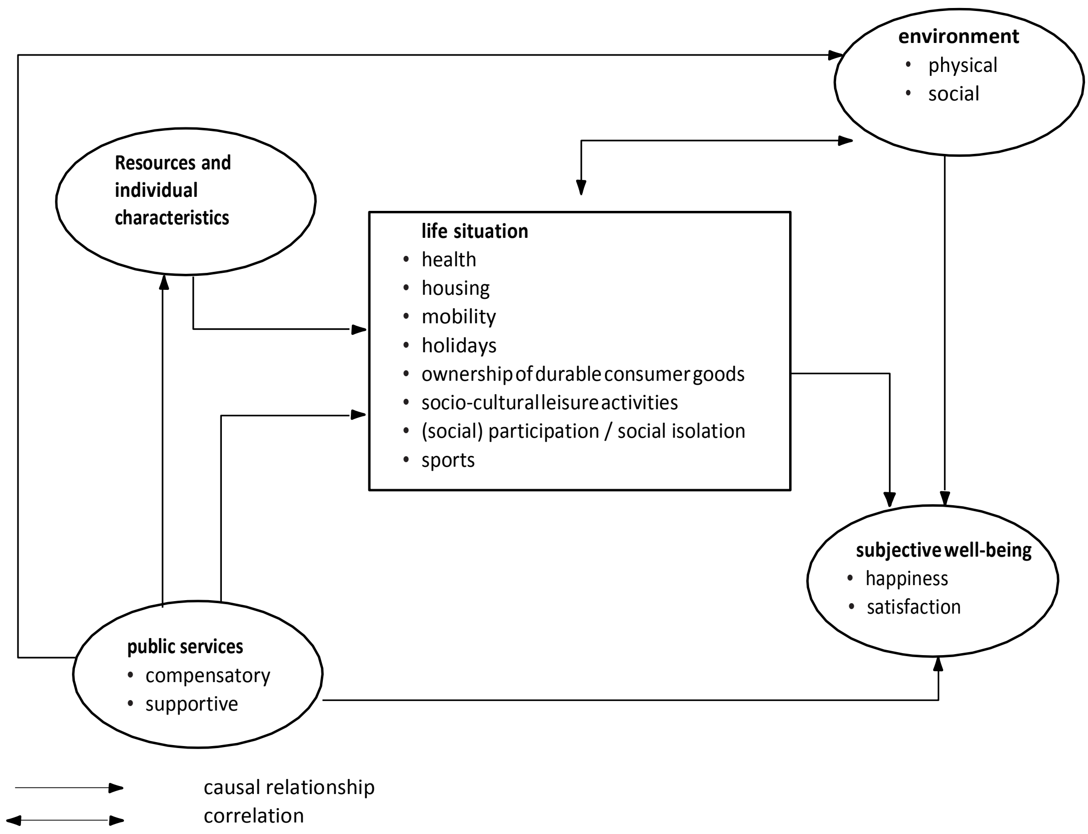
It is for these reasons, that while the PWI is an invaluable contribution to the literature, it does not preclude the need for an individual-level multi-dimensional well-being indicator constructed from objective measures. The use of subjective well-being measures is complementary and not a substitution to other objective-indicator based social indicator approaches emboldened with a similar goal to improving measures of individual well-being.

The second example is the Netherlands Life Situation Index (SLI) that is part of the Social State of the Netherlands (SSN) report (Bijl et al., 2010: 4). The SSN follows the generalised format of indicator dashboards discussed in Section 3.5. That is, it provides a descriptive summary of key areas of life and monitors changes over time to provide a picture of the overall quality of life of the Dutch population. However, two unique features within the SSN is the Life Situation Index (SLI), which sets it apart internationally in terms of its construction as a micro-level composite index and the fact that the index has actually been in existence since 1974.

Both the SSN and the SLI did not initially develop out of a particular conceptual framework, emerging as they were at a time when social indicators were still a novel concept. Hence, the choice of topics in the SSN report and items for the index was based more on pragmatism to try and say something about the totality of a person's current well-being (Boelhouwer, 1999: 53). However, between 1997 and 2001, the SCP retrospectively formulated a conceptual framework (Figure 3.2) to situate the choices already made and as a reference point for future methodological debates (Boelhouwer, 2002, 2010).

The central focus in Figure 3.2 is the life situation of the individual, described as 'the whole of individual living conditions which relate to prosperity and well-being' (Boelhouwer, 2010: 42). The remaining elements are regarded as inputs or outputs in relation to this central theme. Individual resources (i.e. education, work, income and health), individual characteristics (i.e. age, household composition, and ethnicity) and the provision of public services (such as the health care system and social security) directly affect the life situation. The social environment (such as neighbourhood composition and safety) and the physical environment (such as the city and the neighbourhood people live in) affect and are affected by the life situation. Subjective well-being is an outcome element within the framework. It is an evaluation by an individual of the actual condition of his/her life situation.

Figure 3.2 Conceptual framework for the life situation



Source: Boelhouwer (2010: Figure 5.1).

The SLI embodies the life situation of an individual. Currently, the index combines indicators from the eight domains listed above. There are nineteen indicators that vary widely in measurement form. Some examples include (with domains in brackets): hindered in carrying out daily activities at home (health domain); the number of rooms (housing domain); owning a car or having a public transport season ticket (mobility domain); number of overseas holidays (holiday domain); number of household articles owned (durable goods ownership domain); number of hobby activities (socio-cultural leisure activities); voluntary work for how many organisations (social participation domain); and practicing a sport and the frequency of sport (sport domain).[69]

[69] The index is based on a series of data files that operates as a time series but not a longitudinal dataset. Over time there have been changes to data collection methods (from face to face to …), periods of collections (from annual to tri-annual collections) and changes to data content. The surveys are always a representative sample of the Dutch population and include detailed questions on all aspects relating to the index, an individual's socio-economic background information and subjective well-being questions.

The methodological technique uses a variant of principal component analysis called non-linear canonical correlation analysis (termed *Overals* in SPSS). The technique is based on the relationship between pairs of variables and allows for variability in statistical forms and compensability between indicator outcomes. The SLI was initially formed from the factor loadings (weights) on the first factor when the procedure was run and then transformed into a comparison index, with 1997 used as the base year (average score is set at 100 with a standard deviation of 15 for 1997).[70]

With respect to the well-being of the Dutch, the most recent reports suggest that the life situation of the Dutch population since 1997 has improved (Bijl et al., 2012; Boelhouwer, 2010). The index is higher than the average for people who work, have a higher income or a higher education. Older Danish people aged 75 years and over have, comparatively, the most unfavourable life situation across all demographic groups, despite trend improvements since 1997. The proportion of disadvantaged older people (aged 65 years and over) has decreased since 1983, but there is a small group for whom life situation scores have stagnated suggesting the persistence of extreme social disadvantage (Boelhouwer, 2010: 118) (note as the data is not longitudinal, it cannot be established if this is the same group of individuals).

Three main issues stand out with the SLI approach. The first issue is the general applicability of domains to all demographic groups and beyond the Netherlands. The choice of domains is not articulated from a particular conceptual theory (such as from a theory of justice or even with respect to human development or basic needs) or by way of comparison with other multi-dimensional approaches. Instead, the choice of domains is driven by historical precedence, the availability of data, relevance to policy in a welfare state and with reference to the specific cultural context of the Netherlands. Hence, it is questionable if certain domains, such as sport and mobility, are as applicable to groups such as older people or if they would carry the same significance in other national contexts.

[70] The domain scores are subsequently calculated using a complicated and unclear procedure that involves recoding the indicators using 'category quantifications' obtained from the *Overals* procedure, multiplying by the weights obtained for factor 1 and then summing across the indicators.

The second issue is that while the indicators espouse to be applicable to everyone, readily interpretable as positive or negative and measurable at the individual level (Boelhouwer, 2010: 43 - 44) this is not the case in practice. Indicators relating to housing, car ownership and ownership of consumer goods are household level items. Moreover, social values are explicitly attached to indicator outcomes irrespective of individual preferences. This does not affect indicators that are generally accepted and supported by evidence-based research as positive contributors to an individual's overall life situation, such as indicators within the health, leisure activities and social participation domain.

For the remaining indicators however, it is questionable if it is reasonable to assume that outcome responses are either detrimental or beneficial to a person's life situation, without first stipulating if the outcome responses are in fact determined by necessity rather than personal preference. For example, the model treats not owning a car, living in an apartment, having a small number of rooms, not engaging in a sport, not going on a foreign holiday as detrimental to a person's life situation. It is plausible that for many older people, living in an apartment with a small number of rooms and not engaging in conventional sports while still engaging in other meaningful activities are personal choices conducive to a positive life situation.

The third issue is that it is difficult to understand why canonical correlation analysis is the preferred aggregating technique, given the availability of other methods that are more transparent and easily understood but can also accommodate different variable forms (Sharpe and Smith, 2012: 35). Canonical correlation analysis is an exploratory and descriptive technique rather than based on a conceptual link from indicators to domains to the composite index. The index is just the score from the first factor in the analysis, without the relationship between the index and the domains incorporated into the estimation of the index.

Nevertheless, despite these issues, the Dutch endeavour is impressive in its long-standing commitment to pursuing the construction of an assessment instrument that encapsulates the totality of the life situation and places the individual as the pivotal focal point. It is indicative that micro-level composite indices are not only plausible but can offer a significant contribution to policy discourse.

Finally, there are two studies by Halleröd (2009; 2012) that are important contributions to the literature because they both focus on the individual, involve well-being indicators and are guided by the same intention to look beyond reliance on income to assess well-being. However, they are different to the approach advocated in this thesis. Both studies fit a series of confirmatory factor analysis to test the hypothesis that problems experienced by older people in different well-being arenas may lead to an accumulation of adversity, encapsulated as a global well-being problem. The studies use binary indicators from the Swedish Panel of Ageing and the Elderly.

The 2009 study confirmed the grouping of 17 indicators into three distinct categories: physical impairments (such as frequent and severe health problems); psycho-social situation (such as tired in the past two weeks); and material standard of living (such as difficulties making ends meet). The 2012 study confirmed the grouping of 39 indicators into four categories: health status (such as somatic health problems); incidence of functional health problems (such as limited mobility); psycho-social indicators (such as unhappy and downhearted); social relations (such as feeling lonely); and material deprivation (such as no daily paper).

Collectively, they confirm the hypotheses that welfare problems can accumulate into a ‘multi-faceted phenomenon’, hence evidence of a multi-dimensional well-being problem. Using standard demographic predictors in regression analyses to estimate the global factors, both studies also show a higher prevalence of welfare problems amongst women, single-adult households, blue-collar workers, low-income earners and older old people (aged 80 years and over).

3.7 Conclusion to Part 2

In summary, the use of social indicators to capture the complexity of well-being is a research and monitoring area garnering much attention across a broad spectrum of society; from academia and government to involving the input of civil society and the private sector. And one jointly committed to recognising the inherent dimensionality in well-being. In many ways, it is a reversion back to the classical philosophers query into the nature of a good life, by ensuring that we measure those things that matter, thus enabling purposeful action to improve individual and social well-being.

There are numerous examples of well-being indicator dashboards applicable to the general population and specific to older people that are now produced as part of the institutionalised system of social reporting in many national and international statistical offices. They are an important application of social indicators, as they utilise comprehensive indicator systems to encapsulate the many non-economic dimensions, in addition to an economic dimension associated with well-being and social progress. Indicator dashboards serve a useful social monitoring role mandated with a descriptive rather than analytical purpose to shed light on social structures and processes. However, the siloed presentation of macro-level data is unable to capture relationships between dimensions, or provide over-arching insights on individual or social well-being.

Composite indices, on the other hand, serve as a pragmatic communication tool; effective because of its simplicity to garner attention and capable of linking policy decisions to well-being outcomes. Considerable efforts have been devoted to the creation of macro-level composite indices in the last two decades, particularly international comparative indices that rank countries, or assess progress over time. It is only more recently (in the last five years) that attention has turned to applying multi-dimensional composite indices for older people, hence the very limited range of initiatives. While these efforts are commendable and important they are, nevertheless, also limited in capacity to provide insights on the well-being of older people that begins with the individual and uses individual-based well-being outcomes.

The last section demonstrates that literature on micro-level composite indices of well-being is extremely limited. This is surprising given the compelling reasons justifying the worth of micro-level composite indices. Micro-level composite indices provide formal recognition that the well-being of an individual is complex and multi-dimensional and that an overall assessment depends on how the individual fares across the different dimensions that constitute his/her well-being. By beginning at the micro-level, the options for macro-level composite indices still remain. Aggregation across individuals can be grouped to form different demographic groups and different spatial units, and can be compared over time or across country. They provide the same communicability benefit as macro-level indices, reducing complex data into a single latent construct.

It is also evident that amongst the many initiatives discussed above substantive insights on the well-being of Australians and/or older people is limited. There are four tentative summary points. International macro-level composite indices for the general population and specific to older people rank Australia high overall in terms of well-being or social progress compared to other countries. Older people (in comparative countries to Australia, such as New Zealand and the U.S.) have seen improvements in health and economic well-being compared to their predecessors. There is some evidence that in countries with a higher income, older people have higher objective well-being, as do older females (based on the AAI results for EU countries). The SLI results (for Netherlands) show that older old people (aged 75 years and over) have the lowest life situation scores across all demographic groups, despite increasing index scores over time. There is also evidence of a small group of older people in extreme social disadvantage.

The Australian MAP series is evidence that different societal actors, from government, academics and civil society, recognise the importance of multi-dimensional accounts of well-being to policy discourse, and for a national understanding of how Australia is faring and for whom it is faring better or worse. This aligns well with the argument already stipulated for this thesis that it is necessary to expand assessments of individual's living standards and well-being not just beyond disposable income, but also beyond an economics dimension. It is especially pertinent for older people for whom good health and the quality of relationships, for example, may have greater resonance with their overall well-being as they move into different phases along the life course trajectory. The availability of population-based broad multi-purpose individual and household surveys (such as HILDA) provides a plausible path to formulate a multi-dimensional individual well-being approach. The methodology for this approach is set out in Chapter 6 and the findings as they relate to the well-being of older Australians are discussed in Chapter 7.

4 Economic standard of living methodology

4.1 Introduction

This chapter presents the methodological section of Part 1 of the thesis which focuses on the ‘economic’ as the perspective from which to understand and measure the standard of living. The previous chapters have drawn attention to some of the key conceptual and methodological issues brought on by a reliance on economic resources, particularly income. Nevertheless, they remain an influential indicator of the standard of living for four important reasons. First, the measurement of income and/or consumption expenditure remains a commonly understood method for standard of living assessments. Second, the role of money as an enabler of purchasing opportunities and benefits necessary to a good standard of living has normative acceptance (Clarke and Islam, 2004).

Third, the generation of high quality income, wealth and expenditure survey data, coupled with the simple money index that is a feature of the approach, lends itself to statistical comparison, aggregation and manipulation (Sumner, 2006). Fourth, the provision of income is a relatively efficient and simple instrument for government to effect policy and hence remains a central focus of government redistributive social and economic welfare policies (Harmer, 2008).

The approach in this chapter is to continue with convention and treat the standard of living as an economic concept. The review of the literature in Chapter 3 demonstrates that despite the existence of studies based on consumption expenditure estimates or those that examine joint income-wealth patterns, disposable household income continues to be routinely employed as the predominant indicator to measure economic standard of living levels, including with respect to older Australians.

The purpose of this chapter is set out a methodology to operationalise an economic living standard approach (ELS) in a manner that is conducive to measurement using household survey data. Atkinson (1985) draws attention to the range of decisions that must be addressed in any economic study on living standards and well-being. What is the measure of resources (income, consumption or expenditure)? How is wealth included? How are resources estimated – what items should be counted? What is the unit of analysis – household, family or the individual? What is the equivalence scale assumed to adjust for differences in relative needs? What is the time period of assessment? Each of these decisions has the potential to substantially impact economic standard of living assessments. This chapter addresses many of these issues drawing a link between the conceptual approach to the standard of living in Chapter 2, the review of the economic literature in Chapter 3 and the empirical analysis to follow in Chapter 5.

In setting out the methodology, substantial reference is made to the variables used in the dataset, hence, the chapter begins by discussing the main dataset used - the Household, Income and Labour Dynamics in Australia Survey (HILDA). Section 4.3 sets out the operationalisation of the economic standard of living (ELS) approach; presenting four economic resource metrics beginning with disposable income and consecutively including fuller notions of income and wealth. Section 4.4 discusses the imputation methods to estimate key variables in the economic equations. Section 4.5 sets out the methodological assumptions that are characteristic of economic data with respect to the time unit, the counting unit, the sharing unit and equivalence scales. This section also reports on the derivation and treatment of key economic and demographic data within the HILDA dataset. Concluding remarks are presented in Section 4.6.

4.2 The HILDA Dataset

The Household, Income and Labour Dynamics in Australia Survey (HILDA) is a household-based social and economic panel study that has been following approximately 20,000 individuals across 7,700 households every year since 2001 (Watson and Wooden, 2010).[71] The survey began with a large national probability sample of households occupying private dwellings and then sought interviews with all members of those households aged over 15 years (Summerfield et al., 2012: 2).

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[71] Each survey year is referred to as a wave. Wave 1 is the 2001 survey year. Wave 10 refers to the 2010 survey year.

Over time, the sample has been extended to include any new members of households formed as the composition of the original households has changed. The response rates for HILDA are reasonably high and comparable to equivalent overseas surveys such as the British Household Panel Study (BHPS) and the German Socio-Economic Panel (GSOEP); 87.0 per cent of Wave 1 respondents were interviewed in Wave 2 and in subsequent years the response rates have all been above 90 per cent (Summerfield et al., 2012; Watson and Wooden, 2010).[72]

The survey includes a household interview with at least one adult member to collect general household information, and then specific individual interviews with all (or most) of the household members aged 15 years and over. All persons completing a personal interview are also provided with a self-completion questionnaire (SCQ). It is possible within HILDA to obtain information on households, individuals aged 15 years and over (referred to as responding persons) and individuals under 15 years (treated as enumerated persons), although the level of detail varies in each of these sample groups.[73]

In each wave, information is collected on a broad range of socio-economic variables. Household information is collected about household member demographics, the composition of the household, household expenditure and childcare arrangements. Individual interviews collect information on demographic characteristics, income, education, employment, family relationships, health, life satisfaction and a range of self-completion questions. The SCQ includes questions on: physical, mental and emotional health; finances; social and community participation; neighbourhood characteristics; and financial stress. In some waves, the survey has been extended to include topics of special interest, such as a fertility topic in Waves 5 and 8, wealth in Waves 2, 6 and 10 and retirement in Waves 3, 7 and 10. Although there are more recent waves, this thesis focuses on Wave 10 (2010) as it contains a specific module on wealth.

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[72] The response rate for Wave 5 and Wave 10 are 94.5 and 96.1 per cent respectively as a percentage of the previous wave's respondents (Summerfield et al., 2012).

[73] There are accordingly a range of files provided depending on the level of analysis and research question – household, enumerated, respondent and combined files.

There are advantages and disadvantages with using the HILDA dataset. A central question poised in this thesis is to determine if there are changes to the substantive conclusions about older people's standard of living and well-being as we move away from purely an economic perspective towards a multi-dimensional framework that also takes account of non-economic dimensions. There are a range of Australian databases with national representation that provide detailed coverage of one or some of these aspects. The ABS, for instance, oversees the collection, management and publication of data across a range of surveys, for example: the Census of Population and Housing; the Survey of Income and Housing; the Household Expenditure Survey; the General Social Survey; and the National Health Survey.[74] However none of these encapsulate the comprehensive range of social, economic, health, psychological and demographic factors in one dataset targeted towards analysis at the individual level.[75]

HILDA is the only dataset whose breadth and depth of economic, social and personal questions provides the scope to conduct a meaningful multi-dimensional individual-level analysis that upholds the sincerity of this thesis's purpose. The ability to use a consistent single dataset throughout the thesis is not only an essential component of the thesis but it also reduces any differences that may arise from survey methodologies, sample representativeness and inconsistencies in variable definitions (Zaidi, 2008: 64). Furthermore, the gathering of data at a household and respondent level allows the researcher to determine the impact that household factors such as the

[74] The Census of Population and Housing, collected every 5 years, measures the number of people and households in Australia and records summary data on their demographics.

The Survey of Income and Housing and the Household Expenditure Survey (collectively referred to as the Household Income and Expenditure Surveys (HIES)), conducted every 6 years, collects detailed itemised data on household's balance sheets with respect to income, wealth and expenditure patterns, deprivation indicators and financial stress indicators (see Appendix B.1).

The General Social Survey, commencing in 2002 and conducted every 4 years, collects broad-based household and personal data on a very wide range of socio-economic topics such as health, housing, education, employment, social networks and social participation, financial stress and financial resources. The National Health Survey, collected approximately every 3 years, gathers data on the health status of the population, health-related aspects of lifestyle, health risk factors, use of health services and health-related actions people take.

[75] A major advantage of HILDA, as a longitudinal dataset spanning 10 years, is the ability to describe and model the dynamics of household and individual living standards. Although not a component of this thesis, it is possible to investigate the arguments presented here through the prism of time as a topic for further research.

type of relationships, family composition and the transfer of resources, including wealth, have on individual living standards and well-being.

As a large dataset though, HILDA is beset with the same limitations that hinder most other survey-based datasets. There are concerns about the representativeness of the sample due to rates of sample attrition amongst the very young, those living alone or in de-facto relationships and the under-representativeness of immigrants and Indigenous Australians (Scutella et al., 2009). Even though, to some extent the degree of under-representation of these sub-groups is rectified though the weighting of sample data to the population, weights do not adjust for bias within groups and specific groups continue to be excluded. People who are homeless and who live in remote and sparsely populated areas and those living in institutions such as hospitals and other health care are excluded from the HILDA survey sample (Summerfield et al., 2012).

With respect to institutional sample exclusion, the AIHW (2011: 175) reports that around one in twenty older people over 65 years live in care accommodation (such as a residential aged care facility or hospital). This statistic, however, increases sharply to one in four older people aged 85 years and over, driven by the increasing prevalence of age-related health needs. Given that older people aged over 85 years are the fastest growing sector of the Australian population (Australian Government, 2010), the exclusion of people from institutional settings is of obvious critical concern to this thesis with its focus on older people. Moreover, it introduces a within-group health bias for the sample of older people 85 years and over with better health than the elderly living in institutional care settings. These factors imply that results for older people aged 85 years and over should be treated with caution.

Finally, notwithstanding the broad range of topics included in HILDA, the translation of conceptual frameworks is still limited by the availability of data items within HILDA, particularly in relation to data on housing costs and in-kind government transfers. There are also problems with HILDA's definition of some key demographic variables that are necessary for an analysis on older people. Both the issues and the steps to resolve them are discussed in greater detail in the ensuing sections.

4.3 Operationalising the economic living standards approach

4.3.1 Economic resource concepts

The economic standard of living (ELS) approach is a methodology based on determining potential consumption possibilities. The emphasis herein is on the notions of income and wealth as providing the full array of consumption possibilities which determine the economic standard of living (ABS, 2001b: 184). The use of the term 'possibilities' is borrowed from the ABS (2009: 2) who write that it reflects the *capacity* to consume rather than just actual or current consumption. The task is to combine the notions of income, wealth and consumption in a practicable and measurable manner, while attempting to retain conceptual plausibility and methodological rigour.

The economic standard of living (ELS_{ij}) of individual i that belongs to household j is a function of the economic resources available to the household (er_j), divided by eq_j, the equivalence scale appropriate to household j. Symbolically, this is shown as:

Equation 4.1 $\boldsymbol{ELS_{ij} = f\left(\frac{er_j}{eq_j}\right)}$

There are four economic resource metrics collectively referred to as er_j: disposable income, full income, potential consumption and adjusted potential consumption. These can be viewed along a continuum, beginning with the narrowest focus on disposable income (dy_j); expanding to include the value of non-cash benefits and services (arising from the receipt of public goods and/or services from home ownership) defined here as full income (fy_j); and finally, the inclusion of wealth in the form of two derived potential consumption metrics (pc_j) and (apc_j).

It is important to establish at the outset that this does not imply that as the notion of each er metric is expanded to include additional economic resource components, the dollar value of the metrics will automatically increase. It is understood that if wealth is negative then pc_j and apc_j can be less than fy_j. Furthermore, neither does it imply that each er metric along the continuum is superior to the previous one. The task ahead is to determine if the relative economic position of older people and sub-groups of older people changes with each ELS metric and which economic resource factors contribute to these economic living standard conclusions.

It is also necessary to reiterate that the ELS framework advocated in this thesis is one approach, in a large field dedicated towards broadening the measurement of economic living standards and further to that extending towards the non-economic. The diversity and range of these empirical studies is attested to in the literature. There is clearly no singular 'correct' approach, nor are there any 'correct' solutions to the numerous measurement issues. With this in the mind the next sub-sections set out the ELS approach in greater detail.

4.3.2 Disposable income and full income

Beginning with the notion of income, specifically dy and fy, Table 4.1 compares three alternative income definitions and different methods of aggregating current household income components. Drawing from these alternative income approaches, the final column sets out the proposed definition of full income (fy) used in this thesis.[76]

[76] The accounting period for calculating income, in each of these definitions, is annual, whether this is the calendar year or the financial year preceding the survey period.

Table 4.1 Comparison of alternative income concepts and components

Smeeding and Weinberg	ABS Fiscal Incidence Studies	HILDA	Proposed full income model
Cash earnings	Wages and salaries	Wages and salaries	Wages and salaries
+	+	+	+
Other cash earnings (e.g. dividends, private pensions, rental income, net interest)	Own unincorporated business income	Own unincorporated business income	Own unincorporated business income
+	+	+	+
	Investment and property income	Investment and property income	Investment and property income
	+	+	+
	Superannuation and annuities	Private pensions (incl. superannuation)	Private pensions (incl. superannuation)
		+	+
Other regularly received income	Other private cash transfers	Private transfers	Private transfers
+	+		
Net realised capital gains and intermittent income			
+		=	=
	Net imputed rent for owner-occupied dwelling & subsidised private rentals		
	=	=	=
	Private income	**Private income**	**Private income**
	+	+	+
Government public cash transfers	Social assistance benefits in cash	Government public cash transfers	Government public cash transfers
		+	+
		Other income (e.g. scholarships, foreign pensions)	Other income (e.g. scholarships, foreign pensions)
=	=	=	=
Gross cash income (gy)	**Gross cash income *(gy)***	**Gross cash income *(gy)***	**Gross cash income *(gy)***
+	–	–	–
Net inter-household transfers (e.g. alimony, child support)			
+			
Value of in-kind earnings and home production			
–			
Net mandatory work expenses			
–			
Net personal income taxes	Personal taxes on income	Estimated personal income tax	Estimated personal income tax
=	=	=	=
Disposable income *(dy)*	**Disposable income *(dy)***	**Disposable income *(dy)***	**Disposable income *(dy)***
+	+		+
In-kind transfers (e.g. food vouchers, housing assistance)	Social transfers in-kind		Imputed social transfers in-kind
+	–		+
In-kind market income (e.g. fringe benefits, company cars)			
+			
Net imputed rent on the equity in owner-occupied dwellings			Net imputed rent for owner-occupied dwellings
	Taxes on production		
=	=		=
Net total income *(nti)*	**Final income *(fiy)***		**Full income *(fy)***

Source: The first three columns are adapted from Smeeding and Weinberg (2001: Table 1); ABS Catalogue No. 6537.0 (ABS, 2012a: 63); and the HILDA User Manual – Release 10 (Summerfield et al., 2012: Figures 4.6 & 4.8).

The definition of net total income (nti) proposed by Smeeding and Weinberg (2001) is intentionally broad; designed to provide a universal framework that is inclusive of the various approaches adopted by international and national statistical agencies. It includes income items even if statistical agencies do not currently collect them, serving as a benchmark to improve international comparative analysis. The income component definitions go beyond that included in ABS and HILDA to encompass *all potential* income items that increase the living standards of a household.

Hence, 'net total income' includes regular and non-regular income items, cash and non-cash income items as long as no 'action [is] ... taken to convert the item to spendable income' (Smeeding and Weinberg, 2001: 2). Consequently, irregular items such as 'net realised capital gains and intermittent income' are included; so too are net inter-household transfers, in-kind public transfers, in-kind market income, the value of in-kind earnings and non-market home production and the imputed rent on equity in owner-occupied housing; and work expenses deducted.

The ABS in their Fiscal Incidence Studies (FIS) (1996, 2001a, 2007b, 2012a), on the other hand, define income with reference to the System of National (SNA) Accounts (ABS, 2007a) and the Income, Consumption and Wealth (ICW) conceptual framework (ABS, 1995). These frameworks define income in terms of its availability to affect *current* consumption (ABS, 2001b: 192). Although still slightly narrower than Smeeding and Weinberg (2001), in the most recent publication following the 2009-10 Household Income and Expenditure Surveys (HIES) (ABS, 2012a), the income parameters are set according to established international standards for household income statistics (as set out by the Canberra Group (2001)).

Household income is broadened beyond those restricted to items just of a regular and recurring nature.

> Household income consists of all current receipts, whether monetary or in-kind, that are received by the household or by individual members of the household, and which are available for, or intended to support, current consumption by the household. (ABS, 2012a: 62)

Disposable income components include: cash income from employment; business income; investment and property income; regular income received from other private sources (including superannuation, annuities, scholarships and foreign pensions); and cash income, received in the form of government social assistance benefits, minus imputed personal taxes on income (ABS, 2007b: 62). Net imputed rent for owner-occupied dwellings and subsidised private rentals is also included within the ABS definition of private income.

To provide household (and individual) estimation of the value of (in-kind) benefits and services, the ABS FIS approach allocates macro-level public expenditures, for specific categories, to a micro-household level, in line with the Canberra Group (2001) recommendations. Referred to as 'social transfers in-kind', benefit items include the financial cost to the government in providing: education; health; housing; social security and welfare; and electricity concessions and rebates (ABS, 2012a: 64). Unlike Smeeding and Weinberg (2001) however, the ABS also includes a form of indirect tax, labelled 'taxes on production'. This involves allocating the tax payable on goods and services by producers at different stages of the production/sale process to the household (ABS, 2012a: 65). Final income (fiy) is, therefore, the value of social transfers in-kind added to household disposable income minus estimated taxes on production.

The income concept within HILDA is not a full income measure but is restricted to disposable income. HILDA adopts the same accounting principles as the ABS in confining income components to items that are of a regular and recurring nature. Although the ordering of the items varies slightly from that used in ABS FIS, the aggregation procedure is very similar.[77] Income from wages and salaries, business income, investment and property income, private pensions and private transfers add up to 'private income'. Government public cash transfers mirrors the ABS FIS 'social assistance benefits in cash' to include cash payments paid directly to individuals and

[77] For example, within ABS FIS, scholarships and foreign pensions are included in private income, but within HILDA they are added to gross cash income. The order of this is of little importance because they are both included in the final aggregation to produce disposable income.

families in the form of pensions, parenting payments and allowances.[78] This is added to income from other sources and private income to produce gross income. Disposable cash income is the value of gross income minus an estimated personal tax on income (including, in an Australian context, a Medicare levy).[79/80/81]

The proposed full income (fy) model used in this thesis takes as a starting point disposable cash income (dy) as defined and measured within the HILDA dataset.[82] Two income components are adopted from the Smeeding and Weinberg (2001) and ABS FIS (2012a) approach and added to disposable income to produce full income: the value of social transfers in-kind and the value of net imputed rent from owner-occupied dwellings. The numerical expression is:

Equation 4.2 $\boldsymbol{fy_j = dy_j + sti_j + nir_j}$

where sti_j refers to the value of social transfers in-kind and nir_j the net imputed rent from owner occupied dwellings for household j.

(full income = disposable income + imputed social transfers in-kind + net imputed rent from owner occupied dwellings)

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[78] The terms 'public non-cash benefits and services' and 'social transfers in-kind' are used synonymously.

[79] In both ABS FIS and HILDA, personal income tax is calculated using income tax models that factor in demographic characteristics, the nature of income items and tax legislation and not derived from respondent's estimates of their personal tax rates or amounts (ABS, 2012a: 64; Summerfield et al., 2012: 51).

[80] The HILDA income model also specifies an additional category, windfall income, that is not included in the disposable income metric because it encompasses irregular items such as inheritances, redundancies, payments from parents, lump sum superannuation payouts and lump sum workers compensation payouts (Summerfield, 2010: 59).

[81] In the period between 2003-04 and 2007-08, the ABS made revisions to the income concept and the survey collection method. The ABS has endeavoured to produce income series that are internally consistent; however, direct comparability between income estimates produced by ABS SIH, HILDA and National Accounts is not possible. As a measure of comparability Wilkins (2013a: 32) illustrates that total household gross income produced in HILDA as a share of total household income from the National Accounts is around 90-95 per cent. It is in a similar percentage range for the ABS SIH weekly series post 2007-08, but lower for the ABS SIH annual series post 2007-08 (86-88 per cent). For a detailed discussion of these findings, refer to Wilkins (2013a, 2014).

[82] All income components include imputed data to account for missing or non-responding persons and in many cases, derived data is top-coded (using the weighted mean of the top-coded units). Negative incomes are also bottom coded to 0 affecting only 45 respondents, amongst them are 6 older people. This is consistent with the approach adopted in most income studies that seek to preserve the confidentiality of respondents (Burniaux et al., 1998: 82; Summerfield et al., 2012: 56).

Including sti recognises the unique personal benefits conferred on older people (and others) as the recipient of services received in-kind through the provision of publicly funded health, housing, community and welfare services (services that would otherwise be paid out cash income). Including nir_j recognises that homeowners benefit from having a place to live in contrast to the rent incurred by non-home owners. It is a particularly important income component for older people who are more likely over their life span to have secured outright home ownership (AIHW, 2007, 2011; Harding et al., 2002; Headey et al., 2005; Yates and Bradbury, 2010).

While full income (fy) is a more comprehensive measure of economic resources than disposable income (dy), it is certainly not *fully so* as maintained in Chapter 3. There are important aspects of economic resources that it does not capture. Conceptually, full income should also include the value of the full range of in-kind private benefits such as through unpaid housework or child-care, leisure, through household production and employer-provided fringe benefits, and through services received from the ownership of household durable assets (ABS, 2007b; Smeeding and Weinberg, 2001; Travers and Richardson, 1995). In principle, the other benefit accruing to homeowners is the increase in the capital value of the home from the time of purchase to the time of sale (that is, net realised capital gains).

Some of these income components (such as imputing the value of leisure or unpaid housework) are not included because they cannot be estimated using HILDA survey data and the technical exercise to produce reliable practical estimates is beyond the scope of this thesis. However, the financial advantage from the possession of home-wealth is included in the subsequent derivation of the 'potential consumption' measure. This latter remark alludes to the point made by the ABS (2001:199) that economic resource components are not necessarily mutually exclusive to either notions of income or consumption. Net imputed rent, for example, even though conventionally included within income, can equally be treated as a component of potential consumption.

The final thing to note is the exclusion of imputed indirect taxes (also referred to as 'taxes on production'). Some examples include goods and services tax (GST), import duties, export taxes, fuel and tobacco excise, land taxes, stamp duties and professional and business licence fees. Although recommended by the Canberra Group (2001), indirect taxes are not included as this thesis is interested in comparing the amount of economic resources people have available for potential consumption, and not in who ultimately pays for the taxes embodied in consumption expenditure.[83]

4.3.3 Potential consumption and adjusted potential consumption

As discussed in Chapter 2, the conceptual rationale for moving from an income metric to a 'potential consumption' metric which recognises that income and wealth determine potential consumption possibilities are compelling (ABS, 2001b; Browning and Crossley, 2001; Stiglitz et al., 2009; Wolff and Zacharias, 2009). Stiglitz et al. (2009: 115) sums up the argument by writing that 'differences between a household's position in the income and in the consumption distribution are often reflective of differences in the distribution of wealth ... both income and wealth determine *consumption possibilities* which will then give rise to *actual consumption*'.

A focus on 'potential consumption' acknowledges the role of wealth in providing individuals with consumption possibilities that exceed their current income. Older people, in particular, who have accumulated assets over their life course are potentially able to divest them, providing an income stream that directly affects economic living standards. Although the measurement of money provides a common denominator between income and wealth, the task of aggregating them into a unitary measure is not easily operationalised, given that the stock nature of wealth prevents its direct aggregation with income, a flow variable.

Following the ABS Economic Well-Being Framework (ABS, 2001b) the inclusion of wealth into a 'potential consumption' *flow* measure entails adjusting the income flows

[83] They are included in ABS FIS on the assumption that as these taxes are ultimately passed on to consumers through higher prices, it should be allocated to households to balance government expenses (social transfers) with government revenues (indirect taxes) as determined within ASNA. It is of interest to government whose focus is on fiscal considerations and on the effect of government benefits and taxes on the distribution of income. It is also important to stipulate that it is not an item commonly included by scholars because of the technical complications involved in valuation and allocation. These include estimating all the taxes levied during each stage of the production process; the derivation of tax rates to calculate the amount of in-direct taxes allocated to each household; and the reliability of household expenditure data to allocate taxes to households (ABS, 2012a).

model to include the value of notional wealth annuities. The ABS (1995: 24) define the notional wealth annuity as 'the transformation of the value of a household's net worth into a right to be paid a (notional) fixed annual sum of money for a defined lifetime'.[84] The methodological approach adopted herein, adapts the 'wealth-adjusted income metric' proposed by Wolff and Zacharias (2009) to develop two 'potential consumption' metrics that are amenable to estimation using the income and wealth components in the HILDA dataset. Table 4.2 sets out the components of wealth in the two approaches and the methodologies adopted to include these as income streams.

Wolff and Zacharias (2009) categorise assets into five classes: home assets; other real estate owned by the household and business assets[85]; liquid assets (that include cash, bank deposits, money market accounts and the cash surrender value of life insurance plans); financial assets (that include bonds, shares, mutual funds and equity in trust funds); and pension assets (restricted to the cash surrender value of defined-contribution pension plans). The authors exclude the value of vehicles, stipulating that the sale of cars comprises current consumption and is often only used as a last resort in a financial emergency. Although the authors argue that the value of future retirement income from public and private pension plans is a source of future income, they exclude this from their model because of estimation difficulties.[86]

[84] The annuity method is in contrast to the more conventional method that jointly analyses income and wealth distributions as a way of integrating income and wealth. This is the approach adopted by the ABS in their 'Low Consumption Possibilities Research Project' (ABS, 2009b; Billing et al., 2010).

[85] These are separated in Table 4.2 to be consistent with the HILDA wealth model.

[86] While it is possible to calculate the present value of future retirement for older people who are in retirement, the exercise becomes increasingly more complex for working age people, many of whom are decades away from retirement, are likely to change the structure of their private pension plans and be faced with policy changes in the provision of public pensions.

Table 4.2 Comparison of alternative wealth components and ‘potential consumption’ models

Wolff and Zacharias		Proposed 'potential consumption' estimation	
Wealth components		**HILDA Wealth components**	
Home assets +	Mortgage debt +	Home assets +	Home debt +
Other real estate assets* +	Other debt*	Other property assets^ +	Other property debt^ +
Business assets* +		Business assets^ +	Business debt^ +
		Collectibles^ +	
		Vehicles^ +	
Liquid assets *		Cash investments^ +	Credit card debt^ +
		Bank accounts^ +	Other personal debt^ +
+		Life insurance^ +	HECS debt^ +
Financial assets*		Equity investments^ +	Overdue household bills^
+		Trust funds^ +	
Pension assets* =	=	Superannuation^ =	=
Total assets -	**Total liabilities**	**Total assets** -	**Total liabilities**
=		=	
Net worth		**Net worth**	
Home assets - Mortgage debt =	Total non home assets *(marked with *)* - Other debt *(marked with *)* =	Home assets - Mortgage debt =	Total non home assets *(marked with ^)* - Other debt *(marked with ^)* =
Home wealth	**Non-home wealth**	**Home wealth**	**Non-home wealth**

Wealth adjusted income model	**Potential consumption model I**	**Potential consumption model II**
Annual gross income (incl. realised capital gains) -	Annual disposable income -	Annual disposable income -
Property income +	Property income +	Property income +
Non-home wealth components (converted into constant life-time annuities) +	Non-home wealth components (converted into constant life-time annuities) +	Non-home wealth components (converted into constant life-time annuities) +
Gross imputed rent for owner-occupied dwellings	Net imputed rent for owner-occupied dwellings +	
		Home wealth component (converted into a constant life-time annuity) +
=	Imputed social transfers in-kind =	Imputed social transfers in-kind =
Wealth adjusted income *(wi)*	**Potential consumption *(pc)***	**Adjusted potential consumption *(apc)***

Source: Adapted from Wolff and Zacharias (2009) and the HILDA User Manual – Release 10 (Summerfield et al., 2012: Figure 4.9).

Wealth is divided into two components: home wealth and non-home wealth. Home wealth is the equity held in owner-occupied dwellings (calculated as home assets minus mortgage debt on the principal amount). Non-home wealth refers to the remaining aggregation of assets after deducting all other non-home debt. The wealth-adjusted income metric (wi) is calculated by adding to annual gross income (after excluding property income and including realised capital gains), the imputed rent based on the gross value of owner-occupied dwellings and a constant lifetime annuity from non-home wealth (including mortgage debt). The lifetime annuity is the weighted average of the different annuity flows generated for each of the six wealth components (excluding the home asset value but including mortgage debt).

Wolff and Zacharias (2009) do not annuitise home wealth because housing is treated as a 'universal need'; the only benefits afforded to homeowners are the extra resources obtained from not paying rent. They argue that this advantage is taken into account through the imputation of a rental equivalent. It is implicitly assumed that the capital value of the house either cannot (for instance, if it is treated as an illiquid asset) or will not (for instance, if it is retained for bequest reasons) be realised to provide potential consumption possibilities. The wealth-adjusted income metric is, therefore, intended to approximate a measure of 'sustainable consumption over time' based on marketed commodities (as it excludes leisure).

For this thesis, the wealth components included in the proposed 'potential consumption' model follows the estimation of wealth within HILDA (Summerfield et al., 2012). The 11 asset components are grouped into similar asset classes proposed by Wolff and Zacharias (2009).[87] In addition to home assets, the remaining non-financial assets are other property assets, business assets, collectibles and vehicles. Liquid assets include cash investments, bank accounts and life insurance. Financial assets include the value held in equity investments (shares, managed funds and property trusts) and trust funds. Superannuation is the current value of capital held in the superannuation fund.

[87] All wealth components include imputed data to account for missing or non-responding persons and in many cases, derived data is top-coded (using the weighted mean of the top-coded units) to ensure the confidentiality of individuals (Summerfield et al., 2012: 68).

Liabilities are grouped into debt classes to allow the estimation of certain equity variables (specifically, home equity, business equity and other property equity). There are seven debt classes: home debt; other property debt; business debt; credit card debt; other personal debt; HECS[88] debt; and a category for overdue household bills. Following Wolff and Zacharias (2009), wealth is separated into home wealth and non-home wealth.[89]

The derivation of the 'potential consumption' (pc) metric follows the same aggregation procedure as Wolff and Zacharias (2009), although there are some significant methodological differences. The formula for estimating potential consumption is:

Equation 4.3 $\boldsymbol{pc_j = (dy_j - pi_j) + sti_j + nir_j + \left(\sum_{k=1}^{K} nhw_{jk}\right)}$

where pi_j is property income received from income-generating assets and nhw_{jk} is the constant annuity (which includes an investment return) received from each component of non-home wealth for all K non-home wealth components in household j.

(potential consumption = disposable income – property income + imputed social transfers in-kind + net imputed rent + annuitised non-home wealth components)

The income measure is disposable household income (dy) after deducting any income received from income-generating assets. The pi income component is deducted to avoid double counting the returns from asset ownership; within the normative income model as an income stream from dividends, rental receipts, interest earned, royalties and income generated from private pensions, and subsequently, within the potential consumption model through the annuitisation of household wealth. For the same reason that the imputed value of social transfers in-kind is added to disposable income

[88] HECS refers to the Higher Education Contribution Scheme – a debt payable by students who attend Australian tertiary education institutions.

[89] It is possible for households to have zero net-worth if they rent and don't own any HILDA designated assets or negative net worth if debts exceed the value of all other assets.

(dy) in the derivation of full income(fy), it is now added to the potential consumption metric (pc).

The inclusion of net imputed rent for owner-occupied dwellings recognises the financial advantage procured by home owners. Annuitised non-home wealth does not include mortgage debt as this cost is already included in the estimation of net imputed rent. This is in contrast to the wealth-adjusted metric (wi) of Wolff and Zacharias (2009) which annuitises mortgage debt because imputed rent is based on the gross value of the house without any deduction for housing costs. Furthermore, unlike Wolff and Zacharias (2009), the model purposefully uses disposable income and not gross income to at least partially include an element of personal tax.[90]

The second potential consumption metric, adjusted potential consumption (apc) replaces net imputed rent with a notional annuity from home wealth. The formula is:

Equation 4.4 $\boldsymbol{apc_j = (dy_j - pi_j) + sti_j + hw_j + \left(\sum_{k=1}^{K} nhw_{jk}\right)}$

where hw_j is the constant annuity from home wealth.

(adjusted potential consumption = disposable income – property income + imputed social transfers in-kind + annuitised home wealth + annuitised non-home wealth components)

The inclusion of this conceptually is quite contentious, as arguably this is captured (albeit, imperfectly) already through net imputed rent and there are many concerns that prevent viewing the house as a liquid and disposable asset. As discussed in Chapter 2, housing sits apart from other assets because of the psychological and emotive attachment people have with a home, embedded with familial history and a personal sense of place and belonging (Banks et al., 2006; J. D. Fisher et al., 2007; Rowlingson, 2006). There are also practical obstacles preventing the conversion of a

[90] It is partial because a comprehensive accounting of tax involves the estimation of capital gains tax on the sale of assets, the tax implications from superannuation and the taxes on production received by government (indirect tax) in addition to the personal tax payable on income. The tax modelling required for this in line with tax legislation is far beyond the scope of this thesis. It is for these reasons that Wolff and Zacharias (2009) use gross income. However, to ignore tax completely potentially provides a distorted view of economic living standards given Australia's personal income tax rates and lessen the credibility of the model.

home asset into cash income. As a lumpy asset it is difficult to liquidate parts of a home. It is not always easy to find appropriate and affordable alternative accommodation. Moreover, the motivation to retain the home as part of a family inheritance is often very strong (Dvornak and Kohler, 2003; Price, 2008).

Notwithstanding these concerns, in part, the rationale of combining income and wealth into an economic living standard metric arises from the age-related nature and type of wealth holdings. For many older Australians, their largest class of asset is through home ownership (refer to Section 5.3.2). The inclusion of imputed rent by Wolff and Zacharias (2009) acknowledges the extra resources of homeowners who do not have to pay rent in the private market. It does not, however, acknowledge the capital value tied up in the home asset.

The rationale for including all current wealth holdings, without any exceptions, that is, non-home wealth (including the value of consumer durables such as cars) and home wealth, is shared by the ABS (1995: 24). They write that 'the exclusion of non-financial assets and owner-occupied dwellings in particular, would seriously under-estimate the full income potential of the aged'. Moreover, although it may not eventuate into a reality for the majority of older people, it is a scenario worth examining in light of government policy discussions around funding retirement (ASIC, 2005; Productivity Commission, 2005, 2011). This includes taking out reverse mortgages on people's home (known as equity release schemes) so that some of the benefits from the sale of the house are realised by home owners themselves and not by those who inherit the house (ibid).

The 'potential consumption' and 'adjusted potential consumption' models are limited in many respects. They are not *fully* comprehensive including all economic resources that affect consumption. They are narrower than the recently developed Levy Institute Measure of Economic Well-being (LIMEW) (Wolff, Zacharias and Masterson, 2012; Wolff, Zacharias, Masterson, et al., 2012) that is more expansive than that recommended by the Canberra Group (2001) and is an extension of the wi metric. The LIMEW measure includes: cash income; annuity income from non-home wealth; cash and non-cash government transfers; government expenditure items including public goods such as public transportation, water provision and fire; and household production.[91] Household production is important for economic assessments of older people given the increased incidence of this factor post-retirement. However, it is not a feasible estimation option within the current HILDA and ABS HIES datasets and is left as a future area of investigation.

The 'potential consumption' and 'adjusted potential consumption' models also presume that people are both capable of and motivated to dispose of all their assets to finance current and future consumption needs without any regard to the influence of social, psychological, economic, political or legal contexts. Specific mention has been made of the potential difficulty of convertibility of assets into cash income, bequest motives and the emotional capital invested in a home. Finally, as already noted in Chapter 3 and will become more evident in Section 5.3, there are serious measurement problems involved in integrating wealth components (and public expenditures) into a composite measure with income. Apart from the lack of available datasets that comprehensively cover all aspects of economic and financial resources, the task is burdened by an array of assumptions required to provide the necessary imputations.

It is a task worth doing however, despite the limitations, as it is an analytical exercise that seeks to operationalise the theoretical link between notions of income, wealth and consumption. As Weisbrod and Hansen write:

> In proposing our measure we are not implying either that people generally do purchase annuities with any or all of their net worth, that they necessarily should do so, or that they can do so. (Weisbrod and Hansen, 1968: 1316 - 1317)

[91] It should be noted that the pc and apc metrics and the LIMEW index are different in purpose to the well-known Index of Economic Well-being (IEWB) developed by Osberg and Sharpe (2002, 2005) (discussed as a footnote in Chapter 3). The IEWB is used to measure the economic well-being of society, based on the hypothesis that 'society's well-being depends on total consumption and accumulation, and on the individual inequality and insecurity that surround the distribution of macro-economic aggregates' (Osberg and Sharpe, 2002: 294). Hence the index is calculated as the weighted combination of macro-level aggregate data across four components relating to consumption flows, stocks of wealth, inequality and economic insecurity. Its intended purpose is as an alternate to GDP.

It is important to recognise that the final ELS metrics are measures of 'potential' consumption possibilities and not measures of 'realisable' or current consumption. In this way, the ELS approach should be understood as a conceptual 'thought' experiment that may raise as many questions as it answers about the role that income and wealth plays in affecting an individual's economic standard of living.

The methodological strategy is to start with the large micro-data file that is HILDA, with detailed information on income, wealth and demographic characteristics, and then add the necessary data from the ABS HIES datasets, using various imputation techniques to estimate the various components of the economic resource metrics in the ELS approach. The next section describes the procedure to impute the value of social transfers in-kind, a rental equivalent for owner-occupied dwellings and the annuitisation of wealth. The data sources and imputation techniques involved in constructing the ELS metrics are summarised in Appendix B.2 (Table B.1).

4.4 Imputation method for key ELS components

4.4.1 Social transfers in-kind – (sti)

Similar to other large-scale surveys, HILDA is limited to collecting economic data on items that respondents are themselves aware of and can reasonably provide verifiable and objective estimates. Consequently, the value of in-kind government benefits and services is not contained within the HILDA dataset nor are they imputed by the HILDA team. However, it is possible to apply the imputed social transfer in-kind values from the ABS Fiscal Incidence Study (contained in the HES dataset) to the HILDA dataset.

As mentioned above, the ABS (2005) produces a range of government finance statistics (GFS) (ABS, 2011c) that categorises commonwealth, state and local taxation revenue and expenditure, collated from a wide range of sources, to the functional service area (e.g. health, education, defence, recreation and culture) and the type of economic transaction (e.g. cash payments to households or administrative salaries).[92] Table 4.3

[92] There are strict definitive rules for classification of government revenue and expenditure as set out in official financial frameworks such as the Government Purpose Classification and the Economics Transactions Frameworks (ABS, 2005, 2007b, 2012a).

lists the different government expenditure items by purpose and state, showing the dollar amounts for 2009-10 and the percentage share of the total government spend.

The largest expenditure items are for services that directly benefit particular households: social security and welfare ($121,226 mil ≈ 26.4 per cent); health ($86,441 mil ≈ 18.8 per cent); and education ($71,461 mil ≈ 15.5 per cent). These three items, together with small components of housing and community amenities (through housing subsidies) and fuel and energy (through electricity concessions and rebates), account for more than 60 per cent of the total general government expenses.

Table 4.3 Government expenses by purpose (Commonwealth, State and Local), 2009-10

Functional purpose	Cwth	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	Total by purpose	Share of total
	($ mil)										(%)
General public services	15,433	1,702	873	1,893	308	385	201	105	438	25,229	5.5
Defence	19,349									19,349	4.2
Public order and safety	3,844	5,721	4,125	3,413	1,387	2,456	405	470	301	22,275	4.8
Education	35,709	15,191	11,880	9,371	3,860	5,650	1,260	901	875	71,461	15.5
Health	51,525	14,250	11,538	10,267	4,373	5,028	1,212	899	918	86,441	18.8
Social security and welfare	109,133	4,450	3,255	2,399	953	1,263	336	231	186	121,226	26.4
Housing and community ammenities	9,090	3,695	3,059	1,383	1,868	1,982	194	471	225	20,440	4.4
Recreation and culture	3,371	1,224	818	907	288	616	178	148	122	11,517	2.5
Fuel and energy	8,537	35	21	375	50	312	3	103	14	9,313	2.0
Agriculture, forestry and fishing	2,905	954	509	971	210	354	107	58	4	5,463	1.2
Mining, manufacturing and construction	1,630	140	33	249	70	154	8	33	17	2,631	0.6
Transport and communications	6,754	7,262	4,585	4,551	825	1,535	251	234	243	24,937	5.4
Other economic affairs	9,062	954	554	955	259	677	144	159	72	13,717	3.0
Public debt transactions*	13,608	2,614	1,710	2,132	659	525	226	267	290	22,405	4.9
Other purposes	47,763	705	976	915	216	138	59	33	24	3,247	0.7
Total	337,713	58,897	43,936	39,781	15,326	21,075	4,584	4,112	3,729	459,650	100.0

Source: ABS Catalogue No. 5512.0, 2009-10 (ABS, 2011c). Data cubes, General Government Tables, (released, 5 July 2011).
Note: * includes nominal interest on superannuation.

It is the value of in-kind items in these specific functional categories that are allocated from the 2009-10 GFS to households within ABS FIS.[93] However, the decision about to what to include is not clear-cut. Wolff et al. (2005: 1081) write that not all public provisions augment the consumption possibilities of a household, referring to some government expenditure as 'constitut[ing] social overheads that keep the ship of state

[93] Valuations are based on the cost to the government for the provision of these services.

afloat. They are necessary for households to exercise command over the necessaries and conveniences of life, but they do not inherently constitute a part of the objects over which such command is exercised’. Their study includes public expenditure on public order and safety and transportation but excludes defence spending.

The ABS FIS (2012a) approach is to adopt the recommendations of the Canberra Group (2001) that advocate the integration of some public expenditures with income, following suite with the UK Office for National Statistics (ABS, 2001a). Allocations are limited to: a) those functional categories that directly relate to a household’s welfare, and b) can be clearly and reasonably allocated to households using household demographic data from the questions and answers recorded in national household surveys (ABS, 2001a). Hence, ‘indivisible’ public expenditures such as defence and public safety are excluded. In addition, ABS FIS exclude items if they relate to segments of the population outside the scope of HES (e.g. expenditure on residential aged care); if the beneficiaries of government provision are not identifiable within the dataset; or if expenditures for target groups are not identifiable within the GFS data (ABS, 2012a: 71).

The functional categories allocated are: education (pre-school, primary, secondary and tertiary); health (acute care, community health services, pharmaceuticals, private health insurance rebate and other health benefits); social security and welfare (including child care assistance and welfare programs); and housing (limited to rent subsidies). More recently, a component of fuel and energy (electricity commissions and rebates) is allocated. The basic approach is to calculate average benefits on the basis of benchmark estimates for the population group eligible for that specific social transfer in-kind item (ABS, 2012a: 68).

The detailed fiscal incidence data is allocated to individual households within the HES dataset using the questions and answers recorded in the Confidentialised Unit Record Files (CURF) generated from the survey (ABS, 2012b). HES collects detailed data on expenditure, income, net worth, financial stress and other personal household characteristics from a sample of households in Australia (described in Appendix B.1). Table B.2 (Appendix B.2) gives a full account of the ABS methodology in allocating the value of in-kind benefits for each of the functional categories in FIS. Table 4.4 provides a truncated version of the ABS FIS allocation for 2009-10.

Private health insurance rebate and electricity concessions and rebates are new social transfer in-kind items imputed for 2009-10. For all items, except community health services, more than 90 per cent is allocated to households in HES. The last column, showing the contribution of each item to the total amount allocated, illustrate that two largest functional categories allocated are with respect to education (33.0 per cent worth $51,763 million) and health (50.5 per cent worth $79,178 million).

Table 4.4 ABS Fiscal Incidence Study allocation, 2009-10

Functional category	Social transfer in-kind item	Amount allocated in HES ($ mil)	Total GFS expenditure allocated (%)	Share of total (%)
Education	Pre-school education	631	94.7	0.4
	Primary and secondary education	36,369	97.8	23.2
	Tertiary education (university)	7,527	93.1	4.8
	Tertiary education (TAFE)	4,358	99.0	2.8
	Tertiary education (n.e.c)	69	94.5	0.0
	Special and other education	2,809	96.0	1.8
Health	Acute care institutions	32,813	99.6	20.9
	Community health services	23,012	84.2	14.7
	Pharmaceuticals	9,548	91.8	6.1
	Private health insurance rebate	4,403	101.7	2.8
	Other health benefits (public health, health research and health administration)	9,402	97.3	6.0
Housing	Public housing	1,945	100.0	1.2
Electricity	Electricity concessions and rebates	493	100.0	0.3
Social Security and Welfare	Social security and welfare programs	20,263	94.9	12.9
	Child care assistance	3,311	94.4	2.1
Total		156,953	95.9	100.0

Source: ABS Catalogue No. 6537.0 (ABS, 2012a: 81 - 85).
Note: n.e.c refers to not easily classified.

The methodological technique in the ELS approach is to impute the value of the in-kind items within ABS FIS from HES to HILDA using unweighted ordinary least square (OLS) regressions, that statistically match the demographic characteristics of individuals within each household in HES and HILDA.[94] The dependent variable is the ABS FIS

[94] Practically, this is complicated by the fact that age is inconsistently treated across the household, person and income unit HES files. For example, the household file contains variables on the state of usual residence and the age of the household reference person. However, the person file contains

social transfer in-kind item, for example, the spending on acute care institutions or social security and welfare programs allocated to each household in HES.[95] The independent variables are interaction variables using a combination of age, gender and state categories as specified in HES and duplicated in HILDA in each household (e.g. the number of 65-69 year old males in NSW or the number of 40-44 year old females in VIC). The only exception is public housing, for which an extra identifier as a public renter is added to the age/gender/state interaction variable.

The estimated regression coefficients are applied to regression models within HILDA using the same age/gender/state independent variable structure as applied in HES. The predicted dependent variable values are the imputed values of social transfer in-kind items applied to each household within HILDA. This is closely aligned with the FIS method that allocates expenditure according to the utilisation rates of the specific service by a person's age, gender and state of residence multiplied by the average cost for each type of benefit for the majority of in-kind items (including importantly, health in-kind benefits).[96]

The regression-based approach is chosen not only because it is closely aligned with the methods undertaken by the ABS FIS in allocating government expenditure but also due

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the age and gender of persons over 15 years, but it is sometimes grouped in 5 year categories. For example, while 24 years exists as a separate category, the next age bracket is 25-29 years. To preserve confidentiality, the income unit file lists the number of dependent children by age group 0-2, 3-4, 5-9 and 10-14 but top codes the variables if there are 2 or more so that the number of dependent children on the household file does not match the income unit file (specifically the income unit file under-reports by 1 child for 50 cases and 2 children for 2 cases).

Hence, the first step involves merging the person, income unit and household level HES files to provide a classification within each household that identifies an individual by their age (in 5 year groups), gender and state. Dependent children below 15 years of age are identified as the cumulative number in each of the above age brackets and by state, with additional variables identifying if top coded and to account for the difference in cases. Combination age, gender and state demographic variables in HILDA are constructed to replicate those created in the merged HES files.

[95] Education is treated as one category and not separated into levels as detailed in Table 4.4. As discussed, HES does not treat age uniformly across the age spectrum and it is difficult to match school ages with the appropriate school year (age brackets are 0-2, 3-4, 5-9, 10-14, 15-19 and 20-24. Furthermore, it is highly unlikely that households who don't have students/children at a particular educational level will be assigned values when the regressions are run.

[96] The exceptions are targeted households who are assigned expenditure values based on actual usage of the service. These are recipients of public housing, private health insurance rebates or electricity concessions and rebates.

to the relative simplicity and logic of the regression modelling required.[97] The resulting R^2 and adjusted R^2 from the regressions are a measure of the strength of predictive values and a test of the credibility of the regression-based approach.[98]

Table 4.5 compares the weekly mean dollar value of in-kind items in the ABS FIS to the regression-based imputed amounts estimated in HES and HILDA. The high R^2 and adjusted R^2 for five items (education, acute care institutions, community health services, pharmaceuticals and other health benefits) is a consequence of using the same demographic categories as the ABS FIS method of allocation. The R^2 and adjusted R^2 values, around 0.5 for three items (private health insurance rebate, electricity concessions and social security and welfare programs), is not unexpected because ABS FIS only allocates expenditure to those identified as recipients of these benefits. Demographic characteristics that are not released in the public HES files or are not collected in HILDA are hence not included in the regression modelling. Regression results are only low (around 0.3) for child care assistance and public housing as the eligibility criteria for both is income dependent (Department of Human Services, 2013a, 2013b) (refer to Table B.2 in Appendix B.2). However, income is not explicitly used as part of the ABS FIS allocation method and therefore not used in this analysis. The imputation of income-based benefit provision within ABS FIS is a concern raised by Harding et al. (2000) who draws attention to the effect of income levels and socio-economic status and not just age, gender and state on the utilisation of public services.

[97] An alternative model, the 'means-based' approach (Harding et al., 2000; Schofield and Polette, 1998), involves constructing matrices stratified according to different demographic characteristics (for example, age, gender and state). For each demographic combination the average value of the social transfer in kind is obtained in HES and then applied to the same demographic combination in HILDA. Within sufficient interactions, the two approaches are identical. The logical simplicity of the model, however, is countered by programming technicalities and unlike the regression-based approach there is no way of determining the strength of the model.

[98] The adjusted R^2 takes into account the number of predictor variables and the sample size included in the equation. It indicates the generalisability of the model to the population. If adjusted R^2 is only marginally lower than R^2 (as is the case for all items in Table 4.3) the results can be generalised to the population (Pallant, 2001).

Table 4.5 Imputation of social transfers in-kind, 2010

Social transfer in-kind item	Mean $ value per week FIS (actual)	HES (imputed)	HILDA (imputed)	R^2	R^2 (adjusted)
Education	115	117	119	0.883	0.880
Health	180	183	185	0.965	0.964
Acute care institutions	75	76	77	0.954	0.953
Community health services	52	53	54	0.960	0.959
Pharmaceuticals	22	23	23	0.938	0.936
Private health insurance rebate	10	9	9	0.448	0.433
Other health benefits	21	21	22	1.000	1.000
Public housing	4	5	2	0.319	0.281
Electricity concessions	1	1	1	0.574	0.562
Social security and welfare	55	66	66	0.556	0.544
Social security and welfare programs	48	58	59	0.539	0.526
Child care assistance	8	7	8	0.330	0.312
Total social transfers in-kind	356	373	378	0.920	0.918
n (households)	9,774	9,774	7,260		

Source: Author's calculations based on imputations from HILDA Wave 10 Release 10, ABS HES 2009-10. Weights: Cross-sectional household population weights for HILDA (2010), household population weights for HES (2009-10).

Nevertheless, at an aggregate level, there is little difference in the mean dollar values between the imputation results using the OLS regression-based approach and the amounts recorded in HES. Furthermore, the five in-kind items with R2 below 0.88 contribute less than 20 per cent to the total sti dollar value is low. More importantly, the high overall R2 of 0.920 and adjusted R2 of 0.918 is a measure of the strength of the predictive value of the regression-based approach, lending credibility to the results and method.

Although this sub-section analyses the methodological accuracy of imputing sti values from the HES dataset to the HILDA dataset, the general principle (employed in ABS FIS) of collating government expenditures at a macro-level and imputing them at a household level, is itself still problematic. As with most statistical modelling, the imputation of social transfers in-kind is fraught with technical complications, data accuracy and limited comprehensiveness. Three explicit assumptions are cause for concern.

The first concern relates to the plausibility of the 'production cost method', which assumes that the value of in-kind transfers is equal to the cost of government providing them and equal to the value that consumers are willing to pay for them

(Atkinson and Marlier, 2010; Smeeding et al., 1993). Garfinkel et al. (2005) suggest that the recipient value is often lower than the actual cost. However, it is not possible to get market valuations, for as Niemietz (2011: 135) notes 'the entitlements are neither fungible, nor are there close substitutes available in the market, whose price could serve as an acceptable proxy'. The second assumption is that the users of the service/benefit are treated as the sole beneficiaries without any consideration of the positive externalities that extend beyond an individual to the wider social context; particularly in relation to the long term social consequences of health and education benefits (Garfinkel et al., 2005). The third assumption is that the inclusion of social transfers in-kind does not pre-suppose that an increase in the allocation of benefits is related to an increase in needs and may not necessarily imply an increase in their actual standard of living (Callan and Keane, 2009; Radner, 1997). Hence, older people are allocated higher values of in-kind health benefits because as a group they have a higher incidence of health problems.

There is almost universal agreement that these concerns, however, are not sufficient to warrant the exclusion of social transfers in-kind against the contribution they make to improving income analysis and understanding the impact of government redistribution policies (Verbist and Matsaganis, 2014). In as far as the ABS FIS is accepted as an adequate methodological technique to allocate the cost of government benefits to users of the service, the OLS regression-based approach to allocate this from HES to HILDA is equally adequate in its task.

4.4.2 Net imputed rent for owner-occupied dwellings – (nir)

The ABS (2008(b): 5) write that net imputed rent 'conceptually treats owner-occupiers as if they were renting their home from themselves, thus simultaneously incurring rental expenditure and earning rental income' (net of housing expenses incurred). It is understood as the notional difference between the rent a homeowner would pay to rent his home in the private market and the costs actually incurred to maintain and secure ownership of his home (Pech, 2011: 7). Consistent across the empirical applications and described in detail by Saunders and Siminski (2005) are two key approaches to estimating nir: the opportunity cost (OC) and the market value (MV) approach.

The OC approach estimates the potential cash income foregone by homeowners for investing in their home instead of in other income-generating financial assets. It is technically very difficult to apply in practice, as it involves imputing income earned from financial assets before tax and social security benefits are applied, to produce disposable income. Since most survey data apply particular tax models to estimate disposable income from gross income, this approach involves complex 'backward estimating' calculations and is not used here (Saunders and Siminski, 2005).

The MV approach, in contrast, estimates a hypothetical rent if owner-occupiers were to rent their home from themselves.[99] Rent is imputed by distributing the total amount of imputed rent from National Accounts to homeowners, based on the value of their home. The methodology involves two steps:

- A *gross imputed market rent* is estimated based on a fixed percentage of the value of the home. The percentage is calculated by dividing the total amount of gross imputed rent from owner-occupied dwellings listed in National Accounts by estimates of the gross value of housing stock as reported in the surveys. [100/101]

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[99] Travers and Richardson (1993: 91) note that 'in an equilibrium world of non-taxes or agents, this would be the same regardless of whether the household receives or pays the rent.'

[100] There are a variety of alternative methodologies used to estimate gross market rents (ABS, 2008(b)). The ABS use hedonic regressions based on the characteristics of private renters. They apply the estimated coefficients to the corresponding characteristics of owner-occupiers within SIH (ABS, 2011d). Frick and Grabka (2003) distinguish between respondents valuation of the capital value of their property and respondents self-estimation of the rental amount they would pay if they lived as tenants in their own home. Falkingham et al. (1995) suggest using: expert assessments for different types of dwellings; tax assessments on home property; an inflator applied to the acquisition cost of the house; and amending available market house price data to the characteristics of the survey dwelling. The complexity, assumptions and reliance on a range of data sources prohibit the wide-use application of these methods in empirical studies.

[101] The Australian System of National Accounts (ASNA) estimates are produced using stratified information obtained from the Census of Population and Housing on private rent amounts by dwelling structure, bedroom number and location (ABS, 2008(b): 31). For 2005-06, the ABS SIH estimates of gross imputed rent are within 2 per cent of the ASNA estimates.

- The *derived net imputed rent* is the gross imputed rent estimate minus the housing costs associated with maintaining the dwelling. Housing costs refer to the interest component of mortgage repayments, repairs and maintenance, home building insurance (not contents), rates (general council, sewerage and water) and strata and body corporate fees.

Saunders and Siminski (2005), drawing on the work of Yates (1991, 1994), outline three concerns with the MV approach: the likely underestimation of imputed rent in the National Accounts; the reliability of self-reported home values in surveys; and the difficulty in accounting for the depreciation of buildings and the appreciation of land values within income surveys and the National Accounts. The second issue is less important in this thesis because the HILDA wealth model is subject to a stringent imputation and verification process to ensure the credibility of all wealth values including home values. On the last issue, following both Saunders and Siminski (2005) and Yates (1991, 1994), depreciation and capital gains are excluded from estimates of imputed rent. In spite of these limitations, the MV approach has the benefit of simplicity and is widely endorsed as a sound and valid approach (ABS, 2008(b); Saunders and Siminski, 2005; Wolff and Zacharias, 2009).

Despite the collection of income and wealth panel data, the MV approach has not been previously applied to the HILDA dataset. Rodgers (2010; 2009) assume rental values based on four per cent of the difference between the imputed house value and the remaining mortgage principal, extracting these estimates from the HILDA component of the Cross National Equivalent File (CNEF). Statistical reports in HILDA add imputed annual rent values, initially assuming five per cent of the value of the home (Wilkins et al., 2011: 49), and more recently 4 per cent to analysis of consumption expenditure (Wilkins, 2013b: 35). However, none of these applications justify the imputation method, the choice of percentage or account for the on-going costs associated with the purchase and maintenance of owner-occupied dwellings.

The methodological approach used here and applied to HILDA is as follows:

Equation 4.5

$$\boldsymbol{gir_j} = \frac{\boldsymbol{gross\ annual\ imputed\ rent\ from\ owner\!-\!occupiers\ in\ national\ accounts}}{\boldsymbol{reported\ HILDA\ gross\ annual\ value\ of\ housing\ stock}}\,\% \times \boldsymbol{hv_j}$$

Equation 4.6 $\boldsymbol{nir_j = gir_j - annual\ housing\ costs}$

where gir_j refers to the gross imputed market rent, hv_j refers to the gross value of the house and nir_j is the derived net imputed rent after annual housing costs are deducted for household j (as defined on the previous page).

HILDA's coverage of housing costs is insufficient, limited to one variable with expenditure on home repairs, renovations and maintenance.[102] The largest housing expenditure for owner-purchasers, the interest component on mortgage repayments is excluded, as well as other important housing costs associated with building insurance, council, sewerage and water rates and strata and body corporate fees. However, it is possible to impute housing costs for HILDA owner-occupier households using the gross and net imputed rent and housing expenditure data available in ABS SIH 2009-10 (described in Appendix B.1).

The procedure is as follows. Housing costs in ABS SIH are divided into two categories: 'mortgage interest payments' and 'other housing costs'. The latter collectively includes all the remaining costs relating to repairs and maintenance, home building insurance, council, sewerage and water rates and strata and body corporate fees.[103] The annual rate of 'mortgage interest payments' is calculated as the annual mortgage interest payment as a proportion of the outstanding mortgage debt against the dwelling for

[102] The question specifically asks for the best estimate on the average amount of money spent on repairs, renovations and maintenance to your house.

[103] Although ABS SIH 2009-10 does provide a detailed itemisation of various housing expenditures, they purposefully do not provide data on each of the housing cost variables used in the estimation of gross and net imputed rent. On email communication with the ABS, they state that this is because the modelling requirements for some of the cost variables (specifically house insurance costs and repairs and maintenance) preclude their inclusion in the CURF (email reference is available on request from the candidate).

Instead, they suggest that housing costs be determined as the difference between gross imputed rent and net imputed rent for owner-occupier households. Catalogue No. 6250.0 (ABS, 2008(b): 152) states that 'Housing costs for the purpose of calculating net imputed rent for owner-occupiers comprise: rates payments (general and water); body corporate fees; the interest component of repayments of loans that were obtained for the purposes of purchasing or building; rent payments; house insurance costs; repair and maintenance'.

each mortgagee household in ABS SIH. The annual rate of 'other housing costs' is calculated as the remaining annual housing costs (after excluding mortgage interest payments) as a proportion of the gross current value of the dwelling for each owner-occupier household in ABS SIH. These annual rates are then applied to HILDA owner-occupier households using the age (in 5 year brackets) of the highest income earner in each owner-occupier household as the demographic matching factor between the two datasets.

The value of 'mortgage interest payments' in HILDA is estimated by applying the SIH annual rate of mortgage interest payments to the value of the mortgage debt for each matched household. The value of 'other housing costs' in HILDA is estimated by applying the appropriate SIH annual rate of other housing costs to the gross home value for each matched household. The full value of housing costs for each owner-occupied household in HILDA is the addition of these two components.

The final point to note is the treatment of imputing rent for households in receipt of public or free housing. Saunders and Siminski (2005) extended the MV approach to include the imputation of rental income for public housing tenants and occupants of rent-free dwellings. The former inclusion is not estimated as a component of nir as the in-kind benefit received by public housing tenants is already included as a sti item (refer to Section 4.4.1).

4.4.3 Annuitising wealth components – $(\boldsymbol{nhw})$ and $(\boldsymbol{hw})$

The potential of wealth holdings to affect consumption possibilities is accounted for in the ELS approach by integrating income and wealth into a unitary flow metric. This involves converting the stock of wealth into a notional income flow by converting wealth into a notional annuity and adding this annuity value to income. In keeping with most scholars (Brandolini et al., 2009; Crystal and Shea, 1990; Wolff and Zacharias, 2009; Wolff, Zacharias and Masterson, 2012) that follow the approach advocated by Weisbrod and Hansen (1968), the annuitisation method is based on calculating a simple lifetime annuity; a constant stream of payments that pay the household a fixed annual sum of money for a defined lifetime and reduces wealth to zero at the end of that lifetime.[104]

The numeric expression to calculate the annuity for each wealth component is:

Equation 4.7 $\boldsymbol{cw_j = \frac{wv_j * r(1+r)^n}{(1+r)^n - 1}}$

where cw_j is the constant annuity payment, wv_j is the present value of the particular wealth component*,* r is the annual real interest rate and n is the number of annuity periods for household j. This formula is applied to each of the wealth components in the HILDA wealth model.

The two critical parameters in the annuity formula are the length of the annuity period (r) and the interest rate (n). To illustrate the mechanics in practice and the effect of the interest rate and annuity period, Table 4.6 provides a hypothetical example of the annuity stream under 4 alternative scenarios, while holding the present and future values constant. Scenario 2 differs from Scenario 1 by extending the annuity period by 5 years. Scenario 3 differs from Scenario 1 by decreasing the interest rate and maintaining the annuity period. Finally, Scenario 4 differs from Scenario 1 by decreasing the interest rate and increasing the annuity period.

Table 4.6 Hypothetical examples of annuities under different scenarios

Annuity variables	**Scenario 1**	**Scenario 2**	**Scenario 3**	**Scenario 4**
Annual interest rate (r %)	2.5	2.5	1.5	1.5
Annuity period (n years)	10	15	10	15
Present value (wv $)	$100,000	$100,000	$100,000	$100,000
Future value ($)	0	0	0	0
Annuity value	**$11,426**	**$8,077**	**$10,843**	**$7,494**

There are two concurrent effects. The annuity period determines the proportion of wealth to be spread out evenly over a limited a time interval. Longer periods produce lower annuity values, as illustrated in the lower annuity value for Scenario 2 compared

[104] A modified version of this is to choose a consumption path that is not constant (that is, annuity values are not constant over the life term of the unit) (Radner, 1990). This version is not pursued in this thesis.

with Scenario 1. The interest rate, on the other hand, effectively assigns a relative weight to the wealth component. The higher the interest rate, the higher the annuity value of the wealth component, as illustrated in the higher annuity value for Scenario 3 compared to Scenario 1. The combination of longer annuity periods with lower interest rates, as evident in Scenario 4, produces the lowest annuity value.

Given the importance of the parameters in determining annuity values and the consequential impact on the pc and apc estimates, the choice of these parameters is guided initially by adopting the practice of Wolff and Zacharias (2009). Secondly, where necessary, choosing the most conservative option (that is, longer annuity periods and lower interest rates) to not inflate annuity values. Wolff and Zacharias (2009) follow the approach of Weisbrod and Hansen (1968) who propose that the annuity period be equated with an individual's life expectancy on the assumption that there is zero wealth at the end of a lifetime. As their analysis is at the household level, they use the life expectancy of the younger spouse's life. As the analysis in this thesis is at the person level but HILDA wealth data is collected at the household level, it is not possible to use an individual's life expectancy. Instead, the annuity period is set as the expected remaining life of the household, determined by the age and gender of the youngest adult in the household in 2010 using ABS life expectancy tables (2011f).[105]

For the majority of older people that live in either single or couple households, this translates to an annuity period that is set according to the life expectancy of the younger spouse (typically female). However, in households where older people live with other relatives this becomes problematic. It is not possible to ascertain which members in the household have ownership rights and, therefore, which member's life expectancy should be chosen.[106] By using the life expectancy of the youngest adult

[105] The ABS (2011f) explain the derivation of life tables as a 'statistical model used to represent the mortality of a population. In its simplest form, a life table is generated from age-specific death rates and the resulting values are used to measure mortality, survivorship and life expectancy.' Life tables are provided for each age year by gender.

[106] Table 5.2 in Chapter 5 shows that approximately 20 per cent of older people live with other relatives. The majority in this category are either older couples or lone parents with non-dependent children (Table C.1 in Appendix C.2).

person, the longest possible annuity period is set to ensure that irrespective of ownership rights, all members benefit from the household wealth.

In terms of rates of return, the conventional approach is to use a single rate of return (such as the standard bond coupon rate), By effectively treating all wealth components uniformly, the potential impact of the varying risk levels attached to wealth portfolios is lost (Wolff and Zacharias, 2009). Wolff and Zacharias (2009) suggest using asset-specific and historical real rates of return to reflect the diversity of wealth portfolios, both in proportion and risk levels. Their approach is to take the average of actual historical real rates of returns over varying time periods, with explicit assumptions about the category of interest rate most applicable to each asset type.[107]

This thesis applies a range of actual real rates of return applicable to each wealth component. However, as with the Wolff and Zacharias (2009) study, market rates of return for the numerous wealth items grouped within each asset and debt type are not readily available, nor are they necessarily estimated. The only exception is the estimates of average rates of return on superannuation funds provided by industry organisations such as the Australian Prudential Regulation Authority (APRA, 2013) and the Industry Super Network (Vidler, 2011).

To ensure consistency in approach, estimates of average real rates of return published by the Reserve Bank of Australia (RBA) (2012) for 2010 are used.[108] The specific rates are chosen according to the nature and risk level of each wealth component. Where necessary, the nominal rates provided have been adjusted using the inflation rate of 2.7 per cent averaged over the 2010 year (ABS, 2013a). Table 4.7 lists the real interest

[107] For example, liquid assets are assigned 'the weighted average of the rates of return on checking deposits and cash, time and saving deposits, and life insurance reserves' published in Table H.15 by the United States Federal Reserve. Financial assets are assigned the weighted average of returns across six share types sourced from the Federal Reserve and the Economic report of the President: open market paper, Treasury securities, municipal securities, corporate and foreign bonds, corporate equities and mutual fund shares (Wolff and Zacharias, 2009: 91). The rates of return are inclusive of capital gains and the income generated by the assets.

[108] Nominal interest rates are not used because we are interested in the purchasing power of dollars expressed in 2010 terms. The real interest rate adjusts for inflation. The relationship between the nominal and real interest rates and inflation rate is expressed in the Fisher equation: (1 + real interest rate) * (1 + inflation rate) = (1 + nominal interest rate) (I. Fisher, 1930).

rate, the annual period over which rates are averaged, and source documents for seven asset components (liquid, superannuation, financial, business, home, other property and other wealth) and two debt components (non-mortgage and mortgage debt).[109/110]

Table 4.7 Rates of return by wealth component, 2009-10

Wealth component	Interest rate (%)	Period (averaged over)	Source (RBA and ABS Statistical Tables)
Home	2.69	Jan 2010 - Dec 2010	RBA F2 Capital Market Yields - Government Bonds
(Mortgage debt)	2.69	Jan 2010 - Dec 2010	RBA F2 Capital Market Yields - Government Bonds
Other property	2.69	Jan 2010 - Dec 2010	RBA F2 Capital Market Yields - Government Bonds
Business	2.69	Jan 2010 - Dec 2010	RBA F2 Capital Market Yields - Government Bonds
Other wealth	2.69	Jan 2010 - Dec 2010	RBA F2 Capital Market Yields - Government Bonds
(Non-mortgage debt)	2.69	Jan 2010 - Dec 2010	RBA F2 Capital Market Yields - Government Bonds
Financial	3.21	Jun 2010 yield per annum	RBA F3 Capital Market Yields and Spreads - Non-Government Instruments
Superannuation	3.21	Jun 2010 yield per annum	RBA F3 Capital Market Yields and Spreads - Non-Government Instruments
Liquid	1.47	Jan 2010 - Dec 2010	RBA F4 Retail Deposit and Investment Rates

Notes: Explanation of certain wealth components are: liquid (bank accounts, cash and life insurance); financial (equity investments and trust funds); other wealth (collectives and vehicles); and non-mortgage debt (debt associated with business, other property, credit cards, personal and overdue household bills).

Table B.3 (Appendix B.2) elaborates on the rates of return in the different statistical tables as specified by the Reserve Bank of Australia (2012). The home asset and associated mortgage debt is annuitised on the assumption that home equity proceeds can be invested to provide the highest return with the lowest risk. The rate used is the indexed average government bond rate for 2010. The Commonwealth Guarantee Scheme ensures low risk but the returns are higher than the alternative low risk option, bank term deposits (RBA statistical table F4). Financial and superannuation

[109] The choice of the appropriate RBA statistical table on interest rates for the different wealth components is guided by the expert advice of Associate Professor Anthony Asher at the School of Risk & Actuarial Studies at the Australian School of Business, University of New South Wales, and by professional statistical staff at the Reserve Bank of Australia.

[110] It is not possible to set the annual period for all the rates to be an average over Jan-Dec 2010 as these are provided as given by the RBA. Refer to Table B.3 (Appendix B.2).

assets are based on the average annual yield of AA corporate bonds (indexed for inflation) from Australian non-government entities. They have the highest rate of return reflecting the volatility of the share market.[111]

Liquid assets are based on the average bank term deposit rates (based on $10,000 term deposits) to reflect the low risk, low return of cash deposits. The rates are hence lower than riskier financial and superannuation investments. The nature of the remaining wealth components: other property, business and other wealth, and non-mortgage debt are more diverse and do not fit comfortably with specific RBA interest rate tables. They are assigned the indexed average government bond rate for 2010. Even though this potentially under-estimates their true value in the market; it represents a minimum ceiling obtained through the Commonwealth Guarantee Scheme.

4.5 Other methodological and data choices

Economic resources require adjusting to account for the size, composition and sharing needs of the economic unit. The specifications of adjustment are dependent on assumptions regarding: the unit of aggregation (the sharing unit), the unit of analysis and the sharing of resources within the aggregating unit (the equivalence scale). This section discusses these methodological choices. As well, the time unit and an explanation of derived HILDA demographic variables are provided.

4.5.1 The sharing unit/unit of analysis

The sharing unit defines the members that are assumed to pool and share resources. Atkinson (1991: 12) points out the range of elements that influence the range and choice of sharing units provided by institutional providers of survey data. These include common residence, common spending, blood or marital relationship or dependence. The conventional approach is to use three sharing units that decrease in size and scope: the household unit; the family unit; or the income unit (ABS, 1995: 32; Summerfield et al., 2012). The household unit refers to all members who share the

[111] This compares to an average real rate of return for the 5 years ending June 2010 of 2.96 per cent per annum for the two hundred superannuation funds regulated by APRA (AIST, 2011: 9).

same dwelling unit and have common provision for food and other essentials for living. The family unit refers to members related by blood, marriage, adoption, step or fostering who share the same dwelling unit (Smeeding and Weinberg, 2001: 2). The income unit refers to the unit with pooled or shared command over economic resources (ABS, 1995: 32).

Research users of data decide on the unit based on the sharing assumptions specific to the distinct characteristics of their study. This thesis assumes that the primary sharing unit is the household, with the individual as the unit of analysis. The use of the household as the primary sharing unit is consistent with the majority of social science research undertaken nationally and by international bodies (ABS, 2011d; Smeeding and Weinberg, 2001; Zaidi, 2008). It reflects the practicality that even though co-resident household members do not always share all consumption items (such as the cost of food and clothing), there are some items that have attributes of public goods (such as housing and electricity) that members not only share but also benefit from the economies of scale that arise from collective consumption (ABS, 2011a).

4.5.2 Equivalence scales

An equivalence scale is a technical adjustment to household survey income, wealth and expenditure data to take account of differences in needs and economies of scales due to different household sizes and compositions (OECD, 2013d). It is applied to analysis that adopts the household as the unit for aggregating income but the individual as the unit of analysis (Garfinkel et al., 2005; Verbist and Matsaganis, 2014). It is based on the assumption that while members share collectively in the total resources available to the household, economies of scale exist and the needs of individuals differ, both of which require the application of an equivalence scale.[112] For households with more than one member, typically income (although more generally, economic resources) is adjusted by the equivalence scale to produce an individual-based equivalent estimate.

[112] In other words, that a larger household of say five members does not require five times the income or economic resources of a single member household to achieve a similar economic standard of living.

Buhmann et al. (1988) encapsulate the range of alternative equivalence scales through the equation:

Equation 4.8 $$\boldsymbol{ey_{ij}} = \frac{\boldsymbol{hy_j}}{(\boldsymbol{n_j})^{\boldsymbol{\alpha}}} \quad \boldsymbol{0 \leq \alpha \leq 1}$$

where ey_{ij} is the equivalised income of individual i, that belongs to household j, hy_j is the household income, $(n_j)^{\alpha}$ is the equivalence scale with n_j corresponding to the number of household members and α representing the 'equivalence elasticity' (the power by which household economic needs change with size (OECD, 2013d)).

If $\alpha = 0$, no equivalisation adjustment is made and household income is taken as the individual income measure. The assumption herein is of full economies of scale and resources are shared fully amongst household members. The differential needs of the members within a household are disregarded. If $\alpha = 1$, a per capita adjustment is made. The assumption herein is of zero economies of scale. In both cases, individual needs are assumed to be dependent only on the size of the household without any account of demographic-related needs (such as age and gender) (Quinn, 1987; Slesnick, 2005).

The sensitivity of older people's income estimates to equivalence scales and consequently, the impact on normative living standard conclusions has been discussed extensively in the literature (Bradbury, 2009; Buhmann et al., 1988; Burkhauser et al., 1994; R. L. Clark et al., 2004; Quinn, 1987; Radner, 1997; Whiteford, 1997; Whiteford and Kennedy, 1995).[113] Equivalence scales impact the economic living standard calculations of older people in two ways. The first is that low equivalence elasticities increase the needs of smaller households in relation to larger households reflecting the assumption of higher economies of scale in larger households (Whiteford and Kennedy, 1995: 21). Given that many older people, in western industrialised nations live in smaller households, this increases the chances of higher poverty rates for

[113] More generally, the majority of income and expenditure studies discuss the sensitivity of estimates to equivalence scales as a part of analysis (Atkinson, 1991; Atkinson and Marlier, 2010; Atkinson et al., 1995; de Vos and Zaidi, 1997; Saunders et al., 2008; Slesnick, 2005); with a myriad of papers singularly devoted to the theory, estimation and appropriateness of scales (Bradbury, 1989; Buhmann et al., 1988; Deaton and Zaidi, 2002; Ebert and Moyes, 2003; Hunter et al., 2004; Hunter et al., 2003; Nelson, 1993; Radner, 1997).

smaller households and decreases it for larger households (Burkhauser et al., 1994). The second is that the high concentration of older people households around income poverty thresholds means that minor variations in scales will push income estimates above or below poverty lines with substantial differences in poverty rate estimates.[114] Poverty rate changes are more dramatic for single older people because with lower incomes, equivalence scales have a greater impact on their relative income position (Buhmann et al., 1988: 136).

The equivalence scale issue is also compounded by the appropriateness of applying cash income-based equivalence scales to fuller income measures (and more broadly economic resources) without taking into account needs associated with the resource additions. Radner (1997: 71) labels it a 'consistency problem' between 'the specifications of the resources and [the] needs side of comparison'. He shows that the relative economic position of older people in the United States (based on median rates compared to the total population) drops when the equivalence scale is adjusted to account for non-cash needs. Atkinson and Marlier (2010) propose a needs-adjusted equivalence scale that combines a cash income-based scale that varies with household size and composition with a non-cash based scale that varies across the benefits paid to target groups.[115] More recently, Verbist and Matsaganis (2014) follow Paulus et al. (2010) who propose a 'fixed cost approach'. This applies an equivalence scale which provides the same welfare level (i.e. same money value) before and after non-cash income is included. The needs-adjusted equivalence scale is used to examine a hypothetical situation where non-cash needs are accounted for but the public services relating to them are not publicly provided.[116]

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[114] The concentration of older people households around the poverty threshold and the high proportion of older people living in single or couple households are verified in the subsequent ELS analysis in Chapter 5.

[115] The methodology is very complex as it requires estimation of expenditure benefits per individual in each target group, average expenditure benefits for the target reference group and a weighting factor. Nevertheless, the results based on EU-SILC 2006 data indicate a reduction in poverty rates with a needs-adjusted equivalence scale for fourteen EU countries (the exceptions are Spain, Portugal and Slovakia). There are no published results for older people.

[116] The results based on EU-SILC 2007 data show that the equivalence scale adjustment leads to an increase in inequality of disposable income for all 21 countries suggesting that these needs are more

However, despite the recognition that the current equivalence scales are inadequate in accounting for all economic resources and the difference in needs, there is little agreement on guiding principles to determine equivalence scale factors and consistency in empirical applications. The inherent problem is trying to draw parameters around the seemingly infinite variables that determine how and in what way needs vary along the life course from adulthood to old age.[117] Indeed, the ABS (1995: 26) do not currently recommend a particular set of equivalence scales for analysis of economic data, although they use the modified OECD equivalence scale in published income distribution reports (ABS, 2011d, 2012a). Most scholars opt to either present a range of alternative scale based results or follow the scale traditionally used in the country in question or the scale conventionally adopted for a specific type of analysis.

Scales such as the British McClements scale (McClements, 1978), the Australian Henderson scale (R. F. Henderson et al., 1970) and the United States Orshansky scale (Hanson, 2008; Orshansky, 1965) are country specific and derived from expenditure patterns.[118] There are also scales derived subjectively from the relationship between income, household composition and subjective evaluation of a household's standard of living (Bradbury, 1989; Deaton and Zaidi, 2002; Rojas, 2007). International comparative studies generally use equivalence scales that are simple and transparent, accounting for the number of people (such as dividing by the square root of household size) or the number of adults and children (such as the OECD equivalence scales) and excluding any other differentiating characteristics such as gender, adult age groups, physical needs (Harding et al., 2001; OECD, 2013d; Zaidi, 2008).

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concentrated at the bottom of the distribution. Similar to Atkinson and Marlier (2010) the effect of non-cash services when the associated needs are included is also to reduce poverty.

[117] Bradshaw et al. (2008) in the Minimum Income Standard (MIS) project have empirically estimated equivalence scales for single and couple pensioners but these cannot be applied at writ to studies on older people. While other scholars examine the changing needs associated with disability (Zaidi and Burchadt, 2005) and indigeneity (Hunter et al., 2004; Hunter et al., 2003).

[118] The McClements scale is empirically derived based on analysis of actual household expenditure in the Family Expenditure Survey. The Henderson and Orshansky scales area derived from budget standards, costing a basket of goods for different household compositions. The Henderson scale relied on expenditure from the Budget Standard Service of New York from 1954 because Australian data was lacking.

Table 4.8 illustrates the differences between four equivalence scales (represented as: eq^{sqrt}, eq^{oecd}, eq^{power} and eq^{pc}) by showing the equivalence scale relativity and the impact on the unadjusted household disposable income of $100 for a couple person household and a couple person household with one dependent child compared to a single person household. In eq^{sqrt}, the household disposable income is equivalised using the square root of the number of persons in the household. Following Buhmann et al.'s (1988) equation (equation 4.8), the equivalence elasticity (α) is 0.5. It implies that a household with 2 members will need 1.41 times the absolute income of a single person household. A household with three members will need 1.73 times the income of a single person household. The square root equivalence scale is commonly used in international comparative research (Harding et al., 2001; Zaidi, 2008).

Table 4.8 Equivalence scale relativities and impact on unadjusted household income

	Square root of the number of persons in the household		**Modified' OECD scale**		**Number of persons raised to the power of 0.7**		**Per capita**	
	α = 0.50		**α = 0.53**		**α = 0.70**		**α = 1.0**	
Household type	Equivalence relativity	Equivalised household income ($)	Equivalence relativity	Equivalised household income ($)	Equivalence relativity	Equivalised household income ($)	Equivalence relativity	Equivalised household income ($)
Single person household	1.00	100.00	1.00	100.00	1.00	100.00	1.00	100.00
Couple person household	1.41	70.71	1.50	66.67	1.62	61.73	2.00	50.00
Couple person with one dependent child (< 15 years)	1.73	57.74	1.80	55.56	2.16	46.30	3.00	33.33

In eq^{oecd}, the household disposable income is equivalised using the 'modified' OECD equivalence scale that assigns a 1 to the head of each household, 0.5 to each subsequent adult and 0.3 to the number of children (aged under 15 years) in the household.[119] The equivalence elasticity is 0.53. The weighting scheme assumes that while adults and children have differential needs, all adults regardless of age have similar needs. A household with two adults will need 1.5 times the income of a single

[119] An older scale, termed the 'original' OECD equivalence scale assigns a weights of 1, 0.7 and 0.5 respectively (OECD, 2013d).

person household. A household with two adults and one dependent child will need 1.8 times the income of a single person household.

In eq^{power}, the household disposable income is equivalised using the number of persons in the household raised to the power of 0.7. This follows the approach adopted by Bradbury and Gubhaju (2010) that assumes an equivalence elasticity of 0.7 provides a better approximation of the relative Australian Age Pension rates of a single person household to a couple household (based on pre-2009 pension rates). With an α of 0.7, couple and single full-rate pensioners will have approximately the same equivalent incomes. It implies that a household with two members will need 1.62 times the absolute income of a single person household; a household with three members will need 2.16 times the income. As already discussed, in eq^{pc} the household disposable income is equivalised using the number of persons in the household. The equivalence elasticity is 1. There are no economies of scale and needs increase linearly with each additional household member.

Across the four scales, eq^{sqrt} provides the highest economies of scale, eq^{pc} the lowest economies of scale, with eq^{oecd} and eq^{power} in the middle. Stated differently, the equivalence elasticity is lowest for eq^{sqrt} and highest for eq^{pc}. Relative to a single person household, the individual incomes of people in households with two or more members is the highest if eq^{sqrt} is used and the lowest if eq^{pc} is used.

It is evident that none of these scales adequately accounts for the needs of older people and none satisfy the three criteria suggested by Whiteford (1985) of theoretical validity, empirical validity and consensual validity. It is also clear, however, that resolving equivalence scale conceptual and empirical issues is well beyond the scope and purpose of this thesis. As Nelson notes:

> The search for one, true, definitive set of scales seems a chimera since no completely superior method exists for their estimation. The pragmatic standard for policy guidelines is, however, that scales be reasonable and well-informed; absolute truth and generality is not required. (Nelson, 1993: 489)

Hence, the approach is to follow suite with conventional household welfare analysis that assumes economic resources are pooled and economies of scale exist, while noting the inherent risk of potential bias in results emanating from a chosen equivalence scale. Economic living standard estimates are produced using the 'modified' OECD equivalence scale.

There are a number of reasons for using eq^{oecd}. As the analysis in Chapter 5 will reveal, at least one in five older Australians continue to live in households that contain more than one or two people, with some younger old people (65-74 years) in households with dependent children (refer to Table 5.2, Section 5.2). The analysis also draws comparisons to non-older adults that belong to households with dependent children. Hence, it seems appropriate to use an equivalence scale that takes into account the number of additional adults beyond two and the differing needs of children. There is also less justification to use the equivalence scale eq^{power} that compares the pension rate for Australian single pensioner and couple pensioner households, given that this thesis is concerned with all older people - pensioners and non-pensioners alike. eq^{oecd} represents a middle ground between the alternative equivalence scales presented in Table 4.8.

4.5.3 The time unit

The time unit refers to the period over which economic data is collected. The specification is important because the implicit assumption is that the economic resources available can be used for actual or potential consumption at any time during that time period. In other words, there is no reference as Niemietz (2011: 103) points out 'either to what we experienced in the recent past, or what we expect to experience in the near future', as factors influencing how we might use economic resources in that specific time period.

However, putting aside any conceptual inferences, from a technical perspective economic flow data has to be collected with respect to a defined time period. In the Australian context, there are two commonly used approaches: weekly or annual data. Weekly economic data is generally collected in the week or month preceding the interview date. Annual economic data is collected with reference to either the most recent financial year or the twelve months immediately preceding the interview date. The choice of annual data is the preferred option because consumption choices are better determined by longer-term access to economic resources and not as a consequence of weekly or monthly income fluctuations (Zaidi, 2008).

4.5.4 HILDA constructed demographic variables

The constructed variables discussed below are limited to those that warrant explanation and/or if they involve a combination of two or more HILDA original or derived variables.[120]

Age groups: The adult population includes all people aged 15 years and over. The adult population is split into non-older adults (15-64 years) and older adults (65 years and over). Older people are referred to in two ways: as 65-74 / 75-84 / 85 and over year groups; or as younger old (65-74) / older old (75 and over) year groups. Working age adults are defined as those aged between 18 to 64 years.

Long-term health condition/impairment/disability: A long-term health condition includes problems with sight, hearing, speech, blackouts, learning difficulties, limited mobility, nerves and emotions, physical activity, disfigurement/deformity, mental illness, breathing, chronic pain, brain damage, arthritis, heart disease, Alzheimer's and dementia. Respondents are considered to be 'limited' if their condition restricts the type or amount of work or the ability to work at all.

Marital status: This variable distinguishes between respondents who are legally married and/or in a de-facto relationship, separated or divorced, widowed and those who were not married and not in a de-facto relationship.

Household type: This variable is derived in HILDA from a series of questions on the types of relationships existing within the household. The information is then used to

[120] A distinction is made between 'original' (taken directly from the responses in the survey), 'derived' (involved coding by HILDA staff) and 'constructed' (re-coded to variables that are relevant to this thesis) variables.

Variables are derived in the following circumstances: recombination of questions to a common metric; complex combination of questions; conversion of open-ended questions to standard code frames or coded options; imputation of missing data; the matching of external data (Summerfield, 2010: 22).

assign people first to family groups, then to family types and lastly to household types. The core relationships that make up a family group are couple relationships and a parent-child relationship (with the priority first given to dependent children, then dependent students and then non-dependent children). There are 26 household type classifications provided by HILDA.

For this thesis, the constructed household type variable has four categories: single person households; couple relationship households; older people living with other relatives (extended family); and those living in shared households with unrelated people. The first two categories comprise over 75 per cent of older Australian household types. The last two categories recognise that some older people may live with other relatives in a household, while a very small percentage lives with unrelated people.

Housing tenure: The HILDA variable does not distinguish between outright ownership of one's home from those who continue to pay off a mortgage. Neither does it distinguish between public and private tenants. These are important distinctions for older Australians because it provides specific benefits to those who are unencumbered with financial outlays (through home mortgages or private rent) and have secure housing.

For this thesis, the constructed housing tenure variable categorises respondents as: owning their own home, paying off a mortgage, public tenant, private tenant or living rent free. They are classified as 'owning their own home' if there are no current loans attached to their house. They are classified as 'paying off a mortgage' if there is either one or a combination of a current financial institution loan, a non-financial institution loan or a second loan secured against the house they are living in. If they rent, pay board or are involved in a rent-buy scheme then they are either classified as 'public tenants' or 'private tenants'. Public tenants if it is through a government housing authority or a community (or co-operative) housing group. Private tenants if it is through a private landlord (or real estate agent), caravan park owner or an employer. The 'rent-free' category includes those respondents who live rent free with family, in homes provided within their personal networks or through life tenure contracts.

Employment status: The HILDA respondent level employment variable categorises respondents as: employed full-time, employed part-time, not in the labour force (NILF) but marginally attached, NILF but not marginally attached.[121] It does not identify older respondents who are retired. The constructed employment status variable in the thesis uses this employment question, in conjunction with a subsequent question on retirement from the paid work force, to distinguish respondents as: employed full-time, employed part-time, retired or other. The 'other' category includes a mixed bag of responses such as those who self-identify as NILF but are marginally attached and as not retired and those who have never been in the paid workforce.

Pensioner status: The constructed variable in the thesis uses two HILDA original variables that ask respondents if they receive the Age Pension, and then if they receive any income from the government in the form of a benefit, allowance or pension. The variable identifies a respondent as a pensioner if they receive the Age Pension, another government allowance/pension or both.[122]

Forms of pensions: Using the same variables as above, this constructed variable further categorises the form of pensions respondents may receive. The four categories of pensions are: the Age Pension; the Age Pension and other pensions; other pensions only; or they are not the recipient of any pensions. 'Other pensions' include: mature age allowance; service pension; disability support pension; wife pension; carer payment; sickness allowance; widow allowance; special benefit; partner allowance; and parenting allowance. The largest forms of other pensions for older Australians are the service pension, the carer's payment and the mature age allowance.

Principal source of income: The constructed variable uses the categorisation of various income components and sub-totals as set out in the HILDA financial year income model (discussed in Section 4.3.2) To preserve the confidentiality of the respondents, all HILDA General Release datasets top code many income sub-totals such as

[121] 'Marginally attached' consists of those people actively looking for work, but not available to start work in the reference week; or not looking for work but available to start work within four weeks (HILDA, 2010).

[122] In general, the difference between a pension and allowance is that the former is a permanent payment, while the latter is a temporary payment made in particular circumstances.

disposable income, gross income, private income and market income, by setting a ceiling on the highest recordable income of individuals. All values above the top coding income thresholds are replaced by the weighted means of income above the threshold (Summerfield, 2010).

Consequently, it is not always the case that aggregating the income components will produce the same sub-total estimates as provided by HILDA. It is, therefore, necessary to re-calculate income sub-totals by aggregating income components to provide five principal sources of household gross income.[123] These are: income earned from wages/salaries and/or business; income earned from investments or through private pensions; income received through Australian government income support payments; and income from other sources (such as through private transfers, scholarships, foreign pensions and windfall income).

SEIFA index of relative socio-economic advantage / disadvantage (IRSAD) and the SEIFA index of economic resources (IER): Using ABS Census data, the Socio-Economic Indexes for Areas (SEIFA) rank geographic areas according to relative socio-economic advantage and disadvantage, defined as 'people's access to material and social resources and their ability to participate in society' (ABS, 2013c: 6).

The IRSAD provides a SEIFA score based on the economic and social conditions of people and households within a geographic area; with a low score indicating relatively greater disadvantage and a high score indicating relatively greater advantage. It takes into account the proportion of families with high incomes, people with a tertiary education, and people employed in a skilled occupation (HILDA, 2010: S166). The IER follows the same approach as IRSAD but is limited to economic resources based on indicators of high and low income and on variables that correlate with high or low wealth (ABS, 2013c: 8). For example, reference is made to the income levels, rent paid, mortgage repayments, and dwelling size of households and people within a geographic area (HILDA, 2010: S167). It is also presented as a 'continuum of disadvantage to advantage' (HILDA, 2010: S167).

[123] This variable excludes the effect of individual taxes.

Within HILDA, deciles are formed after ranking the indexes and assigning the deciles according to the population counts (HILDA, 2010: S166). The constructed variables in this thesis collapse the 10 deciles into 5 quintiles (quintile 1 = decile 1 + decile 2 … quintile 5 = decile 9 + decile 10).

4.6 Conclusion

This chapter operationalises an economic living standard (ELS) approach that combines the notions of income and wealth as providing a set of consumption possibilities that determine the economic standard of living. Expanding the notion of income to include the flow of non-cash economic resources and wealth as a stock value, however, is complex. The approach is developed through comparison with other full income models proposed by Smeeding and Weinberg (2001) and the ABS FIS (1996, 2001a, 2007b, 2012a), and the wealth annuity method advocated by Wolff and Zacharias (2009).

A continuum of four economic resource metrics is presented beginning with the narrowest focus on disposable income (dy), expanding to include the value of non-cash benefits and services (arising from the receipt of public goods and/or services from home ownership) defined here as full income (fy); and finally the inclusion of wealth in the form of two derived 'potential consumption' (pc) and (apc) metrics. The inclusion of these economic resource components is intended to account for the range of economic factors conferred to an individual along his/her life course trajectory and the extent to which these are not captured by disposable income indicators.

This chapter details the technical procedures to estimate three economic resource components at a household (and individual) level. Social transfers in-kind are imputed in HILDA from HES as part of the ABS Fiscal Incidence Study; using a regression-based approach that statistically matches values based on a combination of age, gender and state demographic variables. Net imputed rent is calculated based on a market value approach that distributes the National Accounts gross imputed rent value to homeowners based on the value of their home and then deducts housing costs. Housing cost rates are imputed using reported values in ABS SIH. The lifetime annuities for the various non-home wealth components and home wealth are estimated based on Australian Reserve Bank real rates of returns specific to each wealth component and ABS predicted life expectancies.

Of course, there are limitations with this approach. A comprehensive economics-focussed approach should take into account all economic resources (such as, the value of home production and leisure) and include a full accounting of public expenditures (such as, public infrastructure and defence). The tax treatment of assets is not adequately captured. The choice of interest rates used in estimating annuities, at best approximates the true capital worth of assets on the market. Finally, problems with the coverage of datasets both in sample representation and data items, data accuracy and equivalence scales persist irrespective of the economic resource metric under consideration. Notwithstanding the numerous methodological assumptions that are almost always part of any social-science study, this chapter systematically sets out a methodological approach to include social transfers in-kind, the benefits from home ownership and wealth accumulation within an income flow model.

5 Economic standard of living results and discussion

5.1 Introduction

Reiterating the ELS approach from Chapter 4, four economic resource metrics are constructed at a household level and equivalised for individual unit analysis: disposable income (dy), full income (fy), potential consumption (pc) and adjusted potential consumption (apc). Disposable income follows standard convention, to include all cash items of a regular and recurring nature minus personal tax. Two economic resource components are added to dy to provide a measure of fy: imputed social transfers in-kind (sti) and net imputed rent for owner-occupiers (nir).

The two potential consumption metrics introduce wealth components, converting the stock of wealth into income flow measures in the form of lifetime annuities. The pc metric appends the fy metric with annuity values for different components of non-home wealth (for example, property wealth, business assets, financial assets, superannuation and liquid assets) and deducts property income, to avoid double counting the returns from asset ownership. The apc metric adds the annuity value of home wealth to the pc metric and deducts net imputed rent, to avoid double counting the services from home ownership.

The main intention of this chapter is to determine the extent to which the alternative economic resource metrics affect the substantive conclusions about the economic living standards of older people generally and for specific sub-groups of older people. The chapter is organised into six sections. To provide a context of the social and economic circumstances of older people in Australia and to introduce the dataset used in the analysis, Section 5.2 provides a short descriptive summary of the demographic characteristics of older Australians based on data from Wave 10 of HILDA. Section 5.3 provides the imputation results of the economic resource components (social transfers in-kind, net imputed rent and wealth annuities) used to formulate the ELS metrics. Section 5.4 investigates the relationship between the metrics. In Section 5.5 the economic resource metrics are analysed using median comparisons, quintile distributions and poverty rates. The last two sections conclude Part 1 of the thesis with a discussion on the key findings and a review of the ELS approach in Section 5.6 and concluding remarks in Section 5.7.

5.2 A descriptive analysis of older people in Australia

The descriptive analysis in this section looks at the demographic characteristics of older Australians.[124] It provides the social and economic context to compare and understand the position of different sub-groups of older people using the ELS metrics. To ensure that empirical conclusions are generalisable to the adult Australian population, it is necessary to begin by discussing the representativeness of the HILDA sample to the Australian population.

As discussed in Chapter 4, the HILDA sample identifies a potential respondent if they are an adult, aged 15 years and over. Consequently, the sample includes all adults from responding households who responded to the person and self-completion questionnaires. To ensure representativeness with Australian population estimates, the sample is weighted using, where applicable, a combination of benchmarks on age, gender, state, labour force status, marital status and household composition as provided by the ABS Estimated Resident Population figures produced from the 2001 and 2006 Census and from the ABS Labour Force Survey (Summerfield et al., 2012).[125]

Table 5.1 compares the unweighted frequency counts of the HILDA sample against population estimates provided in the ABS Estimated Resident Population report (ABS, 2011a) and against HILDA weighted results. The total sample size of responding adults in Wave 10 is 13,526 with older people numbering 2,159, constituting 16 per cent of the sample interviewed. The effect of weighting is to reduce the over-representation of 15-24 and 45-54 year groups and increase the under-representation of 25-34, 35-44 and 55-64 year groups; bringing these proportions in line with ABS estimated resident population proportions.

[124] Although there are many self-assessment questions asked in HILDA regarding an individual's life satisfaction, financial situation, local community, neighbourhood, personal relationships and so on these have not been included here because they will be dealt with in Chapters 6 and 7.

[125] Appendix C.1 discusses the weighting scheme in further detail.

Table 5.1 Comparison of HILDA Wave 10 sample to the 2010 Australian resident population

	HILDA unweighted				HILDA weighted				ABS estimated resident population			
	Male	Female	Total	Sample size	Male	Female	Total	Population size	Male	Female	Total	Population size
Years	%	%	%	n	%	%	%	N	%	%	%	N
15 - 24	20.7	19.4	20.0	2,708	18.4	17.2	17.8	3,144,452	18.1	16.6	17.4	3,140,512
25 - 34	16.1	15.7	15.9	2,149	17.9	17.4	17.6	3,111,069	18.0	17.3	17.6	3,186,431
35 - 44	16.8	17.2	17.0	2,303	17.5	17.5	17.5	3,087,232	17.6	17.4	17.5	3,165,633
45 - 54	17.8	17.5	17.6	2,386	17.1	17.3	17.2	3,025,938	16.9	16.8	16.8	3,043,754
55 - 64	13.4	13.5	13.5	1,821	14.4	14.2	14.3	2,526,029	14.1	14.0	14.0	2,536,616
65 - 74	9.0	8.9	9.0	1,214	8.5	9.0	8.7	1,541,210	8.9	9.0	9.0	1,618,229
75 - 84	5.2	5.9	5.6	751	5.1	5.2	5.1	905,004	5.0	6.0	5.5	992,971
85+	0.9	1.9	1.4	194	1.1	2.2	1.7	297,669	1.5	2.8	2.2	390,843
Total	100	100.0	100	13,526	100	100	100	17,638,603	100	100	100	18,074,989

Source: Author's calculation based on HILDA Wave 10 Release 10; ABS Catalogue No. 3101.0 (ABS, 2011a: 20).
Sample: All adults (aged 15 years and over) from responding households.
Weights: Cross-sectional responding person population weights for 2010.

For older people, the effect of weighting is a minimal reduction in the proportion from 16.0 per cent to 15.6 per cent, but in doing so results in a slight under-representation (by 1 per cent) compared to the ABS population proportion, particularly for older old females (75 years and over). This is an acknowledged weakness of HILDA given that unlike the ABS ERP, HILDA is unable to include the institutionalised population, which includes aged-care accommodation (Summerfield et al., 2012). On balance though, Table 5.1 indicates that the HILDA weighted sample closely approximates the ABS estimated resident population across age-gender groups, with marginal differences limited to less than 1 per cent.

Tables 5.2 and 5.3 summarise older age groups using a range of key indicators that cover their demographic, relationship and household profiles, employment and pensioner characteristics, location and socio-economic status. Comparisons are made between different age groups of older Australians and then differences of older people to non-older adults (aged under 65 years).[126]

[126] To reflect the imprecision of estimates due to the sampling process, in Tables 5.2 and 5.3 the ABS (2011d, 2012a) convention is followed. Estimates are marked with a † if the relative standard error is between 25-50 per cent of the size of the tabulated result (and †† if above 50 per cent) to signify that the results should be interpreted with caution (or in the case of †† are unreliable). Refer to Appendix C.1.

Table 5.2 The demographic and household profiles of older people (%)

Population sub-groups	Years 65 - 74	75 - 84	85+	All older people (65+)	Non-older adults (15-64)	Adult population (15+)
Gender						
Male	48.2	48.9	32.9	46.7	49.9	49.4
Female	51.8	51.1	67.2	53.3	50.1	50.6
		***		***		
n	1,214	751	194	2,159	11,367	13,526
Birthplace						
Australian born	65.4	66.3	71.7	66.4	76.5	75.0
English speaking	13.9	16.2	9.8†	14.2	8.1	9.0
Non-English speaking	20.6	17.5	18.5†	19.4	15.4	16.0
				***		
n	1,213	751	194	2,158	11,364	13,522
Educational attainment						
Degree or higher	14.0	8.3	5.4†	11.2	23.4	21.5
Vocational / post school qual	31.6	26.3	19.3	28.5	30.9	30.6
Year 12	6.5	8.9	13.7	8.1	18.9	17.2
Year 11 or below	47.9	56.4	61.7	52.2	26.8	30.7
		***		***		
n	1,210	751	194	2,155	11,363	13,518
Limiting long term health condition/impairment/disability						
Limiting LT health condition	37.7	48.4	60.0	43.6	14.4	19.0
Non limiting LT health condition	13.3	14.8	15.0	14.0	7.4	8.4
No LT health condition	49.0	36.9	25.0	42.4	78.2	72.6
		***		***		
n	1,213	748	194	2,155	11,355	13,510
Marital status						
Married/de-facto	71.3	59.2	24.3	62.2	56.9	57.8
Separated/divorced	12.4	7.6	6.1	10.1	9.9	10.0
Widowed	13.0	30.0	67.1	24.5	1.0	4.7
Not married/not de-facto	3.3	3.2†	2.6†	3.2	32.1	27.6
		***		***		
n	1,213	751	194	2,158	11,354	13,512
Household type						
Couple only	58.6	53.3	23.2	53.0	19.5	24.7
Lone person	17.1	29.0	47.7	24.4	9.4	11.8
Extended family	22.0	14.9	27.8	20.3	67.1	59.8
Shared household	2.3†	2.8†	1.3†	2.3	4.0	3.7
		***		***		
n	1,214	751	194	2,159	11,367	13,526

Source: Author's calculation based on HILDA Wave 10 Release 10.
Weights: Cross-sectional responding person population weights for 2010.
Note: † 25-50 per cent relative standard error - cautious estimate; †† > 50 per cent - unreliable estimate.
Note: Pearson chi-squared test of significant difference between demographic characteristic and age at $\rho < 0.05$*, 0.01** and 0.001***. Standard errors calculated using the jackknife weighting method.

Across the majority of demographic characteristics with the exception of remoteness area and the SEIFA indices, differences by older age group and between older people and non-older adults are statistically significant. The distributional profile of older people changes with increasing old age and is different to the remaining adult population. Females make up a slightly greater proportion of older Australians (53.3 per cent) compared to non-older adults (50.1 per cent) This predominance however, increases with age; the proportion of females' increases from 51.8 per cent in the 65-74 years age group to 67.2 per cent for those aged 85 years and over. For the very old (85 years and over), there are twice as many females as males.

The demographic changes in the age gradient of older people is reflective of the generational shifts within the Australian population in terms of cultural diversity and educational reform (AIHW, 2007). These are cohort effects.[127] There are lower proportions of older people born in Australia with approximately one-third born in non-English speaking and English speaking countries, compared to over 75 per cent of non-older adults born in Australia. The educational qualifications of older people are also much lower than the non-older adult population. Close to 50 per cent for the 65-74 year age group and well over 50 per cent for the remaining older groups did not complete Year 11. While less than 9 per cent of those aged 75 years and over obtained a tertiary qualification, compared to close to a quarter of non-older adults (23.4 per cent).

The importance of health and the associate impact on functional ability as a pertinent ageing issue potentially affecting an individual's well-being is confirmed with these results. Older people are three times more likely to have a limiting long-term health condition compared to those less than 65 years of age (43.6 compared to 14.4); with sharp increases (by 15 percentile points) in each 10 year age gap between 65 to 85 years. However, the results also indicate that limiting health is not a pre-condition of ageing as a significant number of older people do not indicate a limiting long term health condition (42.4 per cent).

The life course effect of ageing on relationships and household structures is reflected in the sharp decrease of those who are married and inversely, the sharp increase with age of those widowed and living in lone person households. For each older age group, the proportion of widowed older people approximately doubles from 13.0 per cent (65-74 years) to 30.0 per cent (75-84 years) to 67.1 per cent (85+ years). Over two-thirds of the very old are widowed and nearly half live in lone person households. In

[127] The cohort effect describes the particular circumstances and characteristics of people born in a particular time period that are clearly distinguishable from people born in other periods.

contrast, amongst the younger old, around 80 per cent are living in households with other people either in a 2 person couple only household or through sharing a household with dependent, non-dependent children and/or other relatives (labelled as 'extended family').

More detailed examination of the 'extended family'' category (Table C.1 in Appendix C.2) indicates that while nearly 20 per cent of younger old people (65-74 years) are living with dependent or non-dependent children, this drops to 11 per cent in the next older age group as many children have left the household but increases to 27 per cent for the very old (85 years and over). For this very old group, the second largest sub-category to living alone (47.7 per cent) is lone parent households with non-dependent children (24.1 per cent), suggesting that with the onset of very old age, some older people move into households with other relatives. This is supported by housing tenure statistics which show that for this age group, 9.3 per cent live rent free (refer to Table 5.5, Section 5.3.2).

Table 5.3 summarises older age groups by employment and pensioner characteristics, location and socio-economic status. The results are indicative of the life-cycle of earnings and employment. Approximately 9 out of 10 people aged over 65 years are retired with 8 out of 10 are in receipt of a pension, allowance or benefit and 7 out of 10 receiving some form of the Age Pension. Around 16 per cent of those aged 65 to 74 years who are still in the early stages of retirement continue some form of employment either full-time or part-time. This has obvious consequences on their pensioner status with close to a quarter not receiving any form of pension and reliant on earned income as their main source of income (22.9 per cent).

Table 5.3 Employment, pensioner, location and geographic characteristics of older people (%)

	Years			All older people	Non-older adults	Adult population
Population sub-groups	**65 - 74**	**75 - 84**	**85+**	**(65+)**	**(15-64)**	**(15+)**
Employment status						
Employed full-time	6.3	0.6††	0.8††	3.8	51.8	44.3
Employed part-time	9.4	3.8	0.0	6.6	22.1	19.7
Retired	80.5	92.7	93.4	85.9	6.6	19.0
Other	3.8	2.9	5.7†	3.7	19.5	17.1
		***		***		
n	1,211	751	194	2,156	11,354	13,510
Pensioner status						
Pensioner	77.1	90.3	89.6	82.8	18.6	28.6
Non-Pensioner	22.9	9.7	10.4	17.2	81.4	71.4
		***		***		
n	1,214	750	194	2,158	11,360	13,518
Forms of pension						
Age pension only	61.1	74.5	58.7	65.3	0.5	10.6
Age pension & other pensions	6.8	7.8	7.5	7.2	0.0†	1.2
Other pensions only	9.2	8.0	23.4	10.4	18.0	16.8
No pensions	22.9	9.7	10.4	17.2	81.4	71.4
		***		***		
n	1,214	750	194	2,158	11,360	13,518
Principal income source						
Wages/salaries/own business income	22.2	11.0	17.8†	18.0	83.6	73.4
Investment/private pension income	27.6	18.2	18.3	23.5	3.5	6.6
Aust govt cash support payments	47.1	68.6	63.0	55.9	11.1	18.1
Other	3.1	2.3	0.9††	2.6	1.8	1.9
		***		***		
n	1,214	751	194	2,159	11,367	13,526
Remoteness area						
Major city	60.5	58.9	69.1	60.9	68.7	67.5
Regional Australia	38.6	38.7	30.5	37.7	29.8	31.1
Remote Australia	0.9†	2.4††	0.4††	1.4†	1.5†	1.5†
				***		
n	1,214	751	194	2,159	11,361	13,520
SEIFA index of relative socio-economic advantage/disadvantage (IRSAD)						
Quintile 1	21.3	26.6	29.9	24.0	17.5	18.5
Quintile 2	19.5	16.6	19.6	18.5	19.3	19.2
Quintile 3	15.6	20.3	16.3	17.2	19.8	19.4
Quintile 4	23.9	17.5	21.3	21.5	22.6	22.5
Quintile 5	19.7	19.0	12.9	18.7	20.8	20.5
				**		
n	1,214	751	194	2,159	11,359	13,518
SEIFA index of economic resources (IER)						
Quintile 1	24.1	26.8	27.1	25.3	16.6	17.9
Quintile 2	20.2	20.1	24.8	20.6	19.4	19.6
Quintile 3	15.7	15.3	15.8†	15.6	21.1	20.2
Quintile 4	19.4	19.4	17.2†	19.3	21.4	21.1
Quintile 5	20.5	18.4	15.1	19.2	21.5	21.2
				***		
n	1,214	751	194	2,159	11,359	13,518

Source: Author's calculation based on HILDA Wave 10 Release 10.
Weights: Cross-sectional responding person population weights for 2010.
Note: † 25-50 per cent relative standard error - cautious estimate; †† > 50 per cent - unreliable estimate.
Note: Pearson chi-squared test of significant difference between demographic characteristic and age at ρ < 0.05*, 0.01** and 0.001***. Standard errors calculated using the jackknife weighting method.

For the very old, 23.4 per cent are in receipt of ‘other pensions only’. The majority in this category include the service pension (over 85 per cent) and to a lesser degree some recipients of the disability support pension, the carer’s payment and the special benefit.[128] It is likely that this is an age cohort effect; service pension recipients are veterans of World War 2, or are the eligible partners, widows and widowers of veterans (Department of Veterans Affairs, 2011).[129] The payment to partners explains the high incidence of the service pension in this age category, given that more than 65 per cent of those aged 85 years and over are females.

Although the principal source of income for more than 50 per cent of all older people is from government income support payments, the results indicate the increasing reliance on private income earned through investments and private pensions which is inclusive of superannuation income amongst younger old people. The difference in this income stream is approximately 9 percentile points between the younger-old (65-74 years) and older-old (75 years and over) age groups (27.6 per cent compared to 18.2 per cent respectively). However, for all older people it is almost seven 6 times that of all non-older adults.

In terms of the dispersion of older people across remoteness type, the results indicate that there is no statistically significant difference across older age groups. Close to 60-70 per cent live in a major city, between 30-40 per cent live in regional Australia and rural Australia is sparsely populated. On average, there are slightly higher proportions of older people in regional Australia and slightly higher proportions of non-older adults in a major city.[130]

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[128] Source: Author’s calculation from HILDA Wave 10 Release 10.

[129] The service pension is paid by the Department of Veterans Affairs to veterans on the grounds of age or invalidity and in the form of a partner service pension to the partners of eligible veterans. It is subject to an assets and incomes test and forms part of a larger suite of benefits and services to veterans and their dependents in recognition of their service to the Australian Defence Force (Department of Veterans Affairs, 2011).

[130] The unreliability of statistics for remote Australia is due to HILDA’s exclusion of a representative sample of people living in remote and sparsely populated areas (Summerfield et al., 2012).

The SEIFA IRSAD reveals that there are higher proportions of older people located in geographic areas with the most relative socio-economic disadvantage (quintile 1 – 24.0 per cent) and lower proportions in geographic areas with the most relative socio-economic advantage (quintile 5 – 18.7 per cent)) compared to the non-older adult population. There is a closer parity in the spread of the proportion of all older age groups and non-older groups across the middle quintiles. The SEIFA IER results indicate an inverse relationship between older people and non-older adults living in neighbourhoods characterised by economic advantage. There are slightly higher proportions of older people compared to non-older adults living in areas marked as geographic localities with relatively less access to economic resources (quintile 1). Conversely, there is a lower representation of older people compared to non-older adults in both the middle quintile and in areas of greater relative economic advantage (quintile 5).

In summary, Tables 5.2 and 5.3 illustrate that it is not possible to provide a uniform description of older Australians and circumscribe older people into generalised categories. The heterogeneity of older people is apparent.[131] For example, even though the overwhelming majority of older people are retired and have pensioner status, more than a quarter of younger old people receive income privately from income-generating assets (superannuation and investments) and one-fifth from earned income. Even though health is an issue for many older people especially the very old (85 years and over), around 4 in 10 older people do not suffer any limiting long term health condition.

It is possible however, to deduce certain factors that help explain some of the demographic attributes. Certain demographic characteristics, such as, overseas born Australians and lower secondary/tertiary educational qualifications suggest the impact of a cohort effect following the migration policies in the post-war period that saw an influx of immigrants from non-English speaking European countries, and an educational emphasis on vocational skills above secondary and tertiary education. Other descriptions, for example, the increasing impact of long-term health issues,

[131] As Quinn (1987) remarks ‘Beware of the mean’.

status as a pensioner and retiree, the higher incidence of widowhood and the increasing feminisation of ageing are natural consequences of the different elements of the aging process described by Närvänen (2004) in Chapter 1 and resonate with the demographic characterisations of older people in other western economies discussed in Chapter 3.

5.3 Imputation results for key ELS components

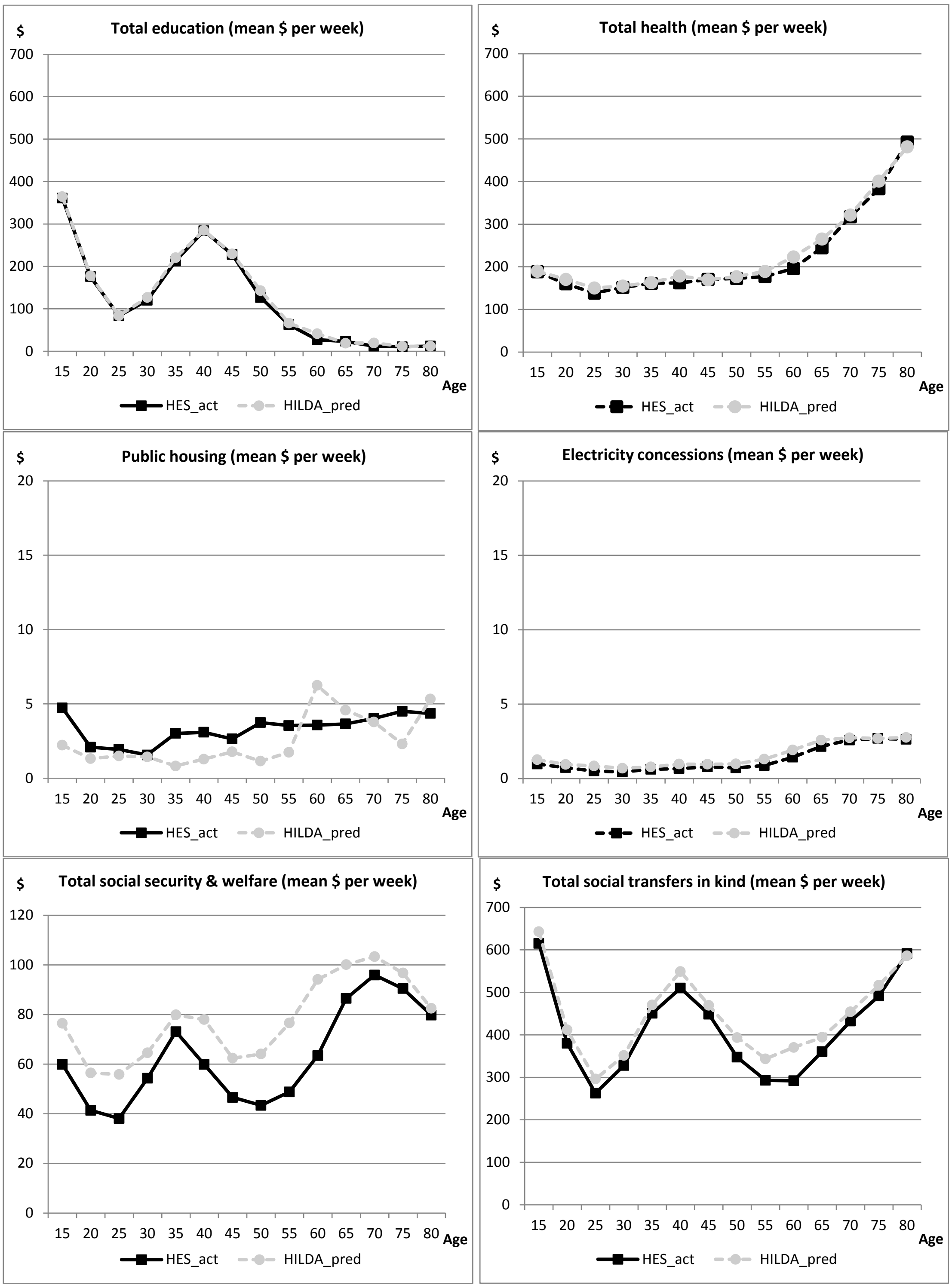
5.3.1 Social transfers in-kind – $(\boldsymbol{sti})$

Reiterating the methodology from Section 4.4.1, the sti values are imputed in HILDA using OLS regression models that apply the estimated regression coefficients from HES (as part of ABS FIS) with age, gender and state interaction variables as independent variables and the social transfer in-kind item as a dependent variable, to similarly structured regression models within HILDA. There are two sets of imputed results.

Figure 5.1 plots the actual weekly mean dollar value of in-kind items in HES and the corresponding predicted imputed values in HILDA by 5 year age group (for adults). This is done for all six functional category totals listed in Table 4.5: total education, total health, public housing, electricity concessions, total social security and welfare and total social transfers in-kind.[132]

[132] Total social security and welfare includes two items: social security and welfare programs and child care assistance. Total social transfers in-kind is the total for all ten sti items.

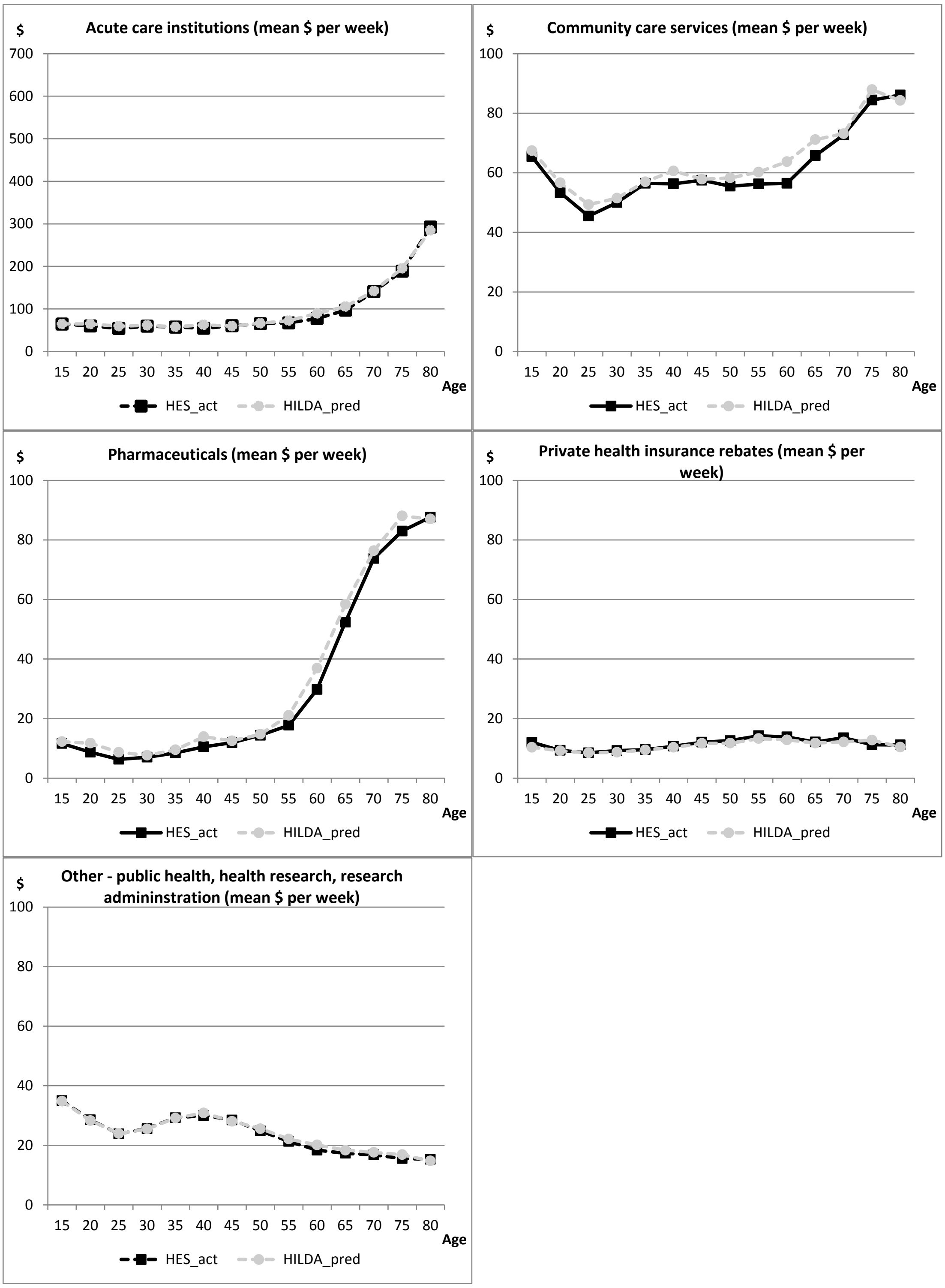
Figure 5.1 Comparison of actual HES and imputed HILDA social transfer in-kind values for functional category totals by 5 year age groups (mean $ value per week)



Source: Author's calculations based on imputations from HILDA Wave 10 Release 10, ABS HES 2009-10. Weights: Cross-sectional household population weights for HILDA (2010), household population weights for HES (2009-10).

Figure 5.2 compares results by the five in-kind health benefit items.

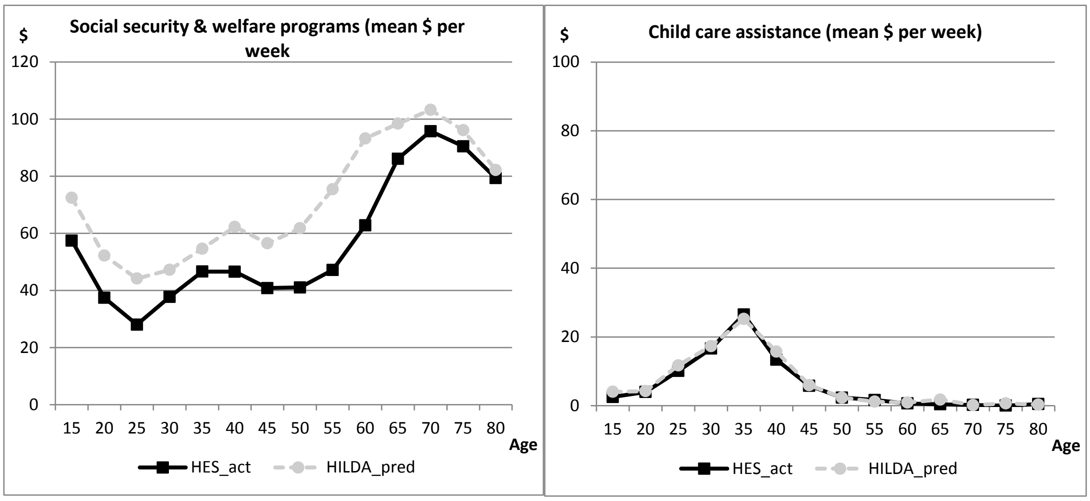
Figure 5.2 Comparison of actual HES and imputed HILDA social transfer in-kind values for health items by 5 year age groups (mean $ value per week)



Source: Author's calculations based on imputations from HILDA Wave 10 Release 10, ABS HES 2009-10. Weights: Cross-sectional household population weights for HILDA (2010), household population weights for HES (2009-10).

Figure 5.3 distinguishes the results by the two types of social security and welfare in-kind items: social security and welfare programs and child care assistance.

Figure 5.3 Comparison of actual HES and imputed HILDA social transfer in-kind values for social security and welfare items by 5 year age groups (mean $ value per week)



Source: Author's calculations based on imputations from HILDA Wave 10 Release 10, ABS HES 2009-10. Weights: Cross-sectional household population weights for HILDA (2010), household population weights for HES (2009-10).

Imputed HILDA values closely track actual HES expenditures for twelve of the thirteen social transfer in-kind items (including totals), reinforcing the credibility of the regression-based approach. The only exception is public housing, and as has been explained in Section 4.4.1 this occurs because public housing is provided on an income basis however income is not included in the OLS regression imputation. Imputed values for social security and welfare programs in HILDA follow the same pattern as in HES however, the mean dollars are on average approximately 20 per cent higher.

The second thing to note is the large variation in the provision of in-kind benefits along the age-gradient. Public education benefits peak for secondary and tertiary students and for younger-age people (with dependent children), decreasing rapidly thereafter with age. A similar spike is evident in the provision of child care assistance for mid-career working-age people (with presumably also young dependent children). Health benefits, particularly in relation to the utilisation of acute care institutions (hospitals) and pharmaceuticals, increase almost exponentially after the age of 60 years. This is also true with respect to the take-up of benefits received through social security and welfare programs. Consequently, the pattern of total social transfers in-kind shows a series of peaks and troughs with age. Imputed values peak for people aged 15-19 years, 35-49 years and those aged 70 and above years suggesting that the two biggest demographic groups who receive non-cash benefits are children/dependent students with respect to education and older people with respect to health.

To provide a more aggregative age perspective of the monetary impact of social transfers in-kind, Table 5.4 compares the equivalised annual mean value of the in-kind items for older people compared to non-older adults. Across all categories, except those relating to children (education and child care assistance), imputed in-kind values are much higher for older people than non-older adults. On average, the total amount imputed is approximately 60 per cent more for older people than non-older adults with dollar estimates increasing with each older age group.

Table 5.4 Equivalised social in-kind items (mean $ per year) by age group

Years	65 - 74	75 - 84	85+	(a) All older people (65+)	(b) Non-older adults (15-64)	Adult population (15+)	Age group ratio (a/b)
Education	379	121	173	272	3,965	3,390	0.07
Health	9,729	16,375	17,958	12,814	4,507	5,799	2.84
Acute care institutions	4,083	8,916	10,719	6,397	1,693	2,425	3.78
Community health services	2,397	3,165	3,140	2,731	1,479	1,674	1.85
Pharmaceuticals	2,274	3,325	3,210	2,722	379	744	7.18
Private health insurance rebate	397	422	374	403	278	298	1.45
Other health benefits	579	548	516	562	677	659	0.83
Public housing	150	108	360	159	49	67	3.21
Electricity concessions	92	104	105	97	27	38	3.67
Social security and welfare	3,409	3,296	2,991	3,326	1,796	2,034	1.85
Social security & welfare programs	3,391	3,287	2,994	3,314	1,573	1,844	2.11
Child care assistance	18	9	-3.6	13	223	190	0.06
Total social transfers in kind	13,842	20,110	21,539	16,745	10,481	11,455	1.60
n	1,208	736	181	2,125	11,320	13,445	

Source: Author's calculations based on imputations from HILDA Wave 10 Release 10, ABS HES 2009-10.
Weights: Cross-sectional responding person population weights for HILDA (2010).
Equivalence scale: Modified OECD equivalence scale.

The key driver, contributing the most in dollar terms, stems from older people's utilisation of health services, particularly from higher hospital stays (acute care institutions), more frequent contact with doctors and allied medical services (community health services) and a larger intake of medicines (pharmaceuticals). The pattern is not unexpected as the access to substantive health care services is a natural consequence of the ageing process (Närvänen, 2004). It is problematic from an economics valuation and broader social perspective because it infers that older people are in a better relative economic position when in fact the increase in the allocation of public expenditure simply matches an increase in health needs. This issue is discussed in more detail in Section 5.6.2.

5.3.2 Net imputed rent for owner-occupied dwellings – (nir)

The importance of including housing services from home ownership in the form of an imputed rent is evident in the housing tenure statistics presented in Table 5.5. Approximately 7 out of 10 Australians are homeowners. The home ownership rate is much higher for older people than non-older adults (81.8 compared to 70.3 per cent). Older people are three times more likely to own their home outright (72.9 per cent) compared to non-older adults (22.3 per cent). Conversely, older people are 5 times less likely than non-older adults to still have a debt against their home, with the incidence of mortgagees decreasing with each older age group (from 12.7 per cent for 65-74 years to 4.8 per cent for those aged between 75 and 84 years to 1.4 per cent for the 85+ year old group).

These statistics corroborate the first part of Ando-Modigliani's theory of wealth accumulation discussed in Chapter 3; the upward climb in the hump-shape age-wealth profile as wealth accumulates with age, funded by income earned pre-retirement (Browning and Crossley, 2001). It provides evidence that older Australians have a large economic resource attached to outright ownership of their home. The private/public rental split for older people is consistent with the Australian Institute of Health and Welfare and Brotherhood of St Laurence's reports (AIHW, 2007; Kimberley and Simons, 2009).

The 'market value approach' used to estimate net imputed rent calculates a hypothetical rent as if owner-occupiers were to rent their home from themselves (Saunders and Siminski, 2005; Yates, 1994). Gross imputed rent is estimated by distributing the total amount of gross imputed rent for owner-occupiers listed in National Accounts (ABS, 2011b) based on the gross values of owner-occupier homes in HILDA. The average rate of gross imputed rental return for 2010 is 3.529 per cent of the gross value of the home, based on an estimated $111,742m of gross imputed rent of owner-occupiers in the National Accounts (ABS, 2011b: Table 52) and a HILDA estimate of \$3,166b of the gross value of housing stock.[133] Although lower than the gross rates of return applied in the Saunders and Siminski (2005) study of 4.994 per cent for 1998-99 and 4.899 per cent for 1993-94, it is very close to the rate of 3.647 that would be applied if the gross value of housing stock based on SIH 2009-10 for owner-occupiers is used (\$3,064b), instead of HILDA.

Table 5.5 Home tenure, home equity and equivalised net imputed rent comparisons

Years	**65 - 74**	**75 - 84**	**85+**	**All older people (65+)**	**Non-older adults (15-64)**	**Adult population (15+)**
Housing tenure (%)						
Own home	71.8	75.7	70.6	72.9	22.3	30.2
Paying mortgage	12.7	4.8	1.4†	8.9	48.0	41.9
Renting private	6.4	8.7	7.6†	7.3	23.1	20.6
Renting public	6.9	5.7†	11.1††	6.9	4.5	4.8
Rent free	2.3†	5.1†	9.3†	4.0	2.2	2.5
n (full sample)	1,203	743	192	2,138	11,278	13,416
Owner-occupiers NIR (mean \$ per year)						
Gross imputed rent	13,402	12,503	13,109	13,082	10,683	11,108
Interest costs	745	516	142	699	5,115	4,589
Other housing costs	3,563	3,316	3,470	3,474	3,079	3,149
Net imputed rent	9,145	9,081	9,606	9,169	2,506	3,685
n (owner-occupiers only)	1,004	571	138	1,713	7,479	9,192

Source: Author's calculations based on imputations from HILDA Wave 10 Release 10, ABS SIH 2009-10.
Weights: Cross-sectional household and responding person population weights for HILDA (2010), Household population weights for SIH (2009-10).
Equivalence scale: Modified OECD equivalence scale.
Note: † 25-50 per cent relative standard error - cautious estimate; †† > 50 per cent - unreliable estimate.

The nir value is gross imputed rent minus housing costs. As full housing costs are not available in HILDA, they are calculated as rates within SIH 2009-10. The rate of mortgage interest costs (as a proportion of mortgage debt) and the rate of other housing costs (as a proportion of gross home value) are estimated and applied to HILDA households. The average mortgage interest rate imputed to owner-occupiers in HILDA (and used to calculate mortgage costs) is 6.06 per cent. As a measure of the

[133] The amount is based on the summed value of all households that are owner-occupiers (that is, either outright owners or owner-purchasers) and is weighted using cross-sectional household population weights.

credibility of this estimate, it is a close approximate to the 2010 average Reserve Bank of Australia mortgage interest rate of 6.63 per cent.[134]

The remainder of Table 5.5 shows the average imputed rent components of older people compared to non-older adults. It illustrates the importance of imputing a rent to owner-occupiers and the differential effect of outright ownership on the values of home services received. Net imputed rent levels are similar across older-age groups, suggesting that even though 12.7 per cent of younger old people are owner-purchasers, their levels of mortgage debt are not high. However, in comparison, net imputed rent for non-older adults is around 4 times lower than older people driven by an approximately 7-fold increase in mortgage interest payments compared to older people. The other housing costs associated with repairs and maintenance, home building insurance, general council rates, sewerage and water rates, and strata and body corporate fees are at similar levels across all age groups.[135/136]

5.3.3 Annuitising wealth components – $(\boldsymbol{nhw})$ and $(\boldsymbol{hw})$

The need to account for the role of wealth in affecting consumption possibilities and broadening an understanding of economic living standards is apparent in Figure 5.4. It presents the quintile distributions of income and wealth, signifying the relationship between the two and the differential impact of age on income-wealth patterns. In Figure 5.4a the overall adult Australian population (15 years and over) is divided into five equal groups based on equivalent disposable income. Along the x-axis, quintile 1 represents those with incomes in the lowest 20 per cent of the disposable income distribution, while conversely quintile 5 represents those with incomes in the highest

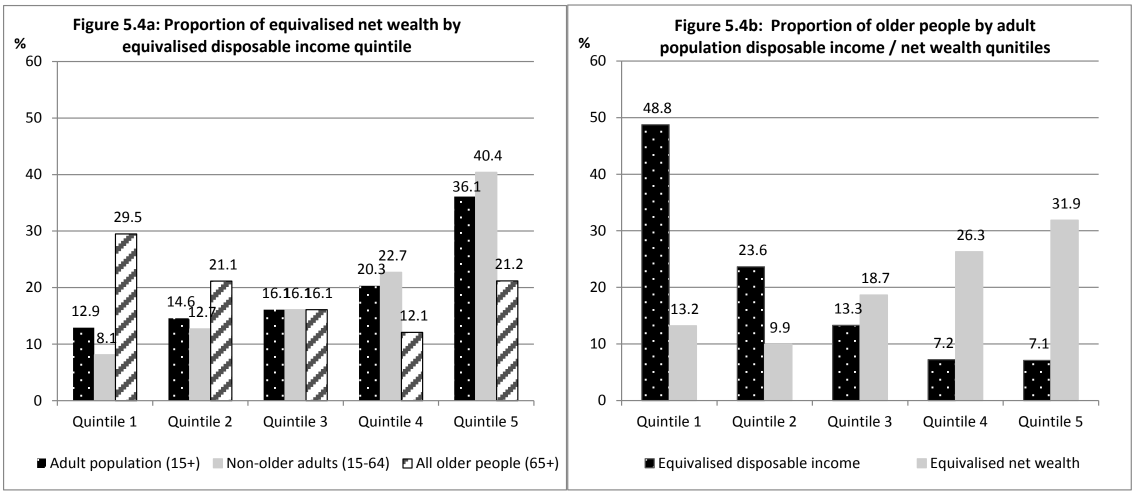
[134] It refers to the discounted bank rate averaged over 2010, sourced from RBA Statistical Table, 'F5 Indicator Lending Rates' (summarised in Table C.2 in Appendix C.2).

[135] These results are not directly comparable with imputed rent estimates produced by the ABS (2011d: Table 18) as the ABS estimates are household weighted (hence un-equivalised). However, as a rough approximation, for outright owners the ratio of mean net imputed rent to mean gross imputed rent from Table 18 of 0.75 ($251/$333 per week) is very close to the calculation based on household weighted mean net and gross imputed rent estimates produced from the imputation process used in this thesis ($15,298/$21,185 = 0.72).

[136] It should be noted that in applying the housing costs, it has not been possible to make an allowance for rate offsets for Pensioner Concession card holders. This can potentially reduce the housing costs of pensioners.

20 per cent of the distribution. The proportions of equivalised wealth held in each equivalised disposable income quintile for all adults, non-older adults and older people is charted.[137] In Figure 5.4b income and wealth quintiles are derived separately based on the equivalised disposable income and equivalised net wealth distributions for the adult population, with the proportions of older people in each quintile charted.

Figure 5.4 Quintile distributions of wealth and income (%)



Source: Author's calculations based on imputations from HILDA Wave 10 Release 10.
Weights: Cross-sectional responding person population weights for 2010.
Equivalence scale: Modified OECD equivalence scale.

The pattern in Figure 5.4a shows that net wealth is positively associated with income for the non-older adult population. Those in the highest income quintile hold a high percentage of total net wealth (approximately 40 per cent).[138] This positive relationship between income and wealth is not duplicated for older people. Those in the two lowest income quintiles have disproportionately higher shares of total net wealth (29.5 per cent and 21.1 per cent respectively) compared to the remaining income quintiles. The results support Creedy and Tan (2007) and Bradbury's (2010) assertion of a group of low income-high wealth older Australians.

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[137] This is calculated using the equivalised wealth values for each income quintile by age group and then estimating the proportion based on the total equivalised wealth values.

[138] To understand this further, in Table C.3 in Appendix C.2 the mean values by income and wealth quintile are listed. The mean net wealth value in the highest wealth quintile is almost three times the mean net wealth value of those in the second highest wealth quintile ($1,269,582 to $442,800) but nearly eleven times the mean net wealth value of those in the second lowest wealth quintile ($1,269,582 to $115,627). The corresponding ratios based on income quintiles are much less drastic. The ratio between quintile 5 and 4 is 1.7 ($88,815 to $53,597) and between quintile 5 and 2 ($88,815 to $29,807) is nearly 3.

Figure 5.4b provides further evidence of the differential wealth position of older people compared to their position using an income paradigm only. The pattern based on disposable income suggests an over-representation of older people in the lower income quintiles compared to the adult population with close to half (48.8 per cent) with incomes amongst the lowest 20 per cent of the adult population and only 7.1 per cent in the top income quintile.

The pattern however, is reversed using wealth. There are lower proportions in the lowest net wealth quintile and close to a third (31.9 per cent) of older people with net wealth amongst the highest 20 per cent of the adult population. The patterns of income and wealth distribution for older people corroborates the conclusion reached in the literature of wealth accumulation over the life course accompanied by a decrease in incomes post-retirement for majority of older people (ABS, 2011e).

To understand the nature and composition of wealth, Table 5.6 presents the proportionate share and dollar value of different asset and debt classes. Across the population, a substantial part of net wealth is held in the home asset. For older people it is around 50 per cent and increases with age. Although the proportion of the gross mean value of homes is similar across the two age groups (last 2 columns), non-older adults have much higher mortgage debt levels and consequently much lower home equity shares (approximately 40 per cent).

The second largest asset class is superannuation particularly amongst younger-old people (64-74 years) and non-older adults contributing 18.7 per cent and 22.3 per cent respectively to overall wealth. The former are more likely to be in the workforce than older old people (75 years and over) and be among the early beneficiaries of the Superannuation Guarantee Scheme (SGS) introduced in 1992.[139] The mean net wealth value of older people is approximately 1.5 times that of non-older adults. However, there is a large discrepancy in the wealth position amongst older people. Younger old people (64-74 years) have a much higher overall wealth portfolio compared to any of the other age groups. Their overall mean net value ($685K) is 38 per cent more than

[139] The SGS consists of a mandarory employer contribution based on a percentage of employee earnings to a private pension plan with the individual bearing all or some of the investment risk.

that of older people aged between 75-84 years ($496K) with high proportions of wealth in non-housing real estate and superannuation.

Table 5.6 Share of mean value of equivalised net wealth (%) (mean $'000 in parentheses)

Years	65 - 74		75 - 84		85+		All older people (65+)		Non-older adults (15-64)		Adult population (15+)	
	(%)	($)	(%)	($)	(%)	($)	(%)	($)	(%)	($)	(%)	($)
Assets												
Home	46.8	(320)	57.6	(286)	60.3	(267)	50.8	(303)	55.4	(214)	54.4	(228)
Other property	14.2	(97)	9.7	(48)	8.2	(36)	12.5	(74)	20.3	(78)	18.5	(76)
Business	3.3	(22)	2.7	(13)	2.7	(12)	3.1	(18)	8.9	(35)	7.6	(32)
Liquid	8.3	(57)	11.3	(56)	14.4	(64)	9.6	(57)	7.5	(29)	8.0	(33)
Financial	10.0	(69)	10.7	(53)	8.1	(36)	10.1	(60)	6.6	(25)	7.3	(31)
Superannuation	18.7	(128)	7.0	(35)	5.0	(22)	14.9	(89)	22.3	(86)	21.2	(89)
Other wealth	2.8	(19)	2.2	(11)	2.1	(9)	2.6	(15)	4.7	(18)	4.2	(18)
Liabilities												
Mortgage debt	1.4	(10)	0.6	(3)	0.2	(1)	1.1	(7)	15.1	(58)	12.0	(50)
Non-mortgage	2.6	(18)	0.7	(4)	0.6	(3)	1.9	(12)	11.4	(44)	9.3	(39)
Total net wealth	100	(685)	100	(496)	100	(443)	101	(596)	99	(386)	100	(418)
n		1,208		736		181		2,125		11,320		13,445

Source: Author's calculation based on HILDA Wave 10 Release 10.
Weights: Cross-sectional responding person population weights for 2010.
Equivalence scale: Modified OECD equivalence scale.
Notes: (a) Explanation of certain wealth components are: liquid (bank accounts, cash and life insurance); financial (equity investments and trust funds); other wealth (collectives and vehicles); and non-mortgage debt (debt associated with business, other property, credit cards, personal and overdue household bills). (b) % columns may not equal 100 because of rounding.

In summary, Figure 5.4 and Table 5.6 indicate three findings that corroborate previous Australian research about wealth holdings and the relationship between income and wealth (Bloxham and Betts, 2009; Bradbury, 2010; Colic-Peisker et al., 2010; Creedy and Tan, 2007; Finlay, 2012; Frick and Headey, 2009; Harding et al., 2002; Headey et al., 2005; Kelly, 2009).[140] The first is that although income and wealth are positively correlated there is a group of older Australians who have low income but high wealth. The second is that pattern of older people's income and wealth distributions are inverse to that of non-older adults. While older people have lower incomes compared to the non-adult population, they have much higher wealth holdings.

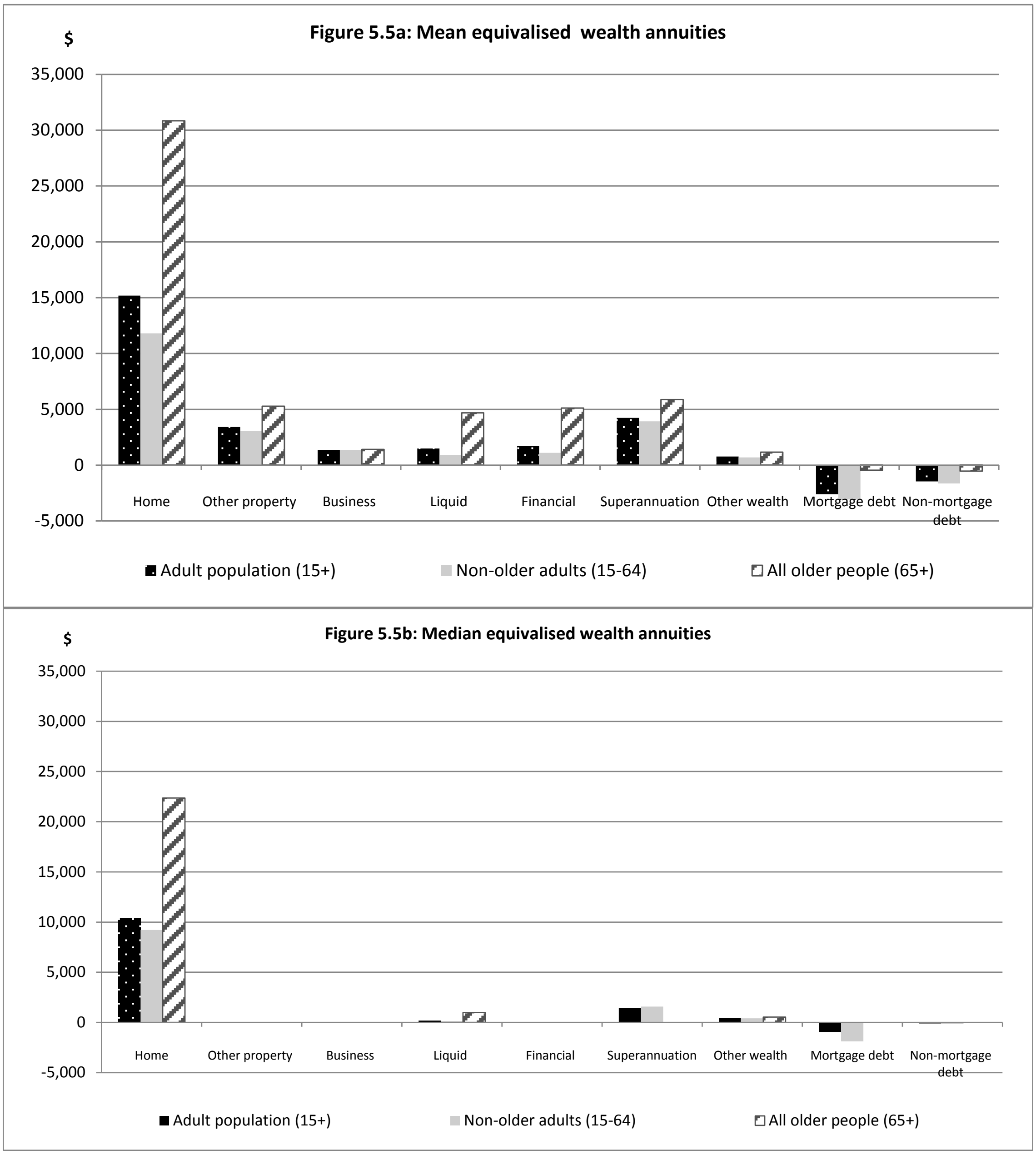
[140] Wealth and income inequality is not explicitly analysed in this thesis though it is inferred from the comparisons of quintile 5 to quintile 1 for both economic resources. However, Australian studies by Finlay (2012), Bloxham and Betts (2009) and Headey et al. (2005) report that wealth is more unequally distributed compared to income. For example, Headey et al. (2005) using HILDA 2002 data report that the bottom 50 per cent of the wealth distribution own less than 10 per cent of total household net wealth and the top 5 per cent own 31 per cent of total net wealth.

The third finding is that, at an aggregate level, the housing asset is the most common type of asset held for the majority of the population and is the main vehicle of savings. The composition of the remaining wealth portfolio differs by age. Non-older adults and younger old people (65-74 years) have higher proportions invested in superannuation and in non-financial assets in the form of other real estate property. Older old people (75 years and over) have higher proportions held in trust funds, equity investments and in liquid form through bank deposits and insurance policies. The analysis reinforces the need to jointly account for income and wealth in any economic living standards measures and further to that, the need to explore mechanisms to incorporate the equity held in the home within an income paradigm.

As discussed in Chapter 4 (Equation 4.7), the annuity method involves estimating a stream of annual payments which are equal over time and fully exhaust the stock of initial wealth at the end of the lifetime of the household (Weisbrod and Hansen, 1968; Wolff and Zacharias, 2009). The annuity period for the household is determined using the age and gender of the youngest adult in the household in 2010 using ABS life expectancy tables (ABS, 2011f). RBA rates of return are applied according to the nature and risk level of each wealth component (refer to Table 4.7, Section 4.4). This annuity is then added to disposable income to obtain an augmented measure of household income after property income is first subtracted from current money income so that there is no double counting of the returns from household wealth.

The impact of including wealth annuities is illustrated in Figure 5.5 (mean and median annuity values are listed in Table C.4 in Appendix C.2). The age-related implications of wealth annuitisation on economic living standards are evident in the differential bar heights in Figure 5.5a. Mean annuity values are higher across all asset components, except for business assets, for older people than non-older adults. They are at least 2.5 times higher for home, financial and liquid assets, and around 1.5 times higher for the remaining asset classes (superannuation, other property and other wealth). In contrast, mean debt annuity values are much lower; around 3 times less for non-mortgage debt and over 6 times less for mortgage debt.

Figure 5.5 Wealth annuities (mean $ value per annum)



Source: Author's calculations based on imputations from HILDA Wave 10 Release 10.

Apart from the home and liquid asset, the differences between older and non-older adults using median annuity values are much less stark (Figure 5.5b). Although the dollar values are not high, liquid asset median values are more than 6 times higher for older people than non-older adults. Across the population median annuity values are zero for other property, business and financial assets. The median superannuation annuity value of zero for older people reflects a cohort effect with most older-old people in the workforce before the implementation of the Superannuation Guarantee Scheme.

The high annuity values for older people in comparison to non-older adults are not unexpected because of the higher overall levels of wealth held by older people, particularly in relation to outright home ownership. It is also not unexpected because the construction of the annuity formula provides a higher annuity value to persons with shorter remaining life expectancies.[141] Hence higher weights are attached to older people versus younger people and males versus females, due to females' longer life expectancies (OECD, 2009a). Another potential factor pointed out by Radner (1990) (although not explored here) is that wealthier people tend to live longer, hence, using expected remaining lifetime population-based norms understate the life expectancies of older wealthier people, allocating them a higher per annum wealth annuity.

5.4 Relationship between the ELS metrics

Before embarking on a demographic analysis of the ELS metrics, this brief section investigates if the empirical evidence supports the conceptual rationale for an expanded economic resources approach. Table 5.7 presents the proportions of the different economic resource components, which contribute on average, to the ELS metrics and Table 5.8 the pair-wise correlation coefficients between the metrics for non-older adults and older Australians.

[141] As a rough and imperfect calculation, the ratio of net housing wealth for older people compared to non-older adults is 1.90 ($296K to $156K mean values respectively). The ratio of the net housing wealth annuity is 3.48 ($30,349 to $8,721 mean values respectively). The remaining annuity multiplier, which is a function of the annuity period is therefore 1.83 (3.48/1.90), suggesting that both higher housing values and the shorter annuity term contribute almost equally to the overall higher housing annuities for older people.

Table 5.7 Contribution of economic resource components to ELS metrics (%)

	All older people (65+)				Non-older adults (15-64)			
Economic resource components (%)	***dy***	***fy***	***pc***	***apc***	***dy***	***fy***	***pc***	***apc***
Mean ELS metrics $ p.a.	31,047	55,143	65,799	82,958	48,618	60,703	66,063	70,379
Disposable income *(dy)*	100.0	56.3			100.0	80.1		
Disposable income - property income *(dy-pi)*			28.6	22.7			67.5	63.4
Net imputed rent *(nir)*		13.5	11.3			2.9	2.6	
Social transfers in-kind *(sti)*		30.2	25.3	20.1		17.0	15.7	14.7
Non-home wealth *(nhw)*			34.8	27.6			14.2	13.3
Home wealth *(hw)*				29.6				8.6
Total (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: HILDA Wave 10 Release 10.
Weights: Cross-sectional responding person population weights for 2010. Weighted sample: 13,445.
Notes: Proportions are based on equivalised mean values for each economic resource component.

A consequence of the additive nature of the ELS approach is the decrease in proportions of the preceding components with each successive ELS metric. Hence, it is more useful to contrast the contributions across the two age-groups, rather than across the ELS metrics. The results in Table 5.7 reflect the different life-cycle circumstances of both age groups that have been discussed so far in previous chapters. Disposable income (including accounting for investment property income) constitutes a much lower fraction of the economic living standards for older people than non-older adults for the fy, pc and apc metrics. For non-older adults with existing pre-retirement reliance on the labour market for earnings and still on the trajectory towards asset accumulation, the benefits from wealth accumulation is under 25 per cent (pc and apc metrics). In contrast, home and non-home wealth contribute approximately 50 per cent to the measured economic position of older people.

In Table 5.8 the varying range in values across the correlation coefficients from 0.494 to 0.968 demonstrates that an individual's economic standard of living is highly sensitive to which economic resource components are included in analysis measures. The high correlation between disposable income and full income for both age groups is understandable as full income includes disposable income as its major component (contributing 56.3 per cent for older people and 80.1 per cent for non-older adults from Table 5.7). Also understandable is the high correlations between potential consumption and adjusted potential consumption, as the deductions of nir, before replacement with the hw annuity, are relatively small (11.3 per cent for older people and 2.6 per cent for non-older adults).

Table 5.8 Correlations between ELS metrics

	All older people (65+)				Non-older adults (15-64)			
Correlation coefficients	***dy***	***fy***	***pc***	***apc***	***dy***	***fy***	***pc***	***apc***
Disposable income *(dy)*	1.000				1.000			
Full income *(fy)*	0.949*	1.000			0.968*	1.000		
Potential consumption *(pc)*	0.603*	0.691*	1.000		0.814*	0.844*	1.000	
Adjusted potential consumption *(apc)*	0.494*	0.654*	0.936*	1.000	0.806*	0.838*	0.992*	1.000

Source: HILDA Wave 10 Release 10.
Weights: Cross sectional responding person population weights for 2010. Weighted sample: 13,445.
Note: Pearson correlation coefficients significant at ρ < 0.001***. Null hypothesis of is no linear relationship between each pair of variables. Standard errors calculated assuming simple random sampling.

However, correlations between the remaining combination of metrics, that is between dy and pc/apc and between fy and pc/apc, are lower for non-older adults (approximately 0.80 to 0.85) and substantially lower for older people (approximately 0.50 to 0.70). These correlations suggest that the addition of economic resource components, particularly wealth, is capturing something quite distinctive that is not necessarily linked to disposable income. It is not the same individuals who perform well across the ELS metrics. The two sets of results provide cursory evidence substantiating the necessity for adopting a broader economic resource perspective and understanding the variation in ELS estimates by demographic characteristic.[142]

5.5 Demographic analysis of the ELS metrics

The ELS metrics are analysed using income statistics that are implicitly relative in nature; the measured economic position of older Australians is compared relative to the entire adult population and to the non-older adult population. Summary statistics are provided through comparisons of median estimates; distributional analysis is provided through profiling the incidence of demographic groups by quintile distribution compared to non-older Australians; and a measure of disadvantage is

[142] As discussed, it is possible to also extend the approach to look at patterns over time and across country in addition to by demographic profile.

provided through relative poverty rates.[143] For the sake of brevity, analysis is contained to key demographic characteristics and not the full list included in Section 5.2.

5.5.1 Median economic resource estimates and relative rates

Table 5.9 presents median equivalised household er estimates with two forms of relative ratios: older people compared to all adults (shaded top panel) and demographic sub-groups of older people compared to all older people. The relative rates are calculated by indexing each cell in the table to a reference cell; for the shaded top panel the reference cells are the median estimates of all adults (15 years and over) and for the unshaded bottom panel, the reference cells are the median estimates of all older people (65 years and over).[144]

The results in the top panel reveal the considerable improvement in the overall economic position of older people with each ELS metric. Against the disposable income metric, older people have incomes that are slightly less than 60 per cent of non-older adults. However, there is over a 1.5-fold increase in this fraction from dy to fy and pc and over a 1.8-fold increase once annuitised home wealth is included in the apc metric. An increase in absolute dollar terms for all age groups with each ELS metric is expected, particularly if wealth equity is positive, given the additive nature of the approach.

[143] The choice of statistics is guided with reference to the first two of the three comparative techniques put forward by Quinn's (1987: 64) evaluative framework for older people: 'compared to others in society', 'compared to some fixed standard of adequacy', and 'compared to the individuals themselves at an earlier time'. The last approach although important is not discussed here as it sits outsides the scope of the thesis.

[144] The Kruskal Wallis test is a non-parametric generalised form of the Mann-Whitney test applicable for comparison across two or more sample groups. It statistically tests for the difference in medians across demographic groups for each metric. The test is limited as it cannot appropriately account for weighting and stratification of the sample to the population (note, the median estimates are weighted appropriately). Hence, interpretation of the statistical significance is treated with caution.

Table 5.9 Median equivalised economic resource estimates and relative rates

		Median ($)				Ratio			
Population sub-groups	**(n)**	***dy***	***fy***	***pc***	***apc***	***dy***	***fy***	***pc***	***apc***
Adult population (15+)	13,445	40,461	54,436	57,756	62,708	1.00	1.00	1.00	1.00
Non-older adults (15-64)	11,320	43,154	55,506	58,571	62,174	1.07	1.02	1.01	0.99
All older people (65+)	2,125	24,400	49,209	52,341	66,643	0.60	0.90	0.91	1.06
		***	***	***	***				
		Older people demographic sub-groups							
Older age groups									
65 - 74 years	1,208	26,690	47,998	50,081	61,181	1.09	0.98	0.96	0.92
75 - 84 years	736	21,481	49,478	52,978	70,930	0.88	1.01	1.01	1.06
85+ years	181	23,901	53,955	62,451	82,998	0.98	1.10	1.19	1.25
		***	**	***	***				
Gender									
Male	959	25,319	49,541	53,081	65,853	1.04	1.01	1.01	0.99
Female	1,166	23,541	49,066	51,566	67,099	0.96	1.00	0.99	1.01
		***	*	*					
Birthplace									
Australian born	1,498	25,235	50,604	54,804	68,332	1.03	1.03	1.05	1.03
English speaking	310	25,174	49,246	54,505	67,818	1.03	1.00	1.04	1.02
Non-English speaking	316	20,853	45,585	47,196	59,691	0.85	0.93	0.90	0.90
		***	***	***	***				
Educational attainment									
Degree or higher	269	36,761	62,452	71,217	85,388	1.51	1.27	1.36	1.28
Vocational qualification	607	25,784	50,848	54,108	69,508	1.06	1.03	1.03	1.04
Year 12	151	23,347	50,087	55,504	65,601	0.96	1.02	1.06	0.98
Year 11 or below	1,094	22,000	46,935	49,353	61,283	0.90	0.95	0.94	0.92
		***	***	***	***				
Marital status									
Married/de-facto	1,244	25,339	50,831	53,956	67,196	1.04	1.03	1.03	1.01
Separated/divorced	256	24,457	47,124	48,216	58,778	1.00	0.96	0.92	0.88
Widowed	549	22,299	48,268	51,037	67,233	0.91	0.98	0.98	1.01
Not married/not de-facto	75	21,852	48,989	53,081	73,031	0.90	1.00	1.01	1.10
		***	***	***	***				
Household type									
Couple only	1,143	24,000	50,064	53,956	69,799	0.98	1.02	1.03	1.05
Lone person	684	19,000	43,869	48,286	67,465	0.78	0.89	0.92	1.01
Family household	262	34,119	53,732	54,919	59,465	1.40	1.09	1.05	0.89
Shared household	36	25,371	47,861	47,241	52,766	1.04	0.97	0.90	0.79
		***	***	***	***				
Housing tenure									
Own home	1,529	25,037	51,654	56,477	74,240	1.03	1.05	1.08	1.11
Paying mortgage	179	30,842	51,520	51,434	63,167	1.26	1.05	0.98	0.95
Renting private	130	21,304	39,291	39,802	39,802	0.87	0.80	0.76	0.60
Renting public	178	18,533	38,567	39,411	39,411	0.76	0.78	0.75	0.59
Rent free	91	21,705	40,903	45,354	45,354	0.89	0.83	0.87	0.68
		***	***	***	***				
Employment status									
Employed full-time	79	43,025	60,540	83,303	94,385	1.76	1.23	1.59	1.42
Employed part-time	150	36,760	61,205	78,247	96,488	1.51	1.24	1.49	1.45
Retired	1,819	23,200	48,307	50,934	63,834	0.95	0.98	0.97	0.96
Other	74	27,083	49,979	54,571	65,966	1.11	1.02	1.04	0.99
		***	***	***	***				
Pensioner status									
Pensioner	1,738	22,467	47,124	49,704	61,359	0.92	0.96	0.95	0.92
Non-Pensioner	387	42,100	70,414	91,616	108,749	1.73	1.43	1.75	1.63
		***	***	***	***				
Remoteness area									
Major city	1,239	25,365	51,586	54,285	69,680	1.04	1.05	1.04	1.05
Regional Australia	858	22,227	46,027	49,778	60,258	0.91	0.94	0.95	0.90
Remote Australia	28	20,333	49,088	63,790	96,488	0.83	1.00	1.22	1.45
		***	***	***	***				

Source: Author's calculations based on imputations from HILDA Wave 10 Release 10, ABS SIH/HES 2009-10.
Weights: Cross-sectional responding person population weights for HILDA (2010).
Equivalence scale: Modified OECD equivalence scale.
Note: Kruskal Wallis test of significant difference in medians at ρ < 0.05*, 0.01** and 0.001***. Standard errors calculated assuming simple random sampling.

It is the inclusion of annuitised home wealth, however, that is the catalyst increasing the measured relative economic position of older people compared to non-older adults and the adult population. Without taking into account the capital value of the home (as in the pc metric), the largest contributors to wealth portfolios across the older age spectrum are superannuation and real estate property. However, the consequence of high rates of outright home ownership amongst the majority of older Australians means that adding the annuitised value of home wealth considerably improves the median ratio for all older people from 0.91 (pc metric) to 1.06 (apc metric).

The profiling of specific sub-groups of older people with lower or higher disposable income-based living standards than the group as a whole (bottom panel results) supports the generalised conclusions reached in the economic literature (as discussed in Chapter 2). Against dy, specific sub-groups with median ratios marginally lower than all older people are: the very old (85 years and over); older females; those with a year 12 qualification; couple households; retirees/pensioners; and those living in regional Australia. Demographic sub-groups lower by 10 percentile points or more are: people aged 75-84 years; those born in non-English speaking countries; early school leavers; unmarried or widowed old people; lone person householders; renters; and those living in remote Australia. There is an obvious correlation in these results related to gender and age; females live longer and consequently are more likely to be widowed, live alone, have retired from (or never been attached to) the workforce and are, therefore, more dependent than males on income received from the Age Pension to maintain their standard of living.

In contrast, groups with relative dy rates 5 or more percentile points higher are: younger older people (65-74 years); tertiary educated; those living with relatives; mortgagees; employed older people; and non-pensioners. The results from Table C.1 (Appendix C.2) suggest that older people in family households have higher equivalised disposable incomes because they live in households with working-age income-producing relatives. The two largest sub-categories within family households for all older people are couple households with non-dependent children and lone parent households with non-dependent children (8.5 per cent and 7.1 per cent respectively).

It is worth mentioning that the relative higher dy position for many of the demographic groups mentioned in the previous paragraph describe substantial proportions of non-pensioners. The profile of older non-pensioners in Table C.5 (Appendix C.2) indicates that they are more likely to be younger old people (74.8 per cent), with close to 60 per cent having obtained a vocational or tertiary qualification and higher proportions (35.1 per cent) still in the workforce compared to older pensioners. A higher rate for non-pensioners is expected given that the income-asset (means) testing for the pension excludes those with higher economic resources. Table C.5 shows that in addition to higher income levels, wealth levels are substantially higher, around 3.5 times that of pensioners, with larger proportions of wealth stemming from investments in non-home property, financial assets and through superannuation. Hence, their sustained advantageous relative economic position when the fy, pc, apc metrics are applied.

What is the pattern for the remaining demographic sub-groups when the ELS metrics extend beyond dy? The effect of net imputed rent and social transfers in-kind embodied within the fy metric is to diminish differences in the relative economic positions within demographic categories. That is, groups with higher dy rates have lower increases to fy than groups with lower dy rates, bringing fy estimates closer to the median fy estimate for all older people. It is the inclusion of annuitised non-home wealth and further to that home wealth that provides stark differences in the relative economic position of certain groups and indicates different conclusions than would otherwise be reached if only dy is used to measure the economic standard of living.

Gender differences, evident with dy estimates, diminish and are not as significant. The relative economic position of outright home owners improves consistently along the continuum of ELS metrics, while that of older renters and mortgagees declines. The relative median rate for private and public renters in the apc metric is reduced to approximately 60 per cent of all older people. The gain of relatively higher disposable incomes of younger-old people who form the majority of mortgagees (evident in Table

C.6 in Appendix C.2), is diminished compared to older old people (75 years and over) once mortgage debt is taken into account. Hence, younger old people (65-74 years) are in a worse relative economic position than the total group (from dy = 1.09 to apc = 0.92). Conversely, older old people are comparatively better off achieving ratios well-above parity (from dy = 0.98 to apc = 1.25). The economic position of older people living in remote Australia also improves considerably once wealth is included, with approximately a 22 percentile increase from fy to pc and pc to apc.

The two relationship variables (marital status/household type) indicate that the addition of economic resources lowers the relative fy, pc and apc rates for separated/divorced older people and older people in family or shared households, but increases it for single older people (not married/not de-facto or widowed) and lone person households. Disentangling these results is complicated as the categories across the demographic groups although distinct, obviously overlap (the composition of household type by marital status is presented in Table C.7 in Appendix C.2). The pattern of results for separated/divorced and widowed older people is understandable as it reflects the relationship consequences of asset ownership/division over the life course, particularly the impact of home ownership. It also explains the higher rates for lone person households as their measured economic resources are weighted upwards – two-thirds are widowers and close to 10 per cent are not married/not de-facto.

For both family and shared households, income, wealth and social transfers in-kind are dependent on and distributed amongst other related or non-related members. Their measured relative economic position is, therefore, a reflection of the life-cycle accumulation of wealth and income both of older individuals themselves and the remaining members. As discussed above, the largest group of household members are non-dependent children. The income gains from including the disposable income of working-age members dissipates once the comparative value of their wealth (or lack of) is also taken into account. What is clear though, is the advantageous position of older people in relationships or in older couple households, the former maintaining ratios above parity and the latter increasing the ratios from below parity to above parity (pc = 1.03) and (apc = 1.05).

In summary, the results from Table 5.9 provide an initial overview of the impact a broader approach to measuring economic living standards has on the substantive conclusions about older Australians. While comparisons of disposable income support the proposition that older people are disadvantaged compared to the population, the argument is weakened as the economic resource metrics are expanded to include publicly provided services and wealth. This is true for older people as a group and for certain demographic sub-groups including older old people (75 years and over), outright home owners, older couples, widowed older people, lone person households, females and those living in remote Australia.

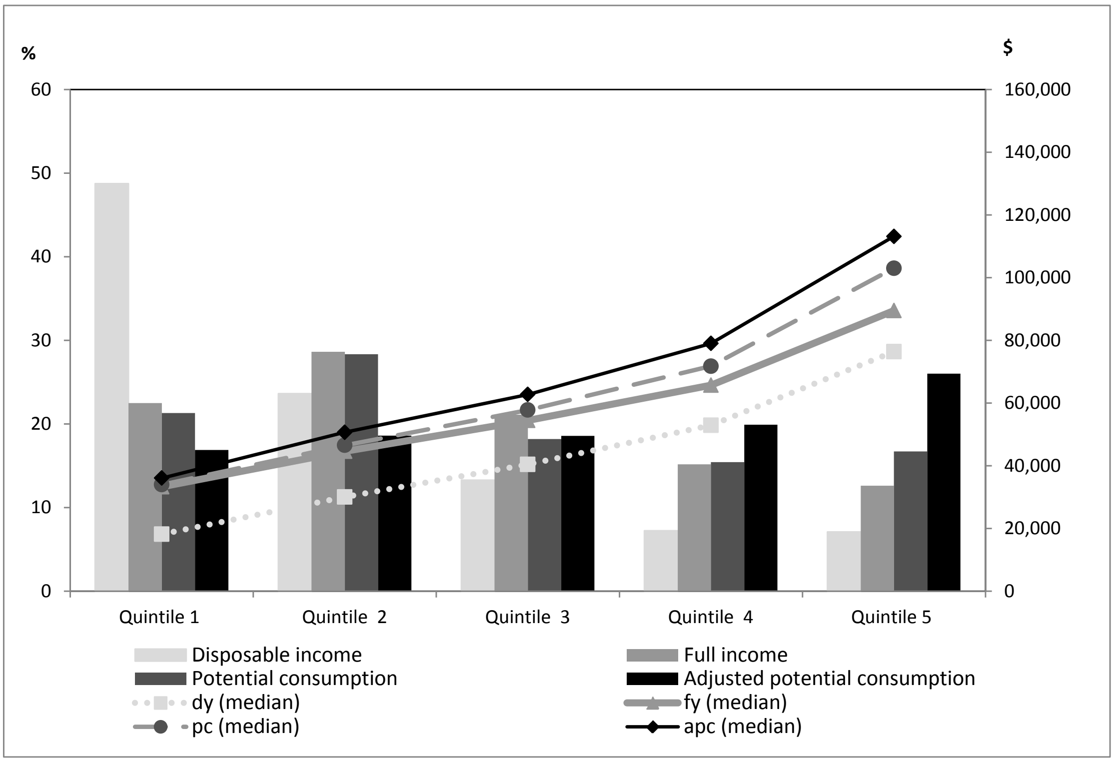
For certain sub-groups such as: separated/divorced older people; older people living in family and shared households; renters; and younger old people (65-74 years), it indicates a weaker measured relative economic position compared to all older people. Finally, the inclusion of expanded economic resources has no impact on the substantive conclusions drawn for the remaining demographic characterisations of older people included in Table 5.9. Hence, the following groups: non-English speaking older people; those without a vocational/tertiary qualification; pensioners; and those living in regional Australia maintain a weaker relative economic position irrespective of the ELS metric used:

5.5.2 Quintile distributions

To provide a more nuanced understanding of the consequence of the ELS approach on different sub-groups of older people at different points along the economic distribution, the quintile distribution of older people and sub-groups of older people is compared to the adult population for each ELS metric. As in Section 5.3.3, the adult population is divided into five equal groups (termed quintiles); the 20 per cent of the population with the lowest economic resource values are in quintile 1 and the 20 per cent with the highest economic resource values are in quintile 5. This is done for each of the four equivalised household economic resource metrics. Using the minimum and maximum thresholds for each quintile and for each economic resource metric, the proportion of older people and demographic sub-groups of older people in each of the quintiles is determined and compared to how above and below they are the 20 per cent (quintiles of the adult population).

The full set of results is set out in Tables C.8 to C.11 (Appendix C.3). Figure 5.6 is a condensed illustration of the results. The bars represent the proportions of older people in each quintile for each economic resource and the lines represent the median annual equivalised dollar figure for each quintile for each economic resource for the overall adult population.[145]

Figure 5.6 Distribution of older people by adult population economic resource quintile (bars %) and quintile median estimates for the adult population (lines $)



Source: Author's calculations based on imputations from HILDA Wave 10 Release 10, ABS HES 2009-10.
Weights: Cross-sectional responding person population weights for HILDA (2010).
Equivalence scale: Modified OECD equivalence scale.

The pattern of median equivalised estimates across the quintiles is different for each ELS metric (lines). For dy the average dollar amount in quintile 5 is four times the average dollar amount in quintile 1. The impact of fy is to automatically inflate the dollar estimates, however, the slope is slightly less steep, suggesting that including social transfers in-kind has an equalising effect on the quintile distribution. The ratios

[145] These are the dollar figures in the first line in Tables C.8 to C.11 in Appendix C.3.

between each quintile estimate are lower across all the quintiles for full income compared to disposable income,[146] and the median dollar amount of quintile 5 to quintile 1 is reduced from a ratio of 4.2 to 2.7. This is in keeping with studies showing that the inclusion of these resource types when measuring income reduces inequality, as non-cash benefits are predominantly ‘pro-poor’ (Callan and Keane, 2009: 65; Travers and Richardson, 1993; Verbist and Matsaganis, 2014).

Unlike the step change in median estimates along the distribution from dy to fy, the pattern is not repeated with the pc and apc metrics. The effect of including wealth annuities is to steepen the slope, leading to greater divergence between the economic value in the top 20 per cent of the distribution and the remaining 80 per cent of the adult population. The difference in the median dollar amounts between fy and pc in the bottom two quintiles is less than 5 per cent, compared to a difference of 9 per cent between fy and pc in quintile 4 and increasing to 15 per cent in quintile 5. The upwards bias in the positive relationship between income and wealth illustrated in Figure 5.4 (Section 5.3.3) is further substantiated in these findings however, the results also indicate the comparatively disadvantaged economic position of those with low levels of net wealth.

The position of older people along the quintile distribution changes noticeably depending on the ELS metric adopted (bars). Older people are disproportionately represented in the lowest 20 per cent of the distribution when conventional disposable income is used. More than 70 per cent are in the bottom 40 per cent and only 14 per cent share in the top 40 per cent of the overall disposable income distribution. With full income, the proportion in quintile 1 more than halves and the proportion in quintile 5 almost doubles compared to estimates using dy. The impact of wealth beyond that is to gradually shift the distribution of older people upwards to more closely resemble the quintile distribution of the adult population. The higher representation (26 per cent) of older people in the highest quintile using the apc metric is an indication of the high rates of outright home ownership for this age group.

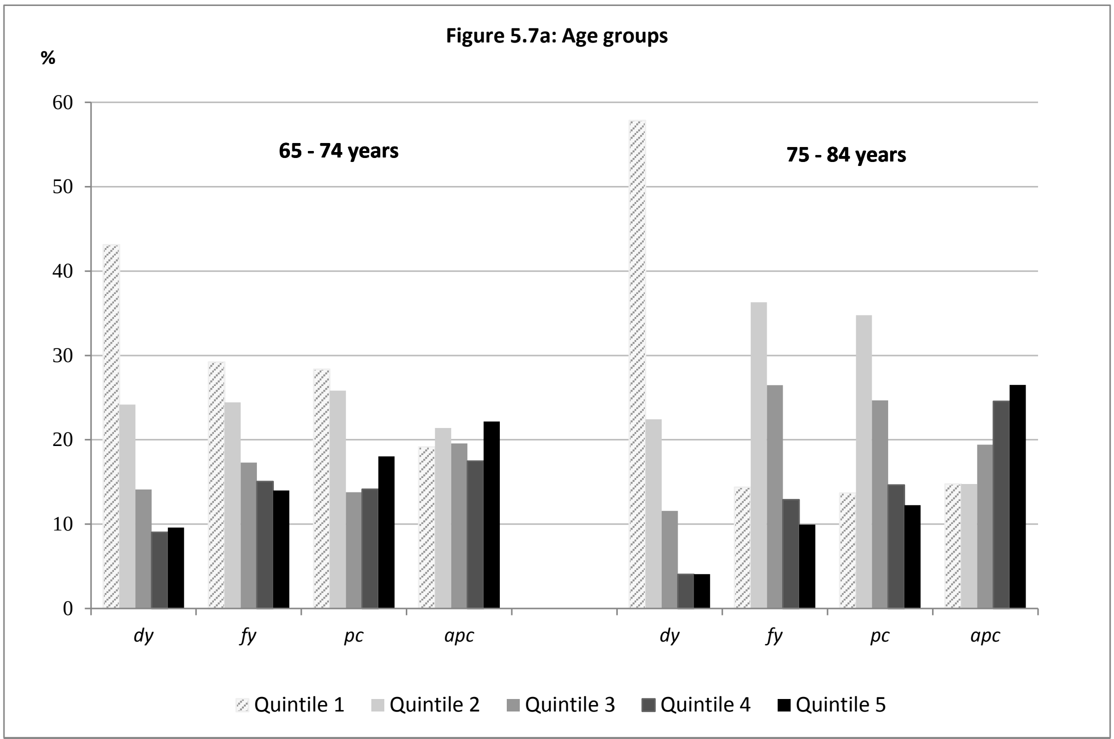
[146] This is simply calculated as the ratio of median estimates from q2 to q1, q3 to q2 and so on. The results for dy are q2/q1=1.7, q3/q2 = 1.4, q4/q3 = 1.3, q5/q4 = 1.4. The results for fy are q2/q1=1.3, q3/q2 = 1.2, q4/q3 = 1.2, q5/q4 = 1.4.

Figure 5.7 profiles the quintile distributions for a few key sub-groups of older people.[147] In Figure 5.7a, based on disposable income, the distribution of younger-old (65-74 years) people is skewed towards the bottom end, even though there are slightly lower proportions in quintile 1 (43.1 per cent) and slightly higher proportions in quintile 5 (9.6 per cent) compared to the overall older person group and age groupings 75 years and over. The impact of fy, pc and apc is to dissipate these large differences, bringing the proportions of younger-old people closer to the 20 per cent non-older adult representation in each quintile.

The scenario however is very different for older people aged between 75 to 84 years, for whom 8 out of 10 are in the bottom 40 per cent of the disposable income distribution. An expanded resource perspective not only reduces the proportion in the lowest quintile from over 50 per cent to around 14 per cent (irrespective of metric), it shifts more older people up the quintile distribution ranking so that once home wealth is included there are over 50 per cent in the top 40 per cent of the apc quintile distribution. The results are even more pronounced for the very old (85 years and over) as illustrated in Tables C.8 to C.11 in Appendix C.2.

[147] Specifically, disaggregation by gender, marital status, employment status and remoteness area are not included, as the changing pattern across the ELS metrics for categories within the sub-groups are fairly similar to that of all older people. The only exception is the irregular distribution for older people living in remote Australia. It is difficult to ascertain if this is due to the presence of outliers – a small group with very high wealth or as a consequence of the statistical unreliability for this group given the high relative standard errors from Table 5.3.

Figure 5.7 Distribution of sub-groups of older people by adult population economic resource quintile (%)



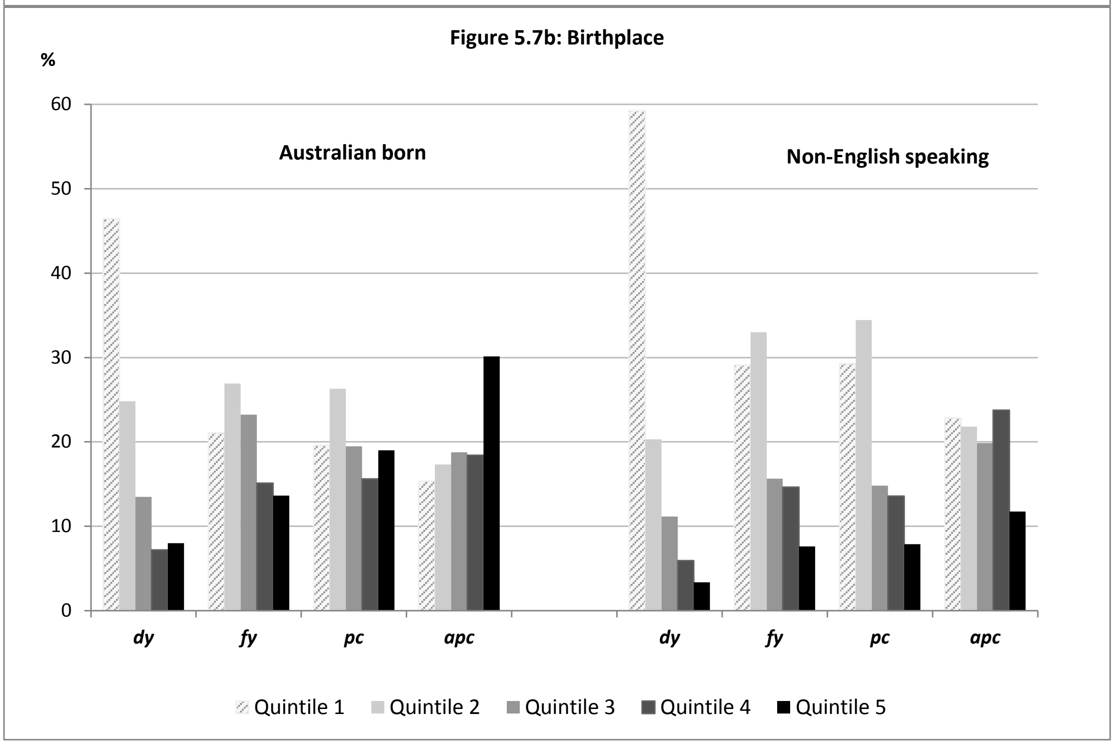


Figure 5.7c: Educational attainment

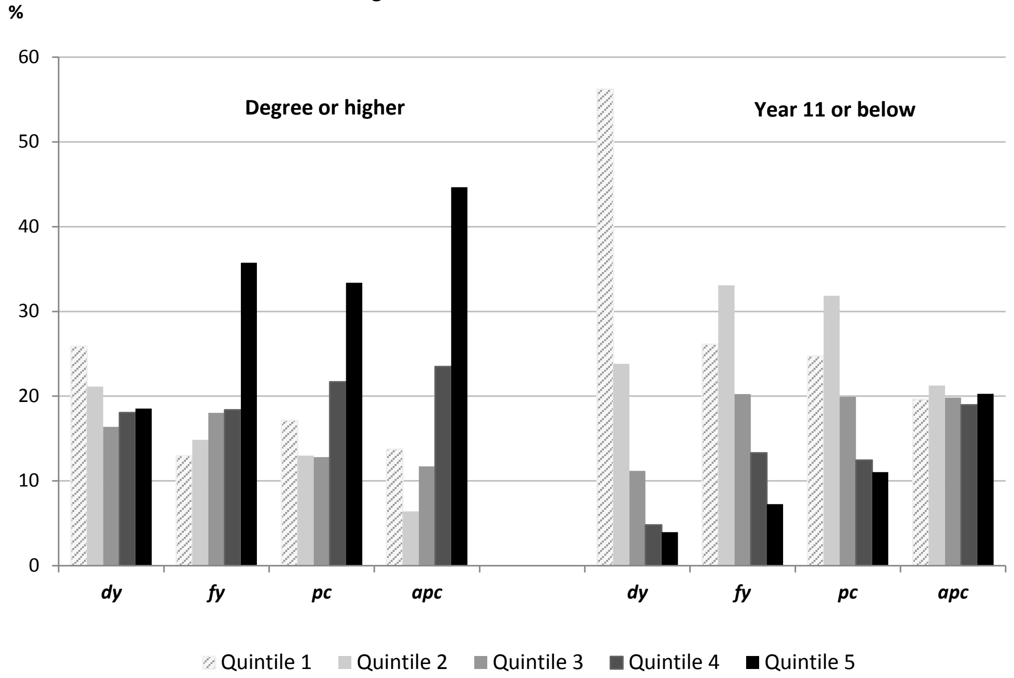
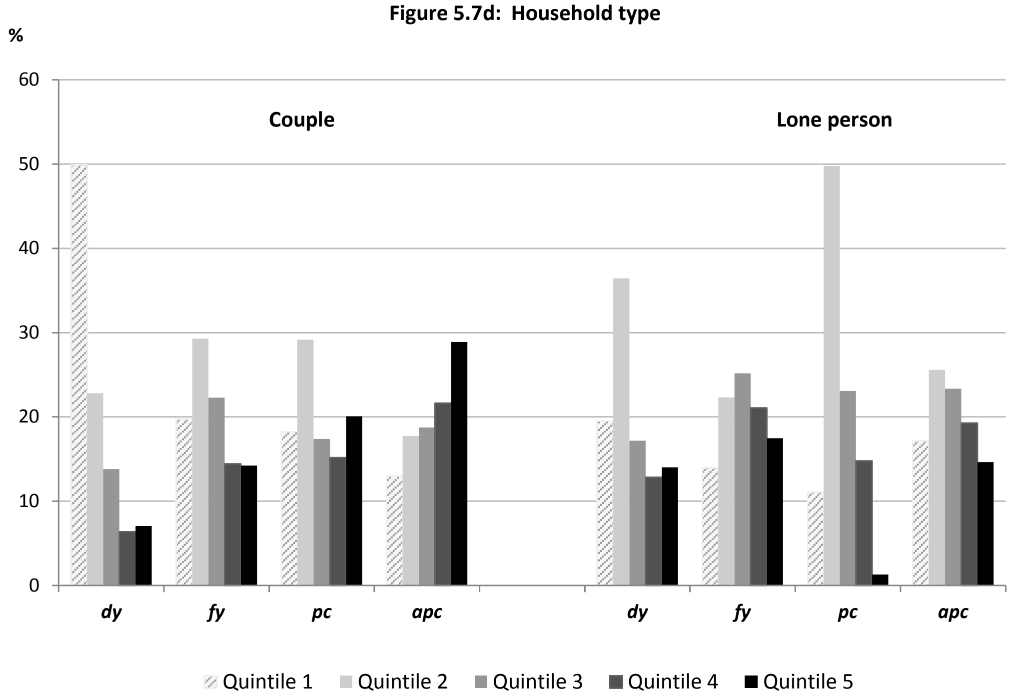
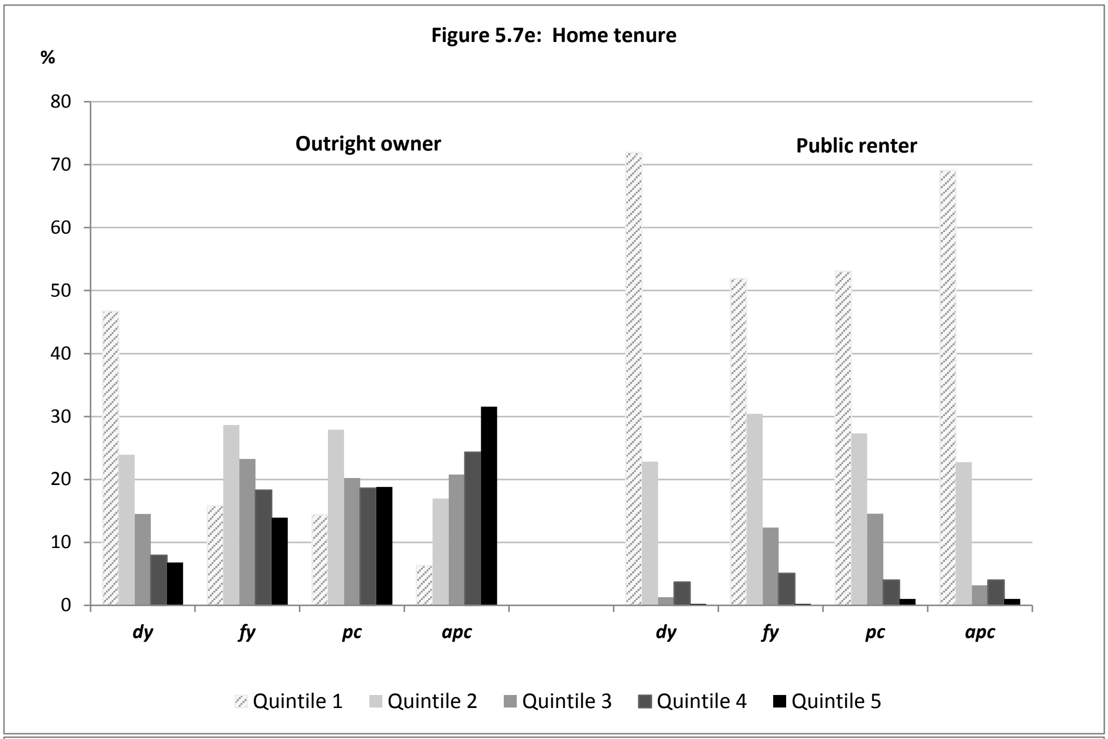
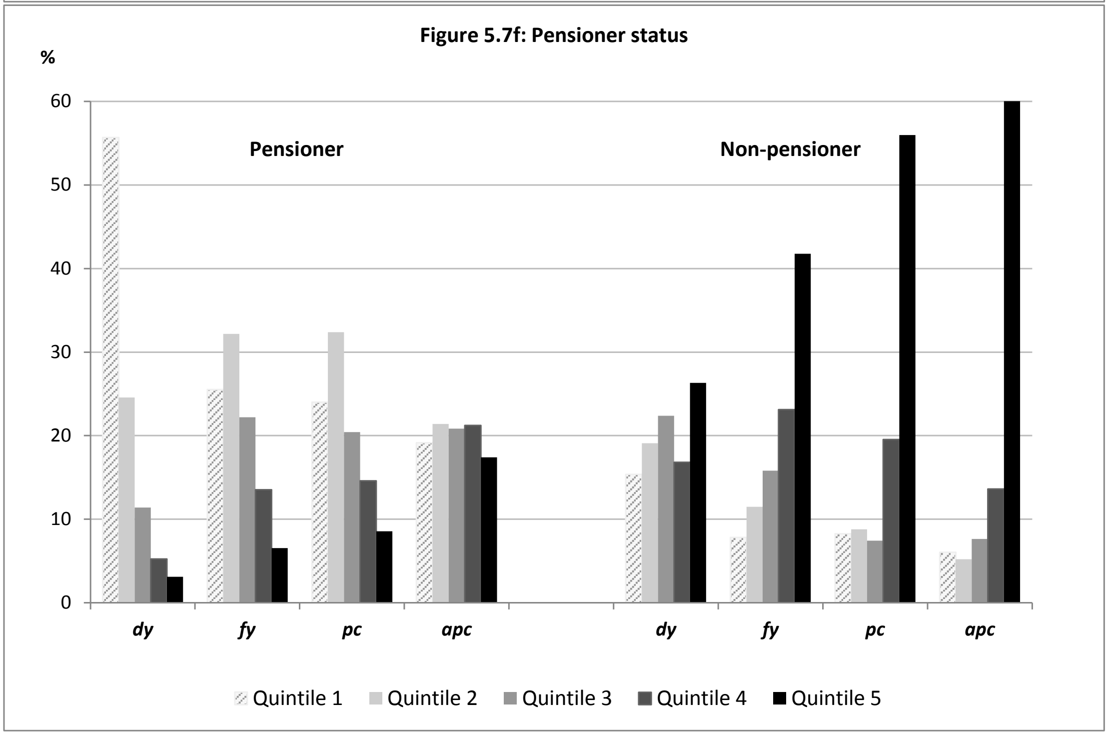


Figure 5.7d: Household type







Source: Author's calculations based on imputations from HILDA Wave 10 Release 10, ABS HES 2009-10.
Weights: Cross-sectional responding person population weights for HILDA (2010).
Equivalence scale: Modified OECD equivalence scale.

The distributional patterns in Figures 5.7b and 5.7c comparing place of birth and educational qualifications reflect the substantive findings using median relative rates in Section 5.5.1. That is, for those born in non-English speaking countries and tertiary qualified older people, both minority groups within the population of older people, the consequences of their backgrounds from many decades earlier in their life, continue to have a major impact later in life. Although an expanded economic resource perspective reduces the extent of distributional inequality when measured using dy, older people born in non-English speaking countries remain a disadvantaged population group. Despite the inclusion of non-home wealth, there are only 21.5 per cent in quintiles 4 and 5 based on pc compared to 22.3 per cent using fy. Conversely, for tertiary qualified older people, the ELS metrics illustrate the advantage conferred from the accumulation of wealth over a lifetime; approximately 33 per cent are in quintile 5 with pc and 45 per cent with apc.

The changing distributional pattern for older couple and lone person households (Figure 5.7d) with each ELS metric is similar, although more severe than comparisons between older old and younger old people. The most striking changes are reverses in the distribution in the bottom and top quintiles for older lone person households. The vast over-representation in quintile 1 with dy (approximately 7 out of 10) is reduced by half with fy and pc and by another 10 percentile points with apc. The steep rise in the proportions of lone person households in quintile 5, from 2.0 per cent with dy to 12.1 per cent with pc and 31.2 per cent with apc is further evidence of a small group of older single people (including widowers) with high levels of wealth but low levels of disposable income.

The polarising effect of home ownership on the economic position of older people is visibly evident in Figure 5.7e. Consistent across all the ELS metrics, more than 50 per cent of older renters have dollar equivalent economic resources in the bottom 20 per cent of the adult population.[148] Although there are slight reductions with each ELS metric, the combined proportion in quintiles 4 and 5 never exceeds 14 per cent. In contrast, while the distributional profile of older home owners closely follows the pattern for all older people when the dy metric is adopted, the results noticeably diverge with the inclusion of expanded economic resources, with higher proportions in the top quintiles.

[148] The results follow a similar though slightly more stark pattern for public renters (refer to Tables C.8 – Tables C.11 in Appendix C.3).

The overall economic advantage of home ownership is not only evident with the apc metric (31.6 per cent in quintile 5), but also in the higher levels of non-home wealth that bring distributional proportions in the pc metric more in line with the overall adult population. The examination of the wealth profile of older people by tenure type in Table C.6 (Appendix C.2) illustrates that it is not just home ownership that drives higher mean wealth levels compared to renters but a compounding wealth effect, with considerably higher investments in non-home assets.

Figure 5.7f draws attention to the substantial difference in the relative economic position of older pensioners and non-pensioners once wealth, particularly home wealth, is taken into account. The high representation of pensioners amongst the bottom disposable income quintiles is not unexpected given that the provision of the public pension through the Australian retirement income system is not targeted towards income replacement (social insurance) but as a safety net though the provision of minimum income levels (social assistance) (Whiteford and Kennedy, 1995).[149]

The proportions across the quintiles for fy and pc however are similar. Tables 5.6 and Table C.5 (Appendix C.2) indicate that older pensioners have similar mean equivalised wealth levels to the adult population ($419K to $418K) but hold more wealth in the housing asset with little mortgage debt. A plausible explanation, similar to the conclusion reached by Creedy and Tan (2007), is of a small group of pensioners with access to non-home wealth (inflating sub-group mean values) that are either below the pension assets threshold or don't yield high income streams. For the majority of pensioners the bulk of wealth is through home ownership and it is the inclusion of this asset when annuitised that pushes them up the quintile proportions for the apc metric.

[149] As at 30 June 2010 the maximum single pension rate (including supplement) was $701.10 per fortnight and the maximum pension for each person in a couple relationship was $528.50 per fortnight (Bendzulla, 2013). On the assumption that the age pension is the sole source of income for single pensioner, hence no tax is paid (Department of Human Services, 2013c), annualised pension gross income for a single older person ($18,227) would place them in quintile 1 of the disposable income distribution.

The quintile distribution for non-pensioners supports the findings using median relative ratios from Table 5.9. The proportions across the quintiles are skewed towards the upper tail of the distribution irrespective of the ELS metric adopted. However, the economic advantage wealth confers is evident in the markedly higher proportions in the top quintiles for each metric beyond dy. More than 55 per cent of older non-pensioners have access to economic resources that only 20 per cent of the adult population have when the pc or apc metric is used.

5.5.3 Poverty rates

Table 5.10 presents the poverty rates for older people relative to the adult population and compares the risk of poverty facing different demographic groups of older people and how these change with each ELS metric. Similar to conventional income poverty analysis which uses a disposable income threshold, the approach adopted herein is based on measuring the proportion of the population with equivalised household economic resources below a percentage of the median for the overall population. The poverty formula is represented as:

Equation 5.1 $\boldsymbol{P_r = \frac{1}{N}\sum_{i=1}^{N} I\ (ELS_{ij} < z)}$

where *N* is the total population, ELS_{ij} is the equivalised household economic resource metric (dy, fy, pc, apc) of individual i that belongs to household, z is the poverty line and *I* is an indicator function that returns 1 if $ELS_{ij} \leq z$ and 0 otherwise (World Bank Institute, 2005: 70-72).[150]

Two thresholds are also deliberately chosen (50 and 60 per cent of the median equivalised household economic resource estimates of the overall population), as it allows an examination of the sensitivity of older people's economic position to different cut-off points. One of the criticisms of income poverty lines is the arbitrariness of income poverty thresholds in determining who is and who is not in

[150] The poverty line with each metric does not necessarily have to change. For instance, Brandolini et al. (2009) retain the disposable income poverty threshold when looking at asset-based poverty. The approach is not applicable here because we are interested in analysing if the risk of poverty changes as the poverty line changes with a shift in median estimates. Additionally, as median estimates tend to increase with additional economic resources, maintaining a constant disposable income based poverty line will automatically skew the results, deflating all poverty rate estimates.

poverty and the impact this has on the conclusions we reach about the living standards of older people (as discussed in Section 2.2 in Chapter 2). The 50 and 60 per cent poverty lines are accepted standard thresholds for calculating poverty statistics across Australian, OECD and EU poverty research (Besharov and Couch, 2009; Förster and D'Ercole, 2005; OECD, 2009a; Saunders and Hill, 2008; Zaidi, 2008, 2010).

Using the conventional disposable income approach (and consistent for both 50 and 60 per cent poverty lines), poverty rates for older people are between three to four times that of non-older adults and between two to three times that of the full adult population. They are marginally worse for females, older people aged 75-84 years, those with secondary level education, widowers, pensioners, retirees, private renters and older people in regional and rural Australia. The risk of dy poverty manifests much more sharply, between 10 to 20 percentage points, for those born in non-English speaking countries (42.5 and 59.2 per cent using the 50 and 60 per cent thresholds), lone person households (53.0 and 70.0 per cent respectively) and public renters (55.4 and 71.4 per cent). In line with conclusions using dy-based median estimates, older people in family/shared households are better off benefiting from access to household disposable income. The poverty rates of 10.2 and 19.2 per cent for family households are closer to those of all adults. So too is the relative economic position of non-pensioners (with poverty rates between 11.9 and 15.2 per cent) and those with an attachment to the labour force.

The sequential inclusion of sti, nir and annuitised wealth components substantively reduces the risk of poverty amongst older people. With a 50 per cent poverty threshold, the poverty rate for non-older adults falls from 8.9 per cent for dy to between 5 to 6 per cent with fy, pc and apc. However for all older people there is more than a 10-fold reduction from 32.0 per cent with dy to between 2 to 3 per cent with fy, pc and apc for all older people. Similar reductions, though slightly lower in scale, are evident using a 60 per cent poverty threshold.

Across the fy, pc and apc metrics, there are notable reductions in the risk of poverty compared to the risk facing all older people amongst the older-old (75 years and older), older people with a vocational/post-school qualification, married older people, couple and family households, outright home owners, those employed full-time and older people living in a major city or remote Australia. Conversely, the risks of poverty are worse for certain demographic sub-groups with an expanded economic resource perspective. Younger older (65-74 years) people, early school leavers, separated/divorced older people, public and private renters and those living in regional Australia have poverty rate estimates higher than those estimated for all older people.

However, the results in Table 5.10 bring to the fore issues with the poverty line approach that are well documented in the Australian poverty literature (ACOSS, 2013; Saunders and Hill, 2008; Wilkins, 2007). That is, the compounding effect of the choice of the poverty threshold with the skewness of income estimates for older Australians towards the lower end of the disposable income distribution, on the plausibility of poverty rates. As already discussed in Chapter 3, the poverty rate is criticised because its numerical formulation implies that it is dichotomous in nature; a person is either identified as being in poverty or not, in contrast to a continuum with graduations between the poor and the non-poor (Lister, 2004: 43). The clear dividing line implies that changes to where the poverty line is set and/or very marginal differences in income (and more broadly economic resources) can differentiate two individual's poverty status irrespective of the similarity in their living standards and experience of poverty.[151]

[151] Consequently, the poverty gap index is occasionally estimated. This measures the total dollar amount between income poverty lines and the incomes of those who fall below it as a proportion of the income poverty line (World Bank Institute, 2005: 69). It provides an insight into the depth of poverty and also the amount of income required to move those in poverty out of poverty (Saunders, 2004).

Table 5.10 Poverty rates by older person's demographic-group (%)

		dy		*fy*		*pc*		*apc*	
Population sub-groups	**(n)**	**50%**	**60%**	**50%**	**60%**	**50%**	**60%**	**50%**	**60%**
Poverty threshold $ p.a.		19,566	23,479	26,697	32,036	28,143	33,771	30,466	36,559
Adult population (15+)	13,445	12.5	19.4	4.6	8.9	5.2	9.8	5.7	10.5
Non-older adults (15-64)	11,320	8.9	14.2	5.0	9.5	5.7	10.2	6.2	11.0
All older people (65+)	2,125	32.0	47.6	2.3	5.7	2.8	7.4	3.1	7.9
Older people demographic sub-groups									
Older age groups									
65 - 74 years	1,208	28.7	41.9	3.2	7.6	3.9	10.5	4.4	11.1
75 - 84 years	736	37.7	56.7	1.3	3.4	1.8	3.6	2.0	4.4
85+ years	181	32.0	49.2	-	2.8	-	2.6	-	1.9
Gender									
Male	959	30.2	45.0	2.2	5.5	2.2	6.7	3.0	7.2
Female	1,166	33.6	49.9	2.3	5.8	3.3	8.0	3.2	8.4
Birthplace									
Australian born	1,498	30.4	45.0	2.4	6.0	3.0	7.5	3.3	6.8
ESP Born	310	25.3	43.5	1.1	3.9	2.6	6.4	3.0	8.4
NESB Born	316	42.5	59.2	2.5	5.8	2.1	7.8	2.4	11.2
Educational Attainment									
Degree or higher	269	17.4	25.9	1.4	3.6	2.2	7.6	3.6	6.0
Vocational / post school	607	25.3	41.8	1.7	4.0	2.6	5.9	1.5	5.9
Year 12	151	35.8	51.3	1.5	7.3	2.3	6.3	3.1	6.8
Year 11 or below	1,094	38.3	55.0	2.7	6.7	3.1	8.3	-	9.6
Marital status									
Married/de-facto	1,244	28.7	45.0	1.5	3.1	1.8	5.2	1.4	5.4
Separated/divorced	256	32.1	46.9	4.7	14.9	6.6	16.3	10.3	19.2
Widowed	549	39.3	53.4	2.5	7.9	3.5	9.2	4.1	9.4
Not married/not de-facto	75	40.8	54.7	6.6	9.0	4.6	7.2	5.4	7.4
Household type									
Couple only	1,143	31.5	48.7	1.4	3.0	1.7	4.7	1.2	5.1
Lone person	684	53.0	70.0	4.6	13.3	5.4	14.8	7.4	15.3
Family household	262	10.2	19.2	1.7	3.8	2.3	6.0	3.2	6.3
Shared household	36	15.1	33.9	3.1	3.1	3.1	3.1	-	6.2
Housing tenure									
Own home	1,529	30.0	45.6	1.5	3.0	1.5	4.0	0.9	2.0
Paying mortgage	179	25.3	33.5	2.2	4.0	4.6	8.8	2.5	7.1
Renting private	130	37.9	59.5	7.2	23.0	10.4	24.0	15.1	31.0
Renting public	178	55.4	71.4	3.7	15.9	4.1	19.9	12.4	42.5
Rent free	91	35.7	57.0	4.2	8.0	5.5	13.3	6.5	14.7
Employment status									
Employed full-time	79	12.1	14.0	0.9	1.8	1.5	2.5	1.8	2.9
Employed part-time	150	11.0	17.4	4.6	5.3	4.5	7.2	2.6	3.8
Retired	1,819	34.8	51.8	2.1	5.9	2.6	7.6	3.1	8.3
Other	74	26.0	39.6	2.5	5.4	5.5	8.5	5.5	10.5
Pensioner status									
Pensioner	1,738	36.2	54.3	2.1	6.0	2.6	7.7	3.4	8.8
Non-Pensioner	387	11.9	15.2	3.1	4.1	3.8	5.9	1.4	3.3
Remoteness area									
Major city	1,239	28.7	44.1	1.6	4.7	2.2	6.5	2.6	6.9
Regional Australia	858	37.0	53.0	3.3	7.5	3.8	8.9	3.9	9.7
Remote Australia	28	42.7	50.6	-	-	1.9	3.8	1.9	1.9

Source: Author's calculations based on imputations from HILDA Wave 10 Release 10, ABS SIH/HES 2009-10.
Weights: Cross-sectional responding person population weights for HILDA (2010).
Equivalence scale: Modified OECD equivalence scale.
Poverty rates: based on 50 and 60 per cent of the median of each economic resource estimate for the enumerated population.

Hence, the inconsistency for a few demographic sub-groups in both poverty rates across the ELS metrics and with regards to the conclusions based on analysis of median relative rates and quintile distributions. This is evident for categorisation by gender and pensioner status and within sub-groups for those born in a non-English speaking country, widowers, lone person, family or shared households, mortgagees, retirees, employed part-time and those with tertiary or secondary school qualifications. For example, using the poverty rates for all older people as a benchmark, poverty rates are higher for pensioners using the dy and apc metric and using both the 50 and 60 per cent thresholds. However, they are lower using the fy and pc metric based on the 50 per cent threshold and higher based on the 60 per cent threshold. For non-pensioners, the reverse holds true; poverty rates are lower for the dy and apc metric irrespective of the two poverty thresholds. However, with the fy and pc metric, poverty rates are higher using a 50 per cent threshold and lower using a 60 per cent threshold.

It suggests that despite broad movements in median estimates and across quintiles for sub-groups of older Australians, there are a range of individuals whose economic resource estimates hover so closely around the poverty thresholds that these individuals are able to fall in and out of poverty identification depending on the threshold applied. It is evidence that choices over poverty lines as with choices over ELS metrics have important consequences on the substantive conclusions drawn. It may be as Travers and Richardson (1993: 1993) note that ‘ traditional poverty lines … are asked to carry too heavy a burden, they confuse issues of inequality with issues of the ability to live decently and seek a degree of precision which is greater than can be given.’ Nevertheless, improving assessments of poverty incidence amongst older people is especially important because the policy implications are considerable. As Hurd (1990: 3) notes older people with limited potential to re-enter the labour market have fewer opportunities to generate additional income and recover from unexpected negative economic shocks.

5.6 Discussion

5.6.1 Overall insights

The comparisons of median relative rates, quintile distributions and poverty rates for the different economic resource metrics show that augmenting disposable income with income streams from non-cash services and annuitised wealth greatly improves the measured relative economic position of older Australians compared to non-older adults and the general population. The comparative analysis supports the argument that analysing the economic standard of living of older people through the prism of disposable income may provide, at best, an incomplete and partial assessment and, at worst, an inaccurate and misleading assessment.

Older people however are not a homogenous group. The overarching aggregate conclusions about all older people do not translate simply into similar across-the-board improvements in the measured relative economic position of demographic sub-groups of older people. The results are not so clear-cut and straightforward. The effect of the fy, pc and apc metrics is to reduce differences between specific typologies for certain groups, challenging conventional conclusions held through disposable income analysis. The five sub-groups for which this is apparent are: younger old (65-74 years) versus older old (75 years and over) people; male versus female differences; couple versus lone person households; married versus widowed or unmarried older people; and older people living in a major city versus in remote Australia.

Many economic studies (as discussed in Chapter 2) have identified older old people, older females, older people living alone, and single older people as vulnerable groups with lower disposable income-based living standards than other groups of older people and the overall population (OECD, 2009a; Zaidi, 2010; Zaidi et al., 2006). Although analysis in this chapter is framed around treating these groups independently, in the older old group, the longer life-spans of females shifts the demographic weight towards describing single widowed older old women living alone. The generalised explanations for their lower income-based economic standard of living centres on their tenuous and chequered attachment to the workforce pre-retirement age; on-going dependence on their male partner during their married lives;

subsequently outliving their husbands in old age; and reliance on the Age Pension as their primary income source (OECD, 2009a).

In contrast, the generalised explanations for higher income-based economic standard of living estimates for younger old people, older males, married and older couple households stem from a range of interacting factors. Older males, unencumbered by care responsibilities and broken work patterns, benefit from higher incomes and longer working lives. Prevalent also, are economies of scale as married/couple older people can potentially share resources.

As already shown, however, these analyses are incomplete. The improvement to the measured relative economic position of single older old people and females with each ELS metric also stem from a combination of interacting factors. At an individual level, there is the impact of both increased age-related health needs and increased pension-related state provided welfare services; costs that would otherwise need to be paid out of cash income. The results from Table 5.5 suggest that given the mean nir dollar values across older age groups are at similar levels, the higher median relative rates stem largely from higher imputed sti estimates attributed to older old people.

At a household level, despite the lack of earned cash income, these groups benefit from wealth accumulated over the life course by household members (predominantly males) particularly outright home ownership. Although the results from Table 5.6 indicate that younger-older people have higher levels of wealth than older old groups, it is the coupling of accumulated wealth with shorter remaining life spans to use up potential consumption possibilities that provide the potential for annuities that increase almost monotonically with age (as evident in Table C.4 in Appendix C.2). This is especially so when wealth levels do not decline in old age.[152]

Moreover, for certain demographic sub-groups, most notably classification by: home tenure (home owner versus renters and mortgagees); marital status (married versus divorced/separated older people); educational status (post-school or tertiary

[152] A crucial factor that is a well-established weakness of cross-sectional data is that wealthier persons tend to live longer, hence with age wealthier households remain in the dataset (Haider et al., 2000).

qualification versus secondary school qualification); and place of birth (Australian or English speaking country versus non-English speaking country), the ELS metrics indicate a more entrenched and polarised division between the relative economic advantage and disadvantage of groups of older Australians than is evident from analysis of disposable income. With the exception of the change in marital status that can occur at any life-stage, of particular note are the consequence of circumstances (whether they be economic, educational or cultural) decades before becoming an older person and reaching retirement age on an individual's ability to accumulate wealth with major ramifications on his/her economic standard of living. Most importantly, the range of ELS metrics illustrates the importance of securing outright home ownership before reaching old age. The results indicate that in addition to providing a critical housing service, it has a flow-on effect translating into higher stocks of non-home wealth.

5.6.2 Reviewing the ELS metrics

The ELS approach set out in this part of the thesis sits within an established and extensive field focussed on how best to compare the standard of living across groups, across time and across country. There is clearly no single 'correct' approach. The full income (fy), potential consumption (pc) and adjusted potential consumption (apc) metrics are put forward as improved and viable alternatives to analysis based on disposable income (dy). In advocating for a broadening of the scope of economic resources, as encapsulated in the form of these metrics, it is the inclusion of two economic resource components that conceptually are the most contentious: imputed social transfers in-kind and to a greater degree annuitised home wealth.

The main contention with the inclusion of social transfers in-kind is the inherent assumption that the greater the allocation of benefits to the individual, the better their overall standard of living (Callan and Keane, 2009; Price, 2008; Radner, 1997). Within an income paradigm, the cost of the public benefits and services is converted into an income stream that provides the recipient of the benefit and/or service dollar values that increase as the allocation increases. However, the reasoning is problematic with respect to the allocation of certain public benefits and services. The most notable example is the allocation of public health benefits. It is evident from the higher incidence of long term health conditions in Section 5.2, and the sti imputation results in Section 5.3.1 that older people have higher public health expenditures allocated to them because of the onset of increasing health issues, which does not necessarily translate into an improved or comparatively better of standard of living than non-older adults. It is equally problematic with respect to the allocation of public education as the imputed estimates improve the relative economic position of students and families with school-aged children.

The approach adopted by ABS FIS does not use actual utilisation rates by person but allocates spending according to average utilisation rates by age, gender and state (sometimes referred to as the 'risk-related insurance approach' or 'insurance premia approach' (Callan and Keane, 2009: 51). It is the same technique applied by insurance companies to calculate health insurance benefit rates. The implication is that you can technically be a healthy older person and have the same imputed health benefit as a sicker older person (Korenman and Remler, 2013). Hence, even though the ABS FIS method does lessen the pronounced relationship between those with the greatest need receiving the greatest imputed benefit value than using actual usage rates, the criticism still remains (Callan and Keane, 2009). It is an inherent characteristic of certain public benefits and services, such as health and education, that are by their very nature provided at different points along the life course and hence directly related to age-specific-needs.

As discussed in Section 4.5.2, there are methodological techniques that attempt to account for the needs associated with public resource additions through adjustments to the equivalence scale (Atkinson and Marlier, 2010; Paulus et al., 2010; Radner, 1997; Verbist and Matsaganis, 2014). However, estimating the various parameters that determine how and in what way needs vary along the life course from adulthood to old age is technically complex, and consequently not routinely used in economic standard of living analysis.

From an economics resource perspective, an important reason to account for social transfers in-kind is that in the absence of the state provision of welfare benefits and services, these costs would otherwise be borne by those individuals with specific needs and be paid out of their after-tax cash income. The public provision of welfare can be seen as a notional 'saving' to the specific consumer of the benefit or service. It forms a critical element in the economic decision making of many individuals and households as the largesse of the welfare state determines their ability to fund discretionary spending. Hence, while acknowledging the analytical consequences of including sti, the exclusion of this economic resource component would ignore a major contribution to maintaining a decent economic standard of living for many Australians.

The issue underscores the larger concern with using economic resources as an indicator of living standards and well-being that is at the heart of this thesis. It is indicative of how the monetary valuation of factors, without taking account of the wider personal social context and without consideration of the totality of a person, may be misleading. In Part 2 of this thesis, the ELS metrics are compared with a multi-dimensional well-being framework as way of accounting for the many non-economic dimensions, such as health, that are constituent components shaping an individual's well-being.

In relation to the inclusion of home wealth, there are a host of reasons put forward against treating home equity as a viable and realistic source of income flows. Wood and Nygaard (2010) write of homeownership as providing 'ontological security' and Fisher et al. (2007) as 'socio-emotional selectivity': terms used to capture the emotional weight embodied in the bricks and mortar that sustain memories, relationships, personal identity and a sense of belonging. Often referred to as 'the great Australian dream' (Wulff, 1993: 230), for the majority of Australians, owning a home is a cultural aspiration closely linked to family values, economic stability, a marker of social-economic status and a bequeathable legacy with the potential to significantly influence the economic security of people's loved ones (Colic-Peisker et al., 2010; Mares, 2013; Olsberg and Winters, 2005). It plays an important emotional role in providing a general sense of well-being to individuals (Colic-Peisker et al., 2010; Mares, 2013; Olsberg and Winters, 2005).

In addition, it is well established that home assets are considered ‘lumpy assets’, constrained by the ease of convertibility into cash income. For instance, it is difficult to liquidate parts of a home. There are the expected unavoidable costs associated with all housing transactions, such as real estate agent fees, legal conveyancing fees and moving costs. These in conjunction with potential difficulties in finding and funding alternative housing impede the ability to trade up or trade down (Dvornak and Kohler, 2003; Price, 2008).

In an Australian context, there are also salient current policy disincentives that impede liquidising the home asset. Stamp duty is a government levy that effectively lowers the price offered by the buyer and decreases the after-tax price received through sale. The Henry Tax Review (Australian Treasury, 2009: 48) identified the high cost of stamp duty acting as a deterrent preventing people from ‘changing their place of residence as their personal circumstances change or discourage people from making lifestyle changes that involve a change in residence’. Moreover, the exemption of owner-occupied housing from capital gains tax and land tax, and the lack of a bequest tax acts as an incentive to maintain the bulk of wealth through own-housing investment (Colic-Peisker et al., 2010; Elsinga and Mandič, 2010).

For older Australians, perhaps the most pertinent policy incentive is the exclusion of the value of the principal place of residence from the assets tests for receipt of the Age Pension (Productivity Commission, 2011). This means that should an older person sell their own home, any profit realised on the sale and subsequent purchase of another lesser valued home, is counted as non-concessional income and could either lead to a reduction in the pension amount or ineligibility for the Age Pension (ibid). It is not just the loss of the pension amount that is at stake but the associated pensioner concessions on a wide range of living expenses from medical services, pharmaceuticals to transportation and household utilities (Callan and Keane, 2009).

The emotional and financial security attached to a home along with a favourable policy environment can help explain the cultural entrenchment in Australia to secure and maintain outright home ownership. As evident in the preceding sections, more than 70 per cent of the population (and 80 per cent of older people) are owner-occupiers and it forms the largest asset class in the wealth portfolio (home equity accounts for 40 per cent for the population and 50 per cent for older people). This means that despite the heterogeneity of housing types, despite the heterogeneity of the population and irrespective of how income rich and poor people are, it is the only asset class that most people own and is the main vehicle of their saving.

However unlike other assets in a wealth portfolio, the home asset has a unique dual role. It functions simultaneously as a source of realisable wealth and a source of consumption services (Elsinga and Mandič, 2010; Hurd, 1990). In other words, it is both an 'investment good and a consumption good' (Dietz and Haurin, 2003: 411). As a dwelling it provides housing services, without it this service would be paid as rental expenditure out of after-tax income, hence the need to estimate a net imputed rent and add this to disposable income. As an economic resource it is fungible; the home equity can be used as leverage to increase borrowing or exchanged for other economic resources that can fund non-housing consumption.

In Olsberg and Winter's investigations on the housing intentions and intergenerational transfer of assets of older Australians they write:

> The most outstanding feature of responses from this mainly home-owning population was the almost uniform definition of the home as the conduit to a person's future lifestyle choices. The symbolic dimension of the home as the foundation for personal identity is now somewhat blurred as the values of consumption and lifestyle begin to take precedence. Home-owners spoke of their home offering them a diversity of choices for the future. (Olsberg and Winters, 2005: ix)

In popular Australian vernacular, the terms OWLS (Oldies Withdrawing Loot Sensibly) and SKI (Spending Kids Inheritance) are used to describe the emergence of these attitudes (Olsberg and Winters, 2005).

Home ownership is widely-recognised as a 'universal buffer', a crucial piece of the puzzle that shapes the economic and health welfare of older people (Elsinga and Mandič, 2010: 955). This includes using the house as an insurance against future potential life risks, particularly meeting the costs of health emergencies and unexpected financial difficulties (R. L. Clark et al., 2004; Elsinga and Mandič, 2010; Reed et al., 2004). The Castle (1988) hypothesis discussed in Chapter 3 makes a direct link between the lack of generosity of the Age Pension and the extent of home ownership in Australia. Castle's (1988) thesis conjectures that the high incidence of home ownership is factored into and mitigates low public expenditure on age-related income-support payments.

Acknowledgment of the potential economic resource trapped within home equity has led to Australian government and community led policy inquiries to determine the range of alternative options to access this resource (Australian Government, 2014; Australian Treasury, 2009; Productivity Commission, 2011). On behalf of the Brotherhood of St Laurence, Yates (2009) puts forward three relevant housing taxation policy options as a way impacting housing behaviour and improving the efficiency and equity of the housing market: remove the land tax exemption on owner-occupied housing; introduce a capital gains tax above a given limit; and re-introduce a death duty.

As part of its mandate to review the efficiency and impact of the tax and transfer system, the Henry Tax Review (Australian Treasury, 2009) set out three recommendations relating to owner-occupied housing. First, abolish stamp duty thereby removing a major financial obstacle to selling (Recommendation 51). Second, investigate the introduction of a tax on bequests to encourage the using of wealth to meet present living costs and not retaining as an inheritance (Recommendation 24). Third, include a deemed income from owner-occupied housing beyond a certain asset value threshold hence removing the disincentive to hold the majority of wealth in the home (Recommendation 88).

These inquiries are part of a larger Australian policy debate on ensuring adequate economic, health and social service provision for older Australians while alleviating the increasing costs brought on by an ageing population. They include discussions on reform of the aged-care system, amending the structure of superannuation tax concessions, promoting a superannuation structure that accounts for care responsibilities beyond paid employment and facilitating employment beyond the pension age (National Commission of Audit, 2014; Productivity Commission, 2011, 2013).

The Productivity Commission's Inquiry (2011) includes three proposals to release home equity and initiate a path for older Australians to contribute to the cost of their health care and accommodation expenses. The first includes the principal residence in an assets test, in addition to the current standard means Age Pension test to determine if aged care recipient's need to make co-contributions (Recommendation 7.9). The second recommends that older Australians be allowed to sell their house, banking the proceeds to pay for their aged-care needs, without impacting their Age Pension (Recommendation 7.3). The third provides older Australians with a government guaranteed equity release scheme where older Australians can draw on their home equity to fund their aged-care expenses (Recommendation 8.1).

The more recent National Commission of Audit (2014) makes very similar recommendations. Some of these include increasing the pension eligibility age to 70 years by 2053 (Recommendation 13.a); replacing the income and asset test with a single means test using deemed income over a greater range of assets (Recommendation 13.b); including in the new means test the value of the principal residence over a threshold (Recommendation 13.c); increasing the superannuation preservation age to five years below the Age Pension age; and allowing older Australians to access equity in their principal residence to pay for aged care services.

Within these contexts, it is conceptually desirable, empirically informative and necessary to policy development to take account of the pivotal role of housing wealth as a potential economic resource within an income 'flow' dimension.[153] By including the full value of annuitised home wealth (100 per cent as opposed to an arbitrary percentage), the apc metric can be treated as an upper bound that provides a lens to

[153] The economics of housing itself is an extensive complicated field that cannot adequately be dealt with in this thesis. The central role of sub-prime lending in initiating the global financial crisis has focussed policy research attention on understanding the relationship between housing wealth and individual living standards at a microeconomic level and the wealth of nations at a macroeconomic level (S. J. Smith and Searle, 2010).

gauge the full impact of housing and other forms of asset ownership on the measured relative economic position of older Australians.

5.7 Conclusions

This chapter concludes Part 1 of the thesis which examines the economic standard of living of older people. It is based on the premise that disposable income, although important, is conceptually and methodologically limited as a means for assessing economic living standards. The economic standard of living is a function of income (cash and non-cash) and wealth as economic resources that determine consumption possibilities. In the context of an ageing population, improved measured assessments of the economic living standards of older people are imperative for evidence-based policy decisions.

The statistical analysis of the different economic resource metrics along the ELS continuum show that augmenting disposable income with income streams from non-cash services and annuitised wealth substantially improves the measured relative economic position of older Australians, at an aggregate level, compared to non-older adults and the general population. Moreover, the effect of the ELS approach is to alter the substantive conclusions about the measured relative economic position of certain demographic sub-groups of older people than would otherwise be drawn using disposable income only.

With each fy, pc and apc metric, differences in the relative economic position between younger old/older old people, males/females, couple/lone person households, married/widowed or unmarried older people and major city/remote Australia residency are minimised. On the other hand, they indicate a widening gap between the relative economic advantage of home owners and corresponding disadvantage of older renters, and similarly the polarised position between married and divorced/separated older people, than suggested with disposable income analysis. This extends to the educational advantage of obtaining a tertiary qualification and the cultural disadvantage of being born in a non-English speaking country.

The many methodological and conceptual limitations with the ELS approach are noted. Methodological limitations have already been discussed in Chapter 4. There are also important conceptual concerns. The inclusion of in-kind government social transfers does not pre-suppose that an increase in the allocation of benefits is related to an increase in needs and may not necessarily imply an increase in the standard of living (Radner, 1997). The conversion of wealth stocks to income flows does not account for asset illiquidity, the ease of disposal, transaction costs, bequest motives and the emotional capital associated with certain assets (for example, the home and collectibles) (Rowlingson, 2006). In a cross-sectional study, there is also the issue of inter-generational comparability as the varying economic circumstances faced by different ages along the life course cannot be adequately controlled for (Hurd, 1990).

However, social scientists and economists have long recognised that the measurement of income and wealth is a 'rough-and-ready process and always contains errors' (Travers and Richardson, 1993: 175), notwithstanding which the endeavour is worthwhile in the pursuit of advancing knowledge. The intention of the full income (fy), potential consumption (pc) and adjusted potential consumption (apc) metrics are to provide improved and viable alternatives to analysis based on disposable income (dy). Furthermore, to determine what, if any, changes this makes to substantive conclusions about the economic living standards of older people generally and for specific sub-groups of older people.

As a conceptual 'thought' experiment this does raise as many questions as it answers about the role that income, public services and benefits, wealth especially home ownership plays in affecting the economic living standards of older (and non-older) people. In advocating for this approach it is imperative that greater attention be paid to the interactions between socio-demographic factors; such as age, gender, relationship status, housing tenure and employment status, to allow for a more nuanced understanding of the economic living standards of sub-groups of older people to emerge.

Finally, it is important to acknowledge that 'the economic' represents but one facet of an individual's overall standard of living. It should be considered a first step towards the development of a multi-dimensional approach to estimating older people's individual standard of living and well-being. It remains to be seen if the conclusions reached for older people collectively and sub-groups of older people using this economic standard of living approach is corroborated when a multi-dimensional well-being perspective is adopted. This is the subject of Part 2 of this thesis

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6 Multi-dimensional individual well-being methodology

6.1 Introduction

The literature review on social indicator applications in Chapter 3 indicates that there is little doubt that well-being has now become a firmly-established notion within policy-orientated and academic literature and also that well-being is inherently multi-dimensional. The challenge however, is the empirical undertaking to make the well-being paradigm operational and comparable as an analytical framework to the economic paradigm with its long entrenched history as the principal narrative in social policy discourse.[154]

The intention in Part 2 of the thesis is to contribute towards well-being analysis by formulating a multi-dimensional individual well-being (MIW) indicator framework applicable to adults and investigate the extent to which this approach broadens our understanding of the standard of living and well-being of older Australians. A necessary caveat: the MIW approach set out below is one attempt amongst many others to operationalise what is ultimately an unobservable concept (that of well-being itself). The literature review in Chapter 3 illustrates that there need not be just one path, but many paths each with a different purpose, with different limitations and with different methodologies. The assumptions made in this chapter are set according to what is possible within the scope of this thesis and ultimately, as well, what is possible within the dataset.

The beginning part of the chapter draws on the principles set out in the social indicator theoretical framework in Chapter 2 to develop a multi-dimensional well-being indicator framework taking into account the needs and circumstances of adults. Sections 6.3 and 6.4 discuss the choice of dimensions and indicators. Section 6.5 uses factor analysis to confirm the applicability of the indicators to the dimensions. Section 6.6 sets out the decision rules to construct dimension scores and a composite well-being index. Concluding remarks are presented in Section 6.7.

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[154] As Alkire (2002: 282) puts it, the alternate account must be 'theoretically and empirically defensible, while also being flexible and appropriate to diverse cultural and political settings'.

6.2 Operationalising the multi-dimensional individual well-being (MIW) approach

6.2.1 Key methodological principles

The methodological approach herein is to treat the well-being of an individual as a multi-dimensional concept that can be disaggregated into a list of dimensions with specific indicators attached to each dimension. It is the identification of the indicators along various dimensions, the construction of various composite indices and the subsequent analysis of the dimensions, the indicators and composite indices that form the basis of this framework and the mechanism to assess measured individual well-being.

As an initial step it is necessary to establish what is meant by dimensions and indicators so as to ascertain the parameters governing the MIW approach. It is evident from the social indicator literature review in Chapter 3 that there is little consensus on the terminology to describe the grouping of indicators into broad constructs. Terms such as dimensions, domains, sub-indices and components are used interchangeably (de Leon and Boris, 2010; Nardo et al., 2005; O'Hare and Gutierrez, 2012; Pollard and Lee, 2003). In using the term 'dimension' in the MIW approach, application is made with reference to Alkire's (2002: 182) definition of dimensions as the 'component aspects of a particular situation' which reflects the co-existence of many dimensions alongside each other.

In general, this means that the field of inquiry may be specified around conceptual notions such as human development, human rights, quality of life, basic human needs or well-being (Alkire, 2002; Green, 2001). It may be located within or across disciplines (Lippman et al., 2009). It may be constrained spatially to international, national, community or individual level assessments (Wiseman et al., 2006). For this thesis, the choice of dimensions is governed by those aspects that directly and personally affect the individual well-being, and vary across the individual well-being, of adult Australians (Atkinson et al., 2002).

Moreover, adopting the philosophical aspirations of Alkire's (2002: 186) principles in discussing the 'Dimensions of Human Development', the dimensions *attempt* to be:

‘incommensurable’ – the qualities of one dimension are not present in another dimension; ‘irreducible’ – the list of dimensions cannot be made any shorter; ‘non-hierarchical’ – there is no permanent hierarchy to the dimensions as these are circumstance dependent; and ‘valuable’ – each dimension is relevant to progress/well-being in its own right. In proposing this, Alkire (ibid) maintains that dimensions represent ‘values or “reasons for action” which people from different language groups and neighbourhoods could recognise based on practical reason’.

There appears to be greater consensus regarding the definition of indicators (ABS, 2001b, 2010; Atkinson et al., 2002; Cobb and Rixford, 1998; Spicker, 2004). Cobb and Rixford (1998: 1) write that ‘technically speaking, an indicator refers to a set of statistics that can serve as a proxy or metaphor for phenomena that are not directly measurable’. Atkinson et al. (2002: 19) defines an indicator as an ‘abstraction from the underlying issue that is the real object of concern’. Similarly, Spicker (2004: 432) states that ‘an indicator is a signpost of pointer. It is a way of representing something, not necessarily the thing itself’.

The treatment of indicators as signposts for the main foci suggests that each individual indicator on its own may not sufficiently or adequately capture the underlying analytical concern (Scrivens and Iasiello, 2010). Each indicator sits alongside a suite of other indicators that collectively point to the various aspects of the analytical concern (that is, a system of indicators is used) (Frønes, 2007; Maggino and Zumbo, 2012). Cobbs and Rixford (1998: 20) warn against conflating indicators with reality, writing that ‘even the best indicator is only a fractional measurement of the underlying reality’. Moreover, an indicator need not necessarily be the same as a measure, as the latter is meant to reflect ‘the nature of the thing it is measuring, and it ought to be accurate’ (Spicker, 2004: 433), while an indicator should draw attention to the analytic concern. For example, Spicker (2004: 433) argues that while income is not a good measure of poverty it is a good indicator, as it draws attention to the central issues around poverty and is suggestive of action to mitigate or aggravate it.

The above definitions also distinguish indicators as a particular type of social statistic that is not intended to be merely descriptive or neutral but should reflect success or failure with regards to the analytical concern (W. Van den Berghe, 1988) referred to in (Scrivens and Iasiello, 2010). Hence, a key feature in indicator development is a recognition that indicators are used to promote greater understanding and facilitate comparison over time, across groups or against a standard with the intention of monitoring or improving the underlying analytical concern (ABS, 2001b; Scrivens and Iasiello, 2010).

As with the choice of dimensions, an *attempt* is made to be guided by seven of the principles of indicator construction set out by Atkinson et al. (2002: 21-25). These are: indicators should encapsulate the central concern and have 'intuitive validity'; have a 'clear and accepted normative interpretation'[155]; be accepted and transparent to the general public; be 'robust and statistically validated'; reflect policy interventions; be balanced in number across the different dimensions; and attempt to be proportionate in weight across the different dimensions.[156] The constraints are in identifying indicators that for empirical purposes are parsimonious and measurable via large scale survey data, yet conceptually form constituent and valuable elements of the different dimensions of well-being.

There are two additional methodological principles used to guide the development of the MIW approach. Although apparent in the discussion so far, it is important to reiterate that the unit of analysis is the individual. This differentiates the multi-dimensional well-being approach from the majority of other social indicator approaches that by and large develop composite indices for comparison across countries and use macro-level indicators (aggregated to the population) such as poverty rates, mortality rates, literacy rates and consumption flows. Notable examples include the Active Ageing Index (Zaidi et al., 2013), the Human Development Index (UNDP, 2014a, 2014b), the Index of Child Well-being (Bradshaw and Richardson, 2009) and the Index of Economic Well-being (Osberg and Sharpe, 2002). The focus on the individual is achievable within a household survey dataset such as HILDA as it collates

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[155] That is to say, a movement either up or down reflects an improvement or deterioration.

[156] This recognises that while indicators may have different degrees of importance, they should not be 'grossly different'.

data on a range of self-assessment topics at the person-level and is also consistent with the development of the ELS metrics.

By utilising the individual as the unit of analysis, the development of a composite index takes the form of intra-personal aggregation, in contrast to inter-personal aggregation commonly used in social indicator approaches. Intra-personal aggregation refers to aggregating across the component indicators per individual. Inter-personal aggregation refers to aggregating across the individuals for each component indicator.

As discussed in Chapter 2, the development of a composite well-being index is contentious. The first question is if it is conceptually plausible to aggregate across dimensions or are they intrinsically non-comparable (Atkinson et al., 2002; Nardo et al., 2005; Saltelli, 2007)? If they are to be aggregated, by what form of aggregation, using what weighting system and for what analytical purpose (ibid)? The second set of questions raise methodological issues applicable to both inter-personal aggregation and intra-personal aggregation, with most research applications using a range of validity and reliability tests and presenting a range of weighting scenarios. It is argued here though that the first question is a more pertinent and problematic issue for inter-personal macro-level aggregation than it is for the MIW approach.

It is anecdotally obvious that an individual's well-being can be perceived as the cumulative effect of the many different aspects (dimensions) that make up his/her life. Indeed, a primary intention in developing an individual level composite index of well-being is to provide a more holistic assessment of a person's comparative position by taking into account the full scope of and inter-relationship between many dimensions. The ABS in their Measuring Well-being Framework (2001b: 8) acknowledge the inadequacy of considering dimensions in isolation, writing that 'All aspects of life are connected to a greater or lesser extent. An individual's health affects, and is affected by, all other aspects of their life, such as their family and community environments'.

An individual level composite index is the rationale behind the development of the Life Situation Index in the Netherlands discussed in Chapter 3 (Boelhouwer, 2010). It is also the rationale behind the development of the micro data child well-being index (Moore et al., 2008). Moore et al. (2008) use a micro-data tally method to simultaneously examine how children fare across multiple dimensions of well-being, rather than measuring each well-being dimension in isolation.[157] It also remains conducive to analysis at various micro, meso or macro levels as individual-index scores can be aggregated upwards to form demographic group or population estimates (Vandivere and McPhee, 2008).

Pogge (2009) has argued for this holistic measure of individual dis(advantage) through intra-personal aggregation as a way of improving composite indices such as the Gender Development Index (GDI) and the Human Development Index (HDI).[158] Pogge writes:

> An index is supposed to provide summary information about a group. To do so, it must track how group members are doing. This purpose is much better served when the inter-personal aggregation is performed last, after the relevant aspects of each person's situation have been holistically assessed. This is so because the significance of these situational aspects depends on the age and gender of the person and because these aspects are also interrelated in their significance. If individual lives are what ultimately matter, then we must attend to these inter-dependencies. (Pogge, 2009: 218)

The final principle underpinning the methodological framework is that well-being is analysed across the spectrum from those with low well-being to those with high well-being. The philosophical focus is implicitly positive, with well-being framed in terms of

[157] The micro-data tally method proposed by Moore et al. (2008) sits within a dedicated scholarly literature on developing child well-being frameworks that place the child as the main focal point and the starting point for assessment (Ben-Arieh, 2008; Ben-Arieh and Frønes, 2011; Bradshaw et al., 2007; Bradshaw and Richardson, 2009; Lamb and Land, 2013; Lippman et al., 2011; O'Hare and Gutierrez, 2012).

[158] Pogge (2009) argues that as composite indices such as the GDI and the HDI are focused on countries and the ranking of countries, they shift attention away from individual human beings. The use of macro-level aggregates (e.g. life expectancy rates and GDP) ignores inequalities because they fail to account for the distribution of sub-populations within countries. The reliance on these forms of indices can potentially have a perverse effect on policy and social outcomes because they can galvanise policy decisions towards effecting numerical changes in the indices, overlooking the pertinence of other social problems.

the quality of life individuals actually achieve. It is conceptually motivated by the value system endorsed in Sen's (1993a: 31) capability approach with its emphasis on the functioning vector of achievements; those things that a person 'manages to do or be in leading a life'. As Lister (2004: 17) writes 'of the kind of life we want people to be able to achieve in order to 'flourish' – rather than the negative – of the lack of material resources that can prevent them from achieving it'. This is in contrast to indicator studies that focus on ill-being or disadvantage with parameters constrained to the extent to which individuals are lacking or deficit in different dimensions of well-being (Halleröd and Selden, 2012; Perry, 2002; Tomlinson et al., 2008).

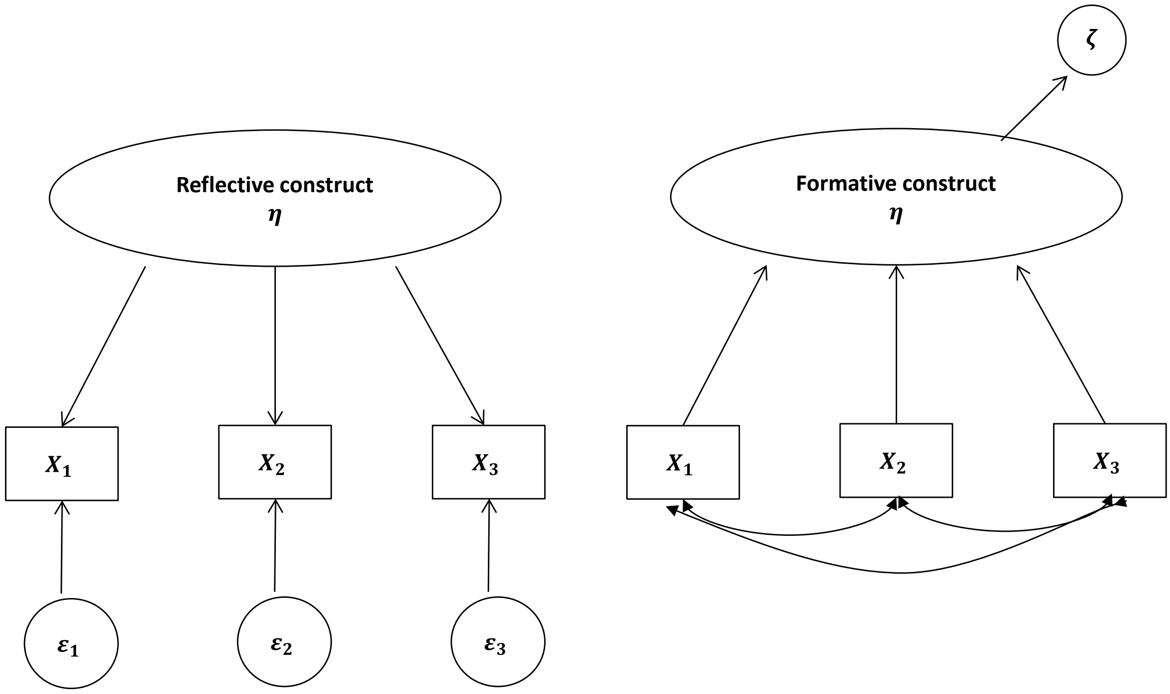
A focus on the positive is aligned with the development of the ELS metrics wherein a higher economic standard of living is associated with a higher level of economic resources in dollar terms. Similarly, in the subsequent development of the composite indices, the higher the scores, the better the well-being outcomes. This shares similar tenets to the argument put forward by Anand and Sen (1997) and Maggino and Zumbo (2012) in relation to the estimation of global well-being and human development indices. Anand and Sen (1997) argue for a complementary approach; conglomerate indices that capture both the best off and the worst off, alongside the conventional estimation of deprivation indices that only look at the worst off, to enable a greater understanding of what promotes and hinders well-being progress.

6.2.2 Measurement models

Following the principles underpinning the social indicator empirical applications, discussed in Chapters 2 and 3, the general approach involves reducing a large number of observable indicators to a set of unobservable (latent) constructs. In seeking to provide a methodological framework to describe the various analytic and technical strategies involved in the social indicator construction, Maggino and Zumbo (2012: 202) label the process a 'hierarchical design'. The process involves different measurement models at different stages in the development of composite indices (ibid: Table 10.11 and Table 10.12); in this thesis, from well-being dimensions to indicators and from well-being dimensions to a multi-dimensional well-being index.

The MIW approach uses two kinds of measurement models: a reflective and a formative model (Figure 6.1) (Bollen and Lennox, 1991; Maggino and Zumbo, 2012). Both are situated within the suite of structural equation modelling (SEM) statistical techniques that include within it 'models of measurement' designed to understand and test the relationship between observed variables and unobservable constructs (Bowen and Guo, 2011; Hooper et al., 2008; Kline, 2011).[159]

Figure 6.1 Reflective and formative models



In the reflective model, the unobservable (latent) construct (η) determines the set of indicators (X_i) (Bollen and Lennox, 1991; Brown; Jarvis et al., 2003; Maggino and Zumbo, 2012; Roy et al., 2012). The indicators are assumed to be reflective in nature, treated as manifestations of or determined by the reflective construct. Hence causality flows from the reflective construct to the indicators. It is assumed that changes in the reflective construct will impact all the indicators that make up that construct. The reflective construct is an unobserved exogenous construct symbolised in Figure 6.1 with paths leading from it towards the indicators. The indicators are observed endogenous variables with arrows leading to them, each with an associated error term

[159] The MIW approach does not fully utilise the full range of SEM modelling options. The specification of 'models of measurement' forms one part of SEM. However, more complex investigations testing the casual relationship between variables and/or latent variables are not explored in this thesis.

(ε_i) to account for the unexplained variance. This type of model is also referred to as a *top-down* explanatory approach or as an *effects* model. Notationally, represented as:

Equation 6.1 $\boldsymbol{X_i = \lambda_i \eta + \varepsilon_i}$

where X_i is the ith indicator, η is the reflective construct, λ_i is the coefficient that measures the expected effect of η on the ith indicator and ε_i is the measurement error for the ith indicator (in Figure 6.1a, i ranges from 1 to 3).

In the formative model, the unobservable (latent) construct (η) is 'determined by or formed from' (Maggino and Zumbo, 2012: 207) the set of indicators (X_i) (Bollen and Lennox, 1991; Brown; Diamantopoulos et al., 2008; Diamantopoulos and Winklhofer, 2001; Jarvis et al., 2003; Roy et al., 2012). The indicators are assumed to be formative in nature and aggregated to form the formative construct. Hence, causality flows from the indicators to the formative construct. The indicators may or may not be observed but they are exogenous, symbolised in Figure 6.1b with paths leading from them to the formative construct. The formative construct is treated as an unobserved endogenous variable with an error term (ζ) to account for the unexplained variance. This type of model is also referred to as a *bottom-up* explanatory approach or as a *composite cause* model. Notationally, represented as:

Equation 6.2 $\boldsymbol{\eta = \sum_{n=1}^{N} \Upsilon_i X_i + \zeta}$

Where η is the formative construct, X_i is the ith indicator, Υ_i is the weight associated with the ith indicator, ζ is the error term and N is the total number of indicators (in Figure 6.1b, N ranges from 1 to 3).

Table 6.1 sets out the key conceptual and methodological differences between reflective and formative models as set out in the literature (Bollen and Lennox, 1991; Brown; Jarvis et al., 2003; Maggino and Zumbo, 2012; Roy et al., 2012).

Table 6.1 Summary of differences between the reflective and formative models

Reflective model	Formative model
The reflective construct causes the indicator. Causality flows from the reflective construct to the indicators. Thus, the indicators are treated as manifestations of the reflective construct. The indicators are called *constitutive* variables.	The second-order indicators cause the formative construct. Causality flows from these indicators to the latent construct. Thus, a formative construct is the result of an aggregate of indicator variables. The indicators are called *concomitant* variables.
As manifestations of the reflective construct, indicators are inter-changeable and can be removed if the relationship between the reflective construct and the indicator is not statistically significant.	As the formative construct is theoretically considered to be the composite of all its indicators, indicators are not inter-changeable and cannot be removed without affecting the latent construct itself.
Strong correlations must exist between the indicators if they are to represent phenomenon associated with the same construct. The corollary is that two uncorrelated indicators cannot measure the same construct (that is, there must be internal consistency within the reflective construct). The strength of the correlations are statistically measured and accounted for in the model.	Correlation between indicators is of little importance as the model assumes that each indicator has a unique contribution to the formation of the formative construct, hence the aggregative form. Correlations between indicators are not statistically measured and accounted for in the model.
As each indicator is separately associated with the reflective construct but shares covariance with all the other indicators in the construct, the random unexplained variance for each indicator is treated as an error term.	The aggregative nature of the formative model does not permit error terms with the indicators. The random variance at the formative construct level is treated as an error term.
Estimation is possible through various factor analysis options.	Estimation is more difficult. Assumptions and decisions regarding the number, nature and form of indicators, the aggregative procedure and weighting strategy are reliant on a strong conceptual link between the formative construct and its indicators.[160]

[160] Estimation of formative constructs is possible within the class of SEM. Although less established in the social sciences, there is an emerging literature from business, management, marketing and psychology which utilise complicated statistical models such as multiple indicators and multiple causes partial least squares and regression analysis, with the aid of strong assumptions, to estimate formative constructs (Coltman et al., 2008; Diamantopoulos et al., 2008; Diamantopoulos and Winklhofer, 2001; Jarvis et al., 2003; Roy et al., 2012). Estimations using these modelling techniques constitute a separate study in their own right and are not explored in this thesis.

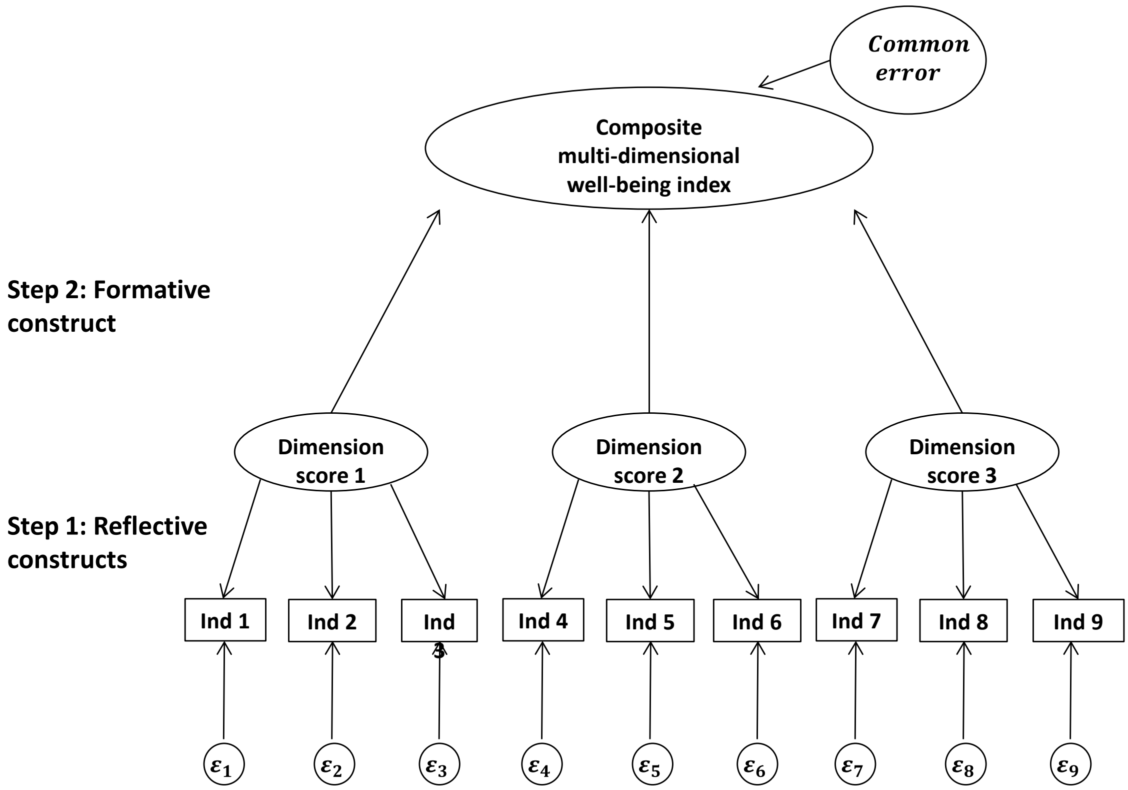
While the substantive nature of reflective and formative models is significantly different, this does not imply that they are mutually exclusive in the measurement process. It is possible to measure both models at different levels (referred to as first, second or higher orders), as part of a larger model measuring the relationships between latent constructs (Brown, 2006; Edwards and Bagozzi, 2000). Jarvis et al. (2003) states that as the theoretical link between the indicators and the latent constructs determines the type of measurement model, four scenarios are possible with the estimation of a second order construct (that is, a two-level measurement model): 1) first order reflective and second order reflective; 2) first order formative and second order formative; 3) first order formative and second order reflective; and 4) first order reflective and second order formative.

It is this last scenario that is employed in the formulation of the MIW metrics relating to dimension-specific well-being and overall multi-dimensional well-being. Figure 6.2 illustrates the development of the composite multi-dimensional well-being index as a second-order construct involving a two-step consecutive process (assuming 9 indicators and 3 dimensions).

Step 1: From dimensions to indicators

The well-being dimensions are estimated as reflective constructs based on the relationship between the observed chosen indicators in the HILDA dataset. As uni-dimensional well-being constructs, they are first-order constructs; that is, a single unifying trait combines the set of indicators (for example, physical health) (Roy et al., 2012). These are estimated as well-being dimension scores Section 6.6.

Figure 6.2 Construction of the well-being dimension scores and composite well-being index



Step 2: From dimensions to multi-dimensional well-being

The composite multi-dimensional well-being index is estimated as a formative construct based on the weighted combination of indicator variables. The indicators at this stage of the modelling process are the uni-dimensional well-being constructs (the dimension scores) from Step 1. Justification for using the dimension scores as indicators in Step 2 is provided by Land (1971: 323) who contends that any social statistic can be an 'indicator' if it fulfils three criteria: it represents a component in a social system model, such as within the well-being framework; it can be used for comparative purposes across groups and over time; and it can be aggregated with other indicators or disaggregated within the model. All three criteria are met with the estimation of the well-being dimension scores.

The composite well-being index is referred to as a second-order construct to emphasise that it exists only through the existence of the uni-dimensional well-being constructs (Roy et al., 2012). The estimation of a second-order formative construct as a multi-dimensional well-being index is possible, for as Law, Wong and Mobley (1998: 741) write, 'In contrast to a set of interrelated uni-dimensional constructs, the dimensions of a multi-dimensional construct can be conceptualised under an overall abstraction, and it is theoretically meaningful and parsimonious to use this overall abstraction as a representation of the dimensions'.

Having specified the two measurement models that enable the construction of the dimension-specific well-being and overall multi-dimensional well-being metrics, the remaining decisions involve:

- determining the dimensions that constitute well-being (formative model);
- determining the indicators within each well-being dimension and conducting dimensional analysis to verify the relationship between the indicators and the dimension (reflective model);
- determining the weighting criteria (reflective and formative model);
- determining the aggregating technique (reflective and formative model); and
- assessing the robustness of the estimated latent constructs through sensitivity analysis (reflective and formative model) (Maggino and Zumbo, 2012; Nardo et al., 2005) .

There are also technical issues such as the treatment of missing data, analysis limitations with ordinal data and the standardisation of data. These are discussed in the following sections.

6.3 Dimensions

Deconstructing individual well-being, in the abstract, into a set of dimensions may be thought to be intuitive. In reviewing a range of studies on human well-being, Clark and Gough (2005: 62) write that 'one of the most notable conclusions is that most people appear to share a common vision of the good life'. And that this 'empirical philosophy' (that is, identified through fieldwork or from a lay person's perspective) is not at odds with abstract theoretical accounts such as lists based on notions of human development, capabilities or the quality of life.

By way of illustration they provide a list of thirty aspects of a good life identified through semi-structured interviews with South Africans.[161] The list covers a large terrain inclusive of emotional states (such as happiness and love), human values (such as respect and independence) to functional needs (such as jobs, housing and education) and material possessions (such as a motor car, clothes and furniture). They show that these are similar to the list of ten central human capabilities developed by Nussbaum (2005) (and discussed in Chapter 2): life, bodily health, bodily integrity, senses, imagination and thought, emotions, practical reason, affiliation, other species, play and political and material control over one's environment.

However, the high number of reports that catalogue well-being studies for the purposes of listing, comparing and synthesising the various applications suggest that well-being measurement is more complex (Booysen, 2002; Cummins, 1996; de Leon and Boris, 2010; Hagerty et al., 2001; Lippman et al., 2009; Sirgy, 2011) That is, there is no standard form of measurement to translate abstract and aspirational notions of well-being into operational form. Frønes states that:

> A good life is a meaningful metaphor for most people, but it is not an entity that exists in a given format. The good life and happiness exist as narratives, visions, and images and as economic and psychological models. The construction of indicators of the good life is interwoven with the theory of the good life. (Frønes, 2007: 13 - 14)

A range of questions arise in relation to this. Is it actually empirically possible to universally and comprehensively capture well-being through a series of dimensions? Should practical capabilities (for e.g. education or employment) be treated as an end in

[161] These are: jobs, housing, education, adequate/regular income, a good family, living a religious/Christian life, good health, enough food, happiness/joy, love (each other), good friends, education for children, motor car, owning a business, understanding (between people), support of family, relaxation, good area to live, nice/good clothes, security/safety, having/caring for children, respect (especially for others), sports, to get married, independence (financial), peace (household/community), recreation, communication (between people), acquiring skills/qualifications and furniture.

themselves, endowed with intrinsic values or a means to an end (enabling of a higher income for instance) (D. A. Clark and Gough, 2005)? How should the role of psychological states in contributing to a positive outlook be incorporated? How should intangible aspects but of intrinsic value to an individual be measured; 'feelings such as being respected, feeling proud, achieving status and being successful as well as more virtuous ends' (D. A. Clark and Gough, 2005)?

Within this context, to enable operationalisation of the MIW framework, it is necessary to determine an 'evaluative space' (Sen, 1993a: 32) that is simultaneously expansive enough to encompass the complexities of individual well-being and 'do justice to the richness of the idea' and yet measureable as an analytical framework within the constraints of survey data. In compiling the list of well-being dimensions for this chapter, therefore, reference is made to the existing literature on well-being to identify commonality in the dimensions. The well-being dimensions listed in Table 6.2 are deliberately drawn from the literature to illustrate the breadth of applications at various levels across groups in society, including children and older people.

The different categorisation of the reports and studies have emerged from different academic traditions and intended for different purposes. The first two reports (ABS, 2001b; Stiglitz et al., 2009) serve as 'gold standards', drawing tenets from psychology, moral philosophy and welfare economics (Stiglitz et al., 2009: 153) to list, in an ideal measurement scenario, a comprehensive account of well-being dimensions for analysis at both the societal and individual level. Stiglitz et al. (2009), for instance, include global issues such as the environment and insecurity of an economic and physical nature that are not measurable within HILDA. The list provided by Ruth and Harter (2010) is based on popular opinion from a global Gallup study across 150 countries on the essential elements that shape people's lives.

Table 6.2 Comparison of dimensions across selected literature

Broad categorisation	Stiglitz et al. (2009)	ABS well-being framework (2001)	Rath and Harter (2010)	Cummins et al. (2003 & 2013)	Cummins et al. (1996)	Bradshaw and Richardson (2009)	Moore et al. (2008)	Pollard and Lee (2003)	Breheny et al. (2013)	Hallerod et al. (2012)	Bowling and Gabriel (2004, 2007, 2011)
Economic	Material living standards	Economic resources	Financial well-being	Standard of living (economic terms)	Economic or material well-being	Material resources	Socio-demographic context (hhold income, capital and education)	Economic well-being	Security (financial security) Restriction (having consumer choice)	Economic stress	Financial circumstances and independence
Health	Health	Health	Physical well-being	Personal health	Physical and functioning health Emotional well-being (mental health, spiritual well-being)	Health	Individual physical health Individual psychological health	Physical well-being Psychological well-being	Health care (have physical comfort)	Physical function Subjective and somatic health Psychosocial issues	Health and functional status Psychological outlook
Relationships	Social connections and relationships	Family and community	Social well-being	Personal relationships	Intimacy	Personal relationships	Individual social health (parent-child, activity engagement, social behaviours)	Social well-being	Contribution (to the lives of others)	Personal/social relations	Social relationships and social support

Table 6.2 Comparison of dimensions across selected literature (cont'd)

Broad categorisation	Stiglitz et al. (2009)	ABS well-being framework (2001)	Rath and Harter (2010)	Cummins et al. (2003 & 2013)	Cummins et al. (1996)	Bradshaw and Richardson (2009)	Moore et al. (2008)	Pollard and Lee (2003)	Breheny et al. (2013)	Hallerod et al. (2012)	Bowling and Gabriel (2004, 2007, 2011)
Participation			Community well-being	Community connectedness	Community engagement				Social integration (connection to others)		Social roles and activities
Local Environment		Housing				Housing and the environment	Neighbourhood context				Home and the neighbourhood
Natural Environment	Environment (natural)										
Education	Education	Education and Training		Achievements in life		Education	Individual educational achievement & cognitive development	Cognitive well-being			
Safety	Insecurity	Crime and justice		Personal safety	Safety	Behaviour and risks					
Work	Personal activities (including work)	Work	Career well-being		Productive activity						
Other	Political voice and governance	Culture and leisure		Future security		Subjective well-being	Family context (parenting, health coverage)		Enjoyment (ability to experience enjoyment)		Leisure activities

The next two studies are based on the work of Cummins and colleagues, psychologists who examine people's cognitive evaluations of their quality of life as a way of measuring well-being. Cummins (1996) drew on 32 life satisfactions studies based on focus groups, case studies, clinical studies and sample surveys to categorise 173 quality of life terms into seven domains of subjective well-being. In later work (Capic et al., 2015; Cummins et al., 2003; International Wellbeing Group, 2013), the construction of the Personal Well-being Index (PWI) involved seven 'satisfaction with …' questions, each considered a constitutive component (dimension) contributing unique variance to the overall PWI as a measure of overall life satisfaction.

The three studies by Bradshaw and Richardson (2009), Moore et al. (2008) and Pollard and Lee (2003) focus on the 'child'. They are included because the dedication to and proliferation of appropriate child well-being frameworks has been influential within the larger social indicator movement (Bradshaw et al., 2007; Lamb and Land, 2013; Lippman et al., 2011; O'Hare and Gutierrez, 2012). While these promote unique child-centred well-being dimensions, the dimensions in actuality are similar to the other studies listed in Table 6.2. The only difference relates to the distinction between individual dimensions (for example, physical and psychological health) that directly involve the child from contextual realms that are not within the direct control of the child but influence their well-being (for example, the neighbourhood context and economic well-being).[162] The dimensions are also similar across the three studies irrespective of whether they are concerned with ranking of countries using aggregate data (Bradshaw and Richardson, 2009), comparison of child demographics using micro-data (Moore et al., 2008) or summarised from Pollard and Lee's (2003) classification of the literature.

[162] Ben-Arieh (2008: 5) asserts that a key impetus for the child indicator movement is attributable to child human development theory that delineate circles of influence in promoting or constraining a child's well-being at different stages of development. Bronfenbrenner and Morris (2006) theorise four concentric circles of influence underwritten by time: the micro-system – the direct influence of family, friends, neighbours and school; the meso-system – direct influences brought on by the inter-relationships between the different microsystem structures; the exosystem – societal context of the family (social networks, local community) with indirect influence on the microsystem structures; and the macrosystem – the wider societal context such as the economic and political environment and the cultural setting.

The last three studies in Table 6.2 present dimensions of well-being based on research with older people. The study by Halleröd and Selden (2012) frames well-being negatively clustering indicators into welfare problems. Breheny et al.'s (2013) study examines well-being from a positive perspective, however, the dimensions are identified in terms of being enabled or constrained by material resources. Yet despite this, they share a similarity with the series of papers published by Bowling and Gabriel (2004, 2007) and Bowling and Stenner (2011) that through a range of open-ended surveys and qualitative research sought to identify the dimensions/themes that older people themselves regard as giving meaning and well-being to their lives.

Their qualitative research went further, to investigate the motivations from an older person's perspective that give value to these themes. Motivations that on face value do not seem at odds with the desires and aspirations of most adults. These are: 'the freedom to do the things they wanted to do without restriction (whether in the home or socially); pleasure, enjoyment and satisfaction with life; mental harmony; social attachment and having access to companionship, intimacy, love, social contact and involvement, help; social roles; and feeling secure' (Bowling and Gabriel, 2007: 842).

Taking into account the synergy and similarity of well-being dimensions across the literature from Table 6.2, Table 6.3 lists the dimensions chosen for application in the MIW approach and provides a conceptual definition of each.

Table 6.3 Final individual well-being dimensions

Dimensions	Definitions
Economic stability	This dimension recognises the normative role of money to an individual's well-being. Its instrumental value is in providing the means to purchase marketed resources to meet the costs of living in society and enable the financial provision of benefits intrinsic to a good life.
Physical health	Health is a fundamental aspect of well-being shaping both the quality and length of life (Stiglitz et al., 2009: 45). Physical health is concerned with the biological status of individuals in terms of the impact of physical functionality and health limitations on the ability to enjoy and maintain an individual's lifestyle (Kronefield, 2006; Peel et al., 2004; Ware and Kosinski, 2002).
Mental health	This dimension incorporates the mental and emotional status of individuals, recognising the role attitudes, beliefs and feelings have on an individual's ability to maintain their lifestyle, including physical and social functioning (Kronefield, 2006; Peel et al., 2004; Ware and Kosinski, 2002).
Personal relationships	This dimension refers to the quality and extent of personal and intimate relationships. It emphasises the importance of social cohesion, giving value to the intangible and fundamental need for individuals to belong, to feel protected, to be loved, to be inter-dependent. ['No man is an island'] (Berry and Welsh, 2010)
Community and social participation	Community and social participation encapsulates individual's interactions with others in the social and civic life of communities. It encapsulates a variety of aspects such as volunteering, civic engagement, political participation and the degree of social connectedness (Berry et al., 2007; Berry and Welsh, 2010; Levasseur et al., 2010; Nieminen et al., 2008).
Neighbourhood environment	This dimension recognises that the spatial unit formed by the neighbourhood provides an immediate social context for an individual influencing their well-being. It includes the quality of the built environment and the quality of neighbourhood relations (Evans, 2003; Guite et al., 2006; O'Campo et al., 2009; Tomaszewski, 2012).

There are four points that require elaborating. The first is to emphasise that the dimensions and indicators in the MIW framework are intentionally relevant to all adults (older and non-older). Applying the MIW framework to an analysis of the well-being of older people does not negate the consequences of the ageing process as described by Närvänen (2004) in Chapter 1. Nor does it diminish the increasing importance of factors such as the resilience to cope with changing life events and maintaining independence and autonomy through the onset of declining health, concerns raised by older people in qualitative research (Bowling and Gabriel, 2007; Hill et al., 2009; McCormick et al., 2009). In choosing universally-relevant, individually-applicable well-being dimensions, consideration is given to old age as a specific life stage across the life course continuum. One describing a heterogeneous demographic, and not a homogenous and distinctly separate entity beyond adulthood (Harper, 2004: 3). The issues and priorities that may face older people in different ways from other adult age-groups at distinct life stages across the life course are evident in the estimated results.

The second point refers to the treatment of subjective well-being within the MIW framework. Unlike Bradshaw and Richardson (2009) a subjective well-being dimension is not included either through the form of an overall life satisfaction question, dimension-specific satisfaction questions or happiness question. As discussed in Chapters 2 and 3, despite the prevalence of SWB questions within social indicator studies, there is still debate about the relationship to objective indicators. Are they complementary or supplementary? What explains the relatively weak correlation between the two sets of indicator forms? Some of the concerns with subjective well-being questions relate to: the temporal nature of self-perceptions; the capacity to differentiate aspiration, adaptation and social comparison from daily realities; and the influence of personality types on self-assessments (Chiappero-Martinetti, 2000; C. Graham, 2010; McAllister, 2005; Stiglitz et al., 2009).

Consequently, the approach adopted in this thesis accepts the proposition made by Cummins (International Wellbeing Group, 2013), Hagerty et al. (2001), Stiglitz et al. (2009) and Boelhouwer (2010) that well-being should exist separately across subjective (satisfaction) and objective realms. Subjective well-being questions provide a parsimonious counterpart to sets of objective measures and hence a useful outcome-focussed measure to compare against. It serves as a complementary and validating role.[163] Each dimension in the MIW framework is amenable to objective and subjective measurement, the latter through a dimension-specific satisfaction question.[164]

The third point is the exclusion of the remaining well-being dimensions listed in Table 6.2 but not included in the MIW dimensions in Table 6.3. The exclusion of the dimensions, education and employment (work), is contentious. Are they predictors influencing well-being outcomes or constituents of well-being itself? For this analysis, they are treated as demographic characteristics on the assumption that the different groups within each demographic (for example, in relation to employment - employed full time, employed part time or retired) act as descriptive statistics that are neutral in nature and are not necessarily imbibed with a value judgement that one sub-group represents more of an achievement than another.[165] By comparing the well-being dimension scores across these demographic sub-groups, it is possible to ascertain if there are consequences for well-being outcomes by different demographic groups.

[163] It is important to point out that in practice though the distinction between objective and subjective questions is not so clearly delineated. Most surveys, whether self-completed or through an interviewer interface include questions, the nature of which require the respondent to make a self-assessment. Hence, potentially facing the same criticism levelled at subjective well-being questions. As Diener and Suh (1997: 210) write ‘the positivistic idea that we can obtain objective measures that are totally value-free is illusory’. The convention is to treat them as ‘objective’ when compared to overt satisfaction specific questions.

[164] The satisfaction questions are: satisfaction with financial situation, satisfaction with health, satisfaction with relationships, satisfaction with feeling part of your local community and satisfaction with neighbourhood.

[165] There may not be agreement on this, especially as policy documents such as the Intergenerational Report (Australian Government, 2010, 2015) advocate, for example, that continued employment for older people or a return to the work force for mothers is beneficial to both individual economic well-being and society in general. However, the counter-argument from a non-economic perspective might place leisure or work-life balance as a higher priority. The point is that while the value placed on these categories is debatable, the intrinsic value within each of the dimensions in Table 6.3 is not.

The dimensions: natural environment; political voice and governance; and safety are not included as HILDA does not possess a set of appropriate indicators. Furthermore, the natural environment relates more broadly to the wider community and is not always directly actionable by individuals themselves. Although HILDA does include a subjective-based 'satisfaction with safety' question, Cummins and colleagues (International Wellbeing Group, 2013: 7) show that this does not contribute unique variance to overall life satisfaction in the development of the PWI.

Finally, prior to describing the indicators, a brief discussion on including an economic dimension is required. Similar reasons excluding education and work as potential well-being dimensions are applicable to the economics dimension. Is the role of economic resources limited to a conduit as a means to an end, an input used to achieve a direct well-being outcome? Or does it possess intrinsic benefits that are of value in itself? In debating the position of resources (economic and non-economic) on the schema of 'a good life' from cause to consequence, philosophers such as Sen (1984, 1993a) have argued that economic resources are commodities; the translation to well-being outcomes (in Sen's language, 'functionings') depend on a person's conversion ability.

However, juxtaposed against this philosophical reasoning are the numerous lists from theoretical accounts of well-being and human development to empirical 'bottom up' accounts that include economic status as a constituent element of well-being. It is the contention in this thesis that excluding an economic dimension will compromise the integrity of a composite well-being index as encapsulating the most important (and measurable) components of well-being. Moreover, the economic dimension defined in Table 6.3 is substantively different from the development of the ELS economic resource metrics, hence the distinct labelling of the dimension as 'economic stability' (this is discussed further in Section 6.4).

As with almost all of the social indicator empirical studies, much subjectivity is involved with much room for debate concerning numerous conceptual and methodological choices including the number, choice and characterisation of the dimensions (and in the next section, with respect to indicators). The final choice of dimensions is perceived as collectively and sufficiently encompassing, yet each contributing uniquely to the well-being of individuals in an Australian context.[166] This is one application and different scholars will no doubt have different views on the plausibility of the choices made.

6.4 Indicators

It is worthwhile noting a comment by Sumner on the plausibility of measurement indicators. He writes:

> … the measure should have an underlying conceptualisation of well-being, ... and be policy relevant, ... a direct and unambiguous measure of progress, specific to the phenomena, valid, reliable, consistent, measurable, user-friendly, not easily manipulated, cost-effective and up to date ... Fine in theory, but what commonly used … indicators could jump through all those hoops? (Sumner, 2006: 55)

With this in mind, the HILDA dataset has been examined to identify potential well-being indicators. The choice of indicators are guided by the principles set out by Atkinson et al. (2002: 21 - 25) (refer to Section 6.2.1); on 'face validity' appear to be deductively related to the six dimensions of well-being (Cobb and Rixford, 1998: 3)[167]; and as far as possible are direct measures of well-being (Bradshaw and Richardson, 2009: 320). This does not mean, however, that the potential list will not include ambiguous indicators or indicators that are not perfect linear representations of each other. However, at this stage, the preference is to follow the rationale of Osberg and Sharpe (2002: 295) and include rather than exclude imprecise measures on the grounds that 'omitting a variable would implicitly set its value to zero. Hence, an

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[166] An unintended but affirming outcome is that the final list of six dimension is in keeping with the recommendation by O'Hare and Gutierrez (2012: 616) of 'an emerging consensus among scholars that 6 or 7 is the correct number of domains to include in a comprehensive composite index'.

[167] The Corsini Encyclopaedia of Psychology (Corsini and Ozaki, 1984: 637) defines face validity as the 'appropriateness, sensibility or relevance of the test and its items as they appear to the person answering the test'. In other words,

imprecise measure of a variable is likely to embody a smaller error than complete omission'. These may be removed after factor analysis is performed.

Table 6.4 specifies the list of 81 potential indicators, their operational form and the percentage of the sample with missing values for each item.[168] All the indicators in Table 6.4 are based on respondents answering attitudinal questions from the HILDA self-completion questionnaire (SCQ). They are Likert items. The majority of indicators have ordered response levels ranging from 5 to 7. Ten indicators have a 3-point Likert scale and fourteen indicators are dichotomous (yes/no). To ensure that all indicators move in the same positive direction, that is, a higher Likert response represents a more positive outcome, negatively framed questions are re-coded to move in the same positive direction. These are italicised.

The indicators have been tentatively grouped into dimensions according to the purpose of their initial design and construction (Berry and Welsh, 2010; S. Henderson et al., 1978; N. L. Marshall and Barnett, 1993; Sampson et al., 1997; Ware and Kosinski, 2002) and in accordance with their thematic placement in the HILDA questionnaire (Summerfield et al., 2012). It is accepted that there will be movement between indicators after the underlying statistical relationship between them is determined through factor analysis.

[168] Discussion and treatment of missing values is discussed in Appendix D.4 and is incorporated into the MIW approach in Section 6.6.

Table 6.4 Description and operational form of well-being indicators (preliminary categorisation)

Well-being indicators	Operational form	% missing
Economic stability *(9 indicators)*		
Could not pay electricity, gas or telephone bills on time*	1 Yes .. 2 No	4.6
Could not pay the mortgage or rent on time*	1 Yes .. 2 No	4.6
Pawned or sold something*	1 Yes .. 2 No	4.6
Went without meals*	1 Yes .. 2 No	4.6
Was unable to heat home*	1 Yes .. 2 No	4.6
Asked for financial help from friends or family*	1 Yes .. 2 No	4.6
Asked for help from welfare/community organisations*	1 Yes .. 2 No	4.6
Difficulty raising $3000 in an emergency	1 Couldn't raise .. 4 Could easily raise funds	2.4
Prosperity given current needs & financial responsibilities	1 Very poor .. 6 Prosperous	1.6
Physical health *(21 indicators)*		
Vigorous activities	1 Limited a lot .. 3 Not limited at all	1.2
Moderate activities	1 Limited a lot .. 3 Not limited at all	1.0
Lifting or carrying groceries	1 Limited a lot .. 3 Not limited at all	1.0
Climbing several flights of stairs	1 Limited a lot .. 3 Not limited at all	1.1
Climbing one flight of stairs	1 Limited a lot .. 3 Not limited at all	1.4
Bending kneeling or stooping	1 Limited a lot .. 3 Not limited at all	1.0
Walking more than one kilometre	1 Limited a lot .. 3 Not limited at all	1.0
Walking half a kilometre	1 Limited a lot .. 3 Not limited at all	1.0
Walking 100 metres	1 Limited a lot .. 3 Not limited at all	1.3
Bathing or dressing yourself	1 Limited a lot .. 3 Not limited at all	0.9
Cut down the amount of time spent on work or other activities	1 Yes .. 2 No	1.0
Accomplished less than would like	1 Yes .. 2 No	1.2
Were limited in the kind of work	1 Yes .. 2 No	1.2
Had difficulty performing work or other activities	1 Yes .. 2 No	1.2
Bodily pain in last 4 weeks	1 Very Severe .. 6 No bodily pain	0.6
How much did pain interfere with normal work	1 Extremely .. 5 Not at all	0.5
Self-assessed health	1 Poor .. 5 Excellent	0.7
Get sick a little easier than other people	1 Definitely true .. 5 Definitely false	1.3
As healthy as anybody I know	1 Definitely false .. 5 Definitely true	1.2
Expect my health to get worse	1 Definitely true .. 5 Definitely false	1.2
My health is excellent	1 Definitely false .. 5 Definitely true	1.2
Mental health *(14 indicators)*		
Feel full of life	1 None of the time .. 6 All of the time	0.7
Have a lot of energy	1 None of the time .. 6 All of the time	0.9
Felt worn out	1 All of the time .. 6 None of the time	1.1
Felt tired	1 All of the time .. 6 None of the time	0.8
Extent physical/emotional health interfered with normal social activities	1 Extremely .. 5 Not at all	0.6
Time physical/emotional problems interfered with social activities	1 All of the time .. 6 None of the time	1.0

Table 6.4 Description and operational form of well-being indicators (preliminary categorisation) (cont'd)

Well-being indicators (cont'd)	Operational form	% missing
Mental health *(14 indicators) (cont'd)*		
Cut down the amount of time spent on work/other activities	1 Yes .. 2 No	1.1
Accomplished less than would like	1 Yes .. 2 No	1.2
Didn't do work/other activities as carefully as usual	1 Yes .. 2 No	1.2
Been a nervous person	1 All of the time .. 6 None of the time	0.7
Felt so down in the dumps nothing could cheer you up	1 All of the time .. 6 None of the time	0.8
Felt calm and peaceful	1 None of the time .. 6 All of the time	0.7
Felt down	1 All of the time .. 6 None of the time	0.8
Been a happy person	1 None of the time .. 6 All of the time	0.8
Personal relationships *(10 indicators)*		
People don't visit me as often I would like	1 Strongly agree .. 7 Strongly disagree	0.8
Often need help from other people but can't get it	1 Strongly agree .. 7 Strongly disagree	1.0
Lots of friends	1 Strongly disagree .. 7 Strongly agree	1.0
No one to confide in	1 Strongly agree .. 7 Strongly disagree	1.0
No one to lean on in times of trouble	1 Strongly agree .. 7 Strongly disagree	1.0
Someone who can always cheer me up when I'm down	1 Strongly disagree .. 7 Strongly agree	1.0
Often feel very lonely	1 Strongly agree .. 7 Strongly disagree	1.1
Enjoy the time I spend with people who are important to me	1 Strongly disagree .. 7 Strongly agree	0.9
When something's on my mind, talking with people can make me feel better	1 Strongly disagree .. 7 Strongly agree	0.9
Usually find someone to help me out when I need	1 Strongly disagree .. 7 Strongly agree	0.9
Community and social participation *(12 indicators)*		
Have telephone, email or mail contact with friends or relatives not living with you	1 Never .. 6 Very Often	0.9
Chat with your neighbours	1 Never .. 6 Very Often	1.0
Attend events that bring people together such as fetes, shows, festivals or other community events	1 Never .. 6 Very Often	1.1
Get involved in activities for a union, political party, or group that is for or against something community events	1 Never .. 6 Very Often	1.1
Make time to attend services at a place of worship	1 Never .. 6 Very Often	0.9
Encourage others to get involved with a group that's trying to make a difference in the community	1 Never .. 6 Very Often	1.1

Table 6.4 Description and operational form of well-being indicators (preliminary categorisation) (cont'd)

Well-being indicators (cont'd)	Operational form	% missing
Community and social participation *(12 indicators) (cont'd)*		
Talk about current affairs with friends, family or neighbours	1 Never .. 6 Very Often	1.1
Make time to keep in touch with friends	1 Never .. 6 Very Often	1.1
Volunteer your spare time to work on boards or organising committees of clubs, community	1 Never .. 6 Very Often	1.0
See members of my extended family (or relatives not living with me) in person	1 Never .. 6 Very Often	1.1
Get in touch with a local politician or councillor about issues that concern me	1 Never .. 6 Very Often	1.1
Give money to charity if asked	1 Never .. 6 Very Often	1.0
Neighbourhood environment *(15 indicators)*		
Neighbours helping each other out	1 Never happens .. 5 Very common	9.4
Neighbours doing things together	1 Never happens .. 5 Very common	11.0
Traffic noise	1 Very common .. 5 Never happens	1.8
Noise from airplanes, trains or industry	1 Very common .. 5 Never happens	1.5
Homes and gardens in bad condition	1 Very common .. 5 Never happens	3.0
Rubbish and litter lying around	1 Very common .. 5 Never happens	1.7
Teenagers hanging around on the streets	1 Very common .. 5 Never happens	2.2
People being hostile and aggressive	1 Very common .. 5 Never happens	3.6
Vandalism and deliberate damage to property	1 Very common .. 5 Never happens	3.5
Burglary and theft	1 Very common .. 5 Never happens	9.5
This is a close-knit neighbourhood	1 Strongly disagree .. 7 Strongly agree	0.9
People around here are willing to help their neighbours	1 Strongly disagree .. 7 Strongly agree	0.8
People in this neighbourhood can be trusted	1 Strongly disagree .. 7 Strongly agree	1.1
People in this neighbourhood generally do not get along with each other	1 Strongly agree .. 7 Strongly disagree	1.1
People in this neighbourhood generally do not share the same values	1 Strongly agree .. 7 Strongly disagree	1.0

Source: HILDA Wave 10 Release 10.
Weights: Cross-sectional responding person population weights for 2010.
Sample: The sample of responding people who completed the self-completion questionnaire is 12,048, comprising 1,984 older people respondents and 10,064 non-older adults.
Note: Italicised items are reverse coded so that a higher numerical value represents a better outcome.
Note: Items with an asterisk are imputed from Waves 11 and 9.

Before commencing description of the potential indicators, it is necessary to justify using the economic-related indicators listed in Table 6.4, instead of choosing one of the ELS metrics developed in Part 1. Central to this is the role of the economic resource metrics – are they a comparison point to the well-being index or should they be incorporated into the MIW model? There are two reasons to consider using one of the

ELS metrics. First, the ELS metrics are able to act as indicators if it is accepted that the enumerated estimates are not neutral, with high dollar amounts assumed to be reflective of higher levels of economic well-being. Second, the development of a composite well-being index, that includes an economic dimension, continues the schema of a continuum of metrics developed so far in the thesis. This enables the relative position of sub-groups of older people to be assessed as we move from a narrow focus on disposable income, towards fuller income measures and further to that towards a multi-dimensional focus.

However, there are counter arguments that justify excluding the ELS metrics. A guiding principle in identifying potential indicators is that they ought to represent direct measures of economic well-being. Indeed, a key motivation for deprivation research is the recognition that even though estimating income and consumption measures are important to understanding what is required to achieve a particular standard of living, they do not measure the standard of living or economic well-being achieved directly (Gordon and Pantazis, 1997; Mack and Lansley, 1985; Ringen, 1988; Saunders, 2011). This is better served with direct questions on an individual's ability to afford socially identified necessities and their self-assessed prosperity, as is the case with the indicators listed in Table 6.4. Moreover, by excluding the ELS metrics there are in effect two independent approaches to standard of living and well-being assessment: an ELS and a MIW approach. Section 7.7 in Chapter 7 investigates the relationship between the two approaches and how this differs for older people versus non-older adults.

Eight of the nine indicators relating to economic stability are modified from the 1999 ABS Survey of Living Standards (Summerfield et al., 2012). This was a pilot study conducted by the ABS to inform the inclusion of financial stress questions within the ABS Household Expenditure Surveys and which drew heavily from the deprivation work by Travers and Roberstson (1996) on social security recipients. Unfortunately, even though the seven financial stress items[169] are asked as part of the annual wave

[169] These are: not pay electricity, gas or telephone bills on time; Could not pay the mortgage or rent on time; Pawned or sold something; Went without meals; Was unable to heat home; Asked for financial help from friends or family; and Asked for help from welfare/community organisations.

data collection, they are withheld from the Wave 10 dataset, as the question erroneously asked about the wrong time period (since January 2009 instead of January 2010). Consequently, they are imputed using data from Waves 9 and 11 (see Appendix D.1 for details). The ninth indicator on self-assessed financial prosperity is adapted from the Australian and International Survey Data for Multivariate Analysis (IsssA) (Kelley and Evans, 1999).

The 35 health indicators classified in Table 6.4 as reflective of either physical or mental health dimensions are taken from SF-36. SF-36 is an internationally recognised, extensively used, validated and multi-purpose generic health screening instrument used to assess functional health status and psychological well-being among the general adult population (McCallum, 1995; Sanson-Fisher and Perkins, 1998; Ware, 2000; Ware and Kosinski, 2002). The 35 items provide measures across eight distinct health concepts widely accepted as affecting disease and treatment (Ware, 2000; Ware and Sherbourne, 1992). These are: physical functioning; role limitations because of physical health problems; bodily pain; limitations in social functioning; general mental health (psychological distress and psychological well-being); role limitations because of emotional problems; vitality (energy/fatigue); and general health perceptions (Ware and Sherbourne, 1992: 474).[170]

The decision rule for allocating indicators to the physical health and mental health dimensions follows that of Ware and Kosinski (2001; 2002) in the creation of the Physical Component Summary (PCS) and Mental Health Component Summary (MCS) scales. They show using principal components analysis that the eight health concepts can be allocated to define distinct physical and mental health dimensions, making it possible to construct 'psychometrically based physical and mental health summary measures' (Ware, 2000: 3134). This not only simplifies interpretation of SF-36 but also

[170] The time relation in the 36th item in SF-36 (self-reported measure of health transition) precludes it from inclusion in the MIW framework.

provides distinct summary measures amenable to specific mental health or physical health targeted disease intervention.[171]

The remaining thirty-seven indicators available in HILDA for use in the MIW framework are adapted from a variety of sources. Interestingly, two-thirds of the indicators are adapted from sources with a similar generic-health investigative purpose; to understand the link between various aspects of life and the mitigation of mental and physical health deficits. The first seven indicators relating to personal relationships are sourced from Henderson et al. ((1980; 1978) who developed a survey instrument to qualitatively explore social relationships between mentally well and mentally ill patients at a health centre in order to assess the protective function of social relationships against physical and/or psychiatric morbidity.[172] The remaining three relationship questions are provided by psychologists Marshall and Barnett (1993) to examine the role of social support in mitigating work-family strains amongst dual earning couples.

The twelve indicators categorised under the community and social participation dimension are adapted from the 'Australian Community Participation Questionnaire' (ACPQ) ((Berry et al., 2007). The survey instrument was initially developed to examine the protective role of community and civic participation against the onset of physical and mental disorders. The ACPQ defines participation as comprising informal social connectedness (that is, a spontaneous and flexible active social life); civic engagement (that is, the associations with organised aspects of community); and political participation (that is, the exercising of rights and opinions).

[171] McHorney (1993: 259) writes that the two scales 'are most sensitive, respectively, to the clinical manifestations of medical and psychiatric conditions. Therefore, when observed differences are found on these scales, interpretation attributed to physical or mental causes can be made with a high degree of confidence'.

[172] The final survey instrument 'The Interview Schedule for Social Interaction' has fifty-two items that examine the incidence, quality and nature of a person's relationships within his immediate social environment (S Henderson et al., 1980).

The ten indicators relating to the neighbourhood are adapted from the Australian and International Survey Data for Multivariate Analysis (IsssA) (Kelley and Evans, 1999) and the British Social Attitudes (BSA) Survey (Summerfield et al., 2012). The final five neighbourhood related indicators are sourced from Sampson et al. (1997), whose study examine if social cohesion neighbours and a willingness to act collectively reduce violence. These five items are specifically intended to capture the level of social cohesion and trust within a neighbourhood.[173]

6.5 Exploratory factor analysis to establish the reflective constructs

As discussed in the preceding section, the relationship between each latent well-being dimension and the sets of indicators is tentatively categorised in Table 6.4 according to the face validity of each item and their initial source. However, to verify if the indicators in Table 6.4 are reflective of the latent well-being dimensions set out in Table 6.3, and the reflective model is statistically valid, exploratory factor analysis is performed. Exploratory factor analysis (EFA) determines if the set of indicators is adequately represented by a smaller number of factors (well-being dimensions). A second type of analysis, confirmatory factor analysis (CFA), is also included in Appendix D.3 as supplementary to EFA, reinforcing the strength of the reflective relationship between the dimensions and the indicators.[174]

Exploratory factor analysis is a mathematical technique that analyses the correlation patterns between indicator variables to determine if they can be represented as linear functions of a fewer number of unobserved latent variables (Brown, 2006). Krishnakumar and Nagar summarises the relationship by writing:

> The FA [factor analysis] model assumes that the observed variables (indicators) are all dependent on one or more latent variables which are

[173] Although somewhat outdated now, Wooden and Watson (2007) present an overview of the various research uses of the HILDA data including the way questions from the SCQ component have been analysed.

[174] Although there is precedence to use CFA for this type of social indicator application (Breheny et al., 2013; Halleröd, 2009; Halleröd and Selden, 2012), the explanation for why CFA is only included as a supplementary validation exercise is discussed in Appendix D.3.

> taken to be their common cause(s). Thus it not only conforms to our idea that the concept we are trying to assess is unobservable but also provides a theoretical framework explaining the observed variables as different manifestations of our latent concept(s) called factor(s). (Krishnakumar and Nagar, 2008: 485)

Exploratory factor analysis is conducted following the procedure and guidelines set out by Nardo et al. (2005), Costello and Osborne (2005) and (Williams et al., 2012). Four conditions to confirm the suitability of the data for EFA are met. First, the sample size is large enough and the sample to variable ratio *(N:p)* of 148:1 exceeds all minimum ratios set in the literature (Nardo et al., 2005; Williams et al., 2012). Second, as the indicators in Table 6.4 are ordinal data, to overcome the assumption of interval data required to conduct EFA, factor solutions are obtained using polychoric correlations rather than Pearson correlations (Holgado-Tello. et al., 2010).[175]

Third, the polychoric correlation coefficients in Appendix D.2 verify the factorability of the matrix. For the most part, the hypothesised positive relationship between indicators in each dimension is observed. Correlation coefficients between indicators in the physical health and mental health dimensions are above 0.30. This is expected given the validity and reliability of the SF-36 instrument as a health screening and assessment tool. Similarly, correlation coefficients are also above 0.30 for the majority

[175] It is now well-established in the literature that measures of association based on ordinal and binary item response data should be measured using polychoric correlations rather than Pearson correlations (Choi et al., 2010; Gadermann et al., 2012; Holgado-Tello. et al., 2010; Jöreskog, 1990; Maggino and Zumbo, 2012; Uebersax, 2006). Pearson correlations assume interval measurement scales. With polychoric correlations, the ordered observed responses are assumed to be continuous in nature but have been divided into a series of categories. The correlation between two ordinal variables is, therefore, estimated on the assumption that they follow a bivariate normal distribution.

Holgado-Tello (2010: 155) show that if Pearson's correlations are used to analyse the validity of an ordinal scale, the correlation coefficients will be lower (and consequently the factor loadings) as all respondents situated at different points on the 'assumed' interval will be assigned the same score. They argue that not choosing the appropriate procedure to the data metric to analyse construct validity will bias the estimated relationships between variables and potentially bias substantive conclusions.

of indicators classified as personal relationships[176] and for all of the economic stability indicators. Some coefficients are below 0.30 within the 'community and social participation' and 'neighbourhood environment' dimensions. The EFA will determine the validity of each indicator and the strength of its relationship to the dimension. Indicators may then be removed entirely or re-classified as a manifestation of another dimension.

Fourth are the adequate sampling statistics. The Kaiser-Meyer-Olkin measure of sampling adequacy compares the magnitudes of the observed correlation coefficients to the magnitudes of the partial correlation coefficients. The KMO index of 0.945 is above the recommended value of 0.6, evidence that the strength of the relationship between the indicators is high (Nardo et al., 2005). The Bartlett's test of sphericity, used to test that the null hypothesis that the correlation matrix is an identity matrix, is significant (χ^2 (3240) = 364000, p <0.001).

Preliminary unrestrained and unrotated factor analyses indicated extracting between 6-12 factors. Based on the Kaiser criterion ('eigenvalue-greater-than-one-rule'), the scree-plot in Figure 6.3 shows that 12 factors have eigenvalues above 1, accounting for 75.1 per cent of the total variance in the data.[177] The Kaiser criterion is criticised in the literature for retaining too many factors and as an inaccurate method to select the number of factors to retain (Costello and Osborne, 2005; Courtney, 2013).[178] Instead, Costello and Osborne (2005) and Nardo (2005) recommend examining the scree plot and retaining the factors above the break, before the eigenvalues on the curve flattens out. In Figure 6.3, depending on the interpretation of the 'kink', this suggests either six or eight factors.

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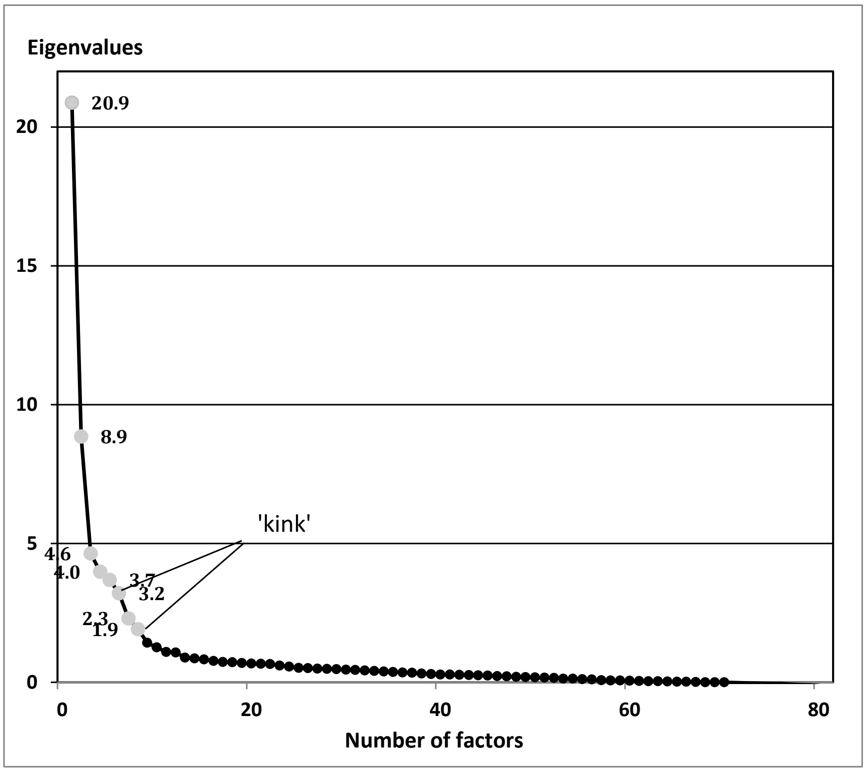
[176] The only exception is the relationship between three indicators to the indicator 'people don't visit me as often as I would like'.

[177] The scree plot is based on the principal axis factoring extraction method with no rotation of factors.

[178] Critics of the Kaiser criterion contend that as it was initially intended for principal components analysis and not EFA, the assumptions for extraction aren't valid (Costello and Osborne, 2005; Courtney, 2013). It is also difficult to differentiate between eigenvalues that are marginally above and below one. Furthermore, simulation studies demonstrate that the Kaiser criterion tends to over-estimate the number of factors (Costello and Osborne, 2005).

Figure 6.3 Scree plot of eigenvalues



Source: Author's calculations based on imputations from HILDA Wave 10 Release 10.

Following Costello and Osborne (2005) who recommend running multiple factor analyses, six, seven and eight factor solutions are examined using two different factor extraction methods: principal axis factoring and iterated principal axis factoring, and each in combination with two different rotation techniques: varimax (factors are assumed to be orthogonal) and promax (factors are assumed to be correlated) rotation with Kaiser normalisation.[179] The intention is not to conduct an exploratory exercise to determine how the indicators cluster, but to validate that the indicators are appropriately grouped into the hypothesised dimensions and hence, are appropriate

[179] The three EFA extraction choices available in Stata are based on different assumptions to estimate communality (where communality refers to the amount of variance in the item due to the factor). The maximum likelihood method is preferred as it is asymptotically efficient; however a pre-requisite is multivariate normality which cannot be met with ordinal data. The principal axis factoring method is the most common method (Williams et al., 2012) and is the default setting within Stata. Kaiser normalisation which normalises the factor loadings before rotating them, is recommended and commonly employed in EFA (ibid).

manifestations of them. The principal criteria for evaluating the factor solutions are presented in Table 6.5.[180]

Table 6.5 Summary of factor extraction-rotation methods

	Principal axis factoring		Iterated principal axis factoring	
Number of factors	Orthogonal (varimax)	Correlated (promax)	Orthogonal (varimax)	Correlated (promax)
6 Factors				
Factors with <= 3 variables [low]	0	0	0	0
Factor loadings > 0.45 (%) [high]	92.6	90.1	88.9	86.4
Cross loadings > 0.45 (> 0.32) (%) [low]	1.2	0.0	1.2	1.2
Uniqueness > 0.70 (%) [low]	8.6	8.6	11.1	11.1
Total Variance explained (%) [high]	62.5	n/a	60.6	n/a
Meaningfulness interpretability	Clean & distinguishable factor structure	Clean & distinguishable factor structure	Reasonably distinguishable factor structure	Reasonably distinguishable factor structure
Eigenvalue range [small]	4.78 - 12.98	5.70 - 16.15	4.39 - 12.35	5.34 - 16.13
7 Factors				
Factors with <= 3 variables	0	0	0	0
Factor loadings > 0.45 (%) [high]	92.6	90.1	92.6	87.7
Cross loadings > 0.45 (> 0.32) (%) [low]	0.0	0.0	1.2	1.2
Uniqueness > 0.70 (%) [low]	8.6	7.4	11.1	9.9
Total Variance explained (%) [high]	65.7	n/a	63.76	n/a
Meaningfulness interpretability	2 factors are related in meaning	2 factors are related in meaning	2 factors are related in meaning	2 factors are related in meaning
Eigenvalue range [small]	3.72 - 13.24	4.34 - 16.29	3.40 - 12.54	3.99 - 16.17
8 Factors				
Factors with <= 3 variables	1	1	1	1
Factor loadings > 0.45 (%) [high]	92.6	91.4	90.1	88.9
Cross loadings > 0.45 (> 0.32) (%) [low]	1.2	2.5	1.2	1.2
Uniqueness > 0.70 (%) [low]	7.4	7.4	11.1	11.1
Total Variance explained (%) [high]	68.4	n/a	66.3	n/a
Meaningfulness interpretability	8th factor is redundant	8th factor is redundant	8th factor is redundant	8th factor is redundant
Eigenvalue range [small]	2.21 - 14.08	3.78 - 16.92	1.94 - 13.92	3.52 - 16.95

Source: HILDA Wave 10 Release 10.
Weights: Cross-sectional responding person population weights for 2010. Sample: 11,835.
Notes: Factor analysis is based on a polychoric correlation matrix of 81 indicators. Missing values are not imputed. Comments in square brackets are desirable results.
Definitions: factor loading - correlation coefficient between each item and its factor; cross loadings - item that loads between 0.32 - 0.45 on two or more factors; uniqueness - variance that is unique to that item and not shared with other variables (equal to 1 minus communality); variance - percentage of variation in the data explained by the different factors together; and eigenvalue - used to determine the variance (the higher eigenvalue, the greater importance of the factor in explaining the variation in the data).

The results for six factors and seven factors are very similar and much stronger than the eight-factor solution across the four factor extraction-rotation methods; hence, the 8-factor solution is discounted as a viable option. For both 6-factor and 7-factor

[180] The framework to compare factor extraction-rotation solutions is adopted from Berry et al. (2007).

solutions, there are no factors with less than 3 indicators loading onto that factor and minimal evidence of cross loadings. The number of indicators with factor loadings above 0.45 for the majority of factor extraction-rotation methods is high and the percentage of variables with high uniqueness is low. The lower eigenvalue range (due to higher lower bounds and lower higher bounds) suggests that each factor makes a reasonable contribution to explaining the variation in the data. Importantly, the factors are clearly aligned with the dimensions proposed in the MIW framework. The similarity of results across the 6 and 7 factor extraction-rotation methods reinforces the stability of the factors and appropriateness of using this data for this analysis.

Table 6.6 illustrates the indicators that are classified differently using a 6-factor and 7-factor solution. In the 7-factor solution, the additional 7th factor includes five indicators categorised as factor 5 and three items categorised as factor 6 in the 6-factor solution model, all relating to neighbourhood relations. However, it is not clear to what extent the creation of the 7th factor is influenced more by the inclusion of the word ‘neighbour’ in all the questions, than to a unique latent construct substantively different from factors 5 and 6 and one which can be considered a constitutive component of the MIW framework. In contrast, in the 6-factor solution, factors 5 and factor 6 clearly reflect the MIW dimensions in Table 6.3; community and social participation and the neighbourhood environment with a reasonable number of indicators across both the dimensions. The 6-factor solution seems the more appropriate. It represents the number of factors at the point in the scree plot with the sharpest break in eigenvalues. Most importantly though, interpretation of the factors is very clear and supports the theoretical premise put forward in Section 6.3.

Table 6.6 Difference in indicator classification using a 6 or 7 factor solution

	6 Factor Solution		7 Factor Solution		
Well-being indicators	**Community participation (factor 5)**	**Neighbourhood environment (factor 6)**	**Community participation (factor 5)**	**Neighbourhood environment (factor 6)**	**Neighbourhood relationships (factor 7)**
Chat with your neighbours	X				X
Attend events that bring people together such as fetes, shows, festivals or other community	X		X		
Get involved in activities for a union, political party, or group that is for or against something community events	X		X		
Make time to attend services at a place of worship	X		X		
Encourage others to get involved with a group that's trying to make a difference in the	X		X		
Talk about current affairs with friends, family or neighbours	X		X		
Volunteer your spare time to work on boards or organising committees of clubs, community groups or other non-profit organisations	X		X		
See members of my extended family (or relatives not living with me) in person*	-		-		
Get in touch with a local politician or councillor about issues that concern me	X		X		
Give money to charity if asked*	X		X		
Neighbours helping each other out	X				X
Neighbours doing things together	X				X
Traffic noise		X		X	
Noise from airplanes, trains or industry		X		X	
Homes and gardens in bad condition		X		X	
Rubbish and litter lying around		X		X	
Teenagers hanging around on the streets		X		X	
People being hostile and aggressive		X		X	
Vandalism and deliberate damage to property		X		X	
Burglary and theft		X		X	
This is a close-knit neighbourhood	X				X
neighbours	X				X
People in this neighbourhood can be trusted		X			X
People in this neighbourhood generally do not get along with each other*		X			X
People in this neighbourhood generally do not share the same values*		X			X

Note: Grouping of indicator results is similar irrespective of factoring extraction-rotation method.
Note: Indicators marked by an asterisk have very low factor loadings and high uniqueness irrespective of factoring extraction-rotation method.

During the various iterations of the factor solutions estimated, four indicators did not fit any of the factor structures well, with factor loadings less than 0.37, uniqueness above 0.78 and mostly with very low correlation coefficients below 0.30. The items are: 'give money to charity if asked'; 'see members of my extended family (or relatives not living with me) in person'; 'people in this neighbourhood generally do not get along with each other'; and 'people in this neighbourhood generally do not share the same values'.[181] Accordingly these four have been removed. A fifth item, 'make time to attend services at a place of worship' also has high uniqueness with inconsistent factor loadings across the extraction/rotation methods hovering around 0.40. This item is retained because it captures (however, minimally) an element of religious activity which is otherwise absent from the framework.

Within the 6-factor solutions, the principal axis factoring extraction methods produce the cleanest structure with high factor loadings on most indicators, lowest percentage of cross-loadings and lowest percentages of variables with high uniqueness. The varimax rotation (assumed factor orthogonality) produces slightly higher factor loading, however, as evident in Table 6.5 there is minimal difference between the results with no substantive difference in terms of indicator classification or interpretation of factors. For the final solution, the promax rotation is adopted as the assumption of correlation among factors (dimensions) is aligned with the notion of inter-relationships and inter-dependency amongst dimensions within an individual. It is also recommended by Costello and Osborne (2005: 3) for social sciences research on the grounds that 'behaviour is rarely portioned into neatly packaged units that function independently of one another'.

The final solution with the clustering of the 77 indicators to the well-being dimensions and the factor loadings is presented in Table 6.7. The factor loadings of each indicator within each factor set are reasonably high with only 5 below 0.45 and none below the minimum accepted criteria of 0.32 (Costello and Osborne, 2005). Re-running the EFA with 6 factors and 77 indicators resulted in the movement of 8 indicators, approximately 10 per cent, from the preliminary classification in Table 6.4 to the final classification in Table 6.7.

[181] The item-rest correlation (the correlation between each other item and the scale that is formed by all other items) for 'see members of my extended family (or relatives not living with me) in person' (in the personal relations dimensions) is lower than for the other items. The items ''people in this neighbourhood generally do not get along with each other' and 'people in this neighbourhood generally do not share the same values' (in the neighbourhood environment dimension) have the lowest item-rest correlations and Cronbach's alpha increases if a scale is formed excluding each item. Disregarding these two items is hence beneficial to improving the reliability of a scale formed around the neighbourhood environment dimension.

Table 6.7 Final factor solution - relationship between well-being dimensions and indicators

Final well-being indicators	Economic stability *(9 indicators)*	Physical health *(18 indicators)*	Mental health *(17 indicators)*	Personal relationships *(12 indicators)*	Community participation *(12 indicators)*	Neighbourhood environment *(9 indicators)*
Could not pay electricity, gas or telephone bills on time*	0.879					
Could not pay the mortgage or rent on time*	0.828					
Pawned or sold something*	0.826					
Went without meals*	0.769					
Was unable to heat home*	0.688					
Asked for financial help from friends or family*	0.839					
Asked for help from welfare/community organisations*	0.818					
Difficulty raising $3000 in an emergency	0.658					
Prosperity given current needs & financial responsibilities	0.546					
Vigorous activities		0.776				
Moderate activities		0.923				
Lifting or carrying groceries		0.918				
Climbing several flights of stairs		0.904				
Climbing one flight of stairs		0.967				
Bending kneeling or stooping		0.928				
Walking more than one kilometre		0.938				
Walking half a kilometre		0.961				
Walking 100 metres		0.945				
Bathing or dressing yourself		0.884				
Cut down the amount of time spent on work or other activities		0.572				
Accomplished less than would like		0.549				

Table 6.7 Final factor solution - relationship between well-being dimensions and indicators (cont'd)

Final well-being indicators (cont'd)	**Economic stability** *(9 indicators)*	**Physical health** *(18 indicators)*	**Mental health** *(17 indicators)*	**Personal relationships** *(12 indicators)*	**Community participation** *(12 indicators)*	**Neighbourhood environment** *(9 indicators)*
Were limited in the kind of work		0.673				
Had difficulty performing work or other activities		0.626				
Bodily pain in last 4 weeks		0.534				
How much did pain interfere with normal work		0.593				
Self-assessed health		0.472				
Get sick a little easier than other people			0.423			
As healthy as anybody I know			0.454			
Expect my health to get worse		0.370				
My health is excellent			0.513			
Feel full of life			0.745			
Have a lot of energy			0.696			
Felt worn out			0.666			
Felt tired			0.688			
Extent physical/emotional health interfered with normal social activities			0.643			
Time physical/emotional problems interfered with social activities			0.597			
Cut down the amount of time spent on work/other activities			0.704			
Accomplished less than would like			0.778			
Didn't do work/other activities as carefully as usual			0.716			
Been a nervous person			0.495			
Felt so down in the dumps nothing could cheer you up			0.641			
Felt calm and peaceful			0.794			
Felt down			0.763			
Been a happy person			0.735			

Table 6.7 Final factor solution - relationship between well-being dimensions and indicators (cont'd)

Final well-being indicators (cont'd)	**Economic stability** *(9 indicators)*	**Physical health** *(18 indicators)*	**Mental health** *(17 indicators)*	**Personal relationships** *(12 indicators)*	**Community participation** *(12 indicators)*	**Neighbourhood environment** *(9 indicators)*
People don't visit me as often I would like				0.387		
Often need help from other people but can't get it				0.591		
Lots of friends				0.501		
No one to confide in				0.788		
No one to lean on in times of trouble				0.796		
Someone who can always cheer me up when I'm down				0.709		
Often feel very lonely				0.530		
Enjoy the time I spend with people who are important to me				0.779		
When something's on my mind, talking with people can make me feel better				0.743		
Usually find someone to help me out when I need				0.810		
Have telephone, email or mail contact with friends or relatives not living with you				0.493		
Chat with your neighbours					0.617	
Attend events that bring people together such as fetes, shows, festivals or other community events					0.527	
Get involved in activities for a union, political party, or group that is for or against something					0.594	
Make time to attend services at a place of worship					0.438	
Encourage others to get involved with a group that's trying to make a difference in the community					0.691	
Talk about current affairs with friends, family or neighbours					0.424	
Make time to keep in touch with friends				0.550		
Volunteer your spare time to work on boards or organising committees of clubs, community groups or other non-profit organisations					0.690	

Table 6.7 Final factor solution - relationship between well-being dimensions and indicators (cont'd)

Final well-being indicators (cont'd)	Economic stability (9 indicators)	Physical health (18 indicators)	Mental health (17 indicators)	Personal relationships (12 indicators)	Community participation (12 indicators)	Neighbourhood environment (9 indicators)
Get in touch with a local politician or councillor about issues that concern me					0.591	
Neighbours helping each other out					0.582	
Neighbours doing things together					0.635	
Traffic noise						0.543
Noise from airplanes, trains or industry						0.507
Homes and gardens in bad condition						0.616
Rubbish and litter lying around						0.809
Teenagers hanging around on the streets						0.708
People being hostile and aggressive						0.787
Vandalism and deliberate damage to property						0.874
Burglary and theft						0.734
This is a close-knit neighbourhood					0.520	
People around here are willing to help their neighbours					0.561	
People in this neighbourhood can be trusted						0.530
Eigenvalue	**8.26**	**16.07**	**15.95**	**8.75**	**5.45**	**6.37**
Percentage of variance explained	**11.82**	**22.99**	**22.81**	**12.52**	**7.79**	**9.11**

Source: HILDA Wave 10 Release 10.

Weights: Cross-sectional responding person population weights for 2010. Weighted sample: 11,852. Missing values are not imputed.

Note: Italicised items are reverse coded so that a higher numerical value represents a better outcome.

Note: Financial stress items marked with an asterisk are imputed from Waves 11 and 9.

Note: Final factor analysis is performed using principal axis factoring with promax rotation.

Three indicators: ‘Get sick a little easier than other people’; ‘As healthy as anybody I know’; and ‘My health is excellent’ move from the physical health dimension to the mental health dimension. In the SF-36 these three items are combined with ‘Expect my health to get worse’ to form a ‘general health’ sub-scale which is then used in the construction of the Physical Component Summary (PCS) scales (equivalent to the physical health dimension). Ware and Kosinski (2002) however, acknowledge that the general health sub-scale shows substantial or moderate validity within both PCS and MCS. That is, it correlates well with both a physical and mental health dimension. Hann and Reeves (2008) criticise the construction of the PCS and MCS on the grounds that the construction of the summary scales from sub-scales doesn’t allow for the interaction between physical and mental health.

Hence, while the original classification in this thesis followed the guidelines of Ware (2000; Ware and Kosinski, 2002), the final decision is to accept the classification as based on the results from the EFA. In doing so, regard is given to the nature of the indicators themselves and not to classification of the sub-scales as is the focus in the construction of the PCS and MCS.[182] Precedence for this is established by Zaidi (2008: 110 - 111) who re-assigned the 35 SF-36 items (8 sub-scales) into four health dimensions using factor analysis, before proceeding to analyse the extent of deprivation within each indicator and health dimension.

The two indicators: ‘Have telephone, email or mail contact with friends or relatives not living with you’ and ‘Make time to keep in touch with friends’ move from original placement in the community and social participation dimension (as assigned by Berry et al. (2007)) to the personal relationships dimension. This makes sense as these indicators tap into the manifestation of personal social cohesion as determined through the maintenance of relationships. The remaining four indicators: ‘Neighbours

[182] In the SF-36, the 35 items are grouped up to form 8 sub-scales (Ware and Kosinski, 2002). Using principal component analysis, 4 of the sub-scales are allocated towards physical health and 4 towards mental health and subsequently used in the construction of the Physical Component Summary Scale (PCS) and the Mental Component Summary Scale (MCS). The subscales that form the PCS are labelled: physical functioning; role-physical, bodily pain and general health. The subscales that form the MCS are labelled: vitality; social functioning, role-emotional and mental health.

helping each other out'; 'Neighbours doing things together'; 'This is a close-knit neighbourhood'; and 'People around here are willing to help their neighbours' moves from original placement in the neighbourhood environment to the community and social participation dimension. The re-classification based on the EFA is plausible as these indicators have a shared link to community as expressed through the nature of neighbourhood relations and incidence of neighbourliness.

In conclusion, the EFA supports the following assertions: the 77 indicators can be grouped into latent factors; the latent factors correspond very closely to the well-being dimensions set out in Section 6.3; and the relationship between the well-being dimensions and the sets of indicators is statistically valid. The next step is working out how to estimate the well-being dimension scores and, further to that, how to aggregate the dimensions into a composite well-being index as specified in the formative model.

6.6 Construction of well-being dimension scores and composite well-being index

As already discussed, the measurement forms in the reflective model, with the construction of the dimension scores, and in the formative model, with the construction of the composite well-being index, are substantially different as they build on distinct conceptual foundations. However, they face similar methodological choices, as each model requires deciding on mechanisms with which to condense arrays of variables into unitary metrics. Many of the general choices outlined by Maggino and Zumbo (2012), Nardo et al. (2005) and Salzman (2003) in the construction of composite indices have already been attended to. These include: formulating the theoretical framework; choosing measurement models; and choosing the items within the measurement models (indicators and dimensions). Three decisions remain that are relevant to the methodological formulation of the MIW approach: treatment of missing data; the choice of the aggregating method; and the choice of the weights within the aggregation scheme.

Missing values are imputed to maximise the sample size and provide as complete a dataset of indicators as possible. This is consistent with the approach followed in other ‘indicator-based studies’ (Berry and Welsh, 2010; Halleröd and Selden, 2012; Henstridge, 2001; McHorney, 1996; Meng et al., 2013). Furthermore, by imputing a missing value for an indicator, it does not negate the potential influence of that indicator, that would otherwise occur in the intra-aggregate procedure (that sums over the missing values) used to estimate an individual’s dimension score. It is a plausible and realistic option given the low proportions of the sample missing values on each of the 77 indicators (Table 6.4) and the low proportions of the sample missing on 2 or more items (Table D.4). Appendix D.4 discusses the pattern of missing data and documents the imputation procedure which uses a univariate imputation method that predicts missing values for each indicator based on a set of demographic characteristics (Schafer and Graham, 2002; StataCorp, 2013a).

Concerning the second decision, the implicit assumption behind the aggregative mechanisms in the construction of the reflective and formative constructs in Figure 6.2 is of an ‘additive aggregation method’ (Nardo et al., 2005: 75). This involves linearly summing over the product of each item and its weight (Salzman, 2003). It includes the standard additive averaging technique of summing the standardised items and dividing by the number of items. The chief concern with ‘additive aggregation’ is it permits compensability between the items being aggregated. Low values in some items may be compensated by high values in other items (Maggino and Zumbo, 2012). Hence, composite indices with very ‘different realities [in their composition may] turn out to be identical and indistinct’ (ibid: 224). Notwithstanding these problems, additive aggregation continues to be the most common aggregation method due to its simplicity and transparency in estimation and interpretation. Alternative methods (such as geometric aggregation) are not yet capable of fully overcoming compensability issues (Maggino and Zumbo, 2012; Nardo et al., 2005; Salzman, 2003).[183]

[183] The non-compensatory multi-criteria aggregating procedure discussed in Nardo et al. (2005: 76) is meant to overcome the ‘compensability logic’. However, it is not only computationally complex but it is uncertain how this can be applied to a micro-level dataset that does not involve the ranking of countries.

A corollary of the additive aggregation method is the third decision; the need to set explicit weights for each indicator and thereafter for each dimension score. The range of literature on weighting is testament to the difficulty and contestability in choosing appropriate weights and the lack of a universally accepted decision-making schema (Decancq and Lugo, 2013; Headey, 2006; Maggino and Zumbo, 2012; Nardo et al., 2005; Salzman, 2003; Schokkaert, 2007). This is because weights inherently reflect value judgements on the relative importance of items in encapsulating latent concepts such as the health well-being dimension or overall well-being (Decancq and Lugo, 2013; Maggino and Zumbo, 2012; Salzman, 2003). Value judgements are essentially subjective, drawing on individual personal values whilst being influenced by social values across diverse societal contexts (Maggino and Zumbo, 2012). Reaching collective agreement on values by scholars to establish legitimacy in empirical applications, and more universally resonating philosophically across society-wide may not actually be achievable.

Decanq and Lugo (2013) draw a distinction between normative and data-driven weighting approaches. The former attempt to establish consensus on the value judgements associated with weights. The latter sets weights statistically based on the distribution of well-being achievements and do not purposefully take the normative interpretation of weights into account. Two examples of normative approaches are weights based on expert opinion or using an equal weighting strategy. There are three examples of data-driven approaches: frequency based weights; weights from factor analysis; or weights from regression analysis that produce the most favourable outcome for each individual. A third, still developing hybrid set of approaches attempt to take account of both, the distribution of well-being achievements and a relative valuation of the achievements. Examples of these include weights based on the stated preferences of individuals in society or hedonic weights derived from regressions between well-being dimensions and an individual's self-reported happiness or life satisfaction.[184]

Applying the philosopher Hume's 'ought-is' distinction Decanq and Lugo write:

> Hume noted that many claims about what 'ought to be' are actually based on statements about what 'is.' However, according to Hume, there is a significant difference between descriptive statements (about what is) and normative statements (about what ought to be). He not only distinguishes between 'is' and 'ought,' between facts and values, he argues, furthermore, that it is impossible to derive an 'ought' from an 'is' (Hume, 1740). (Decancq and Lugo, 2013: 9)

Consequently, it is imperative when choosing weights to be clear about what values they represent (Anand and Sen, 1997), and if they have, in fact, been purposefully guided by normative principles or not. It may also be judicious as Salzman (2003: 20) writes 'to abandon the notion that there exists a set of weights capable of capturing the relative contribution of variables to … well-being'. Hence, to ensure transparency and clarity in the setting of weights within the MIW approach, weighting choices from dimensions to indicators and from dimensions to composite well-being are governed by the characteristics and statistical properties of the reflective and formative measurement models respectively.

6.6.1 Well-being dimension scores – (ds)

In the case of estimating the well-being dimension scores, as the preceding discussion on reflective models in Section 6.2.2 outlines and the exploratory factor analysis in Section 6.5 verifies, each well-being dimension as a latent construct determines the set of indicators. Estimation of each well-being dimension is, therefore, possible using exploratory factor analysis between each dimension and its associated set of indicators

[184] Decanq and Lugo (2008, 2013), Nardo et al. (2005), Salzman (2003) and DiStefano et al. (2009) provide overviews of the various weighting options available in the construction of composite indices within the social science field.

as a one-factor model. The statistical technique within EFA is to estimate factor scores as the linear summation of the product of each indicator item and a factor scoring coefficient. The notational representation is:

Equation 6.3 $$\boldsymbol{ds} = \sum_{n=1}^{N} \boldsymbol{\beta_i X_i}$$

where ds is the well-being dimension score (factor score), X_i refers to the standardised indicator for that factor (well-being dimension) and β_i refers to the factor scoring coefficient for all N indicators classified as manifestations of the specific factor.

The indicators are in standardised form (that is, with mean of 0 and a standard deviation of 1). The factor scoring coefficients represent the relative weight of each indicator in calculating the dimension score.[185] These are estimated in Stata using the OLS regression factor scoring method (DiStefano et al., 2009; StataCorp, 2013b). They are listed in Table D.6 in Appendix D.6. The well-being dimension scores are produced as factor scores. They are in standardised form, similar to a z-score metric, also with a mean of 0 and a standard deviation approximately 1 (refer to Appendix D.5 for an explanation on standardisation).[186]

Two potential concerns with using factor scores are noted. Salzman (2003: 20) warns that using data-driven approaches gives 'a false aura of mathematical objectivity', warning against over-attaching interpretative meaning to the relative valuation of indicators. However, the use of EFA scoring coefficients to weight indicators in the MIW framework is aligned perfectly with the conceptual logic of the reflective model.

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[185] The factor scoring coefficient is different from the factor loading. A factor loading is the regression coefficient of the factor (latent variable) in explaining or predicting the item. Once the relationship between the factor and each item is established, the relationship can be 'inverted' so that the factor loading is now used as the basis for calculating a standard regression coefficient of the item in predicting the latent variable. The factor scoring coefficient hence represents the weight of the item in predicting the factor (DiStefano et al., 2009).

[186] An explanation for why standard deviations from factor scores are not always 1 is provided by StataCorp:

> At a theoretical level, the factor is supposed to have standard deviation 1, but the estimation method almost never yields that result unless an exact solution to the factor model is found. This happens for the same reason that, when you regress y on x, you do not get the same equation as if you regress x on y, unless x and y are perfectly collinear (StataCorp, 2013b: 335).

The reflective model is framed around using the strength of correlations between indicators as representing the latent construct rather than an emphasis on the numerical values of the scoring coefficients. The second concern is of factor score indeterminacy, that is, when factor scores are not uniquely defined as they depend on the factor extraction-rotation method (DiStefano et al., 2009; Grice, 2001). This is less problematic in the one-factor model used to construct the well-being dimension scores as a one-factor model cannot be rotated and factor loadings are very similar irrespective of the extraction method.[187]

Table 6.8 illustrates the suitability of using the indicators to estimate the well-being dimension scores. The well-being dimension scores are represented as es for the economic stability dimension, ph for the physical health dimension, mh for the mental health dimension, pr for the personal relationships dimension, cp for the community participation dimension and ne for the neighbourhood environment dimension.

Table 6.8 Correlational analysis of the well-being dimension scores and composite well-being index

	Economic stability *(es)*	Physical health *(ph)*	Mental health *(mh)*	Personal relationships *(pr)*	Community participation *(cp)*	Neighbourhood environment *(ne)*
Cronbach's coefficient alpha	0.771	0.945	0.926	0.851	0.811	0.851
Factor score deteminacy coefficients	0.969	0.996	0.985	0.960	0..948	0.954

Source: HILDA Wave 10 Release 10.
Weights: Cross-sectional responding person population weights for 2010. Weighted sample: 11,993. Missing values are imputed.

Cronbach's alpha which is a measure of internal consistency and scale reliability (how closely a set of items are as a group) is high and above the recommended level of 0.70 for all the dimensions (Nardo et al., 2005). Within each dimension, the exclusion of each indicator does not increase Cronbach's alpha suggesting that all the indicators are

[187] It is also important to emphasise that the dependency of results on the analyst and the sample are not unique to EFA but just as applicable to many other multivariate statistical techniques that require modelling assumptions and decisions.

relevant and constructing a scale from the indicators is possible.[188] The factor score determinacy coefficients measure the correlation between the factor score estimate and its factor, hence, it is a test of the validity and determinacy of the factor score (DiStefano et al., 2009; Grice, 2001). As all the coefficients are above the recommended 0.90, there is no evidence of the problem of factor score indeterminacy.

6.6.2 Composite well-being index – (cwi)

In the case of estimating the composite well-being index, as a formative construct, it is completely dependent on the conceptual link between the dimensions and the latent construct. As specified in Table 6.1 the choice of weights represents the unique contribution each dimension makes to form the composite index. It does not lend itself as easily to a specific statistical modelling technique such as EFA that is correlation based. Indeed, Decanq and Lugo (2013: 21) make the point that 'a multidimensional approach is called upon precisely because important dimensions of wellbeing are not strongly related'. Hence, weights are instrumentally normative as they signal not only the importance of each dimension but also represent trade-offs (Decancq and Lugo, 2013) or, as discussed above, compensability between the dimensions of well-being (Maggino and Zumbo, 2012).

Consequently, amongst the choice of four weighting approaches set out by Decanq and Lugo (2013), that are intentionally or quasi normative (hybrid), the decision in the MIW framework is to use an equal weighting approach (*choice 1*). Using a weighting strategy decided by a group of experts (*choice 2*) or based on stated individual preferences (*choice 3*) requires a qualitative component that is not feasible within the constraints this thesis. Hedonic weights identified through regressions of dimensions with individual responses to life satisfaction or happiness questions (*choice 4*) is methodologically possible, although complicated, but conceptually problematic. If life satisfaction/happiness questions are a close approximation to composite well-being

[188] It has to be noted that the suitability of Cronbach's alpha as a measure of scale reliability for use with ordinal data is questionable as it ideally should be estimated using polychoric correlations (Gadermann et al., 2012); however, this is not yet possible within Stata and is too complex to undertake within Excel.

index, what is the point of the latter? Moreover, following the theory of set point homeostasis that individual's life satisfaction/happiness hovers around a set point controlled by psychological devices which function as personality traits (Cummins et al., 2003), well-being dimensions may not be strong enough predictors of overall life-satisfaction/happiness to warrant using the regression coefficients as weights.

On the other hand, equal weights are far from unproblematic. It is a truism that certain well-being dimensions are intrinsically more important than others to overall well-being as they are a primary determinant of the quality of life achieved (such as physical health compared to the neighbourhood environment). As Decanq and Lugo (2013: 23) write 'there is no escape from the fact that the weights reflect an important aspect of the trade-offs between the dimensions, so that agnosticism cannot be achieved'.

Equal weighting, however, continues to be the most common weighting approach primarily because of its simplicity, transparency and objectivity (Bradshaw and Richardson, 2009; Hagerty and Land, 2007; Mayer and Jencks, 1989; Michalos et al., 2011). It is also the most reasonable choice in the absence of justifiable and viable alternatives. In a detailed mathematical and empirical exercise Hagerty and Land (2007) test various weighting propositions showing that, in the absence of known individual weights, an equal weighting method acts statistically as a 'minimax estimator' (p.486). That is, it minimises disagreement overall all possible weighting distributions.

In summary, the well-being dimension scores are a weighted linear combination of the indicators using the factor scoring coefficients as weights from running a one-factor EFA model for each dimension and its set of indicators. The well-being dimension scores (produced as factor scores) are in standardised form, similar to a z-score metric with a mean of 0 and a standard deviation approximately 1. The composite well-being index (cwi) is the equally weighted aggregation of the six well-being dimension scores (each is assigned a weight of 1/6). This is tantamount to summing the standardised dimension scores and dividing by the number of items, and as such cwi is also in standardised form. Numerically, this is expressed as:

Equation 6.4 $\boldsymbol{cwi_i = (es_i + ph_i + mh_i + pr_i + cp_i + ne_i)/6}$

where cwi_i refers to the composite well-being index for individual i. Variables on the right hand side are the standardised dimension scores resulting from Equation 6.3 for individual i.

To overcome the difficulty of interpreting z-score metrics that are negative (given a mean of 0), the dimension scores and composite well-being index across the entire adult population (above 15 years) are transformed to have a fixed mean of 100 and a standard deviation of 10 (Mertler, 2007). It is important to reiterate that given the metaphorical role of the dimension scores and composite index, it is unclear what the actual values measure in concrete terms (Cobb and Rixford, 1998: 19). Hence, the measured assessment of the well-being of older Australians following in Chapter 7 is explicitly a relative analysis; comparing how far scores deviate from the fixed mean of 100 and standard deviation of 10. Descriptive labels of high well-being are assigned if values are above the mean of 100 and low well-being ascribed if values are below the mean of 100.

6.7 Conclusion

Similar in purpose to Chapter 4 for Part 1 of this thesis, this chapter draws a link between the theoretical and background sections from Chapters 2 and 3, to focus on an individual's overall well-being in Part 2. As a methodological chapter, it operationalises the concept of individual well-being to enable quantitative measurement.

The development of the multi-dimensional individual well-being (MIW) indicator framework is based on four guiding principles. First, although individual well-being is conceptually a latent concept, it can be disaggregated into a list of uniquely defined but also unobservable well-being dimensions, with specific observable indicators attached to each dimension that can then be mathematically re-constructed and estimated. Second, well-being is framed aspirationally in terms of the quality of life individuals are able to achieve, hence, analysis covers the spectrum from low to high well-being. Third, the development of the MIW framework is intentionally relevant to all adults, with older people as a focal point of interest. Fourth, the individual is the unit of analysis, so all aggregations within the measurement models are done at the intra-personal (individual) level.

Following Nardo et al.'s (2005: 8) insight that the construction of composite indicators is more a craft than following a scientific protocol for encoding, the 'craft' in the MIW approach is to estimate individual well-being as a second-order construct. The two statistical measurement models utilised in this thesis are designed around understanding and testing the nature of relationships between observed variables and unobservable constructs. These models are aligned with the conceptual notion that indicators as manifestations of the well-being dimensions are determined by them in the reflective model, and that overall well-being can be formed or determined by the well-being dimensions in the formative model.

Estimation is conducted as a two-stage consecutive process from well-being dimensions to indicators and from well-being dimensions to a measure of overall well-being for each individual. In the first step, a reflective model process is used to estimate each well-being dimension, on the assumption that the strength of the correlations between indicators determines if, collectively, they represent the unobservable well-being dimension. Following exploratory factor analysis, 77 indicators from the HILDA self-completion questionnaire are spread across the six well-being dimensions accordingly: economic stability (9), physical health (18), mental health (17), personal relationships (12), community and social participation (12) and the neighbourhood environment (9).

For each well-being dimension, a standardised score is estimated as the linear summation of each indicator weighted by a factor scoring coefficient. The scoring coefficients are produced from running a one-factor exploratory factor analysis between each dimension and its set of indicators. The six well-being dimension scores are subsequently used in the second step as part of the formative model process to estimate multi-dimensional overall individual well-being. The resulting composite well-being index is estimated as the equally weighted aggregation of the six well-being dimension scores, on the assumption that each dimension contributes equally to overall well-being.

As with the ELS methodology and a matter of course in most social science studies, operationalising the MIW approach poses a number of methodological choices and assumptions. In addition to determining the aggregating technique and weighting criteria, other substantive decisions include deciding on the well-being dimensions and choosing a potential list of indicators. There are also technical decisions regarding imputation of financial stress indicators, the treatment of missing data and using statistical tools appropriate for estimation with ordinal data. A key intention in this chapter is to detail the specificity involved, providing a transparent account of both the conceptual justification and statistical validation of the various choices made along the decision tree. It is in the next chapter, that the potential of the MIW approach to broaden our substantive understanding of the standard of living and well-being of older Australians at an individual level is examined.

7 Multi-dimensional individual well-being results and discussion

7.1 Introduction

This chapter follows a similar structure to Chapter 5 to present the empirical section of Part 2 of the thesis. Part 2 focuses on incorporating the ‘economic’ and ‘non-economic’ to understand and measure the standard of living and well-being. The multi-dimensional individual well-being (MIW) indicator framework set out in Chapter 6 treats the well-being of an individual as a multi-dimensional concept that can be disaggregated into a list of well-being dimensions with specific indicators attached to each dimension.

Standardised well-being dimension scores are constructed for: economic stability (es), physical health (ph), mental health (mh), personal relationships (pr), community and social participation (cp) and the neighbourhood environment (ne). These six dimensions are considered constituent components that shape the individual well-being of Australians. Overall individual well-being is measured through the construction of an overall composite well-being index (cwi). This is formed from the equal weighted aggregation of the six well-being dimension scores. The final set of seven MIW metrics are the transformed well-being dimension scores and composite well-being index, with a fixed mean of 100 and a standard deviation of 10 for the adult population.

The main intention of this chapter is to assess the multi-dimensional well-being of older Australians. Section 7.2 provides a brief overview of the relationship between the well-being dimension and overall well-being. Sections 7.3 to 7.5 describes the measured relative well-being position of older people and demographic sub-groups of older people to the Australian adult and non-older adult population using a similar analytical frame adopted for the ELS metrics. A summary measure is provided through mean score comparisons combined with multivariate regressions. Distributional analysis is provided through profiling the incidence of demographic groups by quintile distribution compared to non-older Australians. A measure of disadvantage is provided by examining the profile of individuals with low well-being. Section 7.6 summarises the substantive conclusions reached about the well-being of older people and reviews the MIW metrics. Section 7.7 explores the relationship between the two approaches advocated in this thesis. Section 7.8 is the conclusion to Part 2 of the thesis.

7.2 Correlations between well-being dimensions and overall well-being

As an initial overview, what do the aggregate results suggest about the relationship between the well-being dimensions and overall well-being? Table 7.1 presents pair-wise correlation coefficients for non-older adults and older Australians. As discussed in Section 6.2.2, there are not necessarily any correlations between well-being dimensions within a formative model, as each dimension is meant to have a separate relationship, contributing uniquely, to overall well-being. However, considering that the different dimensions pertain to well-being within the same individual, it would be unusual if no inter-connections existed.

Table 7.1 Correlations between MIW metrics

Correlation coefficients	Economic stability *(es)*	Physical health *(ph)*	Mental health *(mh)*	Personal relationships *(pr)*	Community participation *(cp)*	Neighbourhood environment *(ne)*	Composite well-being index *(cwi)*	Composite well-being index (less dimension)
Non-older adults								
Economic stability	1.000						0.530*	0.310*
Physical health	0.193*	1.000					0.558*	0.353*
Mental health	0.302*	0.560*	1.000				0.753*	0.579*
Personal relationships	0.208*	0.235*	0.460*	1.000			0.678*	0.463*
Community participation	0.096*	0.026	0.181*	0.282*	1.000		0.517*	0.251*
Neighbourhood environment	0.179*	0.091*	0.218*	0.211*	0.203*	1.000	0.550*	0.288*
All older people								
Economic stability	1.000						0.337*	0.191*
Physical health	0.118*	1.000					0.712*	0.473*
Mental health	0.139*	0.724*	1.000				0.791*	0.617*
Personal relationships	0.124*	0.210*	0.391*	1.000			0.625*	0.407*
Community participation	0.142*	0.190*	0.285*	0.384*	1.000		0.608*	0.373*
Neighbourhood environment	0.090	0.082	0.094*	0.098*	0.140*	1.000	0.418*	0.151*

Source: HILDA Wave 10 Release 10.

Weights: Cross sectional responding person population weights for 2010. Weighted sample: 11,993. Missing values are imputed.

Note: Pearson correlation coefficients significant at ρ < 0.001***. Null hypothesis of is no linear relationship between each pair of variables. Standard errors calculated assuming simple random sampling.

The results show evidence of weak to moderate positive correlations across both age groups. The link between mental health and achievements in other aspects of well-being is apparent (Allen, 2008; Berry and Welsh, 2010; Guite et al., 2006; Layte et al., 2013; O'Campo et al., 2009; Thoits, 2011; Young et al., 2004), as the mental health dimension has the largest correlations with the most number of other dimensions. The largest correlations are also between mental health and physical health for both the age groups (*r* = 0.560 for non-older adults and *r* = 0.724 for older people), a likely outcome given that as twin dimensions of health they potentially have a direct impact on each other (Hann and Reeves, 2008; Ware and Kosinski, 2001).

Economic stability, though statistically significant, is not strongly associated with the other well-being dimensions (*r* ranges from 0.090 for the neighbourhood environment dimension to 0.302 for the mental health dimension). This is dealt with in much more detail in the subsequent sections, and in Section 7.7 when comparisons with the ELS metrics are drawn. However, to the extent that responses to the financial stress questions in this dimension can be assumed to be highly correlated with income and wealth money metrics[189], it provides prima facie evidence that an individual's economic position is not indicative of their well-being position in other non-economic dimensions. In other words, economic stability is not necessarily associated with sound health or a robust personal network, community or living environment.

There is a large difference in the strength of correlations between the well-being dimensions, community and social participation and physical health for each age group. Berry and Walsh (2010: 588) and Sirven and Debrand (2012: 1289) write of the inconsistent findings in the literature attesting to a bi-directional positive relationship between them. The low statistically insignificant correlation (*r* = 0.026) for non-older adults is consistent with Berry and Walsh's (2010: 592) finding of weak correlations ($r < 0.10$) between the majority of community participation items and two of the SF-36 subscales, physical functioning and general health; the indicators grouped under the physical health dimension in the MIW approach. Conversely, Sirven and Debrand

[189] This qualifying statement is necessary because empirical evidence indicates, that in so far as income poverty and deprivation are concerned, the measures do not fully overlap (Boarini and d'Ercole, 2006; Bradshaw and Finch, 2003; Perry, 2002; Saunders and Naidoo, 2009). People on low incomes do not necessarily experience financial stress, if they have preventative factors such as drawing on their savings or receiving in-kind and cash assistance from family and friends (Boarini and d'Ercole, 2006).

(2012) show evidence of a strong circular beneficial relationship between involvement in social activities and physical and mental health for older people. Those in good health are more likely to participate in social activities, while those in poor health are less likely to participate with their health deteriorating at a faster rate.

As the dimensions are equally weighted in constructing the composite well-being index, strong correlations between the well-being dimensions and the overall index are expected. This is evident in the second last column in Table 7.1 as correlations range from 0.517 to 0.753 for non-older adults and from 0.337 to 0.791 for older people. They are also consistent across both age groups, with the lowest correlation for economic stability and the highest for mental health. The last column follows Bradshaw and Richardson (2009: 345) to examine the association between the dimensions and the composite well-being index formed after excluding that dimension. The results reiterate the important link between mental health and overall well-being as it still retains the highest correlation with the well-being index even when it is not included, suggesting that mental health may have a mediating impact on the other dimensions (Layte et al., 2013). On the other hand, the low correlations for community and social participation and the neighbourhood environment (r < 0.30) suggest that, on their own, each of these dimensions are not strongly related to the other dimensions.

7.3 Comparison of means and multivariate regressions

The measured well-being position of older Australians across the various well-being dimensions and overall well-being is determined by comparing their mean scores to non-older adults in Section 7.3.1. Comparisons by demographic sub-group of older people are in Section 7.3.2. To reiterate, the MIW metrics have a fixed mean of 100 and a standard deviation of 10 for the adult population (aged 15 years and over).

7.3.1 Older people compared to non-older adults

In Table 7.2 the composite well-being index (cwi) of all older people is very close to the standardised mean score of 100, with a score of 99.3 suggesting that overall their well-being is not different to that of non-older adults. However, across well-being dimensions, with the exception of personal relationships, scores for older people are substantially different to non-older adults fluctuating above and below 100. It is prima-facie evidence that the relative well-being of older people is dimension dependent. Relying on one dimension to draw comparisons provides a uni-dimensional prism that doesn't take into account the influence and importance of the diverse facets constituting an individual's life.

Table 7.2 Comparison of dimension scores and composite index across the adult population[190]

Population sub-groups	(n)	Economic stability *(es)*	Physical health *(ph)*	Mental health *(mh)*	Personal relationships *(pr)*	Community participation *(cp)*	Neighbourhood environment *(ne)*	Composite well-being index *(cwi)*
Adult population (15+)	11,993							
Mean		100.0	100.0	100.0	100.0	100.0	100.0	100.0
Standard deviation		10.0	10.0	10.0	10.0	10.0	10.0	10.0
Confidence interval		(99.7-100.3)	(99.7-100.3)	(99.7-100.3)	(99.7-100.3)	(99.6-100.4)	(99.6-100.4)	(99.7-100.3)
Non-older adults (15 - 64)	10,030							
Mean		99.6	101.7	100.4	100.0	99.4	99.4	100.1
Standard deviation		10.5	8.6	9.7	10.0	9.8	9.9	9.9
Confidence interval		(99.2 -99.9)	(101.5-	(100.1-	(99.7-100.3)	(99.0-99.8)	(99.1-99.8)	(99.8-100.5)
All older people (65+)	1,963							
Mean		102.3	91.2	98.1	100.0	103.0	103.0	99.3
Standard deviation		6.6	12.2	11.1	10.0	10.3	9.8	10.4
Confidence interval		(101.9-	(90.4-92.0)	(97.5-98.8)	(99.3-100.6)	(102.3-103.7)	(102.0-103.9)	(98.6-99.9)
		***	***	***		***	***	**

Source: Author's calculations based on imputations from HILDA Wave 10 Release 10.
Weights: Cross sectional responding person population weights for 2010. Missing values are imputed.
Note: Wald test of significant differences in means at ρ < 0.05*, 0.01** and 0.001***. Standard errors calculated using the jackknife weighing method.

Furthermore, it reiterates the importance of the weighting strategy to estimation of the cwi metric. If the mean score for all older people remained around 100, irrespective of dimension, it would indicate the invariance of the cwi metric to both weights and dimension. In other words, it wouldn't matter what and how we aggregated dimensions as the conclusions regarding older people to non-older adults would be the same. However, fluctuations around 100 indicate that a different weighting scheme will result in the composition of a different cwi metric with

[190] Statistical testing for the difference in means between demographic groups is conducted using the adjusted Wald test (this is equivalent to the conventional t-test but is applicable to large scale survey data within STATA). It tests the null hypothesis that the means are the same. Statistical significance is indicated using an asterisk. (Refer to: http://www.ats.ucla.edu/stat/stata/faq/svyttest.htm).

potentially very different conclusions. In the case of an equal weighting strategy that is adopted here, the cwi metric smooths out critical differences, hence it is prudent to maintain an analytical focus on each dimension in addition to the overall composite well-being index.[191]

Well-being dimension scores for the two population groups are the same for personal relationships and between 3-4 points higher for older people for economic stability (102.3), community participation (103.0) and the neighbourhood environment (103.0). These results, for the most part, corroborate dimension-specific literature on older people. Cross-sectional studies on deprivation indicate that older people are less likely to identify as deprived, that is, acknowledge that they do not have the item because of a lack of money, (Berthoud et al., 2006; Halleröd, 2006; McKay, 2008; Saunders, 2011; Saunders et al., 2007) or report high rates of hardship and financial stress (Bray, 2001; Marks, 2007; Siminski and Yerokhin, 2012).

There is evidence that younger-old people (aged between 60-75 years) typically have higher community and social participation outcomes than other younger age groups (Nieminen et al., 2008; Tomaszewski, 2012) as they have more spare time in retirement and fewer familial constraints (Sirven and Debrand, 2008). The higher scores for neighbourhood environment concur with literature that as the majority of older people are home owners (see Table 5.5), who typically have long residency durations, they become embedded in the neighbourhood (Tomaszewski, 2012).

Interesting insights are also observable at an indicator level. Table E.1 (in Appendix E) presents summary descriptive statistics including the frequency of responses to illustrate the differences between older Australians and non-older adults.[192] Notable

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[191] As discussed in Chapter 6, an equal weighting strategy is adopted here in the absence of justifiable and viable alternatives. The above results indicate the importance of testing the sensitivity of composite indices to different weighting strategies so that scholars advance towards a consensus on what constitutes best practice for empirical investigations. This is beyond the scope of this thesis, however, it is an important area of future research.

[192] In the main text, the HILDA SCQ indicators are not analysed individually. Although the indicators are the building blocks from which the dimension scores and the composite well-being index are constructed, each item is a signpost and is not comprehensive enough to encapsulate the entirety of

across the economic stability indicators is the similarity in responses across both age groups. The majority of people do not actually report experiencing negative financial stressful events or difficulty raising emergency funds. However, this is not aligned with any reassurance about their financial position; across both age groups approximately only 15 per cent are positive about their current financial prosperity. The higher mean economic stability score for older people is driven primarily by lower proportions reporting difficulty with timely payment of utility bills or relying on family for financial help or not having the ability to raise $3,000 in an emergency.

There is substantial variation in the pattern of responses across the range of community and social participation indicators. In the community built around the neighbourhood there is a distinction between the high incidence of providing and receiving neighbourly assistance in contrast to the low incidence of neighbourly interactions for both age groups. The results also point to the high levels of community-wide political inaction as only between 2-4 per cent of both age groups get involved in activities for a union, political party or group for or against something, or get in touch with a local politician or councillor on an issue that concerns them.

Within the personal relationships dimensions, with the exception of two indicators (people don't visit me as often as I would like and lots of friends), over 50 per cent of both age groups responded positively to items capturing resilience and to items reflecting the existence and maintenance of personal contacts. Nevertheless, the similarity in mean scores obscures the variation for a small group of older people who indicate a greater lack of support (no one to confide in, no one to lean on in times of trouble, someone who can always cheer me up when I'm down and often feel very lonely). This becomes more apparent with analysis of demographic sub-groups of older people in Section 7.3.2.

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the dimension. A basic tenet of the MIW approach is that insight into understanding well-being is better served by analysing multi-dimensional constructs rather than analysing each of the 77 uni-dimensional items. It is only in this section that reference is made to the results from Appendix E.

The foremost point of difference in the well-being dimensions for older people is on account of physical health and to a lesser extent slightly lower mental health score (98.1). The physical health score of 91.2 is one standard deviation lower than that of non-older adults with differences apparent across all 18 indicators. This is not unexpected given the onset of ageing and the natural decline in physical health due to senescence, a finding well-established in the health literature on ageing (Halleröd, 2009; Meinow et al., 2006; Närvänen, 2004; Peel et al., 2004). However in Table D.1, it is apparent that the comparatively lower mental health score is primarily driven by factors that are a consequence of the same ageing process. That is, negative responses are higher for those representing vitality (full of life and a lot of energy) and the extent to which health problems limit social functioning and work activities (the extent and time that health interferes with social activities and accomplishes less than would like), but not for indicators that reflect the actual emotional status of an individual (nervous person, down in the dumps, calm and peaceful and a happy person).

Interestingly across both health dimensions, approximately 25 per cent of older people are positive about their overall health status and their long term health expectations. There are even higher proportions of older people (above 50 per cent) reflecting positive responses for general health indicators that encapsulate individuals making comparative inferences about their situation (sick a little easier than others, as healthy as anybody I know and my health is excellent). Meng et al. (2013: 2360) writes that the 'SF-36 is a self-reported measure of health-related quality of life; therefore, items may be interpreted using different frames of reference than would be used by a younger population'. It is possible, therefore, that some older people may respond differently to overall/generic versus outcome-specific health characteristics, with the latter situated with reference to their actual physical and mental conditions

7.3.2 Older people by demographic characteristic

In Table 7.3, the mean scores by demographic sub-group of older people emulate running bivariate regressions that reveal the independent impact of each demographic attribute on the score results without asserting any controls for the joint effect of the remaining demographic factors.[193] To account for the collective effect of a range of demographic characteristics in mediating the association between a specific sub-group of older people and the well-being scores, multivariate ordinary least square regressions are also conducted (Table 7.4).[194]

The composite well-being index (cwi) varies substantially across the demographic groups of older people. The index is on par with the adult population (around 100) and marginally higher than the mean score for all older people (99.3) for the following groups: younger-old people; Australian born; those with a vocational or post-school qualification; married; those living in couple households; outright home owners; and those living in regional Australia. Older people who either have a tertiary degree (103.3) or are non-pensioners (103.3) have the highest levels of overall well-being even when multivariate regressions control for the remaining demographic factors by holding them fixed. The higher overall well-being value for employed older people dissipates after controlling for the effect of other demographic characteristics.

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[193] Note for categories beyond two, pairwise comparison of categories may be statistically significant even if the overall adjusted Wald test is not statistically significant. For example, even though the overall means for the mental health dimension by birthplace is statistically insignificant, the difference in means between those born in Australia compared to those born in a non-English speaking country is statistically different at $p<0.05$ ($p=0.03$).

[194] The benchmark group for comparison is a 74 year old Australian born retired male pensioner living in a major Australian city, has a year 12 education, and is currently married and living in a couple household in a house that he owns outright. This group is chosen with consideration to maximising sample size and retaining intuitive interpretation as a typical descriptor of a regular older Australian.

Table 7.3 Mean dimension scores and composite index by selected characteristics

Population sub-groups	(n)	*es*	*ph*	*mh*	*pr*	*cp*	*ne*	*cwi*
Adult population (15+)	11,993	100.0	100.0	100.0	100.0	100.0	100.0	100.0
All older people (65+)	1,963	102.3	91.2	98.1	100.0	103.0	103.0	99.3
		***	***	***		***	***	**
Older people demographic sub-groups								
Older age groups								
65 - 74 years	1,142	102.2	94.5	99.7	99.9	103.1	102.1	100.4
75 - 84 years	675	102.5	88.4	96.7	100.0	102.7	104.3	98.4
85+ years	146	101.9	80.9	93.8	100.5	103.0	103.4	95.3
			***	***			**	***
Gender								
Male	902	102.2	92.7	98.7	98.3	102.3	103.2	99.2
Female	1,061	102.3	89.9	97.7	101.4	103.6	102.7	99.3
			***		***	*		
Birthplace								
Australian born	1,411	102.4	91.3	98.8	100.6	104.0	103.1	100.0
English speaking	298	102.1	92.1	99.0	101.0	102.6	102.1	99.6
Non-English speaking	253	101.8	90.0	94.8	96.5	99.1	103.2	95.8
					***	***		**
Educational attainment								
Degree or higher	252	102.9	96.4	101.7	101.2	105.7	103.7	103.3
Vocational / post school qual	587	102.3	92.2	99.6	99.6	103.6	103.6	100.2
Year 12	140	101.4	90.4	96.4	100.4	102.2	102.6	98.1
Year 11 or below	980	102.2	89.5	96.8	99.8	102.2	102.5	98.0
			***	***		**		***
Marital status								
Married / de-facto	1,173	102.7	93.1	99.2	100.2	103.5	103.1	100.4
Separated / divorced	232	100.7	91.9	98.3	98.2	99.8	100.8	97.1
Widowed	488	101.8	86.0	95.6	100.2	103.1	103.4	97.1
Not married / not de-facto	69	101.7	90.3	96.4	98.7	102.6	103.5	98.1
			***	**		**		***
Household type								
Couple only	1,085	102.8	92.9	99.2	100.7	103.8	103.3	100.7
Lone person	624	101.4	89.2	97.2	99.3	103.0	103.3	98.1
Extended family	218	101.8	88.6	96.4	99.5	101.2	101.4	96.8
Shared household	36	101.9	93.5	96.9	93.7	98.4	103.5	96.4
			***	*	**	***		***
Housing tenure								
Own home	1,436	103.1	91.7	98.7	100.2	103.4	103.4	100.1
Paying mortgage	165	100.0	93.1	98.2	98.7	102.6	103.5	99.0
Renting private	156	99.3	89.8	95.7	98.1	100.5	102.8	96.1
Renting public	110	97.9	85.7	94.7	100.8	99.6	95.3	92.6
Rent free	80	103.6	88.1	96.7	100.5	106.7	106.9	100.7
		***	**	**		**	**	***
Employment status		102.3	91.2	98.1	100.0	103.0	103.0	99.3
Employed full-time	75	100.4	98.3	103.2	101.1	103.3	102.0	102.4
Employed part-time	143	103.1	96.9	102.0	100.7	104.8	102.8	102.9
Retired	1,686	102.3	90.4	97.7	99.8	102.9	103.1	98.8
Other	57	102.0	93.1	96.5	100.7	101.3	101.6	98.6
			***	***				***
Pensioner status								
Pensioner	1,599	102.0	90.1	97.3	99.6	102.7	102.8	98.4
Non-Pensioner	364	103.2	96.3	102.1	101.8	104.6	103.8	103.3
		*	***	***	**	*		***
Remoteness area								
Major city	1,140	102.3	91.4	97.9	99.9	101.6	102.2	98.6
Regional Australia	797	102.1	90.9	98.5	100.0	105.0	104.1	100.2
Remote Australia	26	103.2	89.5	96.7	102.9	108.8	103.3	101.2
						***		

Source: Author's calculations based on imputations from HILDA Wave 10 Release 10.
Weights: Cross sectional responding person population weights for 2010. Missing values are imputed.
Note: Wald test of significant differences in means at $p < 0.05$*, 0.01** and 0.001***. Standard errors calculated using the jackknife weighing method.

Table 7.4 Multivariate ordinary least squares regressions[195/196]

Population sub-groups	Economic stability (es)		Physical health (ph)		Mental health (mh)		Personal relationships (pr)		Community participation (cp)		Neighbourhood environment (ne)		Composite well-being index (cwi)	
	Coef.	*Std. err.*	*Coef.*	*Std. err.*	*Coef.*	*Std. err.*	*Coef.*	*Std. err.*	*Coef.*	*Std. err.*	*Coef.*	*Std. err.*	*Coef.*	*Std. err.*
Age	0.02	0.03	-0.52***	0.06	-0.18**	0.06	0.06	0.06	0.01	0.05	0.14*	0.06	-0.14*	0.05
Gender (ref: Male)														
Female	0.17	0.33	-1.37*	0.52	0.43	0.57	3.30***	0.56	1.86**	0.58	-0.02	0.47	1.27*	0.56
Birthplace (ref: Australian born)														
English speaking	-0.10	0.64	0.89	0.79	0.33	0.84	0.43	0.68	-1.09	0.80	-0.66	0.76	-0.07	0.76
Non-English speaking	-0.39	0.40	-1.53	1.17	-3.84*	1.46	-3.62**	1.11	-3.55***	0.85	1.21	1.12	-3.37**	1.10
Educational attainment (ref: Year 12)														
Degree or higher	1.45	0.87	3.22	1.72	3.71*	1.73	0.14	1.43	3.53	1.33	1.77	1.31	3.95*	1.66
Vocational / post school qual	0.90	0.92	0.22	1.32	1.39	1.78	-0.41	1.15	1.22	1.12	1.29	1.08	1.63	1.18
Year 11 or below	1.09	1.02	-0.68	1.44	0.12	1.29	-1.19	1.16	-0.84	1.29	0.32	0.91	-0.39	1.12
Marital status (ref: Married / de-facto)														
Separated / divorced	-0.61	0.99	-4.62*	1.90	-2.41	1.65	0.33	1.93	-3.57*	1.44	-1.49	1.67	-3.56*	1.62
Widowed	0.10	0.94	-5.29*	2.00	-3.41	1.86	1.21	1.89	-0.59	1.73	0.19	1.97	-2.24	1.69
Not married / not de-facto	0.36	1.21	-5.73*	2.13	-4.87*	2.26	1.98	1.96	-1.11	1.74	0.29	2.36	-2.64	2.02
Household type (ref: Couple only)														
Lone person	-1.09	0.74	4.63*	1.84	2.46	1.61	-3.27	1.80	0.38	1.49	0.15	2.15	0.99	1.47
Extended family	-0.51	0.55	-0.49	1.30	-0.25	1.34	-1.62	1.49	-1.10	1.48	-1.49	1.18	-1.57	1.37
Shared household	0.18	1.40	5.65**	1.65	2.26	1.67	-5.49	2.54	-1.85	1.86	0.19	2.87	0.24	1.69

[195] The reference group for comparison is chosen with consideration to maximising sample size and retaining intuitive interpretation as a descriptor of a typical older Australian.

[196] The conventional t-test is used to test the null hypothesis of no linear relationship between each independent variable and the dependent variable. The value of the R^2 is not a focal point of importance as interest lies in the 'ceteris paribus' relationship between the demographic characteristic and the well-being dimension score/composite well-being index. Moreover, as stipulated by Woolridge (2008), a low R^2 is also not uncommon in cross-sectional regression analysis.

Table 7.4 Multivariate ordinary least squares regressions (cont'd)

Population sub-groups	Economic stability (es)		Physical health (ph)		Mental health (mh)		Personal relationships (pr)		Community participation (cp)		Neighbourhood environment (ne)		Composite well-being index (cwi)	
	Coef.	*Std. err.*	*Coef.*	*Std. err.*	*Coef.*	*Std. err.*	*Coef.*	*Std. err.*	*Coef.*	*Std. err.*	*Coef.*	*Std. err.*	*Coef.*	*Std. err.*
Housing tenure (ref: Own home)														
Paying mortgage	-2.92*	0.94	-1.74	1.04	-1.83	1.05	-1.07	1.08	-0.24	1.05	0.97	1.18	-1.82	1.13
Renting private	-3.38***	0.90	-1.50	1.14	-2.73*	1.30	-1.76	0.98	-2.19	1.11	-0.15	0.95	-3.23**	1.05
Renting public	-4.86***	1.06	-3.80*	1.47	-1.98	1.71	1.05	1.96	-2.13*	1.04	-7.58	4.50	-5.41***	1.30
Rent free	0.72	0.56	-0.78	1.34	-0.88	1.14	-0.07	0.88	2.72	1.65	2.72	1.02	1.28	1.02
Employment status (ref: Retired)														
Employed full-time	-2.13	1.39	2.31	1.52	2.48	1.25	1.30	1.62	-0.17	1.74	-1.34	1.56	0.80	1.46
Employed part-time	0.33	0.54	2.36*	1.10	1.73	1.15	0.37	1.07	0.63	1.18	-0.36	0.88	1.43	1.01
Other	0.13	1.09	1.64	1.35	-1.29	1.92	0.56	1.48	-1.54	1.41	-0.64	1.95	-0.36	1.22
Pensioner status (ref: Pensioner)														
Non-Pensioner	1.14*	0.48	2.32**	0.82	2.24*	0.83	1.75*	0.72	1.02	0.90	1.25	0.90	2.76**	0.76
Remoteness area (ref: Major city)														
Regional Australia	-0.38	0.34	-1.10	0.72	-0.05	0.58	-0.17	0.67	2.96***	0.75	1.93*	0.88	0.98	0.71
Remote Australia	-0.21	1.62	-2.24	3.37	-2.43	3.25	1.13	3.33	5.88**	1.82	0.94	2.78	0.93	2.30
Intercept	102.40		92.89		97.87		100.16		101.95		101.88		99.11	
R squared	0.080		0.205		0.102		0.076		0.104		0.077		0.133	
N	1,961		1,961		1,961		1,961		1,961		1,961		1,961	

Source: Author's calculations based on imputations from HILDA Wave 10 Release 10.

Weights: Cross-sectional responding person population weights for 2010. Missing values are imputed.

Note: age is centred at the mean to provide a meaningful age for the reference group - a 74 year old male, Australian born, has a year 12 education, is married and lives in a couple household, is an outright home owner, a pensioner that is retired from the labour market and lives in a major Australian city.

Note: t-test of no linear relationship at ρ < 0.05*, 0.01** and 0.001***. Standard errors calculated using the jackknife weighing method.

Conversely, cwi is significantly lower, by approximately half a standard deviation less than the population norm, for the very old (85 years and over) (95.3), older people from non-English speaking countries (95.8) and older public renters (92.6). These remain statistically significant with the multivariate regressions results from Table 7.4. Other demographic groups that have marginally lower overall well-being and which remain statistically significant with the addition of regression controls are: separated/divorced older people (97.1), private older renters (96.1) and for the majority of older people that are pensioners (98.4). The final point to note regarding cwi is the lack of notable differences by gender in Table 7.3. The multivariate regression results from Table 7.4 attribute a 1.27 higher point difference to the overall well-being of older women than older men.

The variation in the pattern of well-being across the different dimensions for different groups of older people illustrates the heterogeneity in achievements, especially the coupling of advantage and disadvantage for specific sub-groups. The pattern within each demographic sub-group is now described in turn.

It is apparent that the decrease in overall well-being with old age is driven primarily by the effects of declining age-related health with substantial declines in physical health (from 94.5 to 80.9) and mental health (from 99.7 to 93.8) due to increasing limiting functioning. As already discussed, this is a natural and expected consequence of biological ageing (Närvänen, 2004). The age coefficients in the regression analysis are statistically insignificant across the remaining well-being dimensions, except for a slight increase in the neighbourhood environment score.

The combination of mean scores and multivariate regressions across the well-being dimensions for females mostly corroborate the findings from the literature (Berry and Welsh, 2010; Nieminen et al., 2008; Tomaszewski, 2012). Females have significantly lower physical health scores, explained by an ageing effect (Table 5.2 illustrates the proportionate increase in females with older ageing). With respect to mental health, the regression results indicate an almost negligible difference, even though the average mental health score is lower by 1 point for females than males (possibly, also an ageing effect). This result is consistent with the finding by Headey and Wooden (2004: 31) that 'women score higher on both positive emotions (positive affect) and negative emotions (negative affect). They are both more up and more down than men'. The higher scores for older males on the two dimensions relating to social connectedness (personal relationships and community participation) highlight the higher risk of social isolation for males; a finding clearly identified in the literature with respect to gender and irrespective of age (Berry and Welsh, 2010; Nieminen et al., 2008).

The lower overall well-being of older people born in non-English speaking countries compared to those Australian or English speaking born is associated with lower well-being scores across the majority of well-being dimensions. These persist for the mental health, personal relationships and community participation dimensions, even when controlling for other demographic factors in the multivariate regressions. The only exception is the slightly higher (but statistically insignificant) score for the neighbourhood environment dimension. Studies by Bird et al. (2009) and Bajekal et al. (2004) find that older people from ethnic minority or culturally-diverse backgrounds report positive perceptions of their neighbourhood or built environment irrespective of whether they actually live in neighbourhoods of relative deprivation. Overall, the results provide cursory evidence that is consistent with literature showing that many older migrants, irrespective of the length of their domicile residency, are unable to overcome assimilation obstacles that extend beyond economic resources (Bajekal et al., 2004; Bowling and Stenner, 2011; National Seniors Australia, 2011; Nazroo et al., 2005; Tomaszewski, 2012).

Older people with a vocational/post-school or tertiary educational qualification exhibit higher well-being across physical health, mental health and community participation dimensions, leading to a significantly higher composite well-being index. The increase remains statistically significant for the mental health dimension for tertiary educated older people in the multivariate regressions. These results are consistent with empirical evidence indicating the long term benefits of higher education that exist beyond the economic advantage procured from better labour market opportunities

(Kimberley and Simons, 2009; Ross and Wu, 1996). These extend from an increased likelihood of volunteering and membership in community organisations (Nieminen et al., 2008; Tomaszewski, 2012), to the adoption of healthy lifestyles and access to health care (OECD, 2014), and the development of coping strategies and psychological well-being in later life (Grundy and Sloggett, 2003).

Comparisons by marital status indicate the critical role of a partner to ensuring well-being in old age (Grundy and Sloggett, 2003; Wilson and Oswald, 2010). Scores across all well-being dimensions and the composite index are higher for married older people than the mean for all older people. Conversely, single older people (separated/divorced, widowed, not married/not de-facto) have a comparatively lower overall well-being (cwi is below 98.1). There is a statistically significant negative difference in the regression coefficients (Table 7.4) between married older people and those not in a partnered relationship for the physical health dimension; between married older people and older people who have never been married for the mental health dimension; and between married older people and those separated/divorced for the community participation dimension.

In part, this reflects the association between age and marital status. However, hypothesised reasons for the benefits in physical and mental health from marriage include the protective effects of care and support that promote better health outcomes (Grundy and Sloggett, 2003; Wilson and Oswald, 2010). Longitudinal studies also point to a ‘selection effect’; that healthy (and wealthier) people are more likely to marry (Wilson and Oswald, 2010). It is not possible in this sort of cross-sectional descriptive analysis to distinguish the ‘protective effect’ from the ‘selection effect’, however, the findings confirm that the long term benefits associated with marriage persist into old age.

With respect to household type, the statistical significance of the difference in mean scores is treated with caution as the comparative lower well-being position of older people living alone or in shared households is mitigated once other demographic characteristics are held constant. The regression coefficients move in the opposite direction implying that these two groups have higher physical and mental health well-being compared to couple only households. Moreover, lone person households have higher community participation well-being compared to couple only households. Yet the demographic profiles from Table C.7 and Table 5.2 indicate that over 50 per cent of lone person households are older-old widowers with age-related health declines. Further investigation is necessary to understand if other demographic descriptors in lone-person households can explain the results. As a summary conclusion, the results in this section suggests however that, in and of itself, there are other extenuating circumstances beyond an older person's living arrangements that are more strongly associated with their well-being outcomes.

The results by housing tenure confirm the large body of literature attesting to the cumulative and diverse range of economic, health and social benefits associated with home ownership and the contrasting comparative disadvantages in older renters well-being outcomes (Bridge and Kendig, 2010; Dewilde and Raeymaeckers, 2008; Dietz and Haurin, 2003; J. D. Fisher et al., 2007; Matthews et al., 2006; Searle et al., 2009). Older renters have significantly lower well-being across all dimensions compared to older people living in owner-occupied homes, except for the personal relationship dimension. The lower economic stability scores for older renters is expected as a pre-condition for public housing eligibility is a lack of funds (Department of Human Services, 2013a), and for private renters fluctuating rent payments and insecurity of occupancy are triggers for high levels of financial stress (Morris, 2009; Tanton and Phillips, 2013) (97.9 and 99.3 respectively).

As discussed earlier, this study cannot dis-entangle the cause and effect between poorer physical and mental health outcomes of older renters compared to older owner-occupiers.[197] By way of explanation though, the findings from qualitative research contrasts the therapeutic properties and ontological security of owner-occupation, with the difficulty in obtaining and sustaining home ownership if faced

[197] For example, a recent study by Baker et al. (2014) using the pooled data across 10 waves of HILDA found a bi-directional relationship between housing affordability and health in Australia. They report that a prior condition of mental health can predict current affordable housing outcomes and that current housing affordability influences current individual health.

with physical or mental health problems and the attraction of non-home owning options for individuals with health problems (S. J. Smith et al., 2003; Wood et al., 2010).

The pattern by home tenure also indicates the disparity in well-being outcomes for older public renters compared to private renters. The high personal relationships well-being score for public renters (100.8) versus private renters (98.1) resonate with Australian qualitative research that elderly public tenants maintain strong social support networks created through the physical infrastructure of social housing units and security of long term tenancies (Morris, 2012). Similarly, the lower scores for the quality of the neighbourhood environment for older public renters is supported with qualitative insights on the level of disorder, anti-social behaviour and the adversity of the immediate neighbourhood in public housing estates (Morris, 2012; Wood et al., 2010).

The lower composite well-being index for older public renters compared to private renters, however, does not support the overall qualitative conclusion by Morris (2009: 693; 2012) that older public housing tenants have a 'greater capability to live a life they valued'. It is possible that these results are not comparable as the qualitative research is based on small predominantly Sydney focussed studies exploring the differences in financial constraints and social relations between the two rental types, framed around Sen's notion of capabilities. The research in this thesis is nationally representative and importantly includes physical and mental health as part of an objective overall well-being index. In summary though, the results from Tables 7.3 and 7.4 suggest that the lower well-being of older renters (public and private) across multiple dimensions may potentially be the residue of accumulated disadvantage over the life course including (or leading to) a precarious and residualised housing tenure position that persists post retirement. Further investigation outside the scope of this thesis is required to test this hypothesis.[198]

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[198] In making this statement, the assumption is that the housing tenure position for the majority of older tenants occurred before retirement and continued post-retirement.

Older people employed full-time or part-time have statistically higher mean cwi values than retired older people, through significantly higher physical and mental health outcomes, and only marginally higher personal relationship and community participation dimensions scores. Although some of these differences dissipate when the other demographic variables are controlled for in the multivariate regressions, the pattern of mean scores in combination with the sign and size of the regression coefficients, suggest a positive association between employment and physical health, mental health and personal relationships in old age that is corroborated in the literature (McMunn et al., 2009).

There are, however, differences in the dimension results between those employed full-time and employed part-time. Older people employed full-time have negative regression coefficients for economic stability, community participation and the neighbourhood environment. Conversely, older people employed part-time have positive regression coefficients for all dimensions except the neighbourhood environment. The difference in the two groups suggests the possibility that there may be different causal relationships between an older person's employment circumstances and their well-being outcomes that can possibly run in both directions. For example, an individual's level of financial stress may force them to remain in full-time employment. Or as a consequence of robust physical and mental health, an older individual can maintain full-time employment. There is also evidence that those in part-time employment dually benefit from bridging the advantages of continued labour force attachment with that of retirement (Kim and Feldman, 2000). These include the economic benefits of employment, the daily structure of work, identification with a role and initiating participation in valued activities prior to retirement.

For non-pensioners the sustained advantageous relative economic position when social transfers in-kind and wealth are included, endure within a multi-dimensional framework as well. Well-being scores are higher across all dimensions compared to all older people even when controlling for the effect of other demographic characteristics. Furthermore, except for a lower physical health score (an obvious age effect); the dimension scores and composite index values are also higher than the adult population norm of 100. The economic stability mean score of 103.2 is plausible given their privileged economic position.

There are two plausible explanations for high well-being in the remaining dimensions. The first explanation is that, there is a group of predominantly younger-old employed non-pensioners (65-74 years) (as shown in Table C.5 in Appendix C.2), who given their age have better health outcomes and are able to maintain personal relationships and community participation possibly through interaction with the workforce. The second explanation is that for many there is a circularity of advantage. The human capital that enables the accumulation of wealth and income over the life course also enables achievements in other dimensions that likewise accumulate over the life course. Aspects of some of these dimensions are further maintained by access to economic resources. For example, the affordability of a house in a safe and clean environment, the financial means to purchase access to private health insurance or funding a lifestyle that maintains an extensive personal and social network. Apart from physical health, these advantages do not dissipate post-retirement age.

Finally, the pattern of mean scores in combination with the sign and size of the regression coefficients indicate that older people living in regional and remote[199] parts of Australia experience higher levels of financial stress and poorer physical and mental health outcomes, yet significantly higher community participation scores than older people in a metropolitan centre. The quality of the neighbourhood environment is also reported as higher for older people in regional Australia. These findings are corroborated in Australian-specific literature. The review by Davies and Bartlett (2008) highlight the health disadvantages of older people in rural Australia citing a combination of factors from access to health-care services, the physical demands of

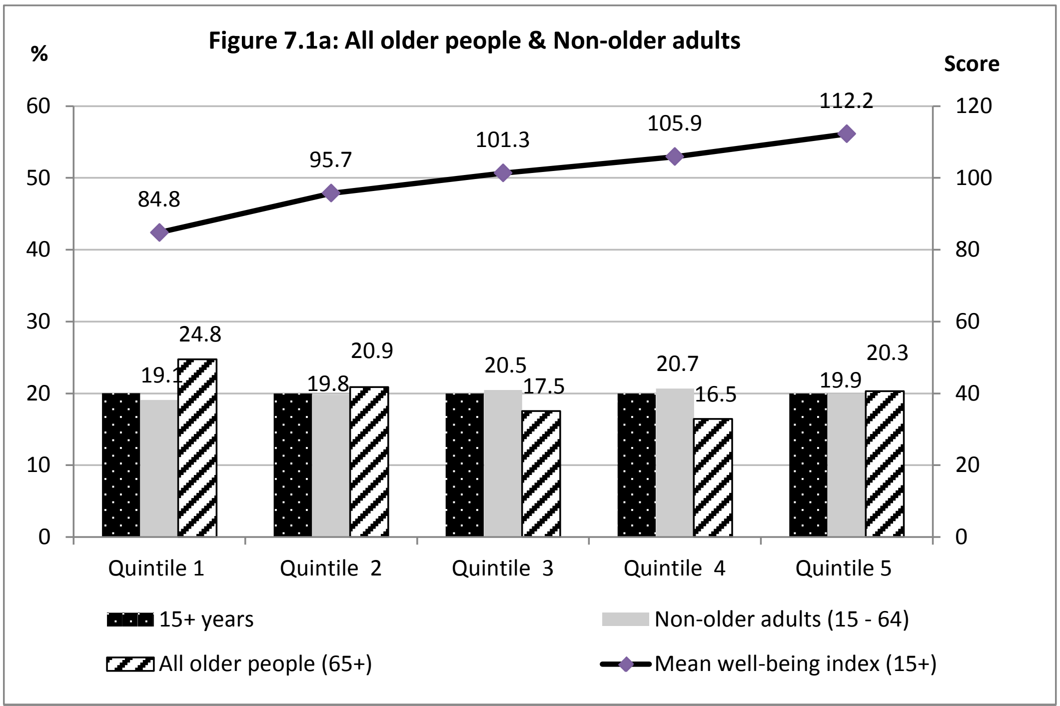
[199] As pointed out in Chapter 5, the results for older people in remote Australia is treated cautiously due to statistical unreliability for this group (refer to Table 5.3 and Fn. 130) as HILDA excludes a representative sample of people living in remote and sparsely populated areas (Summerfield et al., 2012).

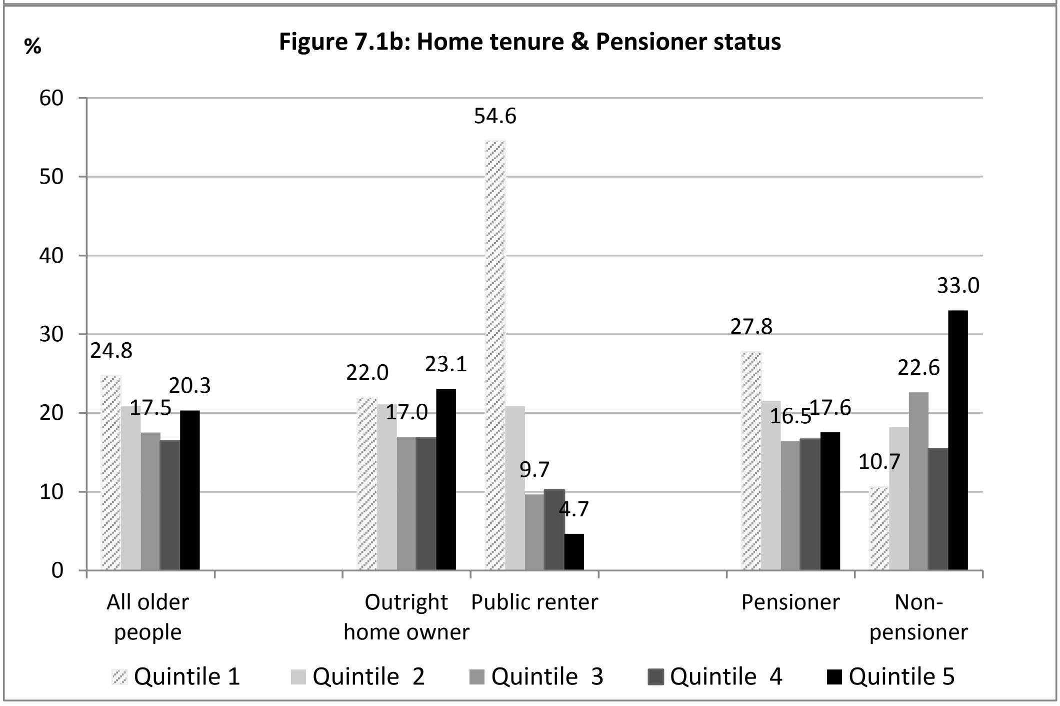
rural life and the mental strain from the temporality of farming conditions. Gong et al. (2014: 528) examines the small area profiles of the minority of older Australians in extreme economic disadvantage and advantage (ignoring the majority who do not lie at the extremities), showing that extreme economic disadvantage is more likely to occur in the balance of Australia rather that in capital cities. Similarly, Saunders and Wong (2014: 147) estimate higher rates of material deprivation in rural areas than the outer and inner metropolitan areas of a major city. While National Seniors Australia (2010) highlight that older people in rural places feel safer with higher levels of social connectivity and social participation than those in metropolitan areas. A significant consequence of their geographic expanse across the Australian continent is pro-actively maintaining the social and civic life of their communities (S Davis et al., 2012; Keough, 2015).

7.4 Quintile distribution by key selected characteristics

Further evidence of the differential pattern in well-being outcomes for specific demographic groups of older people is also apparent by examining the distribution of well-being. Figure 7.1 follows the same approach used in Section 6.4.2 by dividing the adult population into five equal groups; the 20 per cent of the adult population with the lowest well-being index are in quintile 1 and the 20 per cent with the highest well-being index are in quintile 5. Using the minimum and maximum thresholds for each quintile, the proportion of older people and by home tenure and pensioner status is determined and compared to how far below and above 20 per cent they range. The markers along the line indicate the mean composite well-being index for the full adult population in each quintile.

Figure 7.1 Distribution of older people and sub-groups by adult population *cwi* quintiles (bars %)





Source: Author's calculations based on imputations from HILDA Wave 10 Release 10.
Weights: Cross-sectional responding person population weights for 2010.
Sample: 11,993. Missing values are imputed.
Note: Figure 7.1a line is the mean *cwi* for the adult population in each quintile.

The mean scores in quintile 1 (84.8) and quintile 5 (112.2) in Figure 7.1a are approximately 1.5 standard deviations below and above the mean score of 100. The wide spread of well-being scores is indicative of a large disparity in well-being across the overall adult population; the finding analogous to drawing the conclusion of high levels of economic inequality when analysing distributions of economic resources (as evident in Figure 5.6 in Chapter 5).

There is no overwhelming evidence of a substantively different distributional pattern of well-being for older people compared to non-older adults in Figure 7.1a. The pattern is a shallow u-shape with a higher proportion in quintile 1 (24.8 per cent), lower proportions in quintile 3 (17.5 per cent) and quintile 4 (16.5 per cent) and a slightly higher proportion of older people with high well-being in quintile 5. This distributional profile, at an aggregate level, however, masks the significant variation for specific older sub-groups as illustrated in Figure 7.1b.

Reinforcing the mean score analysis from Table 7.1, older outright home owners have slightly higher well-being outcomes to that of all older people with a 3 percentile point reduction in quintile 1 (22.0 per cent) and a similar increase in quintile 5 (23.1 per cent). In contrast, the pattern for older public renters is disproportionately represented as the group with very low well-being. One in every two older public renters is in the lowest cwi quintile (54.6 per cent) and only 1 in 20 has a high well-being score in quintile 5 (4.7 per cent).

The gradients are less pronounced between pensioners and non-pensioners; however, the patterns still diverge in opposite directions. The pattern for pensioners is similar to that of all older people except at the tail ends with slightly higher and lower proportions in quintile 1 and 5 respectively (27.8 and 17.6 per cent). In contrast, the pattern of well-being for non-pensioners is skewed toward the quintile population with high well-being. Only 1 out of 10 non-pensioners have low overall well-being in quintile 1, yet 1 in 3 belong to the highest cwi quintile. There is reasonable evidence to suggest that within the group of non-pensioners, a sizeable proportion actually have a much higher level of overall well-being, both compared to pensioners but also including other non-pensioners. The mean score for the population in quintile 5 is 112.2 is nearly one standard deviation higher than the mean score of 103.3 for non-pensioners.

7.5 Low-well-being

Unlike the broad consensus established in the economics literature on setting relative income poverty lines as the threshold to categorise income poverty, there is no equivalent counterpart, either through conceptual linguistic references in academic and policy discourse, or as a numerical threshold in sociological or social economics literature, that demarcates a socially unacceptable level of well-being. For the purpose of this exercise (and within the experimental parameters of this thesis) this state is referred to as 'low-well-being'; to emphasise a situation indicative of considerable disadvantage undesirable to the individuals themselves and unacceptable to the moral and ethical values held within a society.[200]

However, determining the threshold for low-well-being is essentially an arbitrary exercise. In keeping with the comparative analytical approach so far adopted in this thesis it is, therefore, made with reference to prevailing standards in society. This follows the ABS recommendation when discussing the issue of setting benchmarks within a broad well-being framework. They write:

> There are, nevertheless, a range of values held and expressed in society which enable judgements to be made about where to set levels that can be used as statistical benchmarks. These, so called normative values, are states that are generally considered normal, standard or acceptable. (ABS, 2001b: 8)

Individuals are categorised dichotomously as having low-well-being in each dimension if they fall in the bottom 15 per cent of the distribution for each well-being dimension. It is in accordance with the commonly used statistical convention that one standard deviation below the mean of a population is an undesirable situation (Sanson et al.,

[200] Note that this is different to ill-being as described by Headey and Wooden (2004: 25): 'well-being and ill-being are distinct dimensions and not opposite ends of the same dimension'.

2005: 23). When data follow a normal distribution, approximately 68 per cent of the population lie within 1 standard deviation of the mean, with the remaining 30 per cent lying equally on the two ends (Mertler, 2007: 125).[201] The proportions estimated can only be understood in relative terms, comparing across demographic sub-groups of older people and relative to non-older adults, as they have no quantifiable independent meaning (Sanson et al., 2005: 23). However, they do provide insight into which dimensions older people are disproportionately represented in and how this varies by demographic groups.

Following a common 'counting' approach (Atkinson, 2003) utilised in social exclusion and deprivation studies (Bradshaw and Finch, 2003; Moore et al., 2008; Sanson et al., 2005; Saunders et al., 2007; Scutella et al., 2009), overall low-well-being is also established if an individual falls below the threshold on a certain number of dimensions. This approach is also not without weakness. Important information is lost from applying multiple cut-offs that reduce each dimension to dichotomous categories before aggregation is conducted and from treating all dimensions equally (Sanson et al., 2005: 7-8). Nonetheless, one of its main advantages is that it provides a profile of the incidence of multiple low-well-being across demographic groups helping to identify those groups that are disproportionately cumulatively disadvantaged.[202/203]

[201] More specifically, on repeated samples, 99 per cent of the scores should fall between 3 standard deviations lower or higher than the mean (i.e. between 70 and 130), 96 per cent should be between 2 standard deviations lower or higher than the mean (i.e. between 80 and 120) and 68 per cent should range between 1 standard deviation lower or higher than the mean (i.e. between 90 and 110) (Mertler, 2007: 125).

[202] It follows principle 2 set out by Decancq and Schokkaert (2015) that any well-being measure must be able to account for cumulative deprivation.

[203] It should be noted that for the purposes of this exercise, overall low-well-being is purposely not defined using a 15 per cent threshold applied to cwi. As already discussed in Section 6.6.2, one of the main weaknesses with composite indices is the dependency of the results on the weighting system and the compensatory effect of low scores in one dimension with high scores in another. The consequence for this sort of analysis is that the measured distance between how far the score is below the threshold on any one dimension can dominate the overall result, rather than identifying the fact that an individual sits below the threshold.

This is because aggregation takes place continuously so that measured gaps across dimensions cumulate, increasing the distance between the final cwi and the composite score threshold. For example, using a continuous 15 per cent cut-off to cwi (threshold is 89.8), 27.6 per cent of very old people (85 years and over) have low-well-being, driven mostly by low physical health scores (the

Table 7.5 The incidence of multiple low-well-being across the six dimensions (%)

Number of dimensions with low well-being	65 - 74	75 - 84	85+	All older people (65+)	Non-older adults (15-64)	Adult population (15+)
	Years					
0	49.4	39.9	17.0	43.2	49.9	48.9
1 or more	50.7	60.1	83.0	56.8	50.1	51.2
2 or more	26.8	33.2	50.5	31.2	22.7	24.0
3 or more	10.1	13.6	11.8	11.4	9.7	10.0
4 or more	4.0	6.1	0.3	4.3	3.6	3.7
5 or more	0.9	0.7	0.0	0.7	1.1	1.0
6	0.1	0.0	0.0	0.1	0.2	0.1

Source: Author's calculations based on imputations from HILDA Wave 10 Release 10.
Weights: Cross-sectional responding person population weights for 2010. Weighted sample: 11,993. Missing values are imputed.
Note: The 15% threshold scores for each well-being dimension are presented in Table 7.6.

The extent of multiple low-well-being in Table 7.5 indicates that close to half of non-older adults do not experience well-being disadvantage, around 50 per cent experience low-well-being in just one dimension and almost one-quarter experience low-well-being in two or more dimensions. Multiple incidence of low-well-being is slightly higher for all older people. Two-fifths do not experience low well-being, around 57 per cent experience low-well-being in any one dimension and around one-in-three experience low-well-being in two or more dimensions. The pattern across the older age groups highlights the very high percentage of older old people (75 years and over) who experience low-well-being in at least one or two dimensions. As will become evident in Table 7.6, this is most likely due to declining physical health and mental health. However, beyond a cut-off of two dimensions, the proportions with low-well-being in three or more dimensions are roughly the same as younger-old people and non-older adults. It implies that beyond taking into account the expected decline in age-related health, other factors instrumentally important in affecting cumulative disadvantage are not necessarily age-related.

Consequently, in Table 7.6 the threshold for the 'counting approach' for overall low well-being (column 9) is set at three or more dimensions. A threshold of three is also justified on the grounds that this provides a percentage that is approximately

physical health mean score for this group is 80.9). This compares to 11.8 per cent who have overall low-well-being because they fall below the 15 per cent threshold in three or more dimensions.

equivalent to the poverty rate when the 50 per cent poverty threshold for disposable income is applied (Table 5.10 in Section 5.5.3). This is a common technique used to examine the overlap between income poverty and multi-dimensional disadvantage within deprivation and social exclusion studies (Bradshaw and Finch, 2003; Saunders and Naidoo, 2009; Saunders et al., 2007).[204] The remaining columns show the proportions of older people and demographic sub-groups of older people with low-well-being in each dimension.

Low-well-being rates using the counting approach (3 or more dimensions) are only slightly higher for older people (11.4 per cent) than non-older adults (9.7 per cent). Moreover, the variation in rates across the well-being dimensions re-inforce the mean score findings from Section 7.3. There are much higher proportions of older people with physical health (39.5 per cent) and mental health (23.0 per cent) below the prevailing standard of the population. There are correspondingly lower proportions of older people with economic stability problems (8.5 per cent), low community and social participation (10.2 per cent) and low well-being regarding the neighbourhood environment (8.9 per cent).

[204] Travers and Richardson (1993: 55) write that '… the selection of 'three or more' as the criterion of multi dis-advantage is itself arbitrary and subject to the same criticism that dis-advantage on any one dimension is viewed as the same as disadvantage on any other'.

Table 7.6 Rates of low-well-being (%)

Population sub-groups	(n)	*es*	*ph*	*mh*	*pr*	*cp*	*ne*	Overall (>=3 dim)
Low threshold (score)		94.3	88.5	88.9	88.7	89.7	90.5	
Adult population (15+)	11,993	15.0	15.0	15.0	15.0	15.0	15.0	10.0
Non-older adults (15-64)	10,030	16.2	10.3	13.5	15.1	16.0	16.2	9.7
All older people (65+)	1,963	8.5	39.5	23.0	14.3	10.2	8.9	11.4
Older people demographic sub-groups								
Older age groups								
65 - 74 years	1,147	8.2	28.7	19.0	15.6	10.6	10.5	10.1
75 - 84 years	683	8.4	48.2	26.7	13.1	10.5	6.6	13.6
85+ years	154	11.2	74.8	34.3	10.9	7.0	7.4	11.8
Gender								
Male	909	9.0	34.8	22.0	18.3	10.1	7.7	11.5
Female	1,075	8.1	43.9	23.9	10.7	10.4	10.0	11.3
Birthplace								
Australian born	1,427	8.1	38.9	21.4	12.8	8.8	8.5	10.2
English speaking	302	7.4	36.7	19.6	12.0	10.4	8.7	10.1
Non-English speaking	254	10.9	44.6	32.4	22.8	16.1	10.8	17.1
Educational Attainment								
Degree or higher	255	8.0	25.8	12.9	15.7	6.2	5.8	8.1
Vocational / post school qual	589	8.8	37.3	21.0	15.3	8.0	7.4	11.6
Year 12	142	6.8	42.1	24.4	12.4	9.6	9.8	10.5
Year 11 or below	994	8.8	43.8	26.1	13.8	12.4	10.5	12.3
Marital status								
Married/de-facto	1,177	7.3	32.9	19.6	13.8	7.8	8.2	9.0
Separated/divorced	236	12.6	35.8	21.5	19.2	22.2	14.7	20.4
Widowed	498	10.1	57.2	31.7	14.0	11.7	9.3	14.0
Not married/not de-facto	72	9.7	51.8	30.5	11.8	12.5	4.1	12.6
Household type								
Couple only	1,088	6.8	34.2	19.7	13.0	6.6	7.4	9.0
Lone person	642	11.9	46.9	24.6	15.4	13.7	8.4	14.3
Other-related	218	9.2	47.6	29.7	15.3	13.6	14.0	14.5
Other-not related	36	10.0	24.0	28.8	26.6	29.5	9.2	12.5
Housing tenure								
Own home	1,440	5.8	37.4	21.1	14.1	8.7	7.7	9.5
Paying mortgage	165	15.8	34.9	22.2	19.3	11.0	6.6	11.6
Renting private	162	18.1	44.2	31.4	15.3	17.3	7.0	18.0
Renting public	116	24.8	59.9	36.2	11.4	18.3	31.8	29.5
Rent free	85	3.5	49.4	26.8	10.1	9.6	4.4	7.4
Employment status								
Employed full-time	75	19.1	11.9	7.2	14.8	7.6	8.9	4.3
Employed part-time	144	4.6	18.9	13.8	11.7	7.6	11.4	1.1
Retired	1,704	8.4	42.8	24.6	14.8	10.4	8.7	12.6
Other	59	7.0	29.9	21.2	7.3	15.1	11.1	11.4
Pensioner status								
Pensioner	1,619	9.0	43.7	25.6	14.8	11.2	9.6	13.0
Non-Pensioner	365	6.4	20.4	11.1	12.0	5.6	6.0	4.1
Remoteness Area								
Major City	1,148	8.7	38.7	23.7	14.5	12.3	10.9	12.3
Regional Australia	807	8.4	40.7	21.4	14.3	7.3	6.0	10.4
Remote Australia	29	3.6	46.0	39.0	8.1	2.0	2.9	2.0

Source: Author's calculations based on imputations from HILDA Wave 10 Release 10.

Weights: Cross-sectional responding person population weights for 2010. Missing values are imputed.

Notes: Col 3-8 represent the proportion with a dimension score below each respective threshold value (set at a 15% cut-off). Col 9 represents the proportion with low well-being in three or more well-being dimensions.

The pattern of results by demographic sub-group demonstrate that the health effects of ageing are the cause of the vast over-representation of older age cohorts with physical health low-well-being and to a lesser extent mental health low-well-being compared to all older people. Averaging across the 75-84 years and 85 years and over age groups, more than half have physical health scores below 88.5 and around a third have mental health scores below 88.9. This extends to groups skewed towards the older old: females; widowers; those living alone or with family members; or without tertiary education qualifications. The findings reinforce the regression results that once older ageing is accounted for, either in isolation as a demographic group or through being a principal feature of other demographic characteristics, there are other factors beyond physical health and mental health driving the difference in well-being at a composite level.

The results from Table 7.6 are further evidence of multiple disadvantage for specific demographic groups. Older people born in non-English speaking countries (17.1 per cent), public renters (29.5 per cent), private renters (18.0 per cent) and separated/divorced older people (20.4 per cent) have between 1.5 to 2.5 times the rate of all older people with overall low well-being. Public renters have proportions of low-well-being in excess of all older people on five of the six dimensions (the exception being personal relationships). Similarly, older people born in non-English speaking countries are an over-represented group compared to all older people across all six dimensions. However, multiple disadvantage is not necessarily associated solely with physical and mental health low-well-being. For example, although 20 per cent of separated/divorced older people have overall low-well-being, the rates of low well-being for the physical and mental health dimension for this group are lower than the rates for all older people.

The results reinforce the previous analyses that indicate the better comparative position for specific demographic sub-groups of older people. Tertiary educated older people, married older people, couple households, outright home owners, employed older people, non-pensioners and older people living in remote Australia have lower proportions of low-well-being than older people and also non-older adults. This does not, however, preclude them from low-well-being on a dimension-by-dimension basis. For instance, 19.1 per cent of full-time employed older people have low-well-being in relation to economic stability, which is more than double the rate for all older people, yet only 4.3 per cent have low-well-being in three or more dimensions. Similarly, while very few older people living in remote Australia face multiple low-well-being, proportions are high for physical and mental health low-well-being (46.0 and 39.0 per cent respectively)

In summary, the results on low-well-being provide further evidence to support the view that there are extenuating circumstances for specific groups (such as, older renters, older people born in non-English speaking countries and separated/divorced older people) that place them in positions of considerable disadvantage. This extends beyond a lack of economic resources as measured in the ELS approach to encapsulate a lack of achievement in non-monetary dimensions of their life. The corollary of this is true as well, for those (such as, non-pensioners and older people with a tertiary education) whose relative well-off economic position is accompanied by achievements across the other dimensions of well-being.

7.6 Discussion

7.6.1 Summary of MIW results

A precis of the above analysis of the MIW results suggests five key empirical findings. First, on average and at an aggregate level, older people have overall well-being that is only slightly lower but otherwise comparable to non-older adults. Second, there is significant variation across demographic groups. Older old people (75 years and over), those born in non-English speaking countries, separate/divorced older people, older renters and pensioners have lower overall well-being than the average for all older people. Conversely, older home owners, couple households, those married, older people born in Australia, non-pensioners and tertiary educated older people have significantly higher overall well-being than the average of all older people.

Third, the dimensions that decline the most compared to non-older adults and also fluctuate the most across demographic groups of older people are physical health and to a lesser extent mental health (as far as this is associated with increasing fragility and loss of physical functionality). As this is a natural and expected consequence of the ageing process (Närvänen, 2004), declining physical and mental health is therefore prevalent amongst those demographic groups that are skewed towards older old people: females, widowers, older people living in shared households or those living rent free. However, the existence of lower physical and mental health outcomes is not necessarily associated with a lack of well-being achievements in other dimensions. Most notably, for females and older old people their lower physical health scores do not presuppose a withdrawal from maintaining personal relationships and participation within the community as they have higher dimension scores.

Fourth, the analysis indicates that for the majority of pensioners, who can also be characterised as either permutations of outright home owners, married or living in couple households or collectively belong to one or all of these groups, their overall well-being is similar to the Australian adult population. Apart from the expected decline in physical and mental health, their well-being achievements in the other dimensions exceed those of the non-adult population. One hypothesis is that post-retirement, the combination of a minimum income standard through the pension, the financial and emotional security obtained from home ownership, equitable access to adequate health, aged care and community services and the increase in free time to spend on nurturing social and personal networks, has enabled the majority of older Australians to maintain their well-being relative to non-older adults. The results show that it is those older people who do not fall into one or all of these categories and through a coupling of advantage or disadvantage over their life course experience disparities in overall well-being and across well-being dimensions.

Related to this last statement is the final fifth point. That is, evidence of multiple advantage for tertiary educated older people and non-pensioners and evidence of multiple disadvantage for older renters and older people born in non-English speaking countries. This chapter provides a cross-sectional descriptive analysis based on a methodological approach to measuring individual well-being as a multi-dimensional concept. Consequently, the cumulative longitudinal effects of advantage and disadvantage, or the long term causal relationships between demographic circumstances and well-being achievements are not empirically investigated. Yet, it would be remiss not to draw attention to the evidence that, at least anecdotally, suggests existence of a circularity of advantage or disadvantage that for these groups began pre-retirement age, accumulated over the life course and persist post-retirement into old age. The legacies of decisions or circumstances prevailing many decades earlier in an individual's life are notably illustrated with the cumulative advantages afforded to tertiary education older people and the cumulative disadvantages experienced by many older people born in non-English speaking backgrounds. [205]

Dannefer (2003: S327) describes cumulative advantage/disadvantage (CAD) as 'the systemic tendency for inter-individual divergence in a given characteristic'. Implicit in the definition is that divergence results from the interaction between different forces and is a property not just of individuals but of any collectivity with an identifiable set of members. There is a growing body of gerontological literature investigating the existence of CAD over the life course to explain increasing diverging well-being outcomes with age (Bengtson et al., 2005; Blane et al., 2004; Dannefer, 2003; Gong et al., 2014; Huisman et al., 2003; Ross and Wu, 1996). The cross-sectional results from this thesis indicate the merit of applying the MIW framework to a longitudinal analysis to investigate if the well-being outcomes for these older demographic sub-groups are, in fact, the result of systemic processes that increasingly culminate over the life course.

7.6.2 Reviewing the metrics

One of the key premises so far in this thesis is of the need to measure individual well-being in a way that recognises that the well-being of an individual is complex and multi-faceted, and that an overall assessment depends on how the individual fares

[205] The presumption is that for this particular cohort of older Australians, the majority with tertiary qualifications graduated, at least, 40 to 50 years earlier. It is also understood that amongst the older Australians born in non-English speaking backgrounds, this includes a wide time span from those recently arriving elderly migrants to those who arrived in Australia as early as from the 1950s.

across the different dimensions that constitute his/her well-being. The literature review in Chapter 3 argues that the siloed presentation of data in indicator dashboards do not allow for an examination of the combined distribution of well-being across different dimensions. Nor can the inter-aggregative procedures in macro-level composite indices provide insights on well-being at the level of the individual. The results from this chapter are indicative of the capacity for the MIW framework to overcome these concerns whilst still capitalising on the unique benefits of indicator dashboards and composite indices to well-being assessments.

This is because the presentation of well-being dimension scores and the composite well-being index provides the scope to do both, but with the individual as the focus of analysis and articulated around individual-based well-being outcomes. It is clear from the results in this chapter that relying only on cwi to draw conclusions about older people and demographic sub-groups of older people is subject to the compensability problem described in Section 6.6 (Maggino and Zumbo, 2012; Nardo et al., 2005; Salzman, 2003). Hence, composite indices with very 'different realities [in their composition may] turn out to be identical and indistinct' (Maggino and Zumbo, 2012: 224). This is because low values in some well-being dimensions are compensated by high values in other well-being dimensions (it assumes well-being identification issues away). In the case of older people, it is the tendency for the lower scores on physical health to be compensated by higher scores in other well-being dimensions.

The usefulness of the cwi (and more broadly composite indices), however, lies in its ability to reduce complex multi-dimensional concepts and the data attached to them into a unitary index. The simplicity of a unitary index serves as a pragmatic communication tool, better able to garner public attention and to link policy decisions to well-being outcomes. It provides the same numerical benefits associated with money metrics; analysis may take the form of counting, comparison and ranking either over time, against policy targets or between different groups at micro-meso-macro levels (as micro-level scores can be upwardly aggregated).

It is, therefore, constructive to regard the cwi as serving a metaphorical role (Boelhouwer, 2010). In calling attention to the variation in overall well-being across individuals, it necessitates an examination of for whom and in what way do the different well-being dimensions interact? As Boelhouwer (2010: 91) explains with respect to the role of the Life Situation Index (SLI) and the Human Development Index (HDI), 'we can regard an index as the door of a house. This door invites people to enter, but the house as a whole, not the door, is ultimately important'. The composite well-being index and the dashboard presentation of well-being dimension scores are best utilised as complementary metrics within the overarching MIW framework.

Additionally, from a conceptual ageing perspective, the MIW approach provides a visible way to understand the manner in which different ageing processes, at an aggregate level for older people, are embedded and inter-relate within a chronological ageing process demarcation based on the pension eligibility age. As discussed in Chapter 1, alternative views of the ageing process are biological and psychological ageing and social ageing. Biological and psychological ageing are the natural consequences of physical and mental health brought on by the onset of senescence. Social ageing refers to age norms that prescribe behaviours, expectations, rights and obligations according to socially defined life phases (Närvänen, 2004).

Through the MIW methodology, the lower physical and mental health score for older people compared to non-older adults is seen as a natural consequence within the contextual framework of biological and psychological ageing. The higher community participation score, on the other hand, is accepted and understood within the contextual framework of social ageing as individuals' transition out of a work/care environment to a situation with potentially more free time to invest in community and social activities. Similarly, the higher neighbourhood environment score is also interpretable within a social ageing context. It is expected that at this particular life stage, as long term home owners, many older Australians are embedded in their local neighbourhood. Finally, the similarity in the personal relationship score between older people and non-older adults underscores the notion that even though the well-being of older people in different dimensions is affected simultaneously by different ageing processes, they are also just adults; the nature and quality of their social connectedness is a feature of their personal capital rather than an ageing attribute.

7.7 Comparing the ELS metrics and the MIW scores

The last part of this chapter looks at the relationship between the two distinct approaches explored so far in this thesis. If the various metrics derived using the ELS and MIW approaches identify the same individuals as having high (or low) economic resources and high (or low) multi-dimensional well-being then debate about the various approaches to measure the standard of living and well-being may well be redundant. The most efficient approach is to continue current convention and use disposable income as the dominant form of comparative standard of living analysis. It is clear from Chapter 5 that even within an economic perspective this is not acceptable as the inclusion of wealth and social transfers in-kind substantively changes the relative position of individuals, and especially so for older people. It is also clear from this chapter that older people's relative well-being position changes depending on the well-being dimension with variation across demographic group, so that comparative well-being analysis cannot be constrained to one dimension (for example, physical health).

However, what happens when the summary estimates from the two approaches are compared? What is the nature of the relationship between the ELS metrics and the MIW scores and composite well-being index? How does this relationship differ amongst non-older adults and older people? What possible hypotheses can explain these relationships (or lack of relationships)? Is one ELS metric more closely aligned to well-being achievements? And if so, can this ELS metric be used as a plausible substitute on the grounds of efficiency and in the event that multi-dimensional analysis is not possible? To begin to answer these questions, Table 7.7 presents the Pearson's correlation coefficients between the ELS metrics and the MIW metrics for non-older adults and older people.

Table 7.7 Correlations between the ELS metrics and the MIW metrics

Non-older adults	Disposable income *(dy)*	Full income *(fy)*	Potential consumption *(pc)*	Adjusted potential consumption *(apc)*
Composite well-being index (*cwi*)	0.221***	0.239***	0.253***	0.263***
Economic stability *(es)*	0.235***	0.250***	0.254***	0.263***
Physical health *(ph)*	0.143***	0.130***	0.116***	0.113***
Mental health *(mh)*	0.165***	0.170***	0.172***	0.173***
Personal relationships *(pr)*	0.140***	0.142***	0.144***	0.146***
Community participation *(cp)*	0.047***	0.080***	0.115***	0.130***
Neighbourhood environment *(ne)*	0.081***	0.103***	0.117***	0.128***

Source: HILDA Wave 10 Release 10.
Weights: Cross sectional responding person population weights for 2010. Weighted sample: 10,030
Note: Pearson correlation coefficients significant ρ < 0.05*, 0.01** and 0.001***. Null hypothesis of is no linear relationship between each pair of variables. Standard errors calculated assuming simple random sampling.

All older people	Disposable income *(dy)*	Full income *(fy)*	Potential consumption *(pc)*	Adjusted potential consumption *(apc)*
Composite well-being index (*cwi*)	0.135***	0.159***	0.134***	0.134***
Economic stability *(es)*	0.117***	0.149***	0.131***	0.131***
Physical health *(ph)*	0.168***	0.156***	0.125***	0.104***
Mental health *(mh)*	0.112***	0.122***	0.111***	0.107***
Personal relationships *(pr)*	0.053*	0.080***	0.050	0.057*
Community participation *(cp)*	0.062**	0.073**	0.068**	0.065*
Neighbourhood environment *(ne)*	-0.022	0.010	0.016	0.043

Source: HILDA Wave 10 Release 10.
Weights: Cross sectional responding person population weights for 2010. Weighted sample: 1,963
Note: Pearson correlation coefficients significant ρ < 0.05*, 0.01** and 0.001***. Null hypothesis of is no linear relationship between each pair of variables. Standard errors calculated assuming simple random sampling.

The low correlation coefficients between the ELS and MIW metrics for both age groups resonates with an observation articulated by Travers and Richardson (1993) over two decades ago on the substance of material well-being in Australia. In their influential book, they refer to the ‘fallacy of misplaced concreteness’ by Whitehead (1978); the mistake of neglecting the levels of abstraction from the construct to actual reality and drawing unwarranted conclusions from constructs assuming them to be actual reality (ibid: 117). They cite two examples of this fallacy in relation to material well-being (or with respect to this thesis, an economic standard of living). The first is to conclude that an individual with a high level of material well-being has a high level of human well-being. That is, an ‘individual who is rich in this sense is rich in all aspects of life’. The second is to conclude that what is not measured in economic terms does not exist or has no importance.

The results in Table 7.7 are evidence affirming the first fallacy regarding the economic standard of living and well-being of adult Australians. Correlation coefficients are below 0.3 for non-older adults across all 28 pair-wise correlation combinations, and they are below 0.2 for older people. Yet, they are positive and statistically significant for the 28 pair-wise grouping for non-older adults and the 23 pair-wise groupings for older people. This implies that, at least as far what is justifiably deducible from a cross-sectional analysis, economic resources are only weakly associated with well-being in the different dimensions and overall well-being for non-older adults, but even less so for this cohort of older Australians. That is, many non-older adult Australians and even more older Australians who are ‘rich’ in economic terms, are not necessarily ‘rich’ with respect to other non-economic dimensions of their lives, and vice versa.

There is, nevertheless, a distinct difference between the pattern of correlations for non-older adults compared to older people. Correlation coefficients for non-older adults are highest between adjusted potential consumption (apc) and the well-being dimensions including overall well-being (ciw), with the exception of physical health. Physical health has the highest correlation with disposable income (dy) (0.143). Across the 28 correlation coefficients, the highest correlation is between apc and ciw (0.263), and between apc and economic stability (0.263).

In contrast, for older people, correlations are highest between full income (fy) and the majority of well-being dimensions, including overall well-being. The two exceptions are the physical health and neighbourhood environment dimensions. As with non-older adults, physical health has the highest correlation with dy (0.168) and neighbourhood environment with apc (0.043); even though the absolute value of this coefficient is very low.

The higher correlations between physical health and disposable income for both age groups are, in part, explainable by the nature of some of the SF-36 indicators included within the physical health dimension. Indicators capturing the ability to do things, such as, walk, bath, carry groceries, climb stairs, bend and engage in activities, act as markers for physical functional health status and not as markers for the incidence of disease or illness. The results are consistent with literature (Berkman and Gurland, 1998; Economou and Theodossiou, 2011) indicating that the availability and access to liquid cash (as measured through the dy metric) can fund discretionary spending on those things that enable the promotion and maintenance of physical functioning. Correspondingly, the functional ability to do things can positively affect an individual's earning capacity.

Nevertheless, it is surprising that the physical health dimension exhibits a higher association with disposable income and not full income for older people. The full income metric captures the expenditure associated with the public provision of health services through the social transfers in-kind (sti) economic resource component. Hence, it seems plausible to expect a strong negative association between the fy metric and the physical health dimension; on the premise that older people with declining physical health are more likely to be recipients of age-related public health services. Re-running the correlations for the physical health dimension with sti shows this to be true. The correlation coefficient is -0.243. The effects of sti are subsumed away, when this is appended to dy with net imputed rent (nir) to form fy. The correlation coefficient between the physical health dimension and nir is 0.121. The results for sti reinforces the problematised nature of including social transfers in-kind within an income model without taking into account the needs associated with the receipt of benefits that has been discussed in Chapters 4 and 5 and identified in the literature (Atkinson and Marlier, 2010; Callan and Keane, 2009; Paulus et al., 2010; Radner, 1997; Verbist and Matsaganis, 2014).

Possible explanations for the pattern of correlations in the remaining well-being dimensions between non-older adults (with apc) and older people (with fy) may rest with both changing priorities and status across the life course overlayed with a cohort effect that places this current group of older Australians in a unique position. Following Modiglianis' life cycle hypothesis (Ando and Modigliani, 2005; Modigliani and Brumberg, 2005), the life course stage for most working non-older adults is framed around an economic environment that is earnings based with a focus on asset creation either through buying their home and/or building a stock of investment wealth. It is conceivable that the focus on asset creation results in a mutually beneficial reciprocal relationship between the process of accumulating wealth and achievements in well-being dimensions.

Determining the causal and qualitative nature of this relationship requires further investigation; however, findings by Colic-Peisker (2010), Dietz and Haurin (2003) and Mares (2013) (discussed in Section 5.6) demonstrate the manner in which homeownership is the conduit linking a range of intangible benefits relating to personal identification, social connectivity, lifestyle choices and socio-economic status. A positive relationship between wealth accumulation and subjective notions of well-being (as measured through life satisfaction and happiness questions) is also demonstrated in Australian studies (Headey et al., 2008; Headey and Wooden, 2004).

The higher correlations with the full income metric instead of the potential consumption or adjusted potential consumption metrics for older people suggests that, at an aggregate level, at a particular point along an individual's life course trajectory the relationship between wealth accumulation and achievements in well-being dimensions changes, becoming more tenuous. The ELS results from Chapter 5 confirm that, in keeping with Modiglianis' life cycle hypothesis (Ando and Modigliani, 2005; Modigliani and Brumberg, 2005), many older people do accumulate wealth, predominantly through home ownership. The rationale is that the accumulation of wealth is a protective mechanism in old age to fund both life-style choices and needs post retirement when health concerns increase and potential to earn income decreases (Elsinga and Mandič, 2010; Olsberg and Winters, 2005). This is supported by an Australian policy environment that encourages home ownership and more recently asset accumulation, at least through the superannuation scheme (Castles, 1988; Colic-Peisker et al., 2010; Productivity Commission, 2005).

However, as discussed in Sections 2.3.1 and 5.6.2 there is evidence suggesting that post retirement, a range of different motivations potentially prevent older people accessing their wealth to maintain or improve their well-being. They have already adapted to a lifestyle that is based on their current income levels and not related to the stock of wealth held. They view their wealth as an insurance mechanism against unforeseen circumstances in old age; especially concerns over their long term health, social care and financial needs given much longer life expectancies and potentially decades in retirement (R. L. Clark et al., 2004; Elsinga and Mandič, 2010; Reed et al., 2004). A high priority is placed on bequest motives to ensure the future prosperity of their children, particularly in a housing and investment market that makes it harder for working-age people to become active players (Hurd, 1990; Lockwood, 2012; Nardi and Yang, 2014; Wu et al., 2015). Finally, there are complex 'social, psychological and normative interactions' (Price, 2008: 136) between individuals and assets, which affect the potential fungibility of assets, especially in relation to the one's home (Colic-Peisker et al., 2010; J. D. Fisher et al., 2007; Price, 2008; Rowlingson, 2006).

The results from Table 7.7 suggest that in addition to these potential inhibitors, the majority of older people do not actually associate their wealth accumulation with their overall well-being. The two economic resource components captured in the fy metric are a measure of housing stability (through net imputed rent (nir)) and welfare state provision (though social transfers in-kind (sti)). At an aggregate level, this implies that it is the combination of three features unique to the Australian policy environment that are linked to the well-being outcomes of older Australians. It is the ontological and tenure security provided through one's home, which is not tied to the capital value attached to the house (as annuitised in the apc metric). It is equitable and adequate access to publicly provided health services. It is receipt of an adequate income through the Age Pension and the social and personal opportunities afforded through the freeing up of time in retirement. While the relationship between economic resources and well-being in different dimensions is more important pre-retirement, the wealth accumulation part of the economic resource story becomes less important to an older person's current objective well-being position.

The correlation findings in relation to older people resonate with qualitative literature discussed in Section 6.3 identifying those aspects that give meaning and value to an older person's well-being. In a series of papers Bowling and Gabriel (2004, 2007) and Bowling and Stenner (2011: 273) identify that 'psychological well-being and positive outlook, having health and functioning, social relationships, leisure activities, neighbourhood resources, adequate financial circumstances and independence' are constituent parts to an older person's overall quality of life. Nazroo et al. (2005) identifies that the economic stability associated with income and wealth is only one factor influencing the quality of life of older people. A consistent theme amongst the remaining influences is the value place by older people on aspects that to a large extent are money invariant; such as the importance of having a role, possessing emotional, practical and social support, the availability and capacity to enjoy free time and the ability to remain independent.

Consequently, in answering the last question poised at the beginning of this section, the answer is that none of the ELS metrics can be used as plausible substitutes for the MIW metrics. Furthermore, the results from this section, in conjunction with the variation in results across well-being dimensions and economic resources for different sub-groups of older people are an affirmation of the second fallacy warned of by Travers and Richardson (1993: 117). That is, to conclude that what is not measured in economic terms does not exist or has no importance. An economic perspective cannot supplant a holistic (objective) well-being perspective. Non-economic factors play an important role as constituent components shaping individual well-being. These findings reinforce the premise articulated throughout this thesis, that the development of the ELS and MIW approach offer fundamentally alternative perspectives, each contributing in unique ways to our understanding of the economic standard of living and well-being of individuals.

7.8 Conclusion

This chapter draws a conclusion to Part 2 of the thesis which examines the multi-dimensional individual well-being of older people. The multi-dimensional individual well-being (MIW) indicator framework treats individual well-being as a multi-dimensional concept disaggregated into a list of uniquely defined latent well-being dimensions with specific observable indicators attached to each dimension. The six dimensions: economic stability; physical health; mental health; personal relationships; community and social participation; and the neighbourhood environment, together with an overall well-being metric are analysed with respect to non-older Australians and by demographic sub-group of older people. The estimation of the well-being dimension scores and composite well-being index as micro-level composite indices provides an evaluative space to analyse the inter-relationship between different factors that shape an individual's objective well-being.

On average and at an aggregate level, older Australians have slightly lower overall well-being compared to non-older adults driven primarily by declining physical health and to a lesser extent mental health. However, there is substantial heterogeneity in well-being outcomes across demographic sub-group. Non-pensioners and older people with a tertiary education have higher well-being than all older people and non-older adults; the expected ageing related physical health decline is compensated by achievements in other well-being dimensions. Conversely, older renters, older people born in non-English speaking backgrounds and separated/divorced older people have lower overall well-being driven by comparative well-being deficiencies across the majority of dimensions. For the majority of older people who belong to either one or more of the demographic sub-groups: pensioners, home owners, married older people, couple households and those born in Australia, although their well-being varies considerably by dimension, their overall well-being is not dissimilar to that of the Australian adult population.

The findings with respect to a minority of older Australians parallels the same conclusions reached with the ELS metrics. That is, there are two distinct categories of older people that simultaneously experience cumulative economic resource and multi-dimensional well-being advantage and corresponding disadvantage. Specifically, non-pensioners or tertiary educated older people experience an advantage; while renters, non-English speaking born or separated/divorced older people experience a corresponding disadvantage. With the exception of separated/divorced older people, the circumstances of these remaining groups are legacies prevailing many decades earlier in an individual's life before their current status as an older person. The notion of cumulative advantage and disadvantage has been briefly deliberated upon; however, it is evident from these results, that this is a future line of investigation worth pursuing.

The last line of inquiry in this chapter examines the relationship between the two approaches. The weak correlations between the ELS and MIW metrics and the distinct differences in the pattern of correlations demonstrates that at an aggregate level, for many non-older adult Australians and even more older Australians, their level of economic resources shows little relationship to their objective well-being outcomes. The results suggest that post-retirement, it is the combination of the Australian housing environment, the provision of public health and welfare services and a unique retirement system that has enabled the wealth accumulation part of the economic resource story to become less important to an older person's current objective well-being achievements. Future investigations will need to examine if the relationship between economic resources and objective well-being achievements changes for the minority demographic groups described, who potentially have more to lose and gain in the reciprocal relationship between well-being capacity and income/wealth accumulation.

Many of the substantive findings on the well-being of older Australians in this chapter confirm findings from a diverse range of literature. However, by conceptually and methodologically integrating different dimensions of well-being into a unified framework, the MIW approach provides a single analytical lens to examine the inter-relationship between dimensions. Hence, allowing for a more nuanced understanding of the diverging well-being patterns in an individual's life that goes far beyond the range of insights gained from adopting a disposable income analytical lens (and more broadly, an economic resource perspective).

Similar to the ELS approach, as a conceptual 'thought' experiment the MIW framework raises many questions about current policy debates to ensure the quality of an older Australian's well-being as they age. In particular, the home as a conduit for 'ontological security', above the economic preoccupation with the house as a vehicle for savings, points to policy incentives to continue encouraging home ownership while pursuing options to release equity to finance services older Australians value. It questions policy incentives to promote voluntary superannuation contributions through tax breaks and higher superannuation guarantees if this is not associated with increasing well-being for the majority of older Australians.

It calls into question the extent to which the current generation of non-older Australians will have the same capacity for well-being across the dimensions measured, as this cohort of older Australians, at later stages in their lives; if they cannot secure home ownership, are reliant on a reduced public health and welfare system, and have less free time to nurture the relationships and activities they value. There are also pertinent issues raised about the importance of public investment in education, cultural integration, housing affordability and sustained employment early in the life course to ensure that well-being outcomes in later life are not the residue of accumulated and intractable disadvantage.

8 Summary and conclusion

8.1 Introduction

This thesis is about the measurement of the standard of living and well-being at an individual level. The genesis for this thesis arises from the confluence of two social developments in the last three decades that have prompted us to look at alternative ways to frame and measure where we as individuals and society stand, whether it is with respect to each other, over time or against specific policy goals.

The first is philosophical: a broad social and multi-disciplinary movement challenging the dominant economic paradigm, to shift measurement focus beyond the conventional reliance on disposable income at an individual level and GDP at a national level, as proxy social and welfare standard of living indicators (Land, 1983; Sen, 1987; Stiglitz et al., 2009). The second is demographic: the ageing of the population in developed countries, postulated to have a profound effect across all sectors and demographic groups within society and at all micro-meso-macro levels (Australian Government, 2014; Harper, 2004; Productivity Commission, 2013).

Two lines of conceptual and empirical inquiry are investigated. The first expands the definition and measurement of economic resources in line with the economic theory of consumption for economic standard of living assessments. The second formulates a multi-dimensional well-being indicator framework based on sociological references to individual well-being. The main intention is to investigate and compare if and for whom assessments change depending on the conceptual and methodological approach adopted.

The thesis applies the dual analytic frame to older Australians, aged 65 years and over. The research premise is that a broad conception of the individual standard of living and well-being of older Australians is fundamental to the discourse on the social and economic consequences of an ageing society. This includes ensuring the quality of an older person's standard of living and well-being over the duration of their remaining life span; which, for many, will see them live for decades beyond the official retirement age of 65 years (Harmer, 2009; Kimberley and Simons, 2009; Productivity Commission, 2011; The Senate, 2008). Statistical metrics are powerful tools in this context, framing public discourse, shaping our understanding of what it is that we are inherently seeking to measure and influencing the development and implementation of policies.

Three research questions are poised:

- How does the measured relative economic position of older people and demographic sub-groups of older people change when different economic resources metrics are used?
- How does the measured relative well-being of older people and demographic sub-groups of older people change when a multi-dimensional well-being approach is adopted?
- What is the relationship between an economic standard of living perspective and a multi-dimensional well-being perspective?

In the remaining sections of the chapter, the main conceptual and methodological approaches and empirical findings on the standard of living and well-being of older Australians are summarised. The limitations of the study are outlined. The last section concludes by discussing the main contribution of the study and the implications for future research.

8.2 Summary of the thesis

The starting point for the thesis begins in Chapter 2 by differentiating the standard of living from well-being and unpacking the key principles of the two conceptual approaches that frame the two lines of empirical inquiry explored: the economic approach and the social indicator approach. The standard of living is positioned as narrower than the over-arching concept of well-being, utilised as an economic concept relating to the consumption of goods and services (Clarke and Islam, 2004; Slesnick, 2005).

The chapter discusses how the economic analytical convention is to focus on a household or individual’s command over economic resources, as measured by income and wealth. Referred to as the ‘means of living’ by the ABS (2001b: 184), it is the accumulation of income and wealth that determine the set of potential consumption possibilities on which the economic standard of living is based. Modigliani’s life-cycle hypothesis (Ando and Modigliani, 2005; Modigliani and Brumberg, 2005) is used to explain the flexible relationship between income, wealth, consumption and age. Individuals adjust their pattern of income and wealth accumulation over their lifetime to maintain their marginal utility of consumption, accumulating wealth when younger and earning, and divesting wealth when older and retired. The chapter argues that as economic resources are an important contributor to purchasing benefits necessary to ensure a good standard of living and a key lever for government to affect social and economic welfare policy outcomes, there is a need for economic metrics to capture the full range of economic resources that determine potential consumption possibilities.

The chapter goes on to debate the continued reliance on economic resources for standard of living assessments. It chronicles the development of social indicators as a multi-disciplinary social research movement motivated to legitimise, empirically, the inter-relationship between different aspects that encapsulate the substance of individual and social well-being. The chapter discusses how the elusiveness and protean nature of well-being to include aspects of life not restricted to monetary measurement, justifies its utilisation within the social indicator approach.

Five salient principles, latent within its empirical practice, are provisionally set out as underpinning social indicators as a conceptual approach and subsequently applied in the development of the multi-dimensional well-being indicator framework. First, social indicator frameworks accommodate a range of social theories on social progress, human development and well-being. Second, multi-dimensionality is a constitutive aspect of social indicators. For this thesis, it provides an evaluative space that explicitly recognises the role of economic and non-economic aspects in shaping well-being. Third, social indicator frameworks rely on a system of indicators to operationalise the complex relationship between dimensions. Fourth, social indicators do not necessarily focus on the conversion from commodities (resources) to functionings (achievements), as in the capability approach. Finally, the approach is flexible with respect to ideas contested in the literature, such as composite indices versus indicator dashboards or objective versus subjective indicators.

Chapter 3 critically reviews the literature to identify the research gaps that the thesis addresses. Part 1 examines studies that rely on economic measures to draw standard of living conclusions. It shows that the majority of empirical applications use household disposable income as a proxy indicator for living standards. Older people across these types of international comparative and Australian-specific literature tend to have a lower relative economic standard of living compared to other age groups. It is worse for older-old people, single older people and for older women. The review draws attention to the increasing recognition by scholars to include non-cash income into analytical assessments. Two types of sources are documented: imputing rent for the provision of housing services and the value of in-kind services and benefits, both of which are known to be economically beneficial to all people, and to older people in particular.

The use of consumption expenditure is appraised, however, it is argued that given current measurement obstacles, consumption expenditure is better suited as complementary rather than an alternative to income measures. The chapter goes on to examine studies that analyse the relationship between income and wealth and those that construct potential consumption measures by integrating income and wealth. These empirical studies attest to the importance of wealth in providing economic security as a potential income source and for consumption smoothing. They show that the incomes of older people, on average, are lower than the working-age population, however, they hold higher levels of wealth accumulated over the life course, the majority of which is tied to housing.

The review identifies that empirical studies combining income and wealth into a single index are less prevalent, even though the importance of this type of economic metric has international (Stiglitz et al., 2009) and national (ABS, 2009b) endorsement. A composite metric capable of capturing the range of economic resources that support potential consumption possibilities still retains the benefits of numerical counting, demographic group comparisons, tracking changes over time and setting policy targets that are commonly associated with using income for living standard assessments.

The conclusion to Part 1 of Chapter 3 asserts that in an Australian context, there is scope for a set of metrics measured at the level of the individual that provides a more expansive account of an individual's economic resource position by including fuller notions of income and wealth. This is particularly important to improving understanding of the economic standard of living of older Australians, given the high rates of home ownership, superannuation and the provision of public in-kind benefits and services.

Part 2 of Chapter 3 critically reviews studies that employ multi-dimensional indicator frameworks in line with the tradition of social indicators. Social indicator applications are classified as indicator dashboards or composite indices; the former present a dashboard of indicator statistics and the latter aggregate multiple dimensions of well-being into a composite index. The chapter explains that even though indicator dashboards have proliferated internationally, nationally and by older person demographic, they are unable to provide a holistic and integrated assessment of individual well-being.

With indicator dashboards, the combination of the siloed presentation of indicators/dimensions with the tendency to rely on population-based aggregate estimates compiled from different data sources, means that it is not possible to provide an overall assessment of social or individual well-being, or a nuanced understanding of the relationship between dimensions. For example, it cannot be ascertained if individuals with low income also have poor health or if poor health is linked to a lack of social participation. The chapter contends that indicator dashboards serve a useful social monitoring role mandated with a descriptive purpose to shed light on social structures and processes, rather than an analytical purpose.

The second component of Part 2 examines the literature on well-being composite indices. It similarly demonstrates that despite the proliferation of composite indices, the majority are constructed at the macro-level through inter-aggregative procedures. These aggregate data for each indicator across the range of individuals/households and then aggregate across the indicators. These forms of composite indices overcome some of the shortcomings of dashboard approaches by providing summary assessments of macro-level well-being. However, the chapter argues that macro-level composite indices are nevertheless limited in providing insights on individual well-being; that is at the level of the individual and using individual-based well-being outcomes. The review highlights that literature on micro-level well-being composite indices is extremely limited. It shows that only the Life Situation Index (Bijl et al., 2010; Boelhouwer, 2002) provides assessment instruments that attempt to encapsulate the totality of an individual's life and places the individual as the pivotal focal point using objective well-being indicators.

The conclusion to Part 2 of Chapter 3 asserts that the well-being of an individual is inherently multi-dimensional and that an overall assessment depends on how the individual fares across the different dimensions that constitute his/her well-being. It reasons that in an Australian context, there is scope to construct a set of metrics to measure multi-dimensional well-being at the level of the individual. It argues that this may be especially pertinent for older people, whose well-being across non-economic dimensions, such as in relation to health and personal relationships, may have greater resonance with their overall well-being as they move into different phases along the life course trajectory, than would otherwise be apparent from economic standard of living assessments.

The remaining chapters seek to redress the two research gaps identified in Part 1 and Part 2 of Chapter 3. Chapters 4 and 6 provide the methodologies to operationalise the two lines of inquiry investigated in the thesis. They are summarised in Section 8.2.1. Chapters 5 and 7 provide the empirical analysis relating to assessing the economic standard of living and multi-dimensional well-being of older Australians. They are summarised in Section 8.2.2.

8.2.1 Methodological frameworks

Chapter 4 sets out a methodology to operationalise an economic living standard approach (ELS) that is conducive to measurement using household survey data. The chapter argues that the Household, Income and Labour Dynamics in Australia (HILDA) survey is the only current dataset in Australia that provides the breadth and depth across a range of economic, social, health and personal topic areas that can meaningfully uphold the two lines of inquiry investigated. It acknowledges the limitation of HILDA with respect to sample scope and data items, specifically on housing costs and in-kind social transfers, hence, leading to the imputation of these resource components from the ABS Survey of Income and Housing (SIH) and the ABS Household Expenditure Survey (HES) datasets.

The ELS approach is to treat the standard of living as a function of economic resources denoted in monetary terms. Income and wealth resource components are combined into a set of metrics that collectively represent the potential consumption possibilities on which the economic standard of living is based. Four economic resource metrics are constructed at a household level and equivalised for individual unit analysis: disposable income, full income, potential consumption and adjusted potential consumption. The resource components included in these four metrics are chosen with reference to the models proposed by Smeeding and Weinberg (2001) and the ABS Fiscal Incidence Studies (FIS) (1996, 2001a, 2007b, 2012a) for full income, and Wolff and Zacharias (2009) for the potential consumption and adjusted potential consumption metrics.

The aggregating procedure involves consecutively appending the standard disposable income metric with the value of non-cash benefits and services arising from the receipt of public goods and/or services from home ownership to construct the full income metric. Then, including the value of annuitised non-home wealth components to construct the potential consumption metric. Finally, including the annuitised home wealth value to construct the adjusted potential consumption to metric.

The full income metric is defined as disposable income plus imputed social transfers in-kind plus net imputed rent from owner-occupied dwellings. The chapter details the technical procedure to estimate these two components at a household level as they are not estimated within HILDA. The regression-based approach is used to impute data on social transfers in-kind from the ABS FIS to HILDA. This statistically matches values based on a combination of age, gender and state demographic variables. It is shown that this method is advantageous as it aligns closely with the ABS FIS method to allocate government expenditure to the HES dataset.

Net imputed rent for owner-occupied dwellings is estimated using the market value approach. This estimates a hypothetical rent if owner-occupiers were to rent their home for themselves. The procedure involves distributing the total amount of imputed rent from National Accounts to homeowners based on the value of their home, and then deducting housing costs. HILDA's lack of appropriate coverage of housing cost data is overcome by imputing the rate of housing costs from the ABS SIH data to HILDA using a similar demographic composition.

The last two metrics involve converting the stock of wealth into a notional income flow by attaching an annuity value to each wealth component. The potential consumption metric appends the full income metric with annuity values for different components of non-home wealth (for example, property wealth, business assets, financial assets, superannuation and liquid assets) and deducts property income, to avoid double counting the returns from asset ownership. The adjusted potential consumption metric adds the annuity value of home wealth to the potential consumption metric and deducts net imputed rent, to avoid double counting the services from home ownership.

Wealth annuities are estimated using the lifetime annuity method proposed by Weisbrod and Hansen (1968). This involves estimating a constant value that pays the household a fixed annual sum of money for a defined lifetime and reduces wealth to zero at the end of that lifetime. Life expectancies are set using the age and gender of the youngest adult in the household. Different average real rates of return from the

Reserve Bank of Australian are used according to the nature and risk level of each asset class. Unlike the model proposed by Wolff and Zacharias (2009), the potential consumption and adjusted potential consumption metrics use disposable income (not gross income) to, at least partially, incorporate an element of personal tax, and the adjusted potential consumption metric includes home wealth to account for the capital value tied up in the home asset.

Chapter 6 constructs a multi-dimensional individual well-being (MIW) indicator framework to emphasis the inter-relationship between economic and non-economic dimensions in encapsulating the totality of a person's life. The MIW approach is to treat individual well-being as a multi-dimensional concept that can be disaggregated into a list of uniquely defined but latent well-being dimensions with specific observable indicators attached to each dimension. The chapter outlines two measurement models that enable the construction of unobservable constructs (well-being dimensions and overall well-being) from observable indicators.

The reflective model process is used to construct each well-being dimension from a set of indicators on the assumption that each indicator is a manifestation of the dimension. The formative model process is used to construct a composite well-being metric from the well-being dimensions on the assumption that each dimension contributes equally to overall well-being. Hence, estimation is possible as a weighted linear combination of the well-being dimensions. In both models, the construction of composite indices takes the form of intra-personal aggregation that aggregates across the component indicators (columns) per individual. This is in contrast to inter-personal aggregation commonly used in social indicator approaches.

The process begins by choosing the well-being dimensions and determining if the observed chosen indicators are a manifestation of the latent well-being dimensions. The choice of the well-being dimensions are guided by Alkire's (2002: 186) philosophical principles that dimensions be incommensurable, irreducible, non-hierarchical and valuable, yet also retain practical significance. The final choice fits within the context of Australia's social, economic and political environment to encapsulate dimensions that vary sufficiently across the individual lives of adult Australians. The list of six dimensions move beyond a focus on 'the economic' to also include physical health, mental health, personal relationships, community and social participation and the neighbourhood environment as constituent components that shape individual well-being in Australia.

The list of observed indicators is chosen from the self-completion questionnaire component of the HILDA survey following the principles set out by Atkinson et al. (2002: 21-25). The principles include for indicators to: have intuitive validity as representing the dimensions; be normatively interpretable; and be statistically validated from the many varied empirical applications that each originates from prior to inclusion within HILDA. As Likert items, the indicators share the characteristic that each, as far as possible, is a direct measure of well-being and reflects achievement in that item. As well, the indicators serve as signposts but each one in itself is not a sufficient measure of well-being in that dimension.

Exploratory factor analysis is used to confirm the strength of the reflective relationship between each well-being dimension and the set of observed HILDA indicators following exploratory factor analysis, 77 SCQ indicators were spread across the six well-being dimensions: economic stability (9), physical health (18), mental health (17), personal relationships (12), community and social participation (12) and the neighbourhood environment (9).

The estimation in Chapter 6 is conducted as a two-stage consecutive process from well-being dimensions to indicators and from well-being dimensions to a measure of overall well-being. A second exploratory factor analysis between each dimension and its set of factors is estimated as a one-factor model to produce the factor scoring coefficients for each indicator. The well-being dimensions scores are estimated as the linear summation of the product of each standardised indicator item and the factor scoring coefficient. The composite well-being index is then estimated as the equally weighted aggregation of six well-being dimension scores. The dimension scores and composite well-being index are produced as standardised metrics and are transformed to have a fixed mean of 100 and a standard deviation of 10 for the entire adult population.

8.2.2 Older people research findings

Chapters 5 and 7 present the empirical results relating to the economic living standard approach (ELS) and the multi-dimensional individual well-being (MIW) approach respectively. Three features are common to both analytical approaches. First, a higher dollar value is associated with a higher economic standard of living and a higher well-being score with a higher level of well-being. Second, the development of both frameworks is intentionally relevant to all adults, with older people as a focal point of interest. Third, both approaches analyse the measured relative position of older people and demographic sub-groups of older people to the Australian adult population and non-older adults utilising: median or mean summary measures, quintile distributional analysis and a measure of disadvantage.

In Chapter 5, imputation results are presented for the three key economic resources components: social transfers in-kind, net imputed rent for owner-occupied housing and annuitised wealth. Social transfers in-kind are imputed from ABS FIS to HILDA for education, health, public housing, electricity concessions and social security and welfare. Older people and households with children are the two largest demographic recipients of health and education services respectively. The chapter counters the criticism that older people appear economically better off when allocation of public expenditure simply matches an increase in health needs. It argues that in the absence of state provision, these costs would otherwise be borne through individual discretionary spending. Hence, the public provision of welfare can be seen as a notional 'saving' to the consumer. Ignoring this economic resource ignores a major contribution to the economic standard of living of many Australians.

The imputation of net imputed rent corroborates the first part of Ando-Modigliani's theory of wealth; the upward climb in the hump-shape age-wealth profile as wealth accumulates with age. The chapter illustrates the differential effect of outright ownership on the value of home services received; and the importance of this housing service to the 82 per cent of owner-occupier older Australians.

With respect to wealth stock, the joint quintile distributions of income and wealth confirm the inverse wealth position of older people to their income position. While older people have lower incomes compared to the non-adult population, they have higher wealth holdings, predominantly through home ownership. The profile of wealth annuities illustrates the higher value attached to annuitised home wealth in comparison to the remaining asset classes. It also demonstrates that apart from the annuitised value of home wealth, wealth annuities are comparatively lower for the remaining asset classes with differences between older people and non-older adults less stark.

The annuitisation of home wealth is defended on the grounds that the home is the only asset class that most people in Australia own and is the main vehicle of their saving. Accessing the potential economic resource trapped within home equity is part of current Australian policy discourse to fund the cost of an ageing society. The chapter advocates using the adjusted potential consumption metric as an upper bound to gauge the full impact of housing and other forms of asset ownership on the measured relative economic position of older Australians.

The resulting estimation of the full income, potential consumption and adjusted potential consumption metrics indicate the unique economic resource position of older Australians; through receipt of public in-kind services, particularly health services and welfare programs, through home ownership and through greater accumulation of wealth than non-older adults. The measured relative economic position of older Australians, at an aggregate level, is substantially improved when an expanded economic resource perspective is adopted.

The analysis reveals the heterogeneity in economic standard of living outcomes for different demographic sub-groups of older people. The effect of cumulatively adding economic resource components with the full income, potential consumption and adjusted potential consumption metrics is to reduce differences in the relative economic position of younger old to older old people, males to females, couple to lone person households, married to widowed/unmarried older people and those living in major cities or remote parts of Australia. Furthermore, it highlights the economic advantage of home owners, married older people, older people with a tertiary education and the corresponding economic disadvantage of older renters, non-English speaking born and separated/divorced older people.

In Chapter 7, the relative well-being position of older people is compared on a dimension-by-dimension basis and through the overall composite well-being index. The chapter begins by analysing the correlations between the well-being dimensions. The weak to moderate coefficients across the two age groups (non-older adults and older Australians) reinforce the notion that each dimension has a unique relationship to overall well-being. Correlations coefficients are largest in relation to the mental health dimension confirming the central importance of mental health to achievements in other aspects of well-being.

The overall well-being of older Australians, as measured through the composite well-being index, is only slightly lower than that of non-older adults. Comparative losses in the physical and mental health dimensions are compensated by comparative gains in the economic stability, community participation and neighbourhood dimensions. There is, however, substantial variation in well-being outcomes across dimension and by demographic sub-groups of older people. Non-pensioners and older people with a tertiary education have high levels of comparative well-being across the majority of well-being dimensions. Conversely, older renters, older people born in non-English speaking backgrounds and separated/divorced older people have lower overall well-being, driven by comparative well-being deficiencies across the majority of dimensions. It is postulated that this is anecdotal evidence of a circularity of advantage or disadvantage, which for these groups began pre-retirement age, accumulated over the life course and persists post-retirement into old age.

The results also demonstrate the limitations with relying solely on the composite well-being index, due to the compensability of low values in some well-being dimensions against high values in other dimensions. For older people, this is noticeable in the tendency for lower scores on physical health to be compensated by higher scores in the community participation and neighbourhood environment dimensions. However, rather than reducing the effectiveness of a composite index for individual well-being assessment, the chapter argues that the reduction of multi-dimensional concepts and data into a unitary index serves a metaphorical role, calling attention for further examination. The composite well-being index, in conjunction with the dashboard presentation of well-being dimension scores serve as complementary metrics within the overarching MIW framework.

Overall, Chapter 5 demonstrates that the ELS approach provides enough evidence to support the proposition that economic standard of living assessments cannot be based solely on the uni-dimensional prism of disposable income. However, it also calls attention to the need to look beyond 'the economic', as it is but one facet of an individual's standard of living and well-being. In Chapter 7, the correlational analysis between the well-being of older people, as measured through the MIW approach, shows that there is only a weak positive association between an older person's economic position and their corresponding well-being achievement overall or by specific well-being dimension.

The results support Travers and Richardson's (1993: 117) observation to not make the error of assuming that an individual who is 'rich' in an economic sense is 'rich' in other aspects of their lives. Moreover, the variation in results across well-being dimensions for all older people and by demographic sub-group reinforces the importance of recognising the role of non-economic factors in shaping an individual's well-being. It too supports Travers and Richardson's (ibid) observation to not make the error of concluding that what is not measured in economic terms does not exist or has no importance. The results from these two chapters provide irrefutable evidence that the ELS and MIW approaches offer fundamentally alternative perspectives, each contributing in unique ways to our understanding of the economic standard of living and well-being of individuals.

8.3 Limitations of the thesis

The limitations of the study are only briefly restated here as they are outlined in detail throughout the thesis. The most important empirical limitation is that of data. The estimation of the metrics is ultimately driven by what was feasible, vis-à-vis the quality and availability of the data within HILDA and to a lesser extent ABS HIES. Hence, in the ELS approach it was not possible to take into account the full range of economic resources, such as the value of home production and leisure, or the full range of public expenditures such as public infrastructure and defence. Nor was it was possible to fully account for the tax treatment of assets. Similarly, the MIW approach does not include three well-being dimensions: natural environment; political voice and governance; and safety, as indicators representing these dimensions are not included in HILDA. The financial stress indicators required imputation as they were withheld from Wave 10 because of erroneous question wording. Statistical modelling options for factor analysis were also restricted to techniques appropriate for analysis with ordinal variables.

At a more global level, as HILDA precludes people from institutional settings, the thesis is not able to include a sample of older people who live in care accommodation (such as, in a residential aged care facility or hospital). It is also noted that throughout the thesis, a specific definitions of the standard of living and well-being is not provided. While this may be regarded as problematic, it is also an intentional decision to avoid entering the debate over the difficulty of ascribing unique definitions that have universal acceptance. Instead, the stance adopted in the thesis, is that specific definitions are less important than seeking different ways to operationalise the standard of living and well-being, in ways that broaden our substantive understanding of the individual well-being of people.

Both approaches also involved many methodological decisions to necessitate estimation that other researchers may disagree with. In the ELS approach, some of these included how best to demographically match datasets to enable imputation, allocating life expectancies within households, the choice of interest rates and equivalence scales. Likewise, the MIW approach included choosing the most appropriate factor extraction-rotation method to conduct the exploratory and confirmatory factor analyses, the best method to treat missing data and consideration of the various aggregating and weighting methods to construct composite indices.

Notwithstanding these limitations, the translation of conceptual notions into methodological frameworks that permit estimation is a matter of course in most social science studies. In advocating for the ELS and MIW approaches, the thesis recognises the diversity of other research studies emboldened with the same purpose to improve standard of living and well-being assessments and shift the focus beyond the conventional income paradigm. The intention in the conceptual and methodological chapters was to systematically describe the operational methods employed, providing a transparent account of both the conceptual justification and statistical validation of the various choices made along the decision tree. The intention in the analysis chapters was to provide a descriptive account of the living standards and well-being of older Australians that takes into account the complexity and multi-faceted nature of their lives at this specific life-stage.

8.4 Recommendations for future research

The following recommendations are not intended to be exhaustive but are intended to highlight the range of opportunities to strengthen and extend the study in its current form. Four of the five recommendations relate to research possibilities that currently exist within a household survey dataset such as HILDA.

The first recommendation is to incorporate the personal views of Australians into the multi-dimensional individual well-being indicator framework*.* The problematised nature of deciding on the dimensions that constitute well-being and the weighting system to reduce indicators to composite indices has been discussed at length in Chapter 6. To overcome the criticism of researcher ‘paternalism’ (Decancq and Lugo, 2013), the views of Australians themselves, on the choice of specific dimensions and the varying importance attached to each one, can be incorporated. One method would be to conduct qualitative research focus groups as it provides a flexible and iterative environment to explore themes from the grounded perspective of people’s lives and, given the constraints of data coverage in survey datasets can confirm the appropriateness of quantitative choices. An alternative method would be to investigate the approach advocated by Decancq and Schokkaert (2015) and use individuals personal preferences as revealed from dimension-specific satisfaction questions as weights.

The second recommendation is to take into account subjective well-being. The notion of subjective well-being has been intermittently referred to throughout the body of the thesis; from being an integral component of the social indicator movement (Diener and Suh, 1997) to an example of a micro-level composite index through the Personal Well-being Index (Cummins et al., 2003; International Wellbeing Group, 2013). It was deliberately not utilised in the construction of the MIW framework to separate the ‘objective’ from the ‘subjective’ as distinct well-being realms. However, subjective well-being measures are an important element in any evaluation on the standard of living and well-being as they capture an individual’s cognitive evaluations of their lives (Rojas, 2006). One most obvious way to include subjective well-being in analyses would be to examine the relationship between the MIW metrics with a global life satisfaction question and a happiness question.

Another method would be to construct a composite subjective well-being index at the individual level. This would overcome concerns that the global life satisfaction question is non-specific and yet highly personalised; unable to provide information about which specific factors contribute to overall well-being (Cummins et al., 2003). As discussed in Chapter 6, each dimension in the MIW framework is aligned to a set of objective well-being indicators and a subjective well-being question. The same inter-personal aggregative approach used in the construction of the Personal Well-being Index can be applied to the five relevant satisfaction questions in the HILDA survey. They are: satisfaction with your financial situation, satisfaction with your health, satisfaction with your relationships, satisfaction with feeling part of your local community and satisfaction with the neighbourhood in which you live. This form of index provides a third analytical lens, focussed on subjective assessments, as a counterpoint to a focus on economic resources with the ELS metrics, and a focus on well-being achievements with the MIW metrics.

An obvious extension to this study in its current form would be to apply the same analytical investigation to an assessment of the overall adult population and for different demographic sub-groups of adult people. This is possible as the methodologies to develop the ELS and MIW metrics were intentionally framed around the capacity to assess the standard of living and well-being of all adults. Hence, the economic resource components, the well-being dimensions and indicators are chosen to be universally relevant to all adult Australians. The dual analytic frame was applied to an analysis of older people as the focal point of interest on the understanding that even though older people were at a specific life-stage, they were not necessarily a homogenous and distinctly separate entity beyond adulthood (Harper, 2004: 3).

The fourth recommendation is to utilise the MIW approach to track changes in well-being over time. One way is to continue to use HILDA as a cross-sectional dataset, producing a report card to track changes over time in overall well-being and dimension-specific well-being. Currently, this is possible for the three waves (Wave 6, 10 and 14) that include data on all of the indicators used in the estimation of the MIW metrics.[206] The longitudinal advantage of HILDA can also be utilised to track the same group of individuals and households every year. The research findings in the thesis suggest that for certain older people, their dimension-specific well-being is a result of the cumulative effects of decisions and/or circumstances over their life course. This can be confirmed by estimating dimension-specific well-being scores for each individual for each wave that data is available, and investigating if and how the pattern of well-being changes for an individual as they age and experience different life events.[207] By comparing the well-being trajectories of individuals over time, the

[206] The only indicators not included in every wave are those representing the community participation dimension. They are included in every 4th wave commencing from Wave 6.

[207] It is not possible to estimate a composite well-being index for each individual for the last 14 waves of the HILDA because of the lack of data for the community participation indicators, hence limiting the longitudinal analysis to dimension-specific well-being scores.

persistence of cumulative advantage and disadvantage discussed in Chapter 7 can be further investigated.

As the final recommendation, it is worthwhile repeating the Sarkozy Commission's (Stiglitz et al., 2009: 13 - 16) call for statistical offices to improve on survey designs and the collection of data so that measures of the kind produced with the ELS and MIW approaches can be estimated on a regular and reliable basis. Hence, incorporating them as part of the routine suite of statistics policymakers rely on to make decisions. The lack of data on community participation indicators in each wave of HILDA has already been discussed, as a limiting factor in the capacity to provide a continuous wave-on-wave measure of composite well-being index to track trends or for longitudinal analysis.

The wealth module in HILDA is only included every 4 years. The imputation of social transfers in-kind and net imputed rent for owner-occupied dwellings from ABS HIES to HILDA was necessary because these types of economic resource components are not included in current household panel surveys. However, even within the ABS HIES datasets, the imputation of government expenditures as part of the Fiscal Incidence Study only occurs every 5 years, with a delay of two years from data collection to public availability. The 2009-10 dataset is the most current with the next round for the 2014-15 year not yet released (ABS, 2012a). It is these types of limitations in data coverage and data collection that hinder the capacity of researchers to quantitatively assess well-being and social progress in ways that do justice to the richness of conceptual ideas and serve as pragmatic policy tools.

8.5 Contribution of the research

The contribution of this thesis can be viewed in three ways.

It is *instructive* by proposing two alternative methodologies to operationalise concepts relating to the standard of living and well-being of individuals. The economic standard of living (ELS) approach shows how it is possible to combine fuller income and wealth economic resource components into a set of money-based metrics that determine individual potential consumption possibilities. The multi-dimensional well-being index

(MIW) approach shows how it is possible to disaggregate individual well-being into a set of measurable dimensions and estimate an overall composite well-being index to encapsulate the totality of a person's life, yet be simple enough to mathematically execute and interpret. Collectively, the ELS and MIW approaches show how within a single-sourced individual/household-based comprehensive socio-economic dataset, it is possible to construct a series of metrics, extending from the simple uni-dimensional (disposable income) to the complex multi-dimensional (well-being index). Each provides a fundamentally different analytical lens to objective assessments of an individual's life; one based on assessing inputs in terms of economic resources, and one based on assessing outputs in terms of well-being achievements. These can be used collectively or as stand-alone approaches.

In formulating the ELS and MIW approaches, the thesis addresses a number of recommendations proposed by the Commission on the Measurement of Economic Performance and Social Progress (Stiglitz et al., 2009) and the call to action by the OECD World Forum on Statistics, Knowledge and Policy (OECD, 2007) to actively pursue the measurement of well-being. Six recommendations, in particular, proposed by the Commission (Stiglitz et al., 2009: 13 - 16) resonant with the conceptual principles and methodological approaches pursued in this thesis.

Recommendation 2: Emphasise the household perspective (… Properly defined, household income and consumption should also reflect in-kind services provided by government, such as subsidised health care and educational services.)

Recommendation 3: Consider income and consumption jointly with wealth.

Recommendation 4: Give more prominence to the distribution of income, consumption and wealth (… Ideally, such information should not come in isolation but be linked).

Recommendation 6: Quality of life depends on people's objective conditions and capabilities. Steps should be taken to improve measures of people's health, education, personal activities and environmental conditions.

Recommendation 8: Surveys should be designed to assess the links between various quality-of-life domains for each person, and this information should be used when designing policies in various fields.

Recommendation 9: Statistical offices should provide the information needed to aggregate across quality-of-life dimensions, allowing the construction of different indexes.

By constructing metrics at the person-level, the thesis directly emphasises a micro-level perspective that speaks directly to recommendations 2, 3 and 8. The inclusion of social transfers in-kind in the full income metric and subsequent inclusion of wealth with income into a single index in the potential consumption and adjusted potential consumption metrics respond to recommendations 2 and 3. The construction of well-being scores for the dimensions: economic stability; physical health; mental health; personal relationships; community participation; and the neighbourhood environment reflect recommendation 6 to include measures reflective of people's functionings. The intra-personal aggregation in the MIW approach allows for the assessment of the inter-relationship between dimensions as proposed in recommendation 8. The aggregation across dimensions to produce a composite well-being index is in keeping with recommendation 9. Although some of these recommendations are directed towards engaging statistical offices in the collection of relevant data at the household/individual level, the thesis points to the possibilities that exist within comprehensive socio-economic datasets, as is the case with the HILDA survey.

It is *descriptive* because it provides an empirical assessment of the relative economic standard of living and well-being position of individual older Australians, aged 65 years and over, at a particular point in time. The ELS approach demonstrates that, at an aggregate level, augmenting disposable income with income streams from non-cash services and annuitised wealth (particularly home wealth) substantially improves the measured relative economic position of older Australians. The MIW approach demonstrates that, at an aggregate level, while older Australians have slightly lower overall well-being compared to non-older adults driven primarily by declining physical health and to a lesser extent mental health, they maintain strong personal relationships, engage actively as community members and within their neighbourhood environment.

The results also reveal that the same heterogeneity that applies to perceiving and treating non-older adults as individuals equally applies to older people. There are two distinct categories of older Australians who simultaneously experience economic resource and multi-dimensional well-being advantage and corresponding disadvantage. Specifically, non-pensioners or tertiary educated older people experience an advantage; while renters, non-English speaking born or separated/divorced older people experience a corresponding disadvantage.

Finally, comparisons between two approaches show that for the majority of older Australians, their measured economic resource position is only weakly associated with objective multi-dimensional well-being assessments. It is hypothesised that due to the combination of ontological and tenure security from home ownership, access to public health and welfare services, a minimum Age Pension assurance and the leisure time from retirement, wealth accumulation for many older Australians is less important to current objective well-being achievements.

Finally, it is *prospective* because by empirically shifting measurement from an income paradigm towards a well-being outlook, we instinctively begin to reflect on the kind of life worth living and on the kind of society that makes it possible for individuals to reach a state of 'well'-being. The starting point is not on measurement options as prescribed by the variables within a dataset, but on identifying those elements instrumental to achieving well-being; on what it is that we individually and collectively strive to pursue (Stiglitz et al., 2009) and subsequently working out how best to measure this in a legitimate, coherent and systematic manner. This extends to the representation of indicators in the positive and the sentiment expressed by Lippmann et al. (2011: 426) that 'positive indicators represent good science' because 'conceptualising, developing and monitoring positive indicators helps a society identify the values and goals that unite it'. The discourse and focus hence changes from one conventionally associated with redressing a state of negative affairs towards how to achieve a state of affairs that is positive, aspirational and forward looking.

Appendix A Australia's retirement income system

Australia's retirement income system is built on three pillars: a means tested publicly funded Age Pension; a mandatory superannuation system through an employer based Superannuation Guarantee Scheme; and voluntary private savings supported by tax concessions for voluntary superannuation contributions (OECD, 2013c).[208] The first pillar concentrates on minimum income levels, and the second and third pillars concentrate on income replacement.

The Age Pension is designed as a safety net level of income to provide a reasonable minimum standard of living for those unable to save for retirement and to supplement the retirement savings of others. It is unique in three ways: it is means tested; coverage is comprehensive with the majority of older people eligible for the benefit; yet pension benefits are not high. The Superannuation Guarantee Scheme consists of a mandarory employer contribution based on a percentage of employee earnings to a private pension plan with the individual bearing all or some of the investment risk. The third pillar provides generous tax concessions to encourage and assist those with the capacity to save and is targeted towards middle and high income earners.

In addition to income provision, the Australian Government provides a range of services for age pensioners to access.[209] These include allowances and benefits to assist with living costs: a pharmaceutical allowances; rent assistance; telephone and utilities allowance; a remote area allowance; pensioner concession card to subsidise the cost of medicines, public transport, utility bills and motor vehicle registration; and a senior's concession card for those whose incomes preclude them from receiving the pensioner concession card.

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[208] Refer to: http://www.treasury.gov.au/PolicyTopics/SuperannuationAndRetirement/supercharter/Report/Chapter-1.

[209] Refer to: http://www.australia.gov.au/information-and-services/benefits-and-payments/older-australians.

Appendix B Economic standard of living methodological components

B.1 ABS Household income and expenditure surveys

The ABS (2011) collects household level data on incomes and expenditures through two nationally representative surveys (collectively referred to as the Household Income and Expenditure Survey (HIES)): the Survey of Income and Housing (SIH) and the Household Expenditure Survey (HES). The SIH was first conducted in 1994-95 on an annual basis until 2003-04, from which time it has been conducted bi-annually. Information is collected on income, housing and household characteristics of persons aged 15 years and over from a sample of residents in private dwellings throughout Australia.

The HES was first conducted in 1974-75 and since 1985 has been conducted every 5 years as a stand-alone survey to SIH. The new procedure since 2003-04 (and maintained in 2009-10) is to integrate HES as a sub-sample of households included in the SIH and to conduct it every 6 years. The HES collects more detailed information at an itemised level about the expenditure, income, assets, liabilities and household characteristics of a sub-sample of SIH households.

Information is collected by personal interview from residents of private dwelling in urban and rural areas of Australia. Household selection and interviews are distributed across a twelve month enumeration period to ensure that data collected is representative of income and expenditure patterns across the year. Private dwellings include houses, flats, home units, caravans, garages, tents and other structures that are used as a place of residence at the time of the interview. They are selected through a stratified, multi-stage cluster design based on dwelling framework of the ABS Population Survey Master Sample (ABS, 2011a: 40). The total number of households included in the SIH sample is approximately 18,000 and there are approximately 10,000 households in the HES sample.

Similar to HILDA, HIES excludes certain people who are important to this thesis for the same reasons discussed in Section 4.2. Geographically, very remote areas are not included in the sample design accounting for around 3 per cent of people nationwide but 23 per cent of the Northern Territory population.[210] Excluded from the sample are non-usual residents including non-Australian defence force households and those that contain the diplomatic personnel of overseas governments.

Most importantly is the exclusion of residents from non-private dwellings which include hotels, boarding schools, boarding houses and institutions such as prisons and nursing homes. ABS FIS (2012a: 71) acknowledges that up to $4,000 million of social assistance benefits in cash and approximately $7,000 million in social transfers in-kind may not be allocated from Australian System of National Accounts to HES because HES does not include pensions and allowances received by people living in non-private dwellings and those living in very remote areas.

Despite the limitations of the scope exclusions, the HIES are by far the most comprehensive data sources on people's income and expenditure patterns in Australia. Since 2003-04, the ABS (2011; 2012a) has judiciously attempted to overcome many limitations and improve the sampling frame, data collection methods and imputation of variables. Specific improvements are: moving to a computer assisted personal interview questionnaire; adopting international statistical standards governing the collection of income statistics; including additional sample households to improve representation of pensioners and non-metropolitan households; integration of HES within SIH to improve accuracy, by reducing respondent burden, and improve the comparability of the datasets; extending the number of assets and liabilities questions to provide a more comprehensive analysis of wealth; and improving the allocation of social transfers in-kind and taxes on production.

[210] These are defined by an Accessibility/Remoteness Index of Australia(ARIA) score of greater than or equal to 10.5 (ABS, 2011a: 39).

B.2 Data sources, ABS FIS and RBA rates of return

Table B.1 Economic resource components data sources

Line	Function	Economic resource component	Data source	Method
1		Disposable income	HILDA Wave 10 Release 10	
2	+	Government social transfers in-kind	ABS HES 2009-10 &HILDA Wave 10 Release 10	Regression based imputation method
3	+	Net imputed rent	ABS SIH 2009-10 & HILDA Wave 10 Release 10	Market value approach
4	=	**Full income**		
5		Disposable income	HILDA Wave 10 Release 10	
6	−	Property income	HILDA Wave 10 Release 10	
7	+	Government social transfers in-kind	ABS HES 2009-10 & HILDA Wave 10 Release 10	Regression based imputation method
8	+	Net imputed rent	ABS SIH 2009-10 & HILDA Wave 10 Release 10	Market value approach
9	+	Annuitised non-home wealth components	HILDA Wave 10 Release 10	Life-time annuity method using RBA real rates of return
10	=	**Potential consumption**		
11		Dispsoable income	HILDA Wave 10 Release 10	
12	−	Property income	HILDA Wave 10 Release 10	
13	+	Government social transfers in-kind	ABS HES 2009-10 & HILDA Wave 10 Release 10	Regression based imputation method
14	+	Net imputed rent	ABS SIH 2009-10 & HILDA Wave 10 Release 10	Market value approach
15	+	Annuitised non-home wealth components	HILDA Wave 10 Release 10	Life-time annuity method using RBA real rates of return
16	+	Annuitised home wealth compents	HILDA HILDA Wave 10 Release 10	Life-time annuity method using RBA real rates of return
17	=	**Adjusted potential consumption**		

Table B.2 ABS Fiscal Incidence Study detailed allocation method, 2009-10

Functional category	Social transfer in-kind items	Allocation method	Benefit calculation	Amount allocated in HES ($ mil)	Total GFS expenditure allocated (%)
Education	Pre-school education	Allocated according to the number of imputed children aged 3, 4 or 5 years.	Average pre-school benefit derived by dividing GFS expenditure data by reported state pre-school enrolment data. Underestimated because recorded HES enrolments are less than official national enrolments.	631	94.7
	Primary and secondary education	Allocated according to the number of students by school level (primary / secondary) and school type (government, Catholic, non-government).	Average education and transportation benefit estimated from various government expenditure reports for each category of school level and school type (6 in total). Underestimated because recorded HES enrolments are less than official national enrolments.	36,369	97.8
	Tertiary education (University / TAFE / Tertiary n.e.c)	University - Allocated according to the number of members in each household who reported as attending higher education	Average benefit derived by dividing net government expenses by benchmark enrolment data for higher education. Underestimated because HES does not include students living in student residences.	7,527	93.1
		TAFE - Allocated according to the number of members in each household who reported as attending TAFE	Average benefit derived by dividing GFS expenditure data by the estimated number of TAFE students reported in HES.	4,358	99.0
		Tertiary educ n.e.c - Allocated to all members of the household who reported as attending a tertiary institution irrespective of institution type and part/full time status	Average benefit derived by dividing GFS expenditure data by the estimated number of TAFE and higher education students reported in HES. Underestimated because recorded HES enrolments are less than benchmark estimates.	69	94.5
	Special and other education	Allocated according to the number of pre-school, primary and secondary education students.	Equal average benefit applied to all student types for each state and territory. Household benefits are the sum of member benefits. Underestimated because recorded HES enrolments are less than official national enrolments.	2,809	96.0
Health	Acute care institutions	Allocated according to hospital bed utilisation rates (average number of days in hospital per person) for the age, gender and state of the resident group.	Average benefit per hospital bed day derived by dividing GFS expenditure data by the number of hospital days for each household's state of residence (based on Australian Hospital Statistics). Underestimated because HES excludes residents of special dwellings.	32,813	99.6
	Community health services	Allocated according to the doctor visit rate for age, gender and state of residence.	Average benefit per doctor visit derived by dividing GFS expenditure data by the number of doctor visits for each household's state of residence (based on Medicare Australia). Underestimated because HES excludes residents of special dwellings.	23,012	84.2
	Pharmaceuticals	Allocated according to the eligibility for pharmaceutical concessions and the usage rate of prescribed medicines by age, gender and state of resident group.	Average benefit for prescribed medicines derived by dividing GFS expenditure data by total prescribed medicine utilisations. Groups split into those eligible for concessions and those who were not. Benefit rate adjusted according to differences in expenditure between states. Underestimated because HES excludes residents of special dwellings.	9,548	91.8

Source: ABS Catalogue No. 6537.0 (ABS, 2012a: 81 - 85).
Note: n.e.c refers to not easily classified.

Table B.2 ABS Fiscal Incidence Study detailed allocation method, 2009-10 (cont'd)

Functional category	Social transfer in-kind items	Allocation method	Benefit calculation	Amount allocated in HES ($ mil)	Total GFS expenditure allocated (%)
Health (cont'd)	Private health insurance rebate	Allocated to households that recorded expenditure on private health insurance.	Private health insurance rebate rates were 30% of total private health insurance if any household members were under the age of 65 years: 35% if all household members were aged at least 65 years; and 40% if all household members were aged 70 years or more. Overestimated despite the HES sample scope exclusions.	4,403	101.7
	Other health benefits (public health, health research and health administration n.e.c)	All persons.	Equal average benefit (i.e. per capita) derived by dividing GFS expenditure data per state by estimated resident population. Household benefits are the sum of member benefits. Underestimated because HES excludes residents of special dwellings.	9,402	97.3
Housing	Public housing	Households in government rental accommodation according to the estimated value of their rent subsidy.	Difference between the rent paid by the household and the estimated median value of private market rent for the state of residence, type of dwelling and number of bedrooms from the Census.	1,945	100.0
Electricity	Electricity concessions and rebates	Allocated to households eligible to receive electricity concessions or rebates.	Government expenses for electricity concessions allocated to households according to the value of the concession in their state of residence.	493	100.0
Social Security and Welfare	Social security and welfare programs	Persons who receive social security and welfare *cash* benefits. (Excluding expenditure on direct cash payments, child care and residential aged care.)	Equal average benefit by each benefit type derived by dividing GFS expenditure data by the number of recipients of each benefit type. Household benefits are the sum of member benefits. Underestimated because HES excludes certain population groups and government cash benefits are under-reported in HES.	20,263	94.9
	Child care benefits (CCB) / Child care rebate (CCR)	CCB is modeled at the income unit level depending on the number of children in formal care, reported hours of care, income thresholds and tapers. CCR is modelled at the income unit level based on eligibility criteria for payment.	CCB is allocated according to the number of children in formal care * the reported hours of care * income thresholds with tapers. Hours of formal care are capped at 50 hours per week. CCR is allocated according to specific eligibility criteria (receive the CCB, at an approved child care, meet the work, training, study test). Administrative component of CCB and CCR is allocated equally to all children in receipt of CCB or CCR.	3,311	94.4

Source: ABS Catalogue No. 6537.0 (ABS, 2012a: 81 - 85).
Note: n.e.c refers to not easily classified.

Table B.3 Explanation of RBA rates of return

RBA F3 Capital market yields and spreads - Non-government instruments

Year	Corporate bonds with 1 to 5 years maturity Nominal per annum yields (%) AA	A	BBB
Jun-2008	8.90	9.38	9.45
Jun-2009	5.95	8.24	8.08
Jun-2010	**6.00**	6.55	7.01
Real interest rate	***3.21***		

Source:http://www.rba.gov.au/statistics/tables/index.html#interest_rates.

Corporate bond yields are face-value weighted averages of yields on individual fixed-rate bonds issued by Australian non-government entities. The yields are shown for three broad Standard and Poor's credit ratings (AA, A and BBB) with a remaining maturity of between 1 and 5 years. Of the three credit ratings, the AA bonds provide the highest quality and the lowest credit risk. The yields on individual bonds are sourced by the RBA from financial services company, UBS AG Australia Branch. The nominal rate for financial year ending June 2010 is converted into a real interest rate using Fisher's equation and an inflation rate of 2.7 per cent for 2010.

RBA F4 Retail deposit and investment rates

	Banks' term deposits ($10 000) Nominal rates (%)					
Month-Year	**1 mth**	**3 mths**	**6 mths**	**1 yr**	**3 yrs**	**Average rate (all terms)**
Jan-2010	1.60	3.65	3.20	5.95	7.00	3.75
Feb-2010	1.60	2.85	3.15	5.95	7.00	3.90
Mar-2010	2.35	3.30	3.45	6.00	6.60	4.05
Apr-2010	2.75	3.45	3.55	6.00	6.60	4.25
May-2010	2.75	3.45	3.55	6.00	6.50	4.25
Jun-2010	2.75	3.75	4.40	6.00	6.50	4.20
Jul-2010	2.75	3.80	4.05	6.00	6.50	4.30
Aug-2010	2.75	4.95	4.10	6.00	6.50	4.25
Sep-2010	2.80	3.75	3.90	6.00	6.30	4.40
Oct-2010	2.80	4.20	4.10	6.00	6.15	4.35
Nov-2010	2.80	4.20	4.50	6.00	6.15	4.40
Dec-2010	2.80	4.25	4.50	6.15	6.40	4.45
Average per annun	2.54	3.80	3.87	6.00	6.52	**4.21**
Real interest rate						***1.47***

Source:http://www.rba.gov.au/statistics/tables/index.html#interest_rates.

The rates for banks' term deposits are averages of the five largest Australian banks' rates (Commonwealth Bank, ANZ Bank, National Australia Bank, Westpac and St George) in 2010. The term deposit 'average rate (all terms)' is the average rate on $10,000 term deposits across all terms at the five banks, including their advertised 'specials' and regular rates. The nominal average rate for 2010 is converted into a real interest rate using Fisher's equation and an inflation rate of 2.7 per cent for 2010.

RBA F2 Capital market yields - government bonds

	Australian Government Real rates (%)				
Month-Year	**2 yrs**	**3 yrs**	**5 yrs**	**10 yrs**	**Indexed**
Jan-2010	4.65	4.95	5.27	5.56	2.77
Feb-2010	4.47	4.76	5.12	5.48	2.70
Mar-2010	4.78	5.05	5.34	5.62	2.74
Apr-2010	4.98	5.27	5.53	5.80	2.85
May-2010	4.67	4.94	5.21	5.48	2.69
Jun-2010	4.57	4.71	4.97	5.33	2.72
Jul-2010	4.55	4.59	4.79	5.15	2.66
Aug-2010	4.47	4.50	4.66	4.97	2.54
Sep-2010	4.66	4.70	4.81	5.00	2.55
Oct-2010	4.85	4.90	4.97	5.09	2.54
Nov-2010	5.05	5.12	5.21	5.38	2.65
Dec-2010	5.09	5.19	5.33	5.56	2.82
Average per annun	4.73	4.89	5.10	5.37	**2.69**
Real interest rate					***2.69***

Source:http://www.rba.gov.au/statistics/tables/index.html#interest_rates.

Interest rates and yields are representative of the midpoint of predominant bid and offer quotations in different trading bond markets as identified by the RBA. Indexed bond yields are the rates on those bonds with the longest time to maturity. Yields from March 2009 to December 2010 are calculated from bonds guaranteed under the Commonwealth Guarantee Scheme. They are provided in real terms.

Appendix C Economic standard of living analytical components

C.1 Inferences to the population (HILDA)

In each wave to overcome the non-randomness of the HILDA sample and account for attrition, weights are attached to the panel sample to adjust for differences between group characteristics and their representativeness of the 'in-scope' Australian population. The 'in-scope' Australian population is restricted to the population that is not excluded from the HILDA sample such as the homeless, people living in institutions or in remote areas. HILDA produces an array of weights: cross-sectional, longitudinal and replicate depending on the type of analysis and if analysis is based at the household, enumerated or responding person level.

Cross-sectional weights adjust the panel sample to the population for that year/wave. Longitudinal weights adjust each sample to ensure representation across all the waves being analysed. Longitudinal weights are provided for the balance panel of responding/enumerated persons for any contiguous set of waves (e.g. Waves 1 to 5) and for the combination of any pair of waves (e.g. Wave 2 and 7) (Summerfield et al., 2012). Replicate weights, on the other hand, are used to ensure that appropriate standard errors and confidence intervals are calculated that take into account HILDA's complex survey design (and consequently, improve the precision of estimates).

HILDA is a complex sample design as the original sample for Wave 1 was based on a process that involved stratification by region, geographic ordering of areas, clustering of household selection into the sample within each stratum and unequal weighting of households and individuals (Summerfield et al., 2012). In applying and choosing weights, it is worthwhile noting a comment by Henstridge (2001: 19) that 'The emphasis must be on getting workable sets of weights that can be used for most purposes and recognising that they have limitations. These could be termed the reference weights and their calculation should be regarded as a key part of the survey task.'

For the most part in this thesis, cross-sectional responding person or enumerated person population weights are used to calculate the estimates. The jackknife weighting method, based on cross-sectional responding person or enumerated person population weights with associated replicate weights, is used to calculate the standard errors and p values (Hayes, 2008; Summerfield et al., 2012).[211]

In Tables 5.2 and 5.3, relative standard errors greater than 25 per cent are marked. Standard errors are used as a measure of the reliability of the sample estimates to the population. The ABS (2012a: 79) writes that the standard error 'indicates the extent to which a sample might have varied compared to the population parameter because only a sample of dwellings was included'. The relative standard error (RSE) expresses the standard error as a percentage of the estimate. This thesis follows the ABS (2011d, 2012a) convention and marks an † against estimates that have a RSE of greater than 25 per cent but less than 50 per cent and an †† against estimates that have a RSE greater than 50 per cent. Unmarked estimates with a relative standard error less than 25 per cent, imply a 95 per cent confidence interval of approximately +/- 50 per cent of the tabulated result (Wilkins et al., 2011: vii). Estimates with an † should be treated with caution and estimates with an †† are considered unreliable.

[211] The construction, application and interpretation of the jackknife method in comparison to other weighting systems for complex sample designs is discussed at length in Hayes (2008).

C.2 Additional tables and figures

Table C.1 Further expansion on household types (%)

Years	65 - 74	75 - 84	85+	All older people (65+)	Non-older adults (15-64)	Adult population (15+)
Household type (expanded version)						
Couple only	58.6	53.3	23.2	53.0	19.5	24.7
Lone person	17.1	29.0	47.7	24.4	9.4	11.8
Couple - children/dependent students	1.9††	0.4††	2.0†	1.4††	41.7	35.4
Couple - non-dependent children	12.6	4.0	0.5††	8.5	11.1	10.7
Couple - no children but others	1.1†	2.1	1.2	1.4	1.6†	1.6
Lone parent - children/dependent students	1.0††	0.4††	0.0	0.7††	7.0	6.0
Lone parent - non-dependent children	4.3†	6.1†	24.1	7.1	4.9	5.2
Extended family - no children but others	1.2††	1.9††	0.0	1.3††	1.2	1.2
Shared household	2.3†	2.8††	1.3††	2.3	3.7	3.4
n	1,214	751	194	2,159	11,367	13,526

Source: Author's calculation based on HILDA Wave 10 Release 10.
Weights: Cross-sectional responding person population weights for 2010.
Note: † 25-50 per cent relative standard error - cautious estimate; †† > 50 per cent - unreliable estimate.
Note: 'Extended family ' and 'Shared household' do not correspond with similar named categories in Table 5.2 as the expanded version includes more options.

Table C.2 RBA F5 indicator lending rates (real rates, %)

	Housing loans				
	Banks			Mortgage managers	
	Variable		3-year	Variable	
Month Year	**Standard**	**Discounted**	**fixed**	**Standard**	**Basic**
Jan-2010	6.65	6.00	7.70	6.25	5.90
Feb-2010	6.65	6.00	7.70	6.25	5.90
Mar-2010	6.90	6.25	7.75	6.50	6.05
Apr-2010	7.15	6.50	7.80	6.75	6.40
May-2010	7.40	6.75	7.75	6.95	6.55
Jun-2010	7.40	6.75	7.55	6.95	6.55
Jul-2010	7.40	6.75	7.50	6.95	6.55
Aug-2010	7.40	6.75	7.15	6.95	6.55
Sep-2010	7.40	6.75	7.45	6.95	6.55
Oct-2010	7.40	6.75	7.45	6.95	6.55
Nov-2010	7.80	7.15	7.35	7.35	6.95
Dec-2010	7.80	7.15	7.35	7.35	6.95
Average per annun	7.28	**6.63**	7.54	6.85	6.45
Real interest rate		**6.63**			

Source: http://www.rba.gov.au/statistics/tables/index.html#interest_rates.

These are the average housing loan rates for different loan structures provided by the largest lenders within Australian banking and mortgage manager groups. Standard rates provide facilities such as the option to redraw or make early repayments. Basic rates provide housing loans with limited options. Discounted rates are the interest rates that are offered on standard variable rate housing loans as part of professional bank packages. In three-year fixed rate bank loans, the interest rate cannot be varied for the first three years of the loan. The most oft quoted rate is the discounted bank variable interest rate. This is provided in real terms.

Table C.3 Distribution of older people by equivalised disposable income and equivalised net wealth quintiles for the adult population (%)

Population sub-groups	Sample size	Quintile 1 (bottom	Quintile 2	Quintile 3	Quintile 4	Quintile 5 (top 20%)
Mean incomes (15+ years) $ p.a.		16,857	29,807	40,545	53,597	88,815
All adult population (15+ years)	13,445	20.0	20.0	20.0	20.1	19.9
All older people (65+ years)	2,125	48.8	23.6	13.3	7.2	7.1
Mean net wealth (15+ years) $ p.a		6,115	115,627	254,887	442,800	1,269,582
All adult population (15+ years)	13,445	20.0	20.0	20.0	20.0	20.0
All older people (65+ years)	2,125	13.2	9.9	18.7	26.3	31.9

Source: Author's calculation based on HILDA Wave 10 Release 10.
Weights: Cross-sectional responding person population weights for HILDA (2010).
Equivalence scale: Modified OECD equivalence scale.

Table C.4 Mean and median values of equivalised wealth annuities ($)

Years	65 - 74		75 - 84		85+		All older people (65+)		Non-older adults (15-64)		Adult population (15+)	
	mean	***median***	**mean**	***median***	**mean**	***median***	**mean**	***median***	**mean**	***median***	**mean**	***median***
Assets												
Home	24,302	*19,629*	34,300	*28,442*	58,208	*41,280*	30,817	*22,358*	11,801	*9,210*	15,164	*10,374*
Other property	5,856	*0*	4,366	*0*	4,849	*0*	5,255	*0*	3,063	*0*	3,404	*0*
Business	1,413	*0*	1,291	*0*	1,600	*0*	1,393	*0*	1,350	*0*	1,356	*0*
Liquid	3,157	*768*	5,401	*1,282*	10,382	*2,503*	4,681	*989*	891	*154*	1,480	*197*
Financial	4,905	*0*	5,101	*0*	6,047	*0*	5,093	*0*	1,101	*0*	1,722	*0*
Superannuation	8,469	*941*	2,685	*0*	2,020	*0*	5,862	*0*	3,925	*1,587*	4,227	*1,463*
Other wealth	1,207	*607*	1,008	*533*	1,244	*275*	1,145	*540*	695	*421*	765	*432*
Liabilities												
Mortgage debt	604	*0*	331	*0*	108	*0*	468	*0*	3,080	*1,880*	2,618	*943*
Non-mortgage debt	821	*0*	208	*0*	247	*0*	557	*0*	1,644	*167*	1,475	*89*
n	1,208		736		181		2,125		11,320		13,445	

Source: Author's calculations based on imputations from HILDA Wave 10 Release 10.
Weights: Cross-sectional responding person population weights for HILDA (2010).
Equivalence scale: Modified OECD equivalence scale.

Table C.5 Demographic / wealth profiles of older pensioners and non-pensioners (%)

	Pensioner status	
	Pensioner	Non-Pensioner
Older age groups		
65 - 74 years	52.3	74.8
75 - 84 years	36.0	18.6
85+ years	11.7	6.6
Educational attainment		
Degree or higher	7.7	28.2
Vocational qualification	28.1	30.4
Year 12	8.1	8.2†
Year 11 or below	56.1	33.3
Employment status		
Employed full-time	0.9	18.1
Employed part-time	4.4	17.0
Retired	91.1	60.8
Other	3.7	4.1
Share of mean value of equivalised household net wealth		
Assets		
Home	62.0	35.3
Other property	7.0	20.1
Business	0.9	6.1
Liquid	10.5	8.5
Financial	7.1	14.2
Superannuation	12.2	17.4
Other wealth	2.7	2.5
Liabilities		
Mortgage debt	1.3	0.9
Non-mortgage debt	1.1	3.2
Total ($'000)	**419**	**1,453**
n	1,738	387

Source: Author's calculation based on HILDA Wave 10 Release 10.
Weights: Cross-sectional responding person population weights for HILDA (2010).
Equivalence scale: Modified OECD equivalence scale.
Note: † 25-50 per cent relative standard error - cautious estimate.

Table C.6 Wealth profile of older people by home tenure

	Housing tenure				
	Own home	Paying mortgage	Renting private	Renting public	Rent free
Older age groups (%)					
65 - 74 years	55.2	80.4	48.9	55.4	32.6
75 - 84 years	34.3	17.9	39.6	27.0	41.9
85+ years	10.6	1.7	11.5	17.6†	25.4†
	Share of mean value of equivalised household net wealth				
Assets (%)					
Home	51.6	67.0	-	-	-
Other property	11.6	15.5	45.0	16.0	19.8
Business	2.7	2.9	3.8	-	0.1
Liquid	8.8	7.7	31.9	48.7	32.1
Financial	9.9	8.2	13.8	3.8	26.0
Superannuation	14.5	13.1	15.8	32.7	18.5
Other wealth	2.4	3.3	9.0	7.5	3.9
Liabilities (%)					
Mortgage debt	-	13.9	-	-	-
Non-mortgage debt	1.5	3.9	19.3	8.7	0.5
Total ($'000)	**720**	**542**	**100**	**35**	**304**
n	1,529	179	178	130	91

Source: Author's calculation based on HILDA Wave 10 Release 10.
Weights: Cross-sectional responding person population weights for HILDA (2010).
Equivalence scale: Modified OECD equivalence scale.
Note: † 25-50 per cent relative standard error - cautious estimate.

Table C.7 Profile of older household type by marital status

Household type	Couple only	Lone person	Family household	Shared household
Marital status				
Married/de-facto	97.6	1.1†	45.4	41.7†
Separated/divorced	1.7	23.6	12.8	37.0†
Widowed	0.6†	66.6	37.5	15.2†
Not married/not de-facto	0.0††	8.7	4.4††	6.1††
n	1,148	713	261	36

Source: Author's calculation based on HILDA Wave 10 Release 10.
Weights: Cross-sectional responding person population weights for HILDA (2010).
Equivalence scale: Modified OECD equivalence scale.
Note: † 25-50 per cent relative standard error - cautious estimate; †† > 50 per cent - unreliable estimate.

C.3 Quintile distributions of older people by ELS metric

Table C.8 Distribution of older people by adult population dy quintile (%)

Population sub-groups	(n)	Q1	Q2	Q3	Q4	Q5
Median incomes (15+ years) $ p.a.		18,200	30,021	40,461	52,923	76,399
Adult population (15+)	13,445	20.0	20.0	20.0	20.1	19.9
All older people (65+)	2,125	48.8	23.6	13.3	7.2	7.1
Older people demographic sub-groups						
Older age groups						
65 - 74 years	1,208	43.1	24.2	14.1	9.0	9.6
75 - 84 years	736	57.8	22.4	11.6	4.1	4.1
85+ years	181	50.4	24.5	14.2	7.6	3.3
Gender						
Male	959	46.0	25.0	13.0	7.8	8.2
Female	1,166	51.2	22.4	13.6	6.8	6.1
Birthplace						
Australian born	1,498	46.5	24.8	13.5	7.2	8.0
English speaking	310	45.0	22.7	15.2	9.2	7.9
Non-English speaking	316	59.2	20.3	11.2	5.9	3.4
Educational attainment						
Degree or higher	269	25.9	21.1	16.4	18.1	18.5
Vocational qualification	607	43.5	26.6	14.0	8.5	7.4
Year 12	151	52.0	15.9	19.6	3.7	8.9
Year 11 or below	1,094	56.2	23.8	11.2	4.8	4.0
Marital status						
Married/de-facto	1,244	46.0	25.2	13.9	7.5	7.5
Separated/divorced	256	47.8	22.9	13.3	7.5	8.5
Widowed	549	55.1	20.8	12.0	6.7	5.4
Not married/not de-facto	75	55.9	18.3	11.4	5.7	8.8
Household type						
Couple only	1,143	49.9	22.8	13.8	6.4	7.1
Lone person	684	72.1	12.9	8.4	4.6	2.0
Family household	262	19.5	36.5	17.2	12.8	14.0
Shared household	36	33.9	42.9	18.2	5.0	-
Housing tenure						
Own home	1,529	46.8	23.9	14.5	8.0	6.8
Paying mortgage	179	35.0	23.6	17.8	4.0	19.6
Renting private	130	61.3	17.6	10.4	8.0	2.8
Renting public	178	71.9	22.8	1.3	3.7	0.2
Rent free	91	57.9	27.7	4.8	5.3	4.3
Employment status						
Employed full-time	79	14.0	25.6	15.5	14.5	30.4
Employed part-time	150	19.9	25.5	16.3	16.4	22.0
Retired	1,819	53.0	23.5	12.7	6.2	4.7
Other	74	39.6	21.3	18.3	7.8	13.1
Pensioner status						
Pensioner	1,738	55.7	24.6	11.4	5.2	3.1
Non-Pensioner	387	15.4	19.1	22.4	16.8	26.3
Remoteness area						
Major City	1,239	44.9	24.7	13.0	9.0	8.5
Regional Australia	858	54.9	22.2	14.3	4.1	4.7
Remote Australia	28	53.6	17.9	-	16.8	11.8

Source: Author's calculations based on imputations from HILDA Wave 10 Release 10, ABS SIH/HES 2009-10.
Weights: Cross-sectional responding person population weights for HILDA (2010).
Equivalence scale: Modified OECD equivalence scale.

Table C.9 Distribution of older people by adult population fy quintile (%)

Population sub-groups	(n)	Q1	Q2	Q3	Q4	Q5
Median incomes (15+ years) $ p.a.		33,259	44,644	54,438	65,677	89,487
Adult population (15+)	13,445	20.0	20.0	20.0	20.0	20.0
All older people (65+)	2,125	22.5	28.6	21.1	15.2	12.6
Older people demographic sub-groups						
Older age groups						
65 - 74 years	1,208	29.2	24.5	17.3	15.0	14.0
75 - 84 years	736	14.4	36.3	26.5	12.9	10.0
85+ years	181	12.3	26.9	24.6	22.8	13.5
Gender						
Male	959	22.5	27.7	21.0	14.7	14.0
Female	1,166	22.5	29.4	21.2	15.6	11.4
Birthplace						
Australian born	1,498	21.1	26.9	23.2	15.1	13.6
English speaking	310	19.7	30.7	18.7	16.2	14.7
Non-English speaking	316	29.1	33.0	15.6	14.7	7.6
Educational attainment						
Degree or higher	269	13.0	14.9	18.0	18.4	35.7
Vocational qualification	607	19.7	27.0	23.9	17.2	12.2
Year 12	151	22.4	25.8	20.6	16.0	15.3
Year 11 or below	1,094	26.1	33.1	20.3	13.3	7.3
Marital status						
Married/de-facto	1,244	19.0	28.4	23.2	15.4	14.0
Separated/divorced	256	33.4	29.4	11.0	15.9	10.3
Widowed	549	26.4	29.1	19.4	14.8	10.3
Not married/not de-facto	75	25.6	27.9	26.0	10.6	10.0
Household type						
Couple only	1,143	19.8	29.3	22.3	14.4	14.2
Lone person	684	36.7	30.4	15.3	11.4	6.2
Family household	262	14.0	22.3	25.2	21.1	17.5
Shared household	36	10.3	50.0	19.9	19.8	-
Housing tenure						
Own home	1,529	15.8	28.7	23.3	18.3	13.9
Paying mortgage	179	23.0	24.8	22.1	7.6	22.6
Renting private	130	52.6	25.8	9.5	8.9	3.2
Renting public	178	51.9	30.4	12.4	5.1	0.2
Rent free	91	38.0	34.8	15.9	7.1	4.3
Employment status						
Employed full-time	79	9.6	18.7	16.8	19.1	35.7
Employed part-time	150	11.6	17.0	18.3	19.9	33.3
Retired	1,819	24.2	29.9	21.8	14.5	9.7
Other	74	17.1	31.4	14.6	17.1	19.9
Pensioner status						
Pensioner	1,738	25.5	32.2	22.2	13.5	6.6
Non-Pensioner	387	7.8	11.5	15.8	23.1	41.8
Remoteness area						
Major city	1,239	18.3	27.1	21.9	16.9	16.0
Regional Australia	858	29.8	30.6	20.2	12.4	7.0
Remote Australia	28	8.5	45.1	11.7	16.6	18.2

Source: Author's calculations based on imputations from HILDA Wave 10 Release 10, ABS SIH/HES 2009-10.
Weights: Cross-sectional responding person population weights for HILDA (2010).
Equivalence scale: Modified OECD equivalence scale.

Table C.10 Distribution of older people by adult population pc quintile (%)

Population sub-groups	(n)	Q1	Q2	Q3	Q4	Q5
Median incomes (15+ years) $ p.a.		33,982	46,538	57,763	71,747	103,002
Adult population (15+)	13,445	20.0	20.0	20.0	20.0	20.0
All older people (65+)	2,125	21.3	28.3	18.2	15.4	16.7
Older people demographic sub-groups						
Older age groups						
65 - 74 years	1,208	28.4	25.8	13.8	14.1	18.0
75 - 84 years	736	13.7	34.8	24.7	14.6	12.2
85+ years	181	8.1	22.4	21.4	24.7	23.4
Gender						
Male	959	21.0	26.9	18.2	15.3	18.5
Female	1,166	21.6	29.6	18.2	15.6	15.1
Birthplace						
Australian born	1,498	19.6	26.3	19.5	15.6	19.0
English speaking	310	18.2	29.7	16.9	17.3	18.0
Non-English speaking	316	29.3	34.5	14.8	13.6	7.9
Educational attainment						
Degree or higher	269	17.2	13.0	12.8	21.7	33.4
Vocational qualification	607	17.4	29.5	16.9	18.0	18.2
Year 12	151	19.6	23.3	19.6	17.4	20.1
Year 11 or below	1,094	24.7	31.8	19.9	12.5	11.0
Marital status						
Married/de-facto	1,244	18.3	29.1	18.3	15.9	18.4
Separated/divorced	256	32.7	27.4	13.0	13.6	13.4
Widowed	549	24.0	28.3	18.8	15.9	13.1
Not married/not de-facto	75	24.0	16.2	29.1	8.6	22.2
Household type						
Couple only	1,143	18.2	29.2	17.4	15.2	20.1
Lone person	684	33.5	27.1	15.6	11.8	12.1
Family household	262	11.1	49.8	23.1	14.8	1.3
Shared household	36	21.3	28.3	18.2	15.4	16.7
Housing tenure						
Own home	1,529	14.4	27.9	20.2	18.6	18.8
Paying mortgage	179	25.3	27.3	14.8	9.7	22.9
Renting private	130	51.4	25.9	9.4	7.3	6.0
Renting public	178	53.1	27.3	14.6	4.0	1.0
Rent free	91	31.2	37.1	12.4	7.5	11.8
Employment status						
Employed full-time	79	9.1	15.1	12.9	13.2	49.7
Employed part-time	150	9.9	11.4	15.4	18.2	45.1
Retired	1,819	22.7	30.5	18.8	15.2	12.9
Other	74	23.4	23.3	14.9	17.8	20.6
Pensioner status						
Pensioner	1,738	24.0	32.4	20.4	14.6	8.6
Non-Pensioner	387	8.3	8.8	7.4	19.5	56.0
Remoteness area						
Major city	1,239	19.4	26.9	18.9	17.0	17.7
Regional Australia	858	24.4	31.3	17.3	12.5	14.5
Remote Australia	28	20.9	10.7	12.2	24.9	31.3

Source: Author's calculations based on imputations from HILDA Wave 10 Release 10, ABS SIH/HES 2009-10.
Weights: Cross-sectional responding person population weights for HILDA (2010).
Equivalence scale: Modified OECD equivalence scale.

Table C.11 Distribution of older people by adult population apc quintile (%)

Population sub-groups	(n)	Q1	Q2	Q3	Q4	Q5
Median incomes (15+ years) $ p.a.		36,058	50,693	62,728	79,006	113,154
Adult population (15+)	13,445	20.0	20.0	20.0	20.0	20.0
All older people (65+)	2,125	16.9	18.6	18.6	19.9	26.0
Older people demographic sub-groups						
Older age groups						
65 - 74 years	1,208	19.2	21.4	19.6	17.5	22.2
75 - 84 years	736	14.8	14.8	19.4	24.6	26.5
85+ years	181	10.6	15.8	10.9	18.4	44.3
Gender						
Male	959	17.1	18.3	18.6	18.8	27.2
Female	1,166	16.7	18.9	18.6	20.9	24.9
Birthplace						
Australian born	1,498	15.4	17.3	18.8	18.4	30.1
English speaking	310	15.6	20.4	16.1	21.8	26.2
Non-English speaking	316	22.8	21.8	19.9	23.8	11.8
Educational attainment						
Degree or higher	269	13.8	6.4	11.7	23.5	44.7
Vocational qualification	607	13.5	19.8	17.2	22.0	27.6
Year 12	151	16.0	14.4	25.5	14.4	29.7
Year 11 or below	1,094	19.7	21.2	19.8	19.0	20.3
Marital status						
Married/de-facto	1,244	14.0	18.7	20.7	20.7	25.8
Separated/divorced	256	30.3	15.6	15.1	19.2	19.8
Widowed	549	18.9	19.4	15.3	17.7	28.6
Not married/not de-facto	75	14.3	20.2	12.8	23.0	29.7
Household type						
Couple only	1,143	13.0	17.8	18.7	21.6	28.9
Lone person	684	24.8	13.2	13.9	16.8	31.2
Family household	262	17.2	25.6	23.3	19.3	14.7
Shared household	36	21.0	33.4	21.4	19.1	5.2
Housing tenure						
Own home	1,529	6.4	17.0	20.8	24.3	31.6
Paying mortgage	179	12.0	21.5	23.9	16.8	25.8
Renting private	130	63.9	18.2	10.7	2.1	5.2
Renting public	178	69.1	22.8	3.2	4.0	1.0
Rent free	91	45.0	26.8	8.9	9.3	10.0
Employment status						
Employed full-time	79	5.7	3.9	23.4	11.9	55.1
Employed part-time	150	8.4	10.1	12.2	16.9	52.4
Retired	1,819	18.2	19.6	19.0	20.8	22.5
Other	74	14.3	26.5	16.2	11.5	31.5
Pensioner status						
Pensioner	1,738	19.2	21.4	20.8	21.2	17.4
Non-Pensioner	387	6.1	5.2	7.7	13.6	67.5
Remoteness area						
Major city	1,239	15.6	16.0	18.4	20.9	29.1
Regional Australia	858	19.0	22.9	19.2	18.8	20.1
Remote Australia	28	17.4	14.1	8.3	7.3	53.0

Source: Author's calculations based on imputations from HILDA Wave 10 Release 10, ABS SIH/HES 2009-10.
Weights: Cross-sectional responding person population weights for HILDA (2010).
Equivalence scale: Modified OECD equivalence scale.

Appendix D Multi-dimensional individual well-being methodological components

D.1 Financial stress indicator imputation

In each year that the HILDA survey is administered, respondents are asked to respond to the set of questions with respect to January of that year. However, as the question in the 2010 wave erroneously refers to January 2009 and not January 2010, it is unclear if respondents correctly interpreted the question as the beginning of the current year (2010), or responded literally to the question as it was asked (2009). Consequently, even though data on the financial stress indicators for Wave 10 is available, it is not included in the public access dataset as the data is 'noisy' and cannot be interpreted on the face validity of it.

To overcome this obstacle, data for Wave 10 is imputed by examining the pattern of responses in the items across Waves 9 and 11 and constructing a decision rule for imputation. Table D.1 compares the financial stress responses of individuals across Waves 9 and 11. The sample is limited to those individuals who responded in Wave 10 and also in Waves 9 and 11.

Table D.1 Comparison of financial stress responses by individual respondents across Waves 9 and 11

	% of Wave 10 sample			
Financial stress indicators	**Responses are the same across both waves**	**Responses are different across both waves**	**Responses from either wave is missing**	**Responses from both waves are missing**
Could not pay electricity, gas or telephone bills on time	69.0	8.8	17.5	4.7
Could not pay the mortgage or rent on time	72.0	5.2	18.1	4.8
Pawned or sold something	73.6	4.0	17.7	4.8
Went without meals	75.0	2.6	17.7	4.7
Was unable to heat home	74.9	2.7	17.7	4.8
Asked for financial help from friends or family	68.6	9.2	17.5	4.7
Asked for help from welfare/community organisations	74.1	3.5	17.7	4.8

Source: HILDA Wave 10 Release 10.
Sample: The sample of responding people who completed the Wave 10 self-completion questionnaire is 12,048.

On average, above 70 per cent of the sample of responding individuals in Wave 10 had similar responses in Waves 9 and 11 and less than 5 per cent did not answer in either wave. Individuals in Wave 10 are assigned the same response if the responses are the same across both Waves 9 and 11. Individuals are assigned a missing value if responses are missing across both waves. There are two decision rules for the approximately remaining 25 per cent of the Wave 10 sample. Indicators are assigned the value of the non-missing item in the event that the response from one wave is missing and not the other. If both are non-missing but different (col 2), preference is given to the responses from Wave 11. This affects approximately 5 per cent of the Wave 10 sample. The rationale is that as questions are asked retrospectively about the current year, the results from Wave 11 are more likely to reflect circumstances in 2010 than Wave 9 as the latter requires a prediction about future circumstances.

D.2 Polychoric correlation coefficient matrices

Economic stability

	1	2	3	4	5	6	7	8	9
Could not pay electricity, gas or telephone bills on time	1.000								
Could not pay the mortgage or rent on time	0.841	1.000							
Pawned or sold something	0.648	0.599	1.000						
Went without meals	0.623	0.539	0.641	1.000					
Was unable to heat home	0.577	0.488	0.570	0.753	1.000				
Asked for financial help from friends or family	0.717	0.683	0.691	0.627	0.472	1.000			
Asked for help from welfare/community organisations	0.697	0.631	0.692	0.669	0.554	0.727	1.000		
Difficulty raising $3000 in an emergency	0.511	0.403	0.466	0.504	0.418	0.476	0.481	1.000	
Prosperity given current needs & financial responsibilities	0.497	0.428	0.405	0.454	0.465	0.431	0.414	0.510	1.000

Physical health

	1	2	3	4	5	6	7	8	9	10	11
Vigorous activities	1.000										
Moderate activities	0.784	1.000									
Lifting or carrying groceries	0.711	0.918	1.000								
Climbing several flights of stairs	0.805	0.835	0.825	1.000							
Climbing one flight of stairs	0.673	0.858	0.869	0.905	1.000						
Bending kneeling or stooping	0.752	0.830	0.814	0.816	0.843	1.000					
Walking more than one kilometre	0.743	0.837	0.811	0.872	0.868	0.816	1.000				
Walking half a kilometre	0.661	0.849	0.841	0.845	0.905	0.824	0.962	1.000			
Walking 100 metres	0.517	0.817	0.840	0.767	0.901	0.803	0.865	0.950	1.000		
Bathing or dressing yourself	0.433	0.775	0.815	0.668	0.834	0.751	0.760	0.854	0.919	1.000	
Cut down the amount of time spent on work or other activities	0.591	0.694	0.656	0.636	0.623	0.600	0.633	0.629	0.569	0.502	1.000
Accomplished less than would like	0.630	0.709	0.661	0.660	0.624	0.624	0.655	0.643	0.535	0.487	0.924
Were limited in the kind of work	0.703	0.780	0.735	0.718	0.687	0.695	0.719	0.699	0.590	0.536	0.926
Had difficulty performing work or other activities	0.681	0.744	0.706	0.706	0.672	0.683	0.687	0.658	0.572	0.505	0.906
Bodily pain in last 4 weeks	0.558	0.621	0.593	0.556	0.542	0.597	0.556	0.534	0.450	0.395	0.665
How much did pain interfere with normal work	0.607	0.710	0.686	0.640	0.632	0.650	0.640	0.629	0.554	0.494	0.776
Self-assessed health	0.586	0.610	0.572	0.608	0.554	0.541	0.584	0.536	0.439	0.388	0.596
Get sick a little easier than other people	0.220	0.329	0.336	0.303	0.314	0.227	0.308	0.315	0.302	0.307	0.418
As healthy as anybody I know	0.423	0.468	0.416	0.451	0.414	0.384	0.434	0.404	0.343	0.315	0.495
Expect my health to get worse	0.466	0.454	0.413	0.452	0.411	0.431	0.409	0.375	0.331	0.312	0.404
My health is excellent	0.547	0.563	0.517	0.558	0.492	0.493	0.530	0.478	0.391	0.338	0.580

	12	13	14	15	16	17	18	19	20	21
Accomplished less than would like	1.000									
Were limited in the kind of work	0.928	1.000								
Had difficulty performing work or other activities	0.922	0.957	1.000							
Bodily pain in last 4 weeks	0.657	0.729	0.728	1.000						
How much did pain interfere with normal work	0.772	0.828	0.818	0.882	1.000					
Self-assessed health	0.648	0.660	0.668	0.561	0.620	1.000				
Get sick a little easier than other people	0.419	0.389	0.405	0.347	0.423	0.452	1.000			
As healthy as anybody I know	0.536	0.531	0.525	0.438	0.502	0.665	0.575	1.000		
Expect my health to get worse	0.456	0.470	0.497	0.418	0.448	0.535	0.384	0.479	1.000	
My health is excellent	0.633	0.637	0.648	0.544	0.596	0.817	0.543	0.778	0.585	1.000

Mental health

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Feel full of life	1.000													
Have a lot of energy	0.775	1.000												
Felt worn out	0.500	0.516	1.000											
Felt tired	0.522	0.565	0.785	1.000										
Extent physical/emotional health interfered with normal social activities	0.626	0.598	0.476	0.481	1.000									
Time physical/emotional problems interfered with social activities	0.593	0.577	0.506	0.511	0.836	1.000								
Cut down the amount of time spent on work/other activities	0.539	0.547	0.443	0.454	0.760	0.716	1.000							
Accomplished less than would like	0.585	0.568	0.467	0.467	0.740	0.696	0.936	1.000						
Didn't do work/other activities as carefully as usual	0.573	0.555	0.479	0.477	0.736	0.688	0.888	0.903	1.000					
Been a nervous person	0.306	0.286	0.399	0.389	0.401	0.447	0.441	0.448	0.440	1.000				
Felt so down in the dumps nothing could cheer you up	0.496	0.429	0.498	0.475	0.603	0.649	0.601	0.611	0.614	0.609	1.000			
Felt calm and peaceful	0.634	0.633	0.471	0.485	0.500	0.501	0.494	0.521	0.526	0.428	0.527	1.000		
Felt down	0.539	0.471	0.576	0.532	0.592	0.612	0.595	0.620	0.613	0.574	0.776	0.553	1.000	
Been a happy person	0.683	0.629	0.436	0.441	0.533	0.527	0.488	0.526	0.504	0.429	0.583	0.700	0.598	1.000

Personal relationships

	1	2	3	4	5	6	7	8	9	10
People don't visit me as often I would like	1.000									
Often need help from other people but	0.450	1.000								
Lots of friends	0.302	0.309	1.000							
No one to confide in	0.369	0.556	0.373	1.000						
No one to lean on in times of trouble	0.369	0.584	0.355	0.830	1.000					
Someone who can always cheer me up	0.240	0.383	0.423	0.480	0.499	1.000				
Often feel very lonely	0.404	0.526	0.332	0.548	0.570	0.440	1.000			
Enjoy the time I spend with people who	0.144	0.351	0.327	0.429	0.451	0.518	0.348	1.000		
When somethings on my mind, talking	0.165	0.302	0.350	0.433	0.416	0.522	0.316	0.663	1.000	
Usually find someone to help me out when	0.297	0.524	0.460	0.552	0.586	0.598	0.473	0.621	0.682	1.000

Community and social participation

	1	2	3	4	5	6	7	8	9	10	11	12
Have telephone, email or mail contact with friends or relatives not living with you	1.000											
Chat with your neighbours	0.265	1.000										
Attend events that bring people together such as fetes, shows, festivals or other community events	0.335	0.397	1.000									
Get involved in activities for a union, political party, or group that is for or against something community events	0.097	0.191	0.371	1.000								
Make time to attend services at a place of worship	0.062	0.135	0.263	0.262	1.000							
Encourage others to get involved with a group thats trying to make a difference in the community	0.143	0.235	0.442	0.589	0.525	1.000						
Talk about current affairs with friends, family or neighbours	0.336	0.247	0.317	0.290	0.158	0.352	1.000					
Make time to keep in touch with friends	0.560	0.254	0.384	0.131	0.138	0.229	0.377	1.000				
Volunteer your spare time to work on boards or organising committees of clubs, community groups or other non-profit organisations	0.147	0.233	0.424	0.461	0.366	0.645	0.264	0.198	1.000			
See members of my extended family (or relatives not living with me) in person	0.359	0.271	0.297	0.086	0.165	0.164	0.256	0.395	0.200	1.000		
Get in touch with a local politician or councillor about issues that concern me	0.033	0.241	0.282	0.549	0.301	0.522	0.283	0.083	0.484	0.140	1.000	
Give money to charity if asked	0.151	0.230	0.243	0.192	0.282	0.303	0.311	0.196	0.294	0.238	0.264	1.000

Neighbourhood environment

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Neighbours helping each other out	1.000														
Neighbours doing things together	0.780	1.000													
Traffic noise	0.177	0.130	1.000												
Noise from airplanes, trains or industry	0.076	0.019	0.451	1.000											
Homes and gardens in bad condition	0.148	0.096	0.339	0.315	1.000										
Rubbish and litter lying around	0.152	0.074	0.424	0.354	0.685	1.000									
Teenagers hanging around on the streets	0.115	0.031	0.425	0.283	0.439	0.589	1.000								
People being hostile and aggressive	0.163	0.054	0.442	0.340	0.498	0.620	0.687	1.000							
Vandalism and deliberate damage to property	0.140	0.070	0.425	0.317	0.475	0.592	0.675	0.761	1.000						
Burglary and theft	0.113	0.070	0.346	0.300	0.429	0.498	0.558	0.648	0.795	1.000					
This is a close-knit neighbourhood	0.618	0.593	0.261	0.140	0.267	0.265	0.198	0.254	0.243	0.210	1.000				
People around here are willing to help their neighbours	0.704	0.591	0.261	0.144	0.254	0.273	0.221	0.303	0.264	0.223	0.773	1.000			
People in this neighbourhood can be trusted	0.498	0.416	0.310	0.203	0.342	0.370	0.335	0.418	0.361	0.305	0.633	0.723	1.000		
People in this neighbourhood generally do not get along with each other	0.289	0.194	0.197	0.119	0.215	0.227	0.211	0.314	0.238	0.183	0.281	0.359	0.390	1.000	
People in this neighbourhood generally do not share the same values	0.280	0.252	0.187	0.110	0.240	0.221	0.187	0.301	0.233	0.170	0.296	0.326	0.355	0.567	1.000

D.3 Confirmatory factor analysis

Given the strength of the EFA results, the purpose of confirmatory factor analysis (CFA) is to confirm the hypothesis that the form of the reflective model, from each well-being dimension to the set of indicators as determined by the EFA and categorised in Table 6.7, is valid. CFA is a mathematical technique performed to test the hypothesis that a given latent variable is best reflected by a set of observed variables (Bollen and Lennox, 1991; Brown, 2006). As a special case of structural equation modelling, it is in keeping with the reflective model described in Section 6.2.2. The direction of arrows in CFA point from the latent variable to the observed variable, to reflect that the observed variables (observed endogenous with an error term) are a manifestation of the unobserved factor (latent exogenous).

Analogous to EFA, CFA is estimated using polychoric correlation coefficient matrices given the ordinal nature of the indicator items (Holgado-Tello. et al., 2010). These are introduced into Stata as summary statistics for each well-being dimension. The CFA model is then specified according to Equation 6.1 and estimation is based on the maximum likelihood estimation (MLE) method. To improve the fit of the model, modification indices are used to improve the covariance structure between the error terms for the observed indicators. Three types of frequently used model fit tests are conducted to test the factor structure for each well-being dimension: the 'Root Mean Square Error of Approximation' (RMSEA), the 'Comparative Fit Index' (CFI) and the 'Tucker Lewis Index' (TLI) (Hooper et al., 2008). The results are displayed in Table D.2.

Table D.2 Confirmatory factor analysis model fit

Well-being dimensions	RMSEA	CFI	TLI
Economic stability	0.056	0.996	0.982
Physical health	0.136	0.934	0.888
Mental health	0.082	0.990	0.954
Personal relationships	0.035	0.999	0.989
Community and social participation	0.050	0.991	0.964
Neighbourhood environment	0.041	0.995	0.984

Weights: Cross-sectional responding person population weights for 2010. Weighted sample: 11,852.
Note: Confirmatory factor analysis is performed using the maximum likelihood estimation method.

The RMSEA is an absolute close-fit index based on residual correlation matrix. It determines how well the model 'with unknown but optimally chosen parameter estimates would fit the population covariance matrix' (Hooper et al., 2008: 54). The general consensus is that a RMSEA of 0.06 or less represents good fit, while a value above 0.10 signifies unacceptably poor fit (ibid). The CFI and TLS are incremental close-fit indices which compare the sample covariance matrix to the null model that assumes zero correlations between observed variables (Hooper et al., 2008). For CFI and TLI, values of approximately 0.90 indicate a good fit and a value below 0.90 represents inadequate fit. The results from Table D.2 show that with the exception of the RMSEA for physical and mental health, the RMSEA, CFI and TLI estimates for the well-being dimensions are well within the suggested guidelines, indicating reasonable model fits.

Although the CFA results confirm the strength of the relationship between each well-being dimension and the set of indicators, there are two reasons for its inclusion as a supplementary appendix and not in the main body of work. The first is the problematic reliance on the MLE method. Although it is the recommended as producing consistent and asymptotically unbiased parameters (Bollen and Lennox, 1991; Holgado-Tello. et al., 2010), MLE is not recommended with polychoric correlation coefficient matrices. Statisticians recommend alternative estimation techniques such as, weighted least squares, quasimaximum likelihood or asymptotic distribution free with polychoric correlations (Flora and Curran, 2004; Holgado-Tello. et al., 2010; Jöreskog, 1990; Morata-Ramírez and Holgado-Tello, 2013). However, these are not permitted programming options for summary statistics data within Stata (StataCorp, 2013c).

The second is that convergence with CFA is very difficult to obtain and requires various statistical manipulations such as applying modification indices, improving the starting values and extending the number of iterations. The results from the CFA are considered preliminary and are included for completeness. Overcoming the empirical modelling challenges and undertaking a more comprehensive application of CFA to the MIW framework is beyond the scope of this thesis and is a potential topic for future research.

D.4 Missing data imputation for MIW indicators

Table 6.4 shows that on an item by item basis, the proportion of missing data for 64 of the 77 chosen items is very low with the vast majority of indicators missing around 1 per cent of the (weighted) sample of respondents completing the self-completion questionnaire. The remaining thirteen items are in response to questions concerning financial stress and the neighbourhood environment. Three items have missing data between 3-4 per cent: 'homes and gardens in a bad condition'; 'people being hostile and aggressive'; and 'vandalism and deliberate damage to property'. However, the remaining three items have missing data between 9 to 11 per cent: 'neighbours helping each other out'; 'neighbours doing things together' and 'burglary and theft'.

A possible explanation for the high missing rates on these three items could be related to the applicability of these types of questions for people living under different housing conditions. Table D.3 illustrates the proportion of respondents missing on these questions according to their housing tenure. It indicates that higher proportions of respondents who own homes or in private rental units are missing, and correspondingly there are much lower proportions of public renters and those living rent free; two categories that are more likely to be disadvantaged. Respondents with missing values either marking that they either 'don't know' or 'refused or not answered'. It is plausible that some homeowners and private renters may prioritise their privacy, aided by the financial means to ensure adequate security around their property, hence rendering these questions less relevant to them.

Table D.3 Missing data for specific indicators by housing tenure

Missing %'s by housing tenure	Own home	Paying mortgage	Renting private	Renting public	Rent free
Neighbours helping each other out	24.9	36.7	31.2	4.1	2.2
Neighbours doing things together	25.5	36.5	31.7	4.2	2.2
Burglary and theft	21.5	37.6	30.7	7.9	2.3

Source: HILDA Wave 10 Release 10.
Weights: Cross-sectional responding person population weights for 2010.
Note: rows add up to 100 per cent.

Table D.4 shows that across the weighted sample, the proportion with complete data across all 77 indicators is approximately 68 per cent. It is 6 percentage points lower for older people (61.6 per cent). This is not unexpected given the large number of indicators, the personal nature of the questions included in the SCQ and the nature of the SCQ survey mode. Respondents are required following a telephone interview, to not only interpret the questions independently but to self-motivate, to complete and then return (by mail) the questionnaire (Summerfield et al., 2012; Watson and Wooden, 2010). Summerfield et al. (2012: 5) writes that the SCQ covers 'topics which respondents feel slightly uncomfortable answering in a face-to-face interview'. Watson and Wooden ((2009) from (Watson and Wooden, 2010)) also show that respondents from telephone interviews have a SCQ response rate that is 23 percentage points lower than if interviews are conducted face to face.

Table D.4 Cumulative missing data statistics for MIW indicators

All dimensions	All Older People (65+)	Non-older Adults (15-64)	Adult Population (15+)
% complete data (across 77 Likert items	61.6	69.1	67.9
% missing values on one item	15.0	11.3	11.9
% missing values on two items	7.3	6.1	6.3
% missing values on three items	3.9	3.3	3.4
% missing values on four items	2.0	1.6	1.6
% missing values on five or more items	1.1	1.0	1.0

Source: HILDA Wave 10 Release 10.
Weights: Cross-sectional responding person population weights for 2010. Sample: 12,048.

In addition, Table D.4 indicates that it is the number of missing values across only 1 item that is the key driver for the lack of a more complete dataset. Across the 77 indicators the highest proportion of the sample are missing only one item (11.9 per cent). Given that the number of items missing values decreases steeply, so that there is only less than 1 per cent missing on more than 5 out of 77 indicators, the options to impute values for the few items with missing values is a valid and pertinent question.

Nardo et al. (2005) and Henstridge (2001) outline three options to deal with missing data. Option 1 is to delete the respondent observation if there are any missing values across all 77 potential indicators. Nardo et al.(2005: 17) write that 'as a rule of thumb, if a variable has more than 5 [per cent] missing values, cases are not deleted'. Apart from the three neighbourhood-related indicators, the remaining 74 variables have less than 5 per cent missing. Furthermore, the literature warns that deleting observations where some variables have missing values also deletes the remaining variables with non-missing values (StataCorp, 2013a: 3). The potential consequence from the loss of information is less efficient results with larger standard errors, wider confidence intervals and less power. Following this concern, and that of Osberg and Sharp (2002: 295) to include rather than the exclude imprecise measures, the preference is to tolerate the errors from imprecise items rather than the potentially larger errors generated from a reduced sample.

Option 2 is to leave the indicators as missing for that observation and use models that account for the missing values in the analysis. Henstridge (2001: 17) writes that this option 'can lead to inconsistent treatment and is inconvenient for any but the most experienced users of the data'. Option 3 is to replace the items with missing values with imputed values and treat the estimates as actual data values in the analysis. Although there is no 'gold standard' on how to treat missing values, many studies involving indicators impute missing data (Berry and Welsh, 2010; Halleröd and Selden, 2012; McHorney, 1996; Meng et al., 2013). It is also acknowledged as an appropriate option for the HILDA survey (Henstridge, 2001). Option 3 is adopted in the MIW approach for two reasons. First, it ensures the maximal sample size during analysis. Second, it accounts for the unique contribution of each indicator to an individual's dimension score, which is important within an intra-aggregate procedure.

Missing data is imputed using a univariate imputation model as part of the multiple imputation (MI) statistical package provided by the Stata software program (StataCorp, 2013a). There are three steps: 1) choose the imputation model; 2) estimate the model; and 3) pool the results into a single imputation result (ibid: 3). The univariate imputation model imputes a single value for each imputation, on the assumption that the pattern of missing data is 'missing at random' (MAR). That is, the missing values are not dependent on the variable itself but may be conditional on other observed variables in the dataset (for example, demographic traits) (Nardo et al., 2005; Schafer and Graham, 2002; StataCorp, 2013a).

Consequently, for each indicator, five imputations are generated using a set of demographic factors: age, gender, household type, educational attainment and employment status, as predictors within an ordered logistic regression. The imputation method is described as simulating a posterior predictive distribution of the missing data based on a chosen prior distribution of the non-missing data and the predictors (Schafer and Graham, 2002; StataCorp, 2013a: 8). Five imputations are considered sufficient if the fraction of missing data is low, as is the case in this dataset (J. W. Graham et al., 2007; StataCorp, 2013a: 11). The predictor variables are specifically chosen to include as wide a range of demographic characteristics over which the non-missing responses can vary (StataCorp, 2013a: 116). The final imputed missing value (that is, pooling of results) is based on the average from the five imputations. This follows the recommendation by Henstridge (2001: 16) to use 'the average itself … or some random quantity that has that average as its expectation'.

The final imputation results in Table D.5 show that there is an almost negligible difference in the means and standard deviations across the non-imputed and imputed dataset. This suggests that imputing missing values are important for maximising the sample size in the construction of the dimension scores and composite well-being index. However, they are not instrumental in affecting the substantive results.

It is worthwhile noting that there are a range of imputation methods. Complex multivariate imputation models simultaneously impute missing values across multiple variables on the assumption that the variables are related (for example, chained equations or normal data augmentation) (Schafer and Graham, 2002; StataCorp, 2013a: 115-116). McHorney (1996) and Moore et al. (2008) on the other hand, use simple imputation techniques. McHorney (1996: 573) uses proration to handle missing data, assigning the mean of the non-missing items if less than 50 per cent is missing. Moore et al. (2008) impute missing values to the category representing the most common responses (that is, the modal categories). In this sense, the univariate imputation model can be treated as a middle-ground approach utilising a credible statistical modelling technique, while remaining within the feasibility of this thesis.

Table D.5 Comparison of original and amended samples for MIW indicators

Well-being indicators	original sample size	# of cases imputed	mean: original sample	mean: imputed sample	sd: original sample	sd: imputed sample
Could not pay electricity, gas or telephone bills on time	11,481	567	1.87	1.88	0.34	0.33
Could not pay the mortgage or rent	11,471	577	1.94	1.94	0.24	0.24
Pawned or sold something	11,474	574	1.95	1.95	0.21	0.21
Went without meals	11,478	570	1.97	1.97	0.18	0.18
Was unable to heat home	11,476	572	1.97	1.97	0.18	0.18
Asked for financial help from	11,479	569	1.88	1.88	0.33	0.33
Asked for help from welfare/community organisations	11,474	574	1.96	1.96	0.19	0.19
Difficulty raising $3000 in an	11,783	265	3.21	3.21	1.07	1.06
Prosperity given current needs & financial responsibilities	11,945	103	3.83	3.83	0.80	0.80
Vigorous activities	11,900	148	2.18	2.17	0.78	0.78
Moderate activities	11,923	125	2.67	2.67	0.60	0.60
Lifting or carrying groceries	11,919	129	2.73	2.73	0.55	0.55
Climbing several flights of stairs	11,905	143	2.58	2.57	0.66	0.66
Climbing one flight of stairs	11,895	153	2.78	2.78	0.51	0.51
Bending kneeling or stooping	11,921	127	2.58	2.58	0.64	0.64
Walking more than one kilometre	11,916	132	2.66	2.66	0.64	0.64
Walking half a kilometre	11,912	136	2.77	2.77	0.55	0.55
Walking 100 metres	11,887	161	2.85	2.85	0.45	0.45
Bathing or dressing yourself	11,928	120	2.87	2.87	0.42	0.42
Cut down the amount of time spent on work or other activities	11,919	129	1.83	1.83	0.38	0.38
Accomplished less than would like	11,900	148	1.75	1.75	0.43	0.43
Were limited in the kind of work	11,888	160	1.79	1.79	0.41	0.41
Had difficulty performing work or other activities	11,893	155	1.77	1.77	0.42	0.42
Bodily pain in last 4 weeks	11,981	67	4.55	4.55	1.25	1.25
How much did pain interfere with normal work	11,983	65	4.24	4.24	1.02	1.01
Self-assessed health	11,954	94	3.37	3.36	0.96	0.95
Expect my health to get worse	11,893	155	3.56	3.56	1.14	1.13
Get sick a little easier than other	11,896	152	4.14	4.14	1.03	1.03
As healthy as anybody I know	11,904	144	3.71	3.71	1.07	1.06
My health is excellent	11,895	153	3.52	3.51	1.16	1.15
Feel full of life	11,961	87	4.00	4.00	1.22	1.22
Have a lot of energy	11,937	111	3.75	3.74	1.25	1.25
Felt worn out	11,925	123	4.30	4.30	1.14	1.14
Felt tired	11,949	99	3.91	3.91	1.16	1.15
Extent physical/emotional health interfered with normal social activities	11,971	77	4.31	4.31	1.00	1.00

Table D.5 Comparison of original and amended samples for MIW indicators (cont'd)

			mean		sd	
Well-being indicators (cont'd)	**original sample size**	**# of cases imputed**	**original sample**	**imputed sample**	**original sample**	**imputed sample**
Time physical/emotional problems	11,932	116	4.26	4.25	1.01	1.00
Cut down the amount of time spent on work/other activities	11,915	133	1.85	1.85	0.35	0.35
Accomplished less than would like	11,911	137	1.79	1.79	0.41	0.41
Didn't do work/other activities as carefully as usual	11,901	147	1.85	1.85	0.36	0.36
Been a nervous person	11,963	85	4.96	4.96	1.08	1.08
Felt so down in the dumps nothing could cheer you up	11,946	102	5.36	5.36	0.99	0.98
Felt calm and peaceful	11,961	87	3.97	3.97	1.21	1.20
Felt down	11,948	100	4.86	4.86	1.04	1.04
Been a happy person	11,947	101	4.39	4.39	1.09	1.08
People don't visit me as often I would like	11,946	102	4.43	4.43	1.73	1.73
Often need help from other people but can't get it	11,923	125	5.60	5.59	1.53	1.53
Lots of friends	11,932	116	4.58	4.58	1.61	1.60
No one to confide in	11,922	126	5.62	5.62	1.66	1.66
No one to lean on in times of trouble	11,924	124	5.78	5.77	1.59	1.58
Someone who can always cheer me up when I'm down	11,923	125	5.36	5.36	1.65	1.65
Often feel very lonely	11,923	125	5.31	5.30	1.74	1.73
Enjoy the time I spend with people who are important to me	11,942	106	6.25	6.25	1.11	1.10
When something's on my mind, talking with people can make me	11,943	105	5.66	5.66	1.38	1.38
Usually find someone to help me out when I need	11,944	104	5.63	5.63	1.42	1.42
Have telephone, email or mail contact with friends or relatives not living with you	11,939	109	4.79	4.78	1.18	1.18
Make time to keep in touch with friends	11,913	135	4.43	4.43	1.13	1.13
Chat with your neighbours	11,926	122	3.46	3.46	1.38	1.38
Attend events that bring people together such as fetes, shows, festivals or other community	11,920	128	3.30	3.30	1.26	1.25
Get involved in activities for a union, political party, or group that is for or against something	11,920	128	1.69	1.69	1.04	1.03
Make time to attend services at a place of worship	11,929	119	2.12	2.12	1.58	1.58

Table D.5 Comparison of original and amended samples for MIW indicators (cont'd)

			mean		sd	
Well-being indicators (cont'd)	**original sample size**	**# of cases imputed**	**original sample**	**imputed sample**	**original sample**	**imputed sample**
Encourage others to get involved with a group that's trying to make a difference in the community	11,923	125	2.17	2.17	1.28	1.28
Talk about current affairs with friends, family or neighbours	11,922	126	3.71	3.71	1.38	1.38
Volunteer your spare time to work on boards or organising committees of clubs, community groups or other non-profit organisations	11,926	122	2.23	2.23	1.52	1.51
Get in touch with a local politician or councillor about issues that concern me	11,920	128	1.48	1.48	0.86	0.86
Neighbours helping each other out	10,910	1,138	3.58	3.58	1.07	1.04
Neighbours doing things together	10,715	1,333	3.02	3.02	1.10	1.06
This is a close-knit neighbourhood	11,931	117	3.94	3.94	1.49	1.48
People around here are willing to help their neighbours	11,950	98	4.46	4.46	1.46	1.45
Traffic noise	11,828	220	3.09	3.09	1.10	1.09
Noise from airplanes, trains or industry	11,854	194	3.46	3.46	1.18	1.18
Homes and gardens in bad condition	11,696	352	3.34	3.34	0.84	0.84
Rubbish and litter lying around	11,835	213	3.52	3.52	0.90	0.90
Teenagers hanging around on the streets	11,776	272	3.37	3.37	1.09	1.08
People being hostile and aggressive	11,627	421	3.84	3.84	0.93	0.92
Vandalism and deliberate damage	11,641	407	3.62	3.62	0.97	0.96
Burglary and theft	10,954	1,094	3.55	3.54	0.90	0.88
People in this neighbourhood can be trusted	11,910	138	4.72	4.72	1.39	1.39

Source: HILDA Wave 10 Release 10.
Sample: The sample of responding people who completed the self-completion questionnaire is 12,048. This is the sample size for each indicator after imputation of missing values.

D.5 Standardisation

Choosing a standardisation method is a necessary step in the aggregation of the HILDA indicators given the different response levels in the Likert scales. Standardisation transforms variables in different measurement units into a common basis to allow their relative positions to be compared and to enable aggregation (Decancq and Lugo, 2013). Salzman (2003) points out that without standardisation, composite indices are biased towards items with high value ranges. Unscaled aggregation implicitly assigns higher weights to those variables and lower weights to variables with low value ranges.

There are a range of standardisation techniques discussed in Nardo et al. (2005) and Salzman (2003). The 'linear scaling technique' used in the construction of the HDI (Salzman, 2003: 13) and the PWI (International Wellbeing Group, 2013) converts the variable into a standard 0-100 format using the maximum and minimum value in the range. A common technique for tracking trends over time is 'normalisation to base year" which transforms the relative value of variables to the first year (Salzman, 2003: 12). Conversions using thresholds often involve the researcher assigning values of 1 or 0 to variables above and below a threshold, or assigning variables around the mean to a value of 0 (the neutral region), above the neutral region to 1 or below the neutral region to -1 (Nardo et al., 2005).

Each HILDA indicator in the MIW framework is standardised using the z-score transformation to fit a distribution with a fixed mean of 0 and a standard deviation of 1. The mean value across the weighted sample is subtracted from the raw value and divided by the standard deviation (Salzman, 2003). A z-score transformation retains the distribution of the original set of indicator values. As the standardised variables do not share a common range, interpretation is based on how many standard deviations the z-score is above, below or near the mean of the weighted sample. To overcome the difficulty of interpreting z-scores that are negative (given a mean of 0), z-scores are often transformed to different scales (Mertler, 2007), as is the case with the MIW metrics (assigned a mean of 100 and a standard deviation of 10 for the adult population).

D.6 Factor score coefficients to create well-being dimension scores

Table D.6 Factor scoring coefficients for well-being dimension scores

Well-being indicators	Economic stability (9 indicators)	Physical health (18 indicators)	Mental health (17 indicators)	Personal relationships (12 indicators)	Community participation (12 indicators)	Neighbourhood environment (9 indicators)
Could not pay electricity, gas or telephone bills on time*	0.240					
Could not pay the mortgage or rent on time*	0.126					
Pawned or sold something*	0.125					
Went without meals*	0.182					
Was unable to heat home*	0.111					
Asked for financial help from friends or family*	0.144					
Asked for help from welfare/community organisations*	0.139					
Difficulty raising $3000 in an emergency	0.067					
Prosperity given current needs & financial responsibilities	0.066					
Vigorous activities		0.064				
Moderate activities		0.088				
Lifting or carrying groceries		0.062				
Climbing several flights of stairs		0.071				
Climbing one flight of stairs		0.071				
Bending kneeling or stooping		0.045				
Walking more than one kilometre		0.061				
Walking half a kilometre		0.104				
Walking 100 metres		0.108				
Bathing or dressing yourself		0.023				
Cut down the amount of time spent on work or other activities		0.030				
Accomplished less than would like		0.064				

Table D.6 Regression scoring coefficients (cont'd)

Well-being indicators	**Economic stability** *(9 indicators)*	**Physical health** *(18 indicators)*	**Mental health** *(17 indicators)*	**Personal relationships** *(12 indicators)*	**Community participation** *(12 indicators)*	**Neighbourhood environment** *(9 indicators)*
Were limited in the kind of work		0.120				
Had difficulty performing work or other activities		0.096				
Bodily pain in last 4 weeks		0.047				
How much did pain interfere with normal work		0.067				
Self-assessed health		0.024				
Expect my health to get worse		0.019				
Get sick a little easier than other people			0.039			
As healthy as anybody I know			0.068			
My health is excellent			0.076			
Feel full of life			0.081			
Have a lot of energy			0.078			
Felt worn out			0.069			
Felt tired			0.074			
Extent physical/emotional health interfered with normal social activities			0.081			
Time physical/emotional problems interfered with social activities			0.091			
Cut down the amount of time spent on work/other activities			0.103			
Accomplished less than would like			0.125			
Didn't do work/other activities as carefully as usual			0.077			
Been a nervous person			0.036			
Felt so down in the dumps nothing could cheer you up			0.086			
Felt calm and peaceful			0.062			
Felt down			0.080			
Been a happy person			0.074			

Table D.6 Regression scoring coefficients (cont'd)

Well-being indicators	Economic stability *(9 indicators)*	Physical health *(18 indicators)*	Mental health *(17 indicators)*	Personal relationships *(12 indicators)*	Community participation *(12 indicators)*	Neighbourhood environment *(9 indicators)*
People don't visit me as often I would like				0.055		
Often need help from other people but can't get it				0.092		
Lots of friends				0.081		
No one to confide in				0.168		
No one to lean on in times of trouble				0.192		
Someone who can always cheer me up when I'm down				0.096		
Often feel very lonely				0.086		
Enjoy the time I spend with people who are important to me				0.102		
When something's on my mind, talking with people can make me feel better				0.113		
Usually find someone to help me out when I need				0.195		
Have telephone, email or mail contact with friends or relatives not living with you				0.061		
Make time to keep in touch with friends				0.109		
Chat with your neighbours					0.110	
Attend events that bring people together such as fetes, shows, festivals or other community events					0.100	
Get involved in activities for a union, political party, or group that is for or against something					0.103	
Make time to attend services at a place of worship					0.046	
Encourage others to get involved with a group that's trying to make a difference in the community					0.219	
Talk about current affairs with friends, family or neighbours					0.053	
Volunteer your spare time to work on boards or organising committees of clubs, community groups or other non-profit organisations					0.112	

Table D.6 Regression scoring coefficients (cont'd)

Well-being indicators	Economic stability *(9 indicators)*	Physical health *(18 indicators)*	Mental health *(17 indicators)*	Personal relationships *(12 indicators)*	Community participation *(12 indicators)*	Neighbourhood environment *(9 indicators)*
Get in touch with a local politician or councillor about issues that concern me					0.099	
Neighbours helping each other out					0.198	
Neighbours doing things together					0.132	
This is a close-knit neighbourhood					0.137	
People around here are willing to help their neighbours					0.184	
Traffic noise						0.091
Noise from airplanes, trains or industry						0.067
Homes and gardens in bad condition						0.116
Rubbish and litter lying around						0.193
Teenagers hanging around on the streets						0.129
People being hostile and aggressive						0.209
Vandalism and deliberate damage to property						0.274
Burglary and theft						0.114
People in this neighbourhood can be trusted						0.056

Source: HILDA Wave 10 Release 10.

Weights: Cross-sectional responding person population weights for 2010. Weighted sample: 11,993. Missing values are imputed.

Note: Italicised items are reverse coded so that a higher numerical value represents a better outcome.

Note: Financial stress items marked with an asterisk are imputed from Waves 11 and 9.

Note: Estimated from applying a one-factor model between each dimension and the associated set of indicators using a principal axis factoring extraction method. Scoring coefficients represent the weights used to calculate the dimension factor scores.

Appendix E Multi-dimensional individual well-being analytical components

Table E.1 Summary statistics of well-being indicators

Potential well-being indicators	Operational form	Mean	Median	Std dev	% Positive response: *Positive range^*	% Positive response: Older people (65+)	% Positive response: Non-older adults (15-64)	% Negative response: *Negative range^*	% Negative response: Older people (65+)	% Negative response: Non-older adults (15-64)
Economic stability *(9 indicators)*										
Could not pay electricity, gas or telephone bills on time*	1 Yes .. 2 No	1.9	2	0.3	*2*	94.2	87.6	*1*	5.8	12.4
Could not pay the mortgage or rent on time*	1 Yes .. 2 No	1.9	2	0.2	*2*	96.9	93.9	*1*	3.1	6.1
Pawned or sold something*	1 Yes .. 2 No	2.0	2	0.2	*2*	98.9	95.3	*1*	1.1	4.7
Went without meals*	1 Yes .. 2 No	2.0	2	0.2	*2*	98.8	97.0	*1*	1.2	3.0
Was unable to heat home*	1 Yes .. 2 No	2.0	2	0.2	*2*	96.9	96.5	*1*	3.1	3.5
Asked for financial help from friends or family*	1 Yes .. 2 No	1.9	2	0.3	*2*	97.3	87.6	*1*	2.7	12.4
Asked for help from welfare/community organisations*	1 Yes .. 2 No	2.0	2	0.2	*2*	98.3	96.2	*1*	1.7	3.8
Difficulty raising $3000 in an emergency	1 Couldn't raise funds .. 4 Could easily raise	3.2	4	1.1	*3-4*	89.5	76.3	*1-2*	10.5	23.7
Prosperity given current needs & financial responsibilities	1 Very poor .. 6 Prosperous	3.8	4	0.8	*5-6*	13.4	17.4	*1-2*	2.3	3.3
Physical health *(18 indicators)*										
Vigorous activities	1 Limited a lot .. 3 Not limited at all	2.2	2	0.8	*3*	7.9	47.2	*1*	59.6	16.0
Moderate activities	1 Limited a lot .. 3 Not limited at all	2.7	3	0.6	*3*	39.5	79.1	*1-2*	19.7	4.6
Lifting or carrying groceries	1 Limited a lot .. 3 Not limited at all	2.7	3	0.6	*3*	50.1	82.7	*1-2*	13.9	3.8
Climbing several flights of stairs	1 Limited a lot .. 3 Not limited at all	2.6	3	0.7	*3*	29.4	74.0	*1-2*	30.0	6.1
Climbing one flight of stairs	1 Limited a lot .. 3 Not limited at all	2.8	3	0.5	*3*	54.1	87.3	*1-2*	12.7	3.1
Bending kneeling or stooping	1 Limited a lot .. 3 Not limited at all	2.6	3	0.6	*3*	27.9	72.9	*1-2*	22.4	5.9
Walking more than one kilometre	1 Limited a lot .. 3 Not limited at all	2.7	3	0.6	*3*	41.6	80.9	*1-2*	29.4	5.6
Walking half a kilometre	1 Limited a lot .. 3 Not limited at all	2.8	3	0.6	*3*	57.3	87.2	*1-2*	18.4	4.0
Walking 100 metres	1 Limited a lot .. 3 Not limited at all	2.8	3	0.5	*3*	72.6	91.1	*1-2*	8.7	3.5
Bathing or dressing yourself	1 Limited a lot .. 3 Not limited at all	2.9	3	0.4	*3*	80.2	91.9	*1-2*	4.0	3.7
Cut down the amount of time spent on work or other activities	1 Yes .. 2 No	1.8	2	0.4	*2*	63.2	86.7	*1*	36.8	13.3
Accomplished less than would like	1 Yes .. 2 No	1.8	2	0.4	*2*	50.0	80.7	*1*	50.0	19.3

Table E.1 Summary statistics of well-being indicators (cont'd)

Potential well-being indicators	Operational form	Mean	Median	Std dev	*Positive range^*	% Positive response: Older people (65+)	% Positive response: Non-older adults (15-64)	*Negative range^*	% Negative response: Older people (65+)	% Negative response: Non-older adults (15-64)
Were limited in the kind of work	1 Yes .. 2 No	1.8	2	0.4	*2*	50.5	84.7	*1*	49.5	15.3
Had difficulty performing work or other activities	1 Yes .. 2 No	1.8	2	0.4	*2*	48.7	82.7	*1*	51.3	17.3
Bodily pain in last 4 weeks	1 Very Severe .. 6 No bodily pain	4.6	5	1.3	*5-6*	38.7	64.0	*1-2*	13.5	5.4
How much did pain interfere with normal work	1 Extremely .. 5 Not at all	4.2	5	1.0	*4-5*	59.8	84.0	*1-2*	18.8	6.5
Self-assessed health	1 Poor .. 5 Excellent	3.4	3	1.0	*4-5*	25.8	50.3	*1-2*	34.4	14.9
Expect my health to get worse	1 Definitely true .. 5 Definitely false	3.5	3	1.1	*4-5*	28.6	53.1	*1-2*	31.2	15.0
Mental health *(17 indicators)*										
Get sick a little easier than other people	1 Definitely true .. 5 Definitely false	4.1	4	1.0	*4-5*	76.0	77.3	*1-2*	8.1	9.7
As healthy as anybody I know	1 Definitely false .. 5 Definitely true	3.7	4	1.1	*4-5*	60.5	69.0	*1-2*	20.4	13.6
My health is excellent	1 Definitely false .. 5 Definitely true	3.5	4	1.2	*4-5*	55.7	68.8	*1-2*	35.6	20.4
Feel full of life	1 None of the time .. 6 All of the time	4.0	4	1.2	*5-6*	31.6	45.7	*1-2*	21.1	10.9
Have a lot of energy	1 None of the time .. 6 All of the time	3.8	4	1.2	*5-6*	24.1	35.8	*1-2*	27.9	14.9
Felt worn out	1 All of the time .. 6 None of the time	4.3	4	1.1	*5-6*	54.3	47.7	*1-2*	6.0	8.3
Felt tired	1 All of the time .. 6 None of the time	3.9	4	1.2	*5-6*	36.1	33.9	*1-2*	11.6	13.95
Extent physical/emotional health interfered with normal social activities	1 Extremely .. 5 Not at all	4.3	5	1.0	*4-5*	69.2	83.0	*1-2*	15.5	6.9
Time physical/emotional problems interfered with social activities	1 All of the time .. 6 None of the time	4.2	5	1.0	*5-6*	68.8	79.1	*1-2*	11.1	6.1
Cut down the amount of time spent on work/other activities	1 Yes .. 2 No	1.9	2	0.4	*2*	77.0	87.2	*1*	23.0	12.8
Accomplished less than would like	1 Yes .. 2 No	1.8	2	0.4	*2*	68.4	80.8	*1*	31.6	19.2
Didn't do work/other activities as carefully as usual	1 Yes .. 2 No	1.8	2	0.4	*2*	77.0	86.5	*1*	23.0	13.5
Been a nervous person	1 All of the time .. 6 None of the time	4.9	5	1.1	*5-6*	76.4	71.2	*1-2*	3.9	3.5
Felt so down in the dumps nothing could cheer you up	1 All of the time .. 6 None of the time	5.4	6	1.0	*5-6*	84.0	83.4	*1-2*	1.7	2.4
Felt calm and peaceful	1 None of the time .. 6 All of the time	4.0	4	1.2	*5-6*	49.0	41.4	*1-2*	13.7	13.3
Felt down	1 All of the time .. 6 None of the time	4.9	5	1.0	*5-6*	70.5	71.3	*1-2*	3.4	3.7
Been a happy person	1 None of the time .. 6 All of the time	4.4	5	1.1	*5-6*	61.8	57.5	*1-2*	6.6	7.0

Table E.1 Summary statistics of well-being indicators (cont'd)

Potential well-being indicators	Operational form	Mean	Median	Std dev	% Positive response: *Positive range^*	% Positive response: Older people (65+)	% Positive response: Non-older adults (15-64)	% Negative response: *Negative range^*	% Negative response: Older people (65+)	% Negative response: Non-older adults (15-64)
Personal relationships *(12 indicators)*										
People don't visit me as often I would like	1 Strongly agree .. 7 Strongly disagree	4.5	4	1.7	*6-7*	34.2	33.2	*1-2*	15.2	13.6
Often need help from other people but can't get it	1 Strongly agree .. 7 Strongly disagree	5.6	6	1.5	*6-7*	65.2	65.1	*1-2*	7.7	5.2
Lots of friends	1 Strongly disagree .. 7 Strongly agree	4.6	5	1.6	*6-7*	35.0	31.7	*1-2*	10.9	11.2
No one to confide in	1 Strongly agree .. 7 Strongly disagree	5.6	6	1.7	*6-7*	65.3	65.5	*1-2*	*12.2*	*6.9*
No one to lean on in times of trouble	1 Strongly agree .. 7 Strongly disagree	5.7	6	1.6	*6-7*	68.5	70.2	*1-2*	*9.6*	*5.5*
Someone who can always cheer me up when I'm down	1 Strongly disagree .. 7 Strongly agree	5.3	6	1.6	*6-7*	55.4	58.4	*1-2*	*13.7*	*7.3*
Often feel very lonely	1 Strongly agree .. 7 Strongly disagree	5.3	6	1.7	*6-7*	59.7	57.6	*1-2*	*11.7*	*8.6*
Enjoy the time I spend with people who are	1 Strongly disagree .. 7 Strongly agree	6.2	7	1.1	*6-7*	86.0	84.4	*1-2*	3.1	2.0
When something's on my mind, talking with people can make me feel better	1 Strongly disagree .. 7 Strongly agree	5.6	6	1.4	*6-7*	68.4	63.6	*1-2*	5.0	3.9
Usually find someone to help me out when I need	1 Strongly disagree .. 7 Strongly agree	5.6	6	1.4	*6-7*	70.1	62.7	*1-2*	5.5	4.0
Have telephone, email or mail contact with friends or relatives not living with you	1 Never .. 6 Very Often	4.8	5	1.2	*5-6*	67.3	68.3	*1-2*	5.2	5.2
Make time to keep in touch with friends	1 Never .. 6 Very Often	4.4	5	1.1	*5-6*	53.7	53.9	*1-2*	6.7	6.9
Community and social participation *(12 indicators)*										
Chat with your neighbours	1 Never .. 6 Very Often	3.4	4	1.4	*5-6*	38.6	22.6	*1-2*	13.2	31.3
Attend events that bring people together such as fetes, shows, festivals or other community events	1 Never .. 6 Very Often	3.3	3	1.3	*5-6*	21.0	16.7	*1-2*	31.2	31.8
Get involved in activities for a union, political party, or group that is for or against something	1 Never .. 6 Very Often	1.7	1	1.0	*5-6*	4.2	2.9	*1-2*	87.6	86.2
Make time to attend services at a place of worship	1 Never .. 6 Very Often	2.2	1	1.6	*5-6*	23.3	11.2	*1-2*	61.4	76.0
Encourage others to get involved with a group that's trying to make a difference in the community	1 Never .. 6 Very Often	2.1	2	1.3	*5-6*	9.3	6.1	*1-2*	62.8	72.3

Table E.1 Summary statistics of well-being indicators (cont'd)

Potential well-being indicators	Operational form	Mean	Median	Std dev	% Positive response: *Positive range^*	% Positive response: Older people (65+)	% Positive response: Non-older adults (15-64)	% Negative response: *Negative range^*	% Negative response: Older people (65+)	% Negative response: Non-older adults (15-64)
Talk about current affairs with friends, family or neighbours	1 Never .. 6 Very Often	3.7	4	1.4	*5-6*	36.1	32.4	*1-2*	17.8	21.7
Volunteer your spare time to work on boards or organising committees of clubs, community groups or other non-profit organisations	1 Never .. 6 Very Often	2.2	2	1.5	*5-6*	19.3	10.6	*1-2*	64.2	73.0
Get in touch with a local politician or councillor about issues that concern me	1 Never .. 6 Very Often	1.5	1	0.8	*5-6*	2.2	1.0	*1-2*	83.8	91.8
Neighbours helping each other out	1 Never happens .. 5 Very common	3.5	4	1.0	*4-5*	68.4	55.9	*1-2*	13.1	16.2
Neighbours doing things together	1 Never happens .. 5 Very common	3.0	3	1.0	*4-5*	33.6	30.6	*1-2*	29.3	27.2
This is a close-knit neighbourhood	1 Strongly disagree .. 7 Strongly agree	3.9	4	1.5	*6-7*	21.7	13.1	*1-2*	12.7	18.6
People around here are willing to help their neighbours	1 Strongly disagree .. 7 Strongly agree	4.4	5	1.4	*6-7*	35.8	22.4	*1-2*	8.8	11.2
Neighbourhood environment *(9 indicators)*										
Traffic noise	1 Very common .. 5 Never happens	3.1	3	1.1	*4-5*	43.7	36.7	*1-2*	27.0	29.5
Noise from airplanes, trains or industry	1 Very common .. 5 Never happens	3.4	4	1.2	*4-5*	58.7	51.2	*1-2*	19.1	22.2
Homes and gardens in bad condition	1 Very common .. 5 Never happens	3.3	3	0.8	*4-5*	47.2	40.1	*1-2*	9.7	12.4
Rubbish and litter lying around	1 Very common .. 5 Never happens	3.5	4	0.9	*4-5*	63.7	51.5	*1-2*	8.3	12.2
Teenagers hanging around on the streets	1 Very common .. 5 Never happens	3.4	3	1.1	*4-5*	62.9	44.9	*1-2*	10.5	22.5
People being hostile and aggressive	1 Very common .. 5 Never happens	3.8	4	0.9	*4-5*	77.9	64.3	*1-2*	3.8	7.4
Vandalism and deliberate damage to property	1 Very common .. 5 Never happens	3.6	4	1.0	*4-5*	66.8	56.2	*1-2*	9.0	12.2
Burglary and theft	1 Very common .. 5 Never happens	3.5	4	0.9	*4-5*	59.1	52.4	*1-2*	7.8	10.4
People in this neighbourhood can be trusted	1 Strongly disagree .. 7 Strongly agree	4.7	5	1.4	*6-7*	46.6	27.9	*1-2*	5.6	7.6

Source: HILDA Wave 10 Release 10.
Weights: Cross-sectional responding person population weights for 2010. Weighted sample: 11,993. Missing values are imputed.
Note: Italicised items are reverse coded so that a higher numerical value represents a better outcome.
Note: Financial stress items marked with an asterisk are imputed from Waves 11 and 9.
Note: Likert numbers are categorised as positive or negative responses.

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