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17/01: THE IMPACT OF DIFFERENTIATED ACCESS TO INCOME AND WEALTH ON HEALTH AND WELLBEING OUTCOMES:A LONGITUDINAL AUSTRALIAN STUDY.

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The impact of differentiated access to income and wealth on health and wellbeing outcomes: a longitudinal Australian study[1]

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1 Introduction

It is very likely that differential access to income and accumulated wealth are both mechanisms that promote growing inequalities between individuals and families in Australia. If this proposition is true, it is important to know the extent to which this differential access impact on the health and well-being of the Australian population. While closely related, it is clear that income and wealth are by no means perfectly correlated. It is plausible that inequalities in wealth are increasing at an even greater rate than inequalities in income and that inequalities in wealth pose the greatest risk to social division and future economic development.

Economic strain which is associated with economic insecurity, is a significant life stress that is a cause of many poor health outcomes. Furthermore, it is disturbing that despite the economic progress Australia has enjoyed in recent decades, many indicators of health and wellbeing outcomes are exhibiting adverse trends e.g. higher rates of overweight and obesity, type 2 diabetes, depression, and substance abuse. McEwen and Gianaros (2010) review extensive literature that shows that economic strain can lead to poor health and wellbeing across the life course. It is thus critical to uncover whether, and the extent to which, access to income and wealth in fact alleviate economic related stress and promote health and wellbeing.

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The paper aims to examine the relationship between income, wealth and health outcomes. The paper aims to address the following key research questions:

What levels of income and wealth are typically held by Australians, and how do these differ across socioeconomic, demographic and geographical groups?

To what extent do income and wealth levels influence health and wellbeing outcomes of Australians?

The analysis drew from the 2001-2013 Household, Income and Labour Dynamics in Australia (HILDA) Survey. The HILDA Survey is Australia's nationally representative panel dataset. It is particularly suited for addressing the key research questions in this paper as it comprises a comprehensive range of detailed socioeconomic, demographic, wealth, and health and wellbeing variables.

Section Two of this paper comprises a review of relevant background literature to place the study in appropriate context, as well as a brief outline of the conceptual framework that guides the study, the theory of allostatic load and the concept of economic security. In Section Three, we outline the HILDA dataset and describe the study methodology. In Section Four, the results are presented under the following headings: income and wealth in Australia; and links between income and wealth and health and wellbeing. A discussion is presented in Section Five, with the following headings: summary of main findings, relationship between income, wealth, and health, income, wealth and economic security, strengths and limitations, and conclusions.

2 Literature review

2.1 Social gradient in health

According to a recent paper on poverty and inequality in Australia (Australian Council of Social Service 2015) there is a substantial gap in income and wealth between different groups in society. For example, a person in the top 20% income group receives around five times as much income as a person in the bottom 20% and a person in the top 20% wealth group has a staggering 70 times as much wealth as a person in the bottom 20%. Furthermore, the paper finds that these gaps are widening. Over the last 20 years the share of income going to those at the top has risen, while the share flowing to those in the middle and at the bottom has declined. The same is true for wealth, with the bottom and middle having lost ground to those at the top. The wealth of the top 20% wealth group increased by 28% over the period from 2004 to 2012, while by comparison the wealth of the bottom increased by just 3%. Australia is not alone. There is ample evidence that inequalities in income and wealth are increasing in both developed and developing countries throughout the world (Commission on Social Determinants of Health 2008).

It is evident in a great deal of population health and economic research that socio-economic status (SES) and social class are negatively associated with health outcomes (Commission on Social Determinants of Health 2008). The relationship between SES and health resembles a gradient in which incrementally higher SES is associated with incrementally decreased risk of experiencing morbidity and death. The relationship holds true for many chronic diseases, such as heart disease and type 2 diabetes. It also hold true for many mental health disorders and some forms of cancer. The relationship is not confined to adults. Evidence shows that children's health and developmental outcomes, such as mental health problems, literacy and numeracy, and success at school, follow the same pattern. The social gradient in health and development holds in both developed and developing countries across the world (Commission on Social Determinants of Health 2008). Those with higher SES have better health and well-being and live longer. Cross-national comparisons have shown that in countries with flatter SES gradients, the health and well-being of the population as a whole is better than it is countries with similar economic characteristics and steeper gradients (Commission on Social Determinants of Health 2008).

SES is a composite measure comprised of income, education and occupation. While SES is useful as a general indicator of relative social and economic advantage and disadvantage, it is not so useful when it comes to explaining how SES and health are related because income, education, and occupation are associated with health through different mechanisms (Lynch and Kaplan 2000). Furthermore, it is not helpful for policy development because government measures that influence income are different from those that influence education and employment. The remainder of this review will focus on key issues for research in income and wealth, wealth and health, and economic security and health.

2.2 Income and wealth

There are important differences between income and wealth that may impact health outcomes differently. Income is derived from a variety of sources, including employment, business, investments, and government pensions and allowances (Lynch and Kaplan 2000, Australian Council of Social Service 2015). Household wealth (net assets), on the other hand, represents the total value of assets (such as owner-occupied housing, superannuation and financial equities) less debts (such as mortgages and credit card debt) which is sometimes referred to as net wealth. Wealth determines access to many opportunities. Wealth can enhance income by providing access to further education and higher paying jobs or through acquiring assets

which generate income, such as shares or investment properties. Wealth also provides financial security, enabling those with higher wealth to maintain living standards during periods when other income is low. Furthermore, through the transfer of wealth between generations access to material goods and economic security is afforded to family members.

While a substantial amount of research that has focused on social gradients in health in recent decades only a small proportion of studies have investigated the association between wealth and health. Almost invariably, income has been used as the sole measure of individual and household economic resources. It has been suggested that this situation has arisen for the most part because of the lack of reliable wealth data. Wealth is generally more difficult to measure than income (Baum 2005). In our experience the problem is that datasets rich in wealth data infrequently contain measures of health, and conversely health datasets usually contain measures of income, alone. Previous studies of wealth and health are summarised and evaluated in the following section to give readers an overall impression of the research, the findings, and the methodological limitations of this research. A systematic review of literature that was published in 2007 makes this task easier (Pollack, Chideya et al. 2007), however, for the most part, the present review is integrative rather than systematic.

2.3 Wealth and health

Pollack et al. reviewed studies published between 1990 and 2006 (Pollack, Chideya et al. 2007). Twenty-nine studies met the inclusion criteria which included that they be based in the United States (US). Twenty-four articles reported results from 12 national samples, the largest of which had over 8000 participants (Health and Retirement Survey, Survey of Income and Program Participation, National Survey of Families and Households). Some surveys employed a single question to estimate net worth, whereas others summed responses from more detailed questions concerning multiple specific sources of assets and debts. Home ownership was often the single largest component of an individual's wealth. Five studies measured the relationship between wealth and mortality, 14 between wealth and self-rated health, six between wealth and chronic conditions, eight between wealth and functional status, and six between wealth and mental health. Most studies adjusted for income. Fifteen out of 29 studies found a significant and direct relationship between wealth and health, another 10 found mixed results, and four showed no association. Two of the studies that found mixed results and two showed no association had sample sizes less than 2000 and were deemed to lack statistical power. Other sources of variability in results identified by the authors were: variability in buying power in different regions of the US; what covariates were used in the analyses, such as income, age, gender, race, and marital status; and the varying ways wealth was measured and coded.

Not included in Pollack et al's systematic review (Pollack, Chideya et al. 2007) is an additional study that analysed more recent data from the Panel Study of Income Dynamics in the US. One publication focused on mortality and self-rated general health status (Hajat, Kaufman et al. 2011), and another on three cardiovascular disease risk factors (Hajat, Kaufman et al. 2010). Hajat et al. used data from five waves of the PSID to give a total sample size of 15,745. Wealth was defined as total net worth, which included the value of one's primary home, farm, or business assets, checking or savings accounts, vehicles, second homes, stocks, and bonds minus any debt. Wealth was adjusted for inflation and specified as a 6-category variable, where category 1 included those that had 0 wealth, and categories 2–6 were quintiles of positive wealth. In one study, self-rated health was measured by using the standard question, ''Would you say your health in general is excellent, very good, good, fair, or poor?''. The response was dichotomized as excellent, very good, or good versus fair or poor. Deaths were verified by using the National Death Index (Hajat, Kaufman et al. 2011).

In the other study obesity, smoking and hypertension were self-reported (Hajat, Kaufman et al. 2010). Income, marital status, region of residence, education, age, race, sex, and time were included as covariates.

Hajat et al. (2011) found that compared to those in the wealthiest quintile, those in the less wealth quintiles were at 16% to 44% increased risk of papering poor/fair health and there was a 62% increased risk and 4 excess deaths (per 1,000 persons) among the least wealthy. As to the cardiovascular risk factors, they found a strong inverse association between wealth and obesity incidence, a moderate inverse association between wealth and smoking initiation and a weak inverse association between wealth and hypertension incidence after controlling for income and other time varying confounders (Hajat, Kaufman et al. 2010). The authors conceded that given measurement error, the subjective nature of self-rated health, and the lack of self-rated health data prior to 1984, they were unable to create a truly ‘‘disease-free’’ cohort, and they could not rule out the possibility of reverse causation. Another limitation in the mortality analysis was the relatively high level of attrition in the PSID (Hajat, Kaufman et al. 2011). With regard to the cardiovascular disease risk study, the use of self-paper data for obesity, smoking, and hypertension were major limitations due to the strong likelihood of selection bias (Hajat, Kaufman et al. 2010).

In order to place this research in the context of similar high income countries, selected studies conducted in the United Kingdom (UK) (Martikainen, Adda et al. 2003), New Zealand (Carter, Blakely et al. 2009), Finland (Aittomaki, Martikainen et al. 2010), and Australia (Cai 2009) are reviewed. Starting with the UK, Martikainen at al. (Martikainen, Adda et al. 2003) used data from the Whitehall II study of London based civil servants. It is notable that the Whitehall studies first bought contemporary stress theory to prominence when a clear social gradient was found between employment status and heart disease after adjustment for life-style behaviours, such as diet and exercise. Brunner and Marmot proposed that the stress associated with inferior social position led to altered physiology; HPA axis functioning in particular (Brunner and Marmot 1999). The Martikainen et al. (2003) study focused on the relationship between wealth and health for 7162 men and women aged between 35 and 55 who participated in the Whitehall II study and were re-interviewed between 1997–1999. Two health outcome measures were used: self-rated health with five responses ranging from excellent to poor and participants papering the three poorest levels of health categorised as having “poor” self rated health; and the General Health Questionnaire measure of depressive symptoms that uses four items with those scoring three or more labelled as depression cases. Economic measures were: annual personal income (“amount received annually from salary or wages, pensions, benefits and allowances before deduction of tax”), annual household income (“total annual household income from any source, including personal income”), and household wealth (“amount of money the respondent would have if s/he cashed in all household assets and paid off all debts”). In addition, health was assessed at baseline using survey data on a single question on longstanding illness. A strong independent association was found between household wealth and the two measures of morbidity. Martikainen et al. (2003) acknowledged the limitations of the study, principally, the quality of the data and the fact that is was not possible to determine the dynamics of income history and onset of illness beyond doubt. The authors concluded that the relationship between wealth, which is a measure of income earned over decades and across generations, and morbidity is likely to be related to a set of early and current material and psychosocial benefits.

In New Zealand, Carter et al. (2009) used data for 15,340 participants from first three waves of the Survey of Families, Income and Employment that was conducted in New Zealand between 2002 and 2005. The Kessler-10 which asks about negative emotional states experienced in the four weeks prior to interview was used as a measure of psychological

distress. Scores were grouped into four levels: low, moderate, high, and very high. Wealth (net worth) was calculated by subtracting the total value of all liabilities from the total value of all assets for individuals and couples. The association of quintiles of wealth with psychological distress was investigated using logistic regression, controlling for confounders, socioeconomic variables including household income, and prior health status. It was found that the odds of papering high psychological distress were greater in the lowest wealth quintile compared with the highest (OR 3.06, 95% CI 2.68 to 3.50). Adjusting for age and sex did not alter the relationship; however, adjusting for income and area deprivation attenuated the odds ratio to 1.73 (95% CI 1.48 to 2.04). Further controlling for baseline health status reduced the OR to 1.45 (95% CI 1.23 to 1.71). Carter et al. (2009) drew attention to the difficulties inherent in capturing data in the wealthiest section of the population which may lead to underestimation of the upper end of the net worth distribution compared with other parts of the distribution. Another perceived limitation was likelihood of underestimating the prevalence of psychological distress in the population due the use of the Kessler-10 which ask about psychological distress in the past four weeks.

A Finnish population-based study conducted by Aittomäki et al. (2010) assessed the differential impact of income and wealth on health. The data used were derived from a cohort of 1,268 men and 5,241 women aged from 45 to 67 years who had been employed by the city of the Helsinki. Respondents assessed the monthly disposable income of their household after taxes and income transfers and the total value of household wealth including housing and other real estate minus their debts, mortgages and other loans. Health was measured by a five point self-paper scale ranging from excellent to poor. Twenty-eight per cent of the participants were categorised as having less-than-good self-rated health. Low household wealth was found to be strongly associated with poor self-rated health. The association was curvilinear, the effect levelling off at the higher end of the scale, and remained strong even when the contributions of disposable income and employment status were accounted for. In contrast, the association between household disposable income and self-rated health was greatly affected when the contribution of wealth and employment status were accounted for. Taking into account work conditions did not notably change the dependence on wealth, and health-related behaviour made only a small contribution to the association between household wealth and self-rated health. The authors concluded that the stronger and more robust effect of wealth than of income suggests that the long-term accumulation of economic resources is highly relevant to inequalities in health.

The final study reviewed in this section was conducted by an Australian economist, Cai (2009) who used data for 4,060 men and women who were 50 years or over when they participated in waves 2 to 4 of the HILDA survey. While Cai (2009) explains his treatment of both wealth and health variables in his analysis in considerable detail, he does not explain how his measure of wealth was created other than to say that wealth refers to household net worth (i.e. household total assets minus total debt). Health status was measured by the self-rated health question in the Short Form 36 (SF-36) health questionnaire: “In general, would you say that your health is excellent, very good, good, fair or poor?”. Responses were dichotomised such that the top three health levels represented good health and the bottom two levels represented poor health. Health status was also measured by the self-paper of health conditions, impairment, or disability that restricted everyday activity and had lasted or was likely to last for six months or more. This information was dichotomised as “yes” or “no”. Analysis included the transition from good health to poor health that is possible to ascertain using the panel dataset. Health transitions were the focus of regression modelling. Control variables included age, education, health risk behaviour, becoming non-married, living in an urban area, number of children, and number of adults in a household. Very briefly, results

showed that, for both health indicators, wealthy people were less likely to experience a transition from good to poor health. It was concluded that wealth might have a causal effect on health.

In summary, the great majority of studies presented here do find a positive association between wealth and health, such that higher levels of wealth are associated with better health outcomes. There is, however, very little attention given to explanatory mechanisms, due, perhaps, to the word length limitations imposed by academic journals. While it seems clear that wealth is associated with health, there is a major methodological issue with the dubious validity of many of the health measures used. Furthermore, the temporal nature of many datasets, makes it impossible to rule-out reverse causation as an explanation. This is the view expressed by a team of European economists following a very recent and extensive review of income/wealth and health literature (O'Donnell, Van Doorslaer et al. 2015). O'Donnell et al. (2015) concluded that there is sufficient evidence to prove that in high income countries poor health is a cause of low income, but there is no conclusive proof that low income causes poor health outcomes.

O'Donnell et al.'s (2015) review serves to illustrate what is, perhaps, the greatest problem in income/wealth and health research generally, that the right theory is crucial to explaining the relationships that are found. O'Donnell et al. (2015) make this point, themselves, claiming that the association between income/wealth and health is now well established and that future research should focus on elucidating the pathways that might explain why low income/wealth causes poor health. In the following section we review literature regarding the theory of allostasis/allostatic load and the concept of economic security that we believe are key to explanation and prediction.

2.4 Economic security and allostatic load

The theory of alostasis/allostatic load has been popularised by McEwen (McEwen 1998, McEwen and Gianaros 2010, McEwen, Eiland et al. 2012) in a cascade of recent publications in high-impact international journals. McEwen and his colleagues have integrated evidence-based knowledge in psychology, neuroscience, endocrinology and immunology and explained a pathway whereby economic insecurity and economic strain might influence complex physiological processes that give rise to morbidity and mortality across the life course. Very briefy, through the hippocampus, amygdala, and prefrontal cortex, the brain processes inputs from the external environment and controls bodily adjustments that promote adaptive functioning. The autonomic nervous, endocrine, and immune systems promote adaptation to challenges and threats from both the internal and external environments. Functioning in a highly-integrated way, physiological mediators of these interlinked systems (catecholamines, cortisol and cytokines) maintain functional stability (allostasis) through simultaneous actions that mediate short-term adaptive responses to an acute challenge (McEwen and Stellar 1993). However, chronic exposure to both physical and psychosocial stressors, leading to prolonged activation of the systems, has detrimental physiological consequences referred to as allostatic load.

Overexposure to catecholamines, cortisol and cytokines has a negative effect on the brain as well as metabolic and immune function. The experience of excessive or chronic stress is associated with changes in the structure and function of areas of the brain leading to problems with the regulation of emotions as well as cognitive difficulties in information processing and memory (McEwen and Gianaros 2010). Overexposure to cortisol is associated with high blood pressure as well as problems with sugar and lipid metabolism (Brunner 1997). Excessive levels of catecholamines and cortisol suppress or dysregulate immune responses leading to a decrease in immunoprotective responses that eliminate viral responses and

promote wound health, and an increase in inflammation, autoimmunume disease, hypersensitivity, and susceptibility to cancer (Dhabhar 2013). Therefore, via neuroendocrineimmune systems, excessive or chronic stress is not only a direct cause of disease, it can change the course of diseases that stem from genetic and other causal pathways.

There is evidence that the experience of economic strain may on its own precipitate allostatic load and that when coupled with other major life events, such as job loss and relationship problems, allostatic load and the behavioural (high fat, high sugar diet; smoking; alcohol and substance use; lack of exercise) and physiological consequences are increasingly likely (McEwen and Gianaros 2010). The need for safety and security is common to all animal species and it has been proposed as a major factor in theories of human motivation. It is evident that the need for security comes second only to the physiological need for air, water, food, clothing and shelter (Taormina and Gao 2013). The fact that babies actively seek security in attachment relationships with significant others is a good indication that the need for security is innate, rather than learned (Ainsworth, Blehar et al. 1978). As with babies, older children and adults experience anxiety and stress when they feel insecure (Shonkoff, Boyce et al. 2009). It is not enough, however, for adults to feel safe and secure in the present moment, it is also important that they feel secure about their future and the future of their offspring, a concept called “future time perspective” (Kendall and Li 2005). The quest for security is embedded in all aspects of life including the economic system (Hacker, Huber et al. 2012, Fischer 2013). It is reflected in financial institutions, such as banking, insurance, and stock and commodities trading, that have developed in modern times. Economic security is defined as: the degree to which individuals are protected against hardship causing economic losses (Hacker, Huber et al. 2012). It is plausible that, in high income countries, income and wealth are both proxy measures for economic security and that the gradient seen in many health and developmental outcomes is best explained by the degree to which people perceive themselves to be economically secure.

There is some evidence to support this view. For example, a recent edition of The Journal of Consumer Research presents a series of research articles that focus on the causes of economic insecurity, such as the normalisation of the use of credit and of indebtedness, and the consequences of perceived financial deprivation (Fischer 2013). Rather than review these five articles here, for the sake of brevity we offer our own summary and interpretation of the results and their meaning in the Australian context. It is our understanding that in high income countries people who have considerable economic resources are able to acquire an abundance of material possessions; they are elevated in social position and their material possessions cause little or no economic insecurity or economic strain. When people who have fewer economic resources perceive themselves to have fewer material possessions than others, they typically borrow money from financial institutions in order to acquire the goods and services they need or desire. For those who do not over-commit and are able to pay the interest and principal owing on their loans over time, this arrangement can be satisfactory. These people are elevated in social position because they have material possessions, but they may experience a moderate amount of economic insecurity because they know that factors beyond their control, such as job loss and increases in interest rates, can easily jeopardise their position. For those who have meagre economic resources, who over-commit and are not able to make their loan repayments, borrowing money can have dire consequences. These people frequently experience economic insecurity and economic strain at a level that is associated with allostatic load and poor health outcomes. There is evidence that this scenario is common in high income countries, such as Australia. A recent study conducted in the US

(Yilmazer, Babiarz et al. 2015) provides a concrete example of how this mechanism might work.

Yilmazer et al. (2015) examined how the decline in housing wealth associated with the global economic crisis in 2008 affected the psychological and physical health and health-related behaviours of 4007 US households. They found that the decline in housing wealth was associated with a small but statistically significant increase in psychological distress and that homeowners who had difficulties with mortgage payments reported substantial increases in psychological distress and had higher rates of depression. It was concluded that the increase in stress was the main cause of the adverse health outcomes rather than changes in health-related behaviours.

Williams (2014) has summarised the rapidly expanding literature regarding economic security and home ownership in the US. He makes the point that home ownership is a primary avenue for low income families to build wealth, economic assets, and security. There are, however, significant barriers for sustainable home ownership (Williams 2014). For example, the 2007-8 US housing market collapse affected low income earners and ethnic minority groups disproportionately and it has been difficult for many to recover due to tighter credit and strict lending requirements. Home ownership has been found to have several benefits for families, including better health and better educational outcomes for children (Williams 2014). Therefore, while home ownership may be stressful for those not able to make mortgage payments, owning may be preferable to renting, as an earlier study conducted in Finland has found.

Laaksonen et al. (2009) used data that were drawn from various registers combined by Statistics Finland and linked with death records and followed-up a large population sample of Finns aged 35–79 years from the end of 1999 to the end of 2004. They examined the associations between three different measures of housing wealth and overall mortality, separating subsidized renters and private renters, and using floor area and the number of rooms as measures of dwelling size (Laaksonen, Tarkiainen et al. 2009). Analyses adjusted for other socioeconomic factors, level of urbanisation of the region of residence, and household composition. Laasonen et al. (2009) found that both subsidised and private renters had higher mortality rates than owner-occupiers and that their measures of home size were also strongly associated with mortality, with the excess risk of 1.7–3.0 in the lowest home size quintile compared to the highest. While these associations were attenuated following adjustment they remained sizeable and statistically significant.

To further support our argument that economic security is very likely to be a major determinant of the gradient seen in many health and developmental outcomes, we draw readers attention to a recent working paper co-authored by a group of economists who are associated with the US Federal Reserve Bank of San Francisco and the Board of Governors of the US Federal Reserve System. The paper outlines why economic security is important at an individual and state level and the authors propose a new measure of economic security, the Economic Security Index (ESI) that can be used for research and policy analysis (Hacker, Huber et al. 2012). Hacker et al. (2012, p. 7) suggest that: " ... economic insecurity is rooted in three basic features of human cognition and market dynamics. The first is the fundamental behavioural trait known as 'loss aversion,' the tendency for individuals to be more sensitive to reductions in their economic standing than to increases. The second is the difficulty people face when assessing relevant economic contingencies, which makes it difficult for people to appropriately assess and safeguard themselves against the most serious risks they face. The third is the incomplete character of many private insurance markets, as well as stark differences in personal and familial capacity based on wealth adequacy, credit access, and the

character of social networks, for insuring against those contingencies". The ESI was constructed from four US data sources: the Survey of Income and Program Participation, the March Supplement to the Current Population Survey, the Panel Study of Income Dynamics and the Consumer Expenditure Survey. "The ESI is an annual index that represents the share of individuals who experience at least a 25 percent decline in their inflation-adjusted 'available household income' from one year to the next (except when entering retirement) and who lack an adequate financial safety net to replace this lost income until it returns to its original level" (Hacker, Huber et al. 2012, p. 7). While we look forward to reading papers of the use of the ESI, it is clear that it is targeted at the most vulnerable population groups. We would predict that much smaller declines in income, or even no increase in income in the context of high inflation, may precipitate the experience of economic insecurity for many people.

Finally, in this section, we review a very recently published study that used data from the HILDA survey which has followed almost 20,000 individuals annually from 2001 to 2011 to examine the relationship between economic security and mental health (Rohde, Tang et al. 2016). As the HILDA dataset forms the basis of our analysis, we will explain the study population and survey methodology in some detail in the following methods and results section. Rohde et al. (2016) used three questions in the dataset to capture different aspects of economic insecurity: the potential loss of current household labour income, overall level of financial satisfaction, and how easily could individuals raise funds in an emergency if needed. These ordinal variables were interpreted with a linear scale and inverted when appropriate such that higher scores implied greater risk. Measures of mental health from the Short Form 36 (SF36) health survey that is embedded in HILDA were used to quantify respondent vitality, social functioning, emotional functioning and anxiety/depressive symptoms as continuous variables. In summary, the authors found that a one standard deviation shock to economic insecurity lowered an individual's mental health score by between 1.0 and 1.8 percentage points. The findings were discussed in relation to the economics literature outlined by Hacker et al. (2012) in the paper previously reviewed. In this context, they concluded that their research demonstrates that there is a common element of economic insecurity, rather than idiosyncratic phenomena associated with any specific risk, that is likely to be hazardous to health.

2.5 Summary

Thus far, we have presented a synthesis of evidence-based knowledge that comes from a wide variety of biological and social science disciplines rather than a comprehensive review of discipline specific literature. As mentioned previously, our goal is to elucidate the pathways that might explain why low income/wealth causes poor health. We are fortunate to have access to the HILDA dataset that has allowed us to explore relationships between income, wealth, economic security and health. Our methods and findings are presented in the detail in the following two sections of this paper.

3 Data and methodology

3.1 Data

The analysis drew from the 2001-2013 Household, Income and Labour Dynamics in Australia (HILDA) Survey, Australia's nationally representative longitudinal dataset. It is particularly suited for addressing the key research questions in this paper as it provides a myriad of individual and household-level information relating to respondents' socio-demographic characteristics, along with their family, income, wealth, health and wellbeing outcomes. The first wave of HILDA interviews were conducted in 2001 on a sample of 19,914 individuals within 7,682 households across Australia. The adult respondents were then re-interviewed annually, resulting in a rich collection of longitudinal information that enables researchers to track individuals' life course transitions and changes in their circumstances over time.

This section describes the key variables used in the analysis. It also sets out the sample design and modelling methodology.

3.2 Key variables

3.2.1 Income and wealth

Of critical importance to the present analysis are variables that provide information on an individual's access to income and wealth. Access to income by an individual is represented by a variable on the individual's household financial year disposable income. The income measure is equivalised using the modified OECD scale, first proposed by Hagenaars (1994), which assigns a value of 1 to the household head, of 0.5 to each additional adult member and of 0.3 to each child (aged under 15) This information is available in all 13 waves of the HILDA Survey.

Household wealth data, on the other hand, is only available in special wealth modules included in the HILDA Survey once every four years. Within the timeframe of analysis, the wealth modules are available in 2002, 2006 and 2010. These modules collect an extensive range of data on the assets and debts of Australian households. Key asset categories include the primary home, other property, superannuation, business, equity and cash investments, bank accounts, trust funds, cash-redeemable life insurance, vehicles, and collectibles. Key debt categories include debt secured against the primary home, other property debt, business debt, Higher Education Contribution Scheme (HECS) debt, credit card loans, car loans, hire purchase agreements, personal loans, and overdue bills. In our study, access to wealth by an individual is represented by his or her household net wealth, defined as total household assets less total household debt. As in the case of income, household wealth values are also equivalised.

All income and wealth values are expressed real terms using 2014 Consumer Price Index (CPI) as the base.

3.2.2 Health and wellbeing

Health and wellbeing are the focus outcomes of this study. The HILDA Survey contains a set of questions from the SF-36 Survey, a multi-purpose, short-form health survey with 36 questions that yield eight scales representing the areas of physical functioning, role-physical, bodily pain, general health perceptions, mental health, role-emotional, social functioning and vitality. The values for each are transformed into a 0 – 100 index, with a higher index value representing a better health outcome (Ware and Gandek 1994, Ware, Kosinski et al. 2000).

The eight scales are in turn used to generate a physical health component summary score (PCS) and a mental health component summary score (MCS). The physical functioning, role-physical, bodily pain and general health scales correlate most highly with the PCS. On the other hand, the mental health, role-emotional, social functioning and vitality scales contribute more to the MCS (Ware and Gandek 1994, Ware and Kosinski 2001).

In addition, we include a variable that captures an individual's level of perceived financial prosperity given current needs or financial responsibilities. This is measured on a six-point scale, ranging from very poor (1), poor, just getting along, reasonably comfortable, very comfortable or prosperous (6).

3.3 Sample design

Analysis that includes the wealth variable is constrained to the years 2002, 2006 and 2010 or waves 2, 6 and 10. We pool the data from all these three waves together into a person-period dataset, resulting in about 34,000 cases available for analysis.

In analyses that do not include the wealth variable, we have available to us all 13 waves of the HILDA Survey, resulting in a huge bank of data from about 160,000 cases when pooled into a person-period format.

However, it is worth noting that health and wellbeing data is reported in HILDA's self-completion questionnaire rather than during face-to-face interviews, typically resulting in a lower response rate of around 90%, and hence reducing the available sample by the same share.

3.4 Modelling methodology

To estimate the association between income and wealth on health and wellbeing outcomes, we conduct fixed effects regression analysis using the following model specification:

$$H_{it} = f(E_{it}, E_{it}^2, X_{it}, \partial_i, \varepsilon_{it})$$

where *i* indexes individuals, *t* indexes time, *H* represents a health or wellbeing score, *E* represents one's access to economic resource including income or wealth, *X* represents a vector of controls, ∂_i refers to person-specific fixed effects such as personality traits and ε_{it} represents a random error term.

Unobserved heterogeneity, such as personality traits, can be correlated with any subjective wellbeing measure such as self-reported health and financial prosperity, and with explanatory variables. However, the panel nature of the survey makes it possible to apply a fixed effects regression approach, which minimises this potential bias to the extent that unobservables such as personality type are fixed over time.

The vector of controls comprise a range of personal and household characteristics. These include socio-demographic characteristics such as age, marital status and disability status. In addition to the age variable, an age squared variable has been included in the regression model to account for potential non-linearities in the relationship between age and subjective wellbeing. Education and labour market status are included to represent each individual's human capital profile. Variables are included to denote whether an individual is still co-residing with parents, the household size of the individual, as well as the individual's state and region of residence. Finally, year dummies are entered into the model to control for variations across different points in the economic cycle.

4 Results

This section presents the key findings from the study's empirical analysis. We begin by outlining the socio-economic profile of different population subgroups in the Australian population as represented by their income and wealth received in section 4.1. In particular we focus on differences across age groups, states and territories, and ethnicity. In Section 4.2 the analysis establishes whether there is a statistical link between income and wealth and the range of health and wellbeing outcomes listed in the previous section using descriptive and regression modelling methods.

4.1 Income and wealth in Australia

Table 1 lays out the income and wealth profiles of different age groups in Australia using pooled data from 2002, 2006 and 2010. It is clear that the income-age profile takes on the conventional U-shaped already identified in previous studies (See for example Heckman 2006, Burnett, Davis et al. 2014). We find that median household income peaks in the 26-30 years group at $40,000, followed by a decline to $20,700 among the over-65s. Among those individuals aged over 20 years, there is a significant rise in wealth from $90,300 among those aged 21-25 years to $349,600 among those aged 51-64 years. Hence, the median household wealth of those aged 51-64 years is almost quadruple the wealth of those aged 21-25 years. Beyond 65 years of age, median household wealth dips to $297,200. The wealth-age pattern is unsurprising and reflects the standard life cycle hypothesis in the economics literature (Modigliani and Brumberg 1954). Household wealth typically increases with age during income-earning years that support the accumulation of assets. However, later in life and especially during retirement, income levels are low and there will be typically some drawdown of assets. The 15-20 years age group stands out as has having median household wealth of $163,400, which is twice the wealth held by those aged 26-30 years. This is not surprising because almost 90% of adolescents aged 15-20 years are still living with their parents. Hence, their household wealth reflects the wealth accumulation of parents typically in their 40s and 50s, rather than their personal wealth savings.

Table 1: Income and wealth, by age group

Age groups	Median household income ($'000)	Median household wealth ($'000)	% co-residing with parents	N
15-20	32.2	163.4	88.8	4285
21-25	37.9	90.3	49.0	3317
26-30	40.0	80.3	20.3	3435
31-50	36.1	180.3	7.4	14201
51-64	37.1	349.6	2.7	7970
65+	20.7	297.2	0.3	6001
Total	34.0	206.6	18.9	39209

Source: HILDA waves 2, 6 and 10

Notes: Income and wealth are equivalised using the modified OECD scale. All monetary variables are measured in 2014 prices. Median bequests and parental income transfers are calculated from the sample of the recipients only. * indicates that the estimates have been omitted due to extremely small sample sizes.

As shown in Table 2, there is some geographic variation in the patters of household income and wealth as well. Median household incomes are the highest in the territories (over $44,000). In New South Wales, Victoria and Western Australia, median household incomes sit just above the national median of $34,000. Similar observations can be made with respect

to household wealth. In the territories, median household wealth exceeds the national median of $206,000 by at least $5,000. New South Wales, Victoria and Western Australia also paper relatively high median wealth of over $200,000. Income and wealth estimates are below the national median in South Australia and Tasmania.

Table 2: Income and wealth, by state / territory

State / territory	Median household income ($'000)	Median household wealth ($'000)	% co-residing with parents	N
NSW	34.2	224.1	20.6	13039
VIC	34.5	219.0	20.1	9889
QLD	33.4	180.1	16.2	7523
SA	29.9	148.7	16.4	3003
WA	34.3	232.6	18.0	3881
TAS	28.1	114.9	17.0	932
NT	44.2	255.7	19.3	295
ACT	45.6	276.8	18.0	648
Total	34.0	206.6	18.9	39209

Source: HILDA waves 2, 6 and 10

Notes: Income and wealth are equivalised using the modified OECD scale. All monetary variables are measured in 2014 prices. Median bequests and parental income transfers are calculated from the sample of the recipients only.

Differences in access to economic resources are likely to reflect not just income-earning or asset-accumulating capacities, but also country of origin and cultural differences. Table 3 splits the population in native Australians, and migrants from high income and low or medium income countries[2]. Migrants from low or medium income countries fare the worst in terms of median income and wealth. Their median household wealth is only $145,100, less than 70% the median wealth of $212,200 reported by natives and $232,200 by high income migrants.

Table 3: Income and wealth, by country of birth

Age groups	Median household income ($'000)	Median household wealth ($'000)	% co-residing with parents	N
Native	34.8	212.2	21.7	28647
High income country migrant	32.1	232.2	6.7	5857
Low or medium income country migrant	30.8	145.1	17.1	4705
Total	34.0	206.6	18.9	39209

Source: HILDA waves 2, 6 and 10

[2] Non-Australian countries are assigned to different income groups based on the World Bank's world development indicators (http://data.worldbank.org/data-catalog/world-development-indicators).

Notes: Income and wealth are equivalised using the modified OECD scale. All monetary variables are measured in 2014 prices. Median bequests and parental income transfers are calculated from the sample of the recipients only. * indicates that the estimate has been omitted due to an extremely small sample size.

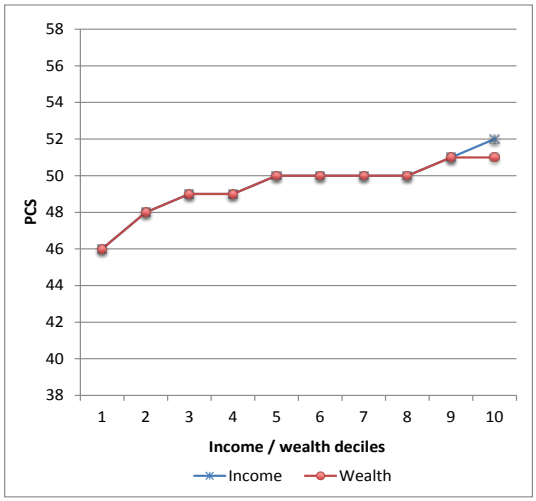
4.2 The links between income and wealth & health and wellbeing

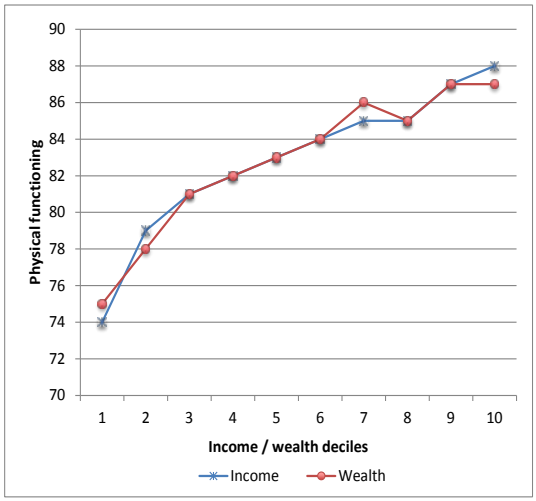
Figure 2 offers a visual representation of the association between income and wealth and health and wellbeing across 11 domains. In each graph, income and wealth deciles are reported on the horizontal axis. The lowest income decile represents the 10% of population with the lowest incomes, while the highest income decile represents the 10% with the highest incomes. Similarly, the lowest wealth decile represents the 10% of population with the lowest wealth, while the highest income decile represents the 10% with the highest wealth. The blue line represents the association between a health or wellbeing outcome and income, while the red line represents the association between each health or wellbeing outcome and wealth.

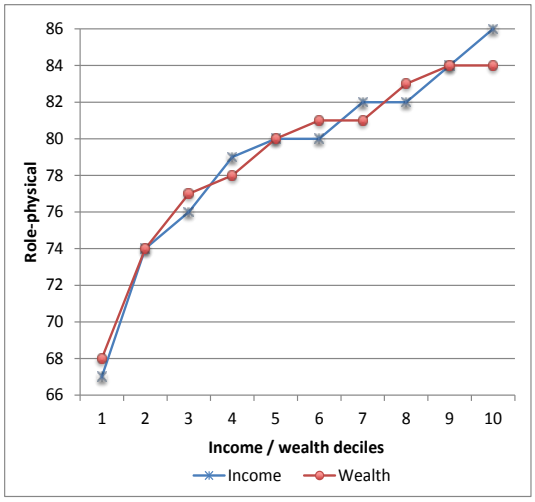
It is clear from the figure that with the exception of perceived financial prosperity in Figure 2(c), higher income and wealth are linked to higher levels of health and wellbeing. Perceived financial prosperity starts at 3 (representing 'just getting along') at the bottom income decile, and stagnates at 4 ('reasonably comfortable) from the second income decile onwards. In the case of wealth, perceived financial prosperity starts at 3 in the bottom two wealth deciles, but also stagnates at 4 thereafter. A key reason is that unlike the other ten health and wellbeing domains which are reported on a scale of 0 to 100, financial security perception is measured on a more discrete scale of 1 to 6 only hence limiting the amount of variation possible.

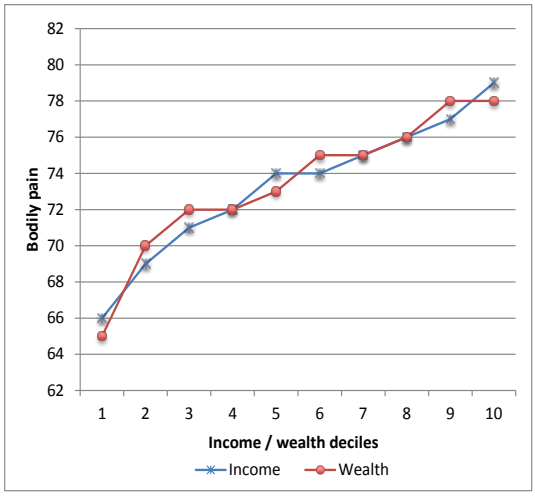
Figure 1: Health and wellbeing outcomes, by income and wealth deciles

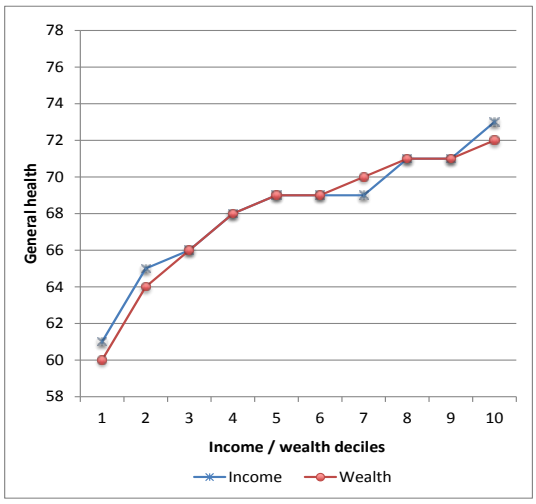
(a) Physical health and wellbeing



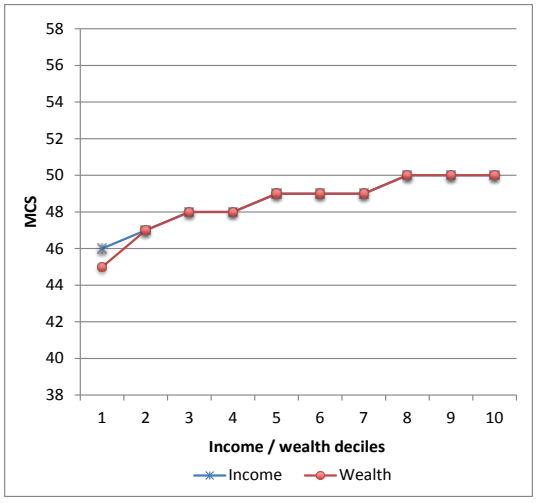


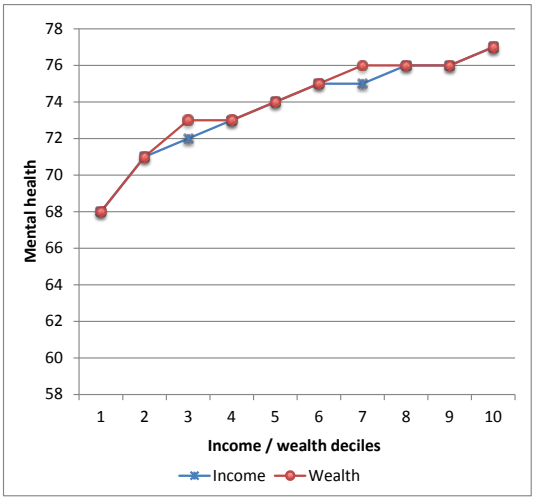


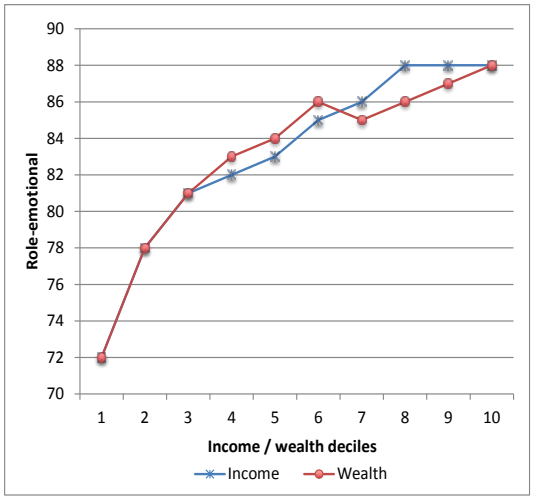


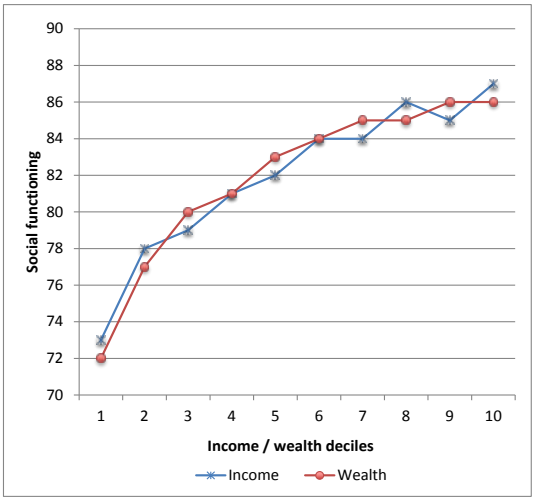


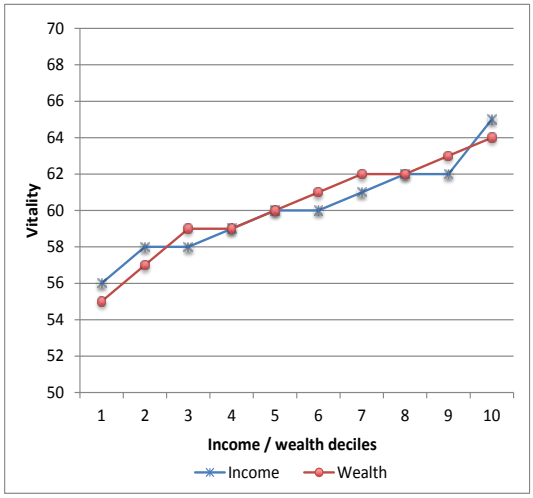
(b) Mental health and wellbeing



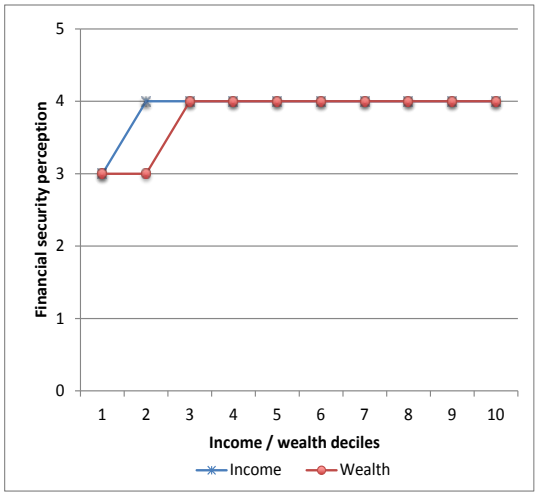








(c) Financial security perception



Source: HILDA waves 2, 6 and 10

Note: The for the financial security variable ranges from 1 to 6. For all other health and wellbeing variables, the score ranges from 0 to 100.

Next, we discuss the results of a fixed effects econometric model that attempts to test for the magnitude and direction of association between income and wealth and the 11 health and wellbeing domains after controlling for other factors. The fixed effects specification was discussed in section 5.3, and the controls range from socio-demographic, education and labour market status, to co-residence with parents, household size, state and region of residence, to year of observation (see Table 4). The regression draws on pooled data from waves 2, 6 and 10 of the HILDA Survey, as wealth is only available in these waves.

Table 4: Fixed effects model of the effects of income and wealth on health and wellbeing, all individuals, pooled observations from 2002, 2006 and 2010 – Main results

	Physical health and wellbeing					Mental health and wellbeing					Financial security perception
	PCS	Physical functioning	Role-physical	Bodily pain	General health	MCS	Mental health	Role-emotional	Social functioning	Vitality	
Variables	Coef. [SE]	Coef. [SE]	Coef. [SE]	Coef. [SE]	Coef. [SE]	Coef. [SE]	Coef. [SE]	Coef. [SE]	Coef. [SE]	Coef. [SE]	Coef. [SE]
Income ($'00,000)	-0.27	0.16	-0.72	-0.24	-0.07	0.56***	0.92***	0.56	0.97*	0.70*	0.19***
	[0.20]	[0.42]	[0.88]	[0.54]	[0.39]	[0.21]	[0.35]	[0.78]	[0.53]	[0.38]	[0.02]
Income squared	0.01**	0.01	0.03	0.01	0.00	-0.02***	-0.04***	-0.02	-0.03**	-0.03**	-0.01***
	[0.01]	[0.02]	[0.03]	[0.02]	[0.01]	[0.01]	[0.01]	[0.02]	[0.02]	[0.01]	[0.00]
Wealth ($'00,000)	0.00	0.00	0.18**	0.05	0.02	0.07***	0.09**	0.23***	0.09*	0.10***	0.02***
	[0.02]	[0.04]	[0.08]	[0.05]	[0.04]	[0.02]	[0.03]	[0.08]	[0.05]	[0.04]	[0.00]
Wealth squared	0.00	0.00	0.00	0.00	0.00	-0.00***	-0.00**	-0.00***	0.00	-0.00***	-0.00***
	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]

Source: HILDA waves 2, 6 and 10

Notes: Income and wealth are equivalised using the modified OECD scale. Negative income or wealth values area replaced by $1. Standard errors are in squared brackets. [(a), (b), (c), (d), (e)] and [(f)] denote single, no qualification, unemployed, New South Wales, major city, and 2002 as the base group, respectively. The symbol *denotes significance at the 10% level, **at the 5% level, and ***at the 1% level. Remaining results are reported in Appendix Table A2.

After controlling for other variables, both income and wealth appear to have positive and significant associations with a range of mental wellbeing domains including MCS, mental health, role-emotional, social functioning and vitality. Wealth appears to be more important across some domains. For instance, income is only mildly significant at the 10% level in the case of vitality and it is insignificant in the case of role-emotional wellbeing whereas wealth remains strongly significant at the 1% level in these domains.

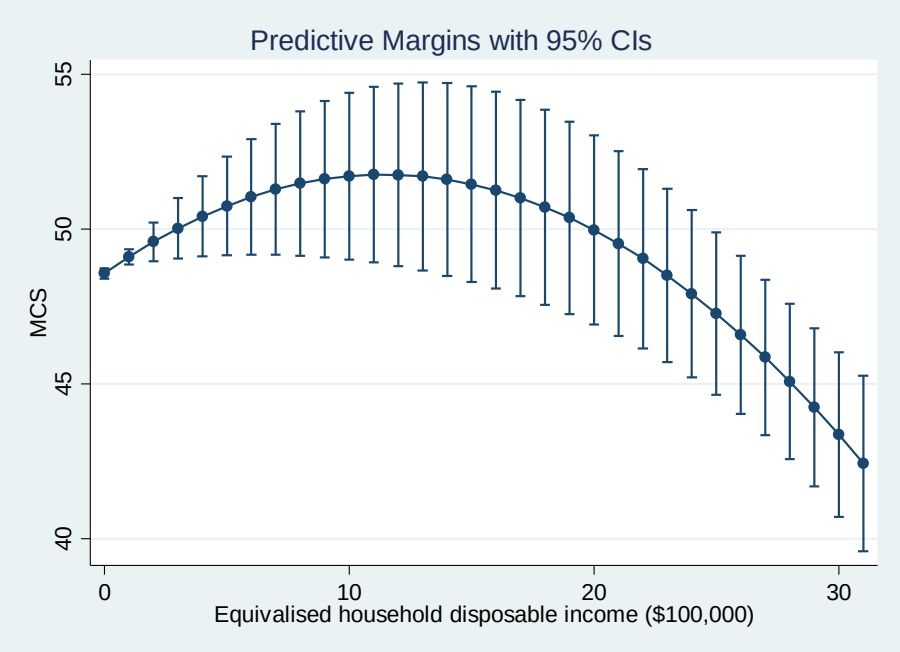
However, it is clear that higher levels of income and wealth are more likely to be associated with improvements in mental health and wellbeing. On the other hand, the associations between income and wealth and physical health and wellbeing are relatively weaker, remaining statistically insignificant across the PCS, physical functioning, bodily pain and general health domains.

Given the demonstrated importance of the links between income and wealth and mental health and wellbeing, Figure 3 displays the values of MCS (a summary measure of mental health and wellbeing) as predicted by the model in Table 4. Figure 3(a) indicates that income has a positive link with mental health and wellbeing as measured by MCS until it reaches a very high level of $1.3 million dollars, beyond which further increases in income become associated with a decline in MCS. The income squared variable has a negative coefficient, hence resulting in this inverted U-shaped relationship between income and MCS. A similar inverted U-shaped association is observed between wealth and MCS with MCS increasing until wealth reaches around $80,000 of equivalised household net wealth (see Figure 3(b)).

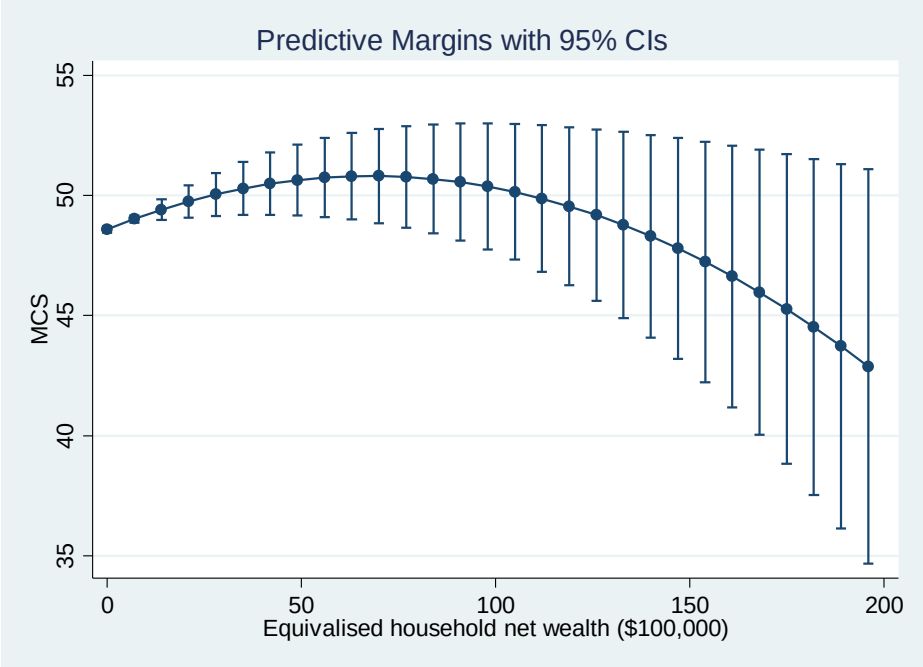
Various explanations have been put forward by studies on the economics of subjective wellbeing to explain this inverted U-shaped pattern. Firstly, a rise in economic resources constitutes may change an individual's reference group against which s/he makes comparisons. Hence, improvements relative to one's peers before the rise in income may have less influence on wellbeing as a result of a change in one's peer group after an income increase (Van Praag and Frijters 1999). Secondly, individuals adapt to material goods and beyond a certain level, the consumption of material goods has little effect on wellbeing (Frederick and Loewenstein 1999). Kahneman et al. (2006) suggest as people's incomes rise, their time use do not shift towards activities that improve their wellbeing. Nonetheless, increases in income and wealth up to certain levels do correlate with a rise in mental health and wellbeing as measured by the MCS.

Figure 2: Predictive values of MCS across different levels of income and wealth[a]

(a) Income



(b) Wealth



Source: HILDA waves 2, 6 and 10.

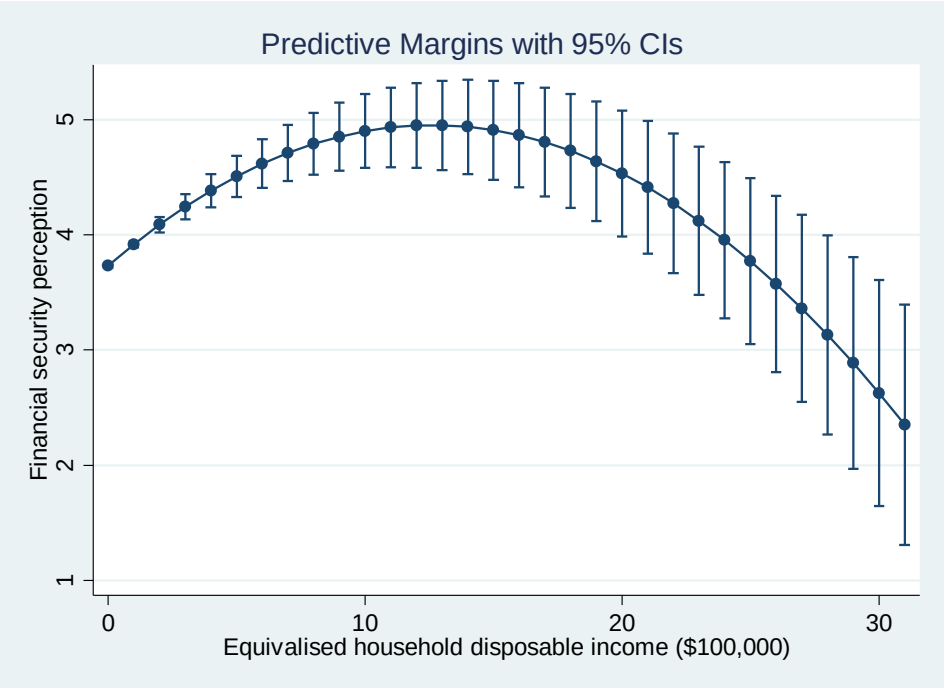
Note:

a. CI refers to confidence intervals.

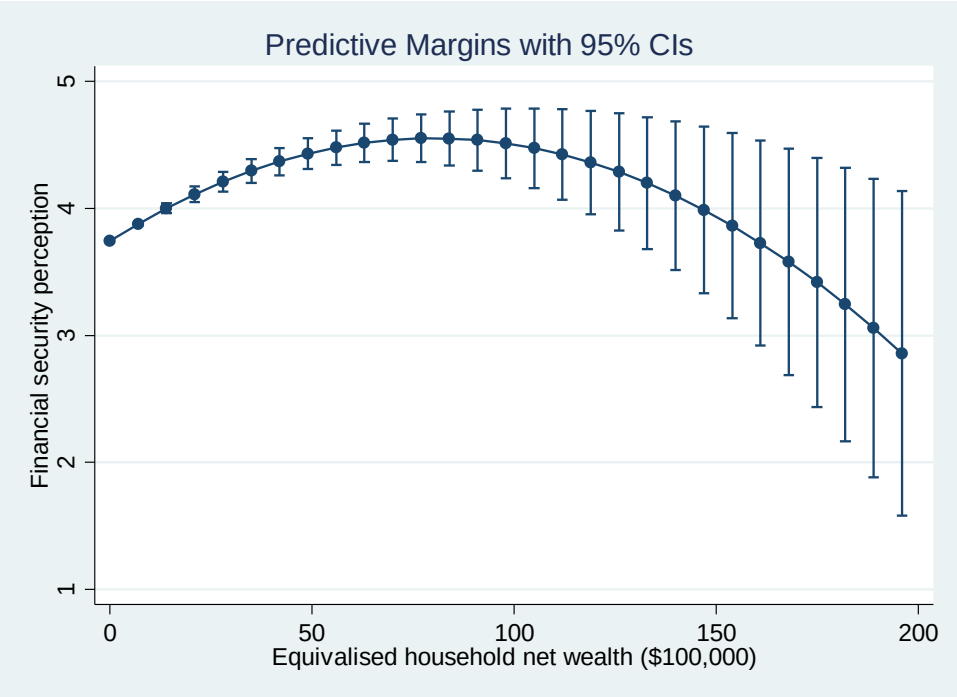
Both income and wealth also have strong statistical links with financial security perception, with income's magnitude being greater than wealth. Once again, an inverted U-shaped pattern is evidence. Increases in income (to around $1.3 million) and in wealth (to around $80,000) are associated with improvements in financial security perception, before financial security perception starts to decline.

Figure 3: Predictive values of financial security perception across different levels of income and wealth[a]

(a) Income



(b) Wealth



Source: HILDA waves 2, 6 and 10

Another key finding that also signals access to economic resources relates to co-residence with one's father or mother (See Appendix Table A2). The model findings show that co-residence with the father has a very strong positive impact on financial security perception. However, this association is absent with respect to the variable representing co-residence with one's mother.

In terms of the control variables (See Appendix Table A2), as expected income and wealth remain positively related to age though at a diminishing rate as indicated by the statistically significant age squared variable across most domains. Unsurprisingly, a long-term disability or health condition is associated with lower health and wellbeing levels across most domains. Being in a couple relationship is positively linked with various mental health and wellbeing domains such as MCS, social functioning, role-emotional and financial security. On the other hand, separation, divorce and widowhood has a negative impact on all health and wellbeing domains.

A university degree appears to be associated lower wellbeing levels across the PCS, physical functioning, social functioning and vitality domains. This finding supports a rapidly growing pool of studies on wellbeing that have shown that higher levels of educational attainment are associated with lower levels of happiness, including Australian studies such as Dockery (2010). Full-time work has a stronger positive link with physical health and wellbeing (such as PCS, physical functioning, role-physical, bodily pain) and financial security perception with part-time work, possibly due to greater access by full-time workers to economic resources that support material wellbeing. However, the reverse is true in the case of mental health and wellbeing, with part-time work having stronger links with MCS, vitality, role-emotional and social functioning than full-time work. It is possible that part-time workers experience less work-related stress than full-time workers, leading to better mental health and wellbeing outcomes.

Table 5 repeats the same regression, but for two sub-samples – individuals who are co-residing with their parents and those not co-residing with their parents. The former are likely to be much younger, with an average age of 22, and 79% are adolescents aged under 21 years. The latter group are older independent adults, with an average age of 47 years.

Turning first to independent adults who are not co-residing with their parents, we find that income generally does not have a significant association with health and wellbeing with the exception of feelings of financial security. Wealth is important across the range of mental health and wellbeing domains, including MCS, mental health, role-emotional, social functioning and vitality. Both income and wealth are linked to feelings of greater financial security, though the magnitude of the income variable is greater than wealth. It is possible that income represents a recurrent stream of economic resources that one can readily access whereas some sources of wealth may not be easily accessible e.g. wealth stored in the family home. Hence, income may therefore lead to feelings of greater financial security than wealth.

Among those co-residing with parents, income is once again generally insignificant across all domains except financial security. However, the effects of wealth on health and wellbeing are mixed. While it has a strong positive association with MCS and role-emotional outcomes, surprisingly it has a negative impact on PCS and role-physical outcomes.

Table 5: Fixed effects model of the effects of income and wealth on health and wellbeing, by parental co-residence status, pooled observations from 2002, 2006 and 2010

Variables	Physical health and wellbeing					Mental health and wellbeing					Financial security perception
	PCS	Physical Functioning	Role-physical	Bodily pain	General health	MCS	Mental health	Role-Emotional	Social Functioning	Vitality	
	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.
	[SE]	[SE]	[SE]	[SE]	[SE]	[SE]	[SE]	[SE]	[SE]	[SE]	[SE]
Not co-residing with parents											
Income ($'00,000)	-0.29	0.13	-0.75	-0.46	-0.33	0.41*	0.67*	0.35	0.89	0.32	0.18***
	[0.21]	[0.44]	[0.93]	[0.56]	[0.41]	[0.23]	[0.37]	[0.82]	[0.56]	[0.39]	[0.02]
Income squared	0.01**	0.01	0.03	0.02	0.01	-0.02**	-0.03***	-0.01	-0.03*	-0.01	-0.01***
	[0.01]	[0.02]	[0.03]	[0.02]	[0.01]	[0.01]	[0.01]	[0.03]	[0.02]	[0.01]	[0.00]
Wealth ($'00,000)	0.02	0.04	0.24***	0.07	0.01	0.06**	0.08**	0.24***	0.10**	0.09**	0.02***
	[0.02]	[0.04]	[0.09]	[0.05]	[0.04]	[0.02]	[0.04]	[0.08]	[0.05]	[0.04]	[0.00]
Wealth squared	0.00	0.00	0.00	0.00	0.00	-0.00***	-0.00**	-0.00***	0.00	-0.00***	-0.00***
	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
N	29360	29360	29360	29360	29360	29360	29360	29360	29360	29360	29360
N groups	14230	14230	14230	14230	14230	14230	14230	14230	14230	14230	14230
R2	0.07	0.05	0.05	0.01	0.08	0.09	0.03	0.02	0.04	0.02	0.05

Source: HILDA waves 2, 6 and 10

Notes: Income and wealth are equivalised using the OECD scale. Negative income or wealth values area replaced by $1. Other explanatory variables include age (and its square), educational qualifications, disability status, employment status, marital status, number of household members in different age bands, state/territory dummies and year dummies. These are available from the authors upon request. The symbol *denotes significance at the 10% level, **at the 5% level, and ***at the 1% level.

Table 6: Fixed effects model of the effects of income and wealth on health and wellbeing, by parental co-residence status, pooled observations from 2002, 2006 and 2010 (continued)

Variables	Physical health and wellbeing					Mental health and wellbeing					Financial security perception
	PCS	Physical Functioning	Role-physical	Bodily pain	General health	MCS	Mental health	Role-Emotional	Social Functioning	Vitality	
	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.
	[SE]	[SE]	[SE]	[SE]	[SE]	[SE]	[SE]	[SE]	[SE]	[SE]	[SE]
Co-residing with parents											
Income ($'00,000)	-2.28	-6.52	-3.36	1.52	0.50	2.88	6.51*	-4.99	3.34	3.06	0.45**
	[2.05]	[5.31]	[6.95]	[4.71]	[3.67]	[2.16]	[3.41]	[6.39]	[4.79]	[3.68]	[0.21]
Income squared	0.77	2.04	1.06	0.20	0.76	-0.48	-1.21	1.21	-0.88	0.56	-0.09*
	[0.48]	[1.58]	[1.34]	[0.97]	[0.75]	[0.44]	[0.73]	[1.56]	[1.02]	[1.02]	[0.05]
Wealth ($'00,000)	-0.26**	-0.11	-0.85**	-0.42	0.17	0.30**	0.32*	0.90**	0.08	0.20	0.01
	[0.12]	[0.31]	[0.38]	[0.29]	[0.20]	[0.13]	[0.20]	[0.45]	[0.24]	[0.20]	[0.01]
Wealth squared	0.00**	0.00	0.01**	0.00*	0.00	-0.00**	-0.00**	-0.01**	0.00	0.00	0.00
	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
N	4711	4711	4711	4711	4711	4711	4711	4711	4711	4711	4711
N groups	3521	3521	3521	3521	3521	3521	3521	3521	3521	3521	3521
R2	0.05	0.06	0.03	0.04	0.04	0.05	0.06	0.04	0.04	0.04	0.05

Source: HILDA waves 2, 6 and 10

Notes: Income and wealth are equivalised using the OECD scale. Negative income or wealth values area replaced by $1. Other explanatory variables include age (and its square), educational qualifications, disability status, employment status, marital status, number of household members in different age bands, state/territory dummies and year dummies. These are available from the authors upon request. The symbol *denotes significance at the 10% level, **at the 5% level, and ***at the 1% level.

5 Discussion

5.1 Summary of main findings

In unadjusted analyses, higher income and wealth were associated with incrementally higher levels of both physical and mental health. Those with higher incomes and wealth were more likely to report being “reasonably comfortable” or “prosperous”. After controlling for other variables, both income and wealth appeared to have positive and significant associations with a range of mental health domains. Wealth appeared to be more important across some domains. A threshold effect was observed for the relationships between both income and wealth and the mental health summary score. However, very few individuals in the sample had household equivalised income above $1.3 million, suggesting that for almost all individuals, higher income was better for mental health. Similarly, very few individuals had equivalised household wealth greater than or equal to $7.5 million, suggesting that for almost all individuals, higher wealth was associated with higher mental health. On the other hand, associations between income and wealth and physical health were relatively weaker, remaining statistically insignificant across most domains. Both income and wealth also had strong statistical links with economic security perception, with income’s magnitude being greater than wealth. Once again, a threshold effect was observed.

5.2 The relationship between income, wealth, and health

A notable difference between this study and most others that have examined the relationship between wealth and health is the detailed measures of health that were used. While there is literature to support the use of scales that simply ask people to rate their general health as poor, fair, good, etc., (Mackenbach, Simon et al. 2002, Jylha, Volpato et al. 2006) the use of such measures has also been the subject of intense criticism (O'Donnell, Van Doorslaer et al. 2015). The SF- 36 data afforded the opportunity to look at many different aspects of health in addition to physical and mental health summary scores. Furthermore, the scale and summary scores were continuous, rather than categorical or binary, variables which gave the study more power to find statistically significant differences. It is, therefore, of great interest that both income and wealth were associated with mental health, but not physical health outcomes in adjusted analyses. Rather than conclude that income and wealth are not associated with physical health outcomes, we believe these findings bring into question the whole concept of self-reported health. Can people reliably paper their own health status based on their knowledge of clinical diagnoses, experience of symptoms, and level of functioning? Even if people can report this information reliably, it is not, necessarily, a good indicator of underlying pathology. The theory of allostasis/allostatic load explains how common causal pathways lead to a great variety of different health outcomes, both physical and mental.

While people have at least some insight into their mental states, they have little idea of pathophysiological processes that will one day result in poor physical health outcomes. For example, most adults can accurately paper when they are feeling anxious or depressed. However, most do not know that their physiological stress response is exaggerated, that their blood pressure is marginally high, that they have an unbalanced lipid profile, that their blood sugar level is borderline high, that atheromatous plaques have started to develop in their arteries, or that their immune system function is compromised. When people report that they have good physical health, their judgement is usually based on their experience of symptoms and medical diagnosis. In Australia, chronic diseases and many forms of cancer are usually diagnosed when people are in their 60s and 70s, but the future health and well-being of adults is often determined at an earlier age in response to factors in the physical and psychosocial environment, such as economic strain (Australian Institute of Health and Welfare 2014).

A more accurate alternative to disease diagnosis and self-reported health is the use of biomarkers as indicators of health status. Many thousands of publications in recent biomedical journals identify biomarkers (specific cells, molecules, genes, gene products, enzymes, and hormones), that can be measured in the body for almost all diseases, such as cancer (Wu and Qu 2015), cardiovascular disease (Trpkovic, Resanovic et al. 2015), Alzheimer's disease (Kang, Korecka et al. 2015), rheumatoid arthritis (Abildtrup, Kingsley et al. 2015), and bipolar disorder (Ghanizadeh, Singh et al. 2015). A key advantage of using biomarkers is that they can reflect disease states long before symptoms develop and a diagnosis is made. For example, using Western Australian Pregnancy Cohort (Raine) Study data Huang et al. (2007) found that 8-year-old children fell into a cluster with higher body mass index, higher blood pressure (BP), more adverse lipid profile and a trend to higher serum glucose resembling adult metabolic syndrome. While there may be many advantages of using biomarker data, a great deal more research will be required to develop measures that are reliable and valid. One of the current issues is that they might reflect transient, rather than long term states (Gersten 2008). This recent work in biomedical science is indicative of the need to use much more sophisticated measures of health in research that seeks to explain the association found between wealth and health outcomes.

In addition to using a more comprehensive measure of health than is common in income, wealth and health research, in the present study health outcomes at the time of the respondents' interviews are matched with their income from the last financial year. This is in contrast to many previous studies where health and income are measured at the same time, therefore confounding the direction of causality. As discussed previously, the direction of causality is a significant issue in this field of research with many arguing that poor health is a cause of low income, but not acknowledging that low income is a cause of poor health. An important feature of the HILDA data collection is that exposure data, in this case income, is collected before outcome data, in this case health. This temporal relationship of exposure and outcome data allows inferences about causality to be made with some confidence. Therefore, the findings of this study support the hypothesis that higher income cause better mental, if not physical, health outcomes.

The findings also support the contention that wealth is as important, if not more important, for health than income. Both income and wealth had positive and significant associations with a range of mental health domains and wealth was more important for some. This finding is congruent with much of the international literature (Pollack, Chideya et al. 2007, Aittomaki, Martikainen et al. 2010), as well as recent Australian research undertaken by Cai (2009) using data for over 4,000 men and women who were 50 years or over when they participated the HILDA survey. Cai (2009) found that wealthy people were less likely to experience a transition from good to poor health as measured by the self-rated health question in the Short Form 36 (SF-36) health questionnaire and by the self-paper of health conditions, impairment, or disability.

5.3 Income, wealth and economic security

Evidence was presented in the background section of this paper that suggests economic security may be a key feature in the relationship between income, wealth and health. To explore this hypothesis, we used a variable that is available in the HILDA dataset to look at associations between income and wealth, and perceived economic security. We found that both income and wealth had strong positive statistical links with economic security perception, with income's magnitude being greater than wealth. Because we had already undertaken extensive analysis of HILDA data with regard to the relationship between income, wealth and health, and Rohde et al. (2016) had just published their findings, we did

not investigate the relationship between our measure of perceived economic security and the various physical and mental health outcomes. As outlined in the background literature review, Rohde et al. (2016) recently used three questions in the HILDA dataset to capture different aspects of economic insecurity: the potential loss of current household labour income, overall level of financial satisfaction, and how easily could individuals raise funds in an emergency if needed. The authors found that a one standard deviation shock to economic insecurity lowered an individual's mental health score by between 1.0 and 1.8 percentage points. We can assume that the measure of perceived economic security that we used would be associated with at least some SF36 health outcomes. The background and discussion sections of the Rohde et al. (2016) article are both very short, as there is very little evidence-based literature available anywhere in the world with to compare and contrast their findings. Again, as mentioned previously, the findings were discussed in relation to the economics literature outlined by Hacker et al. (2012). While Hacker et al. (2012) have proposed an explanation for economic insecurity, that it is embedded in basic features of human cognition and market dynamics, they have not sought to explain how and why economic insecurity may have a negative impact on health outcomes. Following our argument that economic insecurity is an important determinant of a wide range of poor health outcomes across the life course through the process of allostatis/allostatic load, these findings are important and warrant further attention.

5.4 Strengths and limitations

The current study has a number of strengths that have been identified throughout the paper. The principal strengths were the extensive measures of income, wealth and health that were used and the longitudinal nature of the data. Adding to that, we would argue that the fixed effects models we used were appropriate and better suited to the data than the random effects models that continue to be used in this context. Furthermore, we would argue that the use of our interdisciplinary knowledge to better understand the causal mechanisms whereby income and wealth might influence health outcomes, was a very positive feature.

However, there were also a number of limitations. As discussed at some length previously, even our more detailed self-paper measures of health are unlikely to accurately reflect true health status. We pointed out that even if people could reliably paper their own health status based on their knowledge of clinical diagnoses, experience of symptoms, and level of functioning, it is not, necessarily, a good indicator of underlying pathology. We suggested that the use of biomarkers has potential for the accurate measurement of health and pathology.

Another limitation was the lack of depth of some analyses. While data were available in our HILDA dataset, we were not able to analyse it as thoroughly as we would have liked due to a lack of time and resources. There was a limit to the degree of complexity that was possible for us to investigate within the scope of the paper. In a sense, we have “opened a can of worms” that has led us to ask many more questions than those that were stated as objectives at the outset. We hope to be able to answer these additional questions through a more in-depth analysis of our HILDA dataset in the future.

5.5 Concluding remarks

Australian people have for a very long time valued the image of Australia as a very egalitarian nation and successive governments, both liberal and conservative, have tailored their taxation and social policies in an effort to maintain this popular belief. While many continue to hold this view, there is growing evidence that inequalities in income and wealth are increasing and that current government policies are failing to address this issue. A recent

report by a national peak body of the community services and welfare sector states that despite decades of economic growth, income and wealth have become more concentrated in the hands of fewer people. Furthermore, the rate of rising inequality in Australia has been faster than many comparable OECD countries as measured by the change in household Gini coefficient (Australian Council of Social Service 2015). The findings of the present study offer up-to-date evidence that can inform the development of future government policy on economic and social inequality in Australia.

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7 Appendices

Appendix Table A1: Variable definitions

Variables	Definition	Binary [B] or Continuous [C]
Access to economic resources		
Income ($'00,000)	Equivalised household disposable income in the last financial year in $'00,000	C
Income squared	Equivalised household disposable income in the last financial year in $'00,000 squared	C
Wealth ($'00,000)	Equivalised household net wealth in $'00,000	C
Wealth squared	Equivalised household net wealth in $'00,000 squared	C
Demographic characteristics		
Age	Age in years	C
Age squared	Age in years squared	C
Male	= 1 if male, 0 otherwise	B
Has disability	= 1 if the individual has long term health condition, disability or impairment, 0 otherwise	B
Native (ref)	= 1 if born in Australia, 0 otherwise	B
ESB immigrant	= 1 if born overseas in an English Speaking Background (ESB) country, 0 otherwise	B
NESB immigrant	= 1 if born overseas in a Non-English Speaking Background (NESB) country, 0 otherwise	
Aboriginal	= 1 if Aboriginal or Torres Strait Islander, 0 otherwise	B
Single never married (ref)	= 1 if single/never married, 0 otherwise	B
Married/de facto	= 1 if married/de facto, 0 otherwise	B
Separated/divorced/widowed	= 1if separated/divorced/widowed, 0 otherwise	B
Education and labour outcomes		
Year 11 (ref)	= 1 if highest education level achieved is lower than Year 12, 0 otherwise	B
Year 12	= 1 if highest education level achieved is Year 12, 0 otherwise	B
VET	= 1 if highest education level achieved is Vocational Education and Training, 0 otherwise	B
Bachelor or higher	=1 if highest education level achieved is bachelor or higher, 0 otherwise	B
Not employed (ref)	= 1 if not employed last week, 0 otherwise	B
Part-time employed	= 1 if employed less than 35 hours last week, 0 otherwise	B
Full-time employed	= 1 if employed 35 hours or more last week, 0 otherwise	B

Variables	Definition	Binary [B] or Continuous [C]
Co-residence status		
Co-residing with no parent (ref)		
Co-residing with mother	= 1 if co-residing with mother, 0 otherwise	B
Co-residing with father	= 1 if co-residing with father, 0 otherwise	B
Household size		
Number of household members aged 0-4		C
Number of household members aged 5-9		C
Number of household members aged 10-14		C
Number of household members aged 15-23		C
Number of household members aged 25-64		C
Number of household members aged >=65		C
Location		
New South Wales (ref)	=1 if residing in New South Wales, 0 otherwise	B
Victoria	=1 if residing in Victoria, 0 otherwise	B
Queensland	=1 if residing in Queensland, 0 otherwise	B
South Australia	=1 if residing in South Australia, 0 otherwise	B
Western Australia	=1 if residing in Western Australia, 0 otherwise	B
Tasmania	=1 if residing in Tasmania, 0 otherwise	B
Northern Territory	=1 if residing in Northern Territory, 0 otherwise	B
Australian Capital Territory	=1 if residing in Australian Capital Territory, 0 otherwise	B
Major cities (ref)	1 if residing in a collection district with an Accessibility/Remoteness Index of Australia (ARIA)[a] index of 0 to 0.2; 0 otherwise	B
Inner regional	1 if residing in a collection district with an average ARIA index greater than 0.2 and less than or equal to 2.4; 0 otherwise	B
Outer regional	1 if residing in a collection district with an average ARIA index greater than 2.4 and less than or equal to 5.92; 0 otherwise	B
Remote	1 if residing in a collection district with an average ARIA index greater than 5.92; 0 otherwise	B
Year		
2002 (ref)	= 1 if observation is from the 2002 calendar year, 0 otherwise	B
2006	= 1 if observation is from the 2006 calendar year, 0 otherwise	B
2010	= 1 if observation is from the 2010 calendar year, 0 otherwise	B

Note:

a. The regions are classified by remoteness area where each remoteness area represents an aggregation of non-contiguous geographical areas which share common characteristics of remoteness based on the Accessibility/Remoteness Index of Australia (ARIA). For further details, refer to Australian Bureau of Statistics (2001).

Appendix Table A2: Fixed effects model of the effects of income and wealth on health and wellbeing, all individuals, pooled observations from 2002, 2006 and 2010 – Remaining results

	Physical health and wellbeing					Mental health and wellbeing					Financial security perception
	PCS	Physical functioning	Role-physical	Bodily pain	General health	MCS	Mental health	Role-emotional	Social functioning	Vitality	
	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.
Variables	[SE]	[SE]	[SE]	[SE]	[SE]	[SE]	[SE]	[SE]	[SE]	[SE]	[SE]
Age	0.35***	1.10***	1.34***	0.27**	0.16*	0.14**	0.14	1.03***	0.92***	0.35***	-0.01**
	[0.05]	[0.11]	[0.20]	[0.13]	[0.10]	[0.06]	[0.09]	[0.21]	[0.14]	[0.10]	[0.00]
Age squared	-0.01***	-0.01***	-0.02***	-0.01***	-0.01***	-0.00**	0.00	-0.01***	-0.01***	-0.01***	0.00***
	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
Year 12 [(b)]	-0.48	-0.15	-4.58***	-0.58	-3.02***	-1.29***	-1.89***	-1.51	-2.43***	-3.15***	-0.18***
	[0.31]	[0.76]	[1.14]	[0.80]	[0.65]	[0.41]	[0.65]	[1.33]	[0.83]	[0.70]	[0.03]
VET [(b)]	-0.49	0.02	-3.44**	-1.18	-2.04***	-0.82*	-0.82	-2.00	-2.74***	-1.24	-0.09**
	[0.36]	[0.83]	[1.38]	[0.95]	[0.69]	[0.46]	[0.72]	[1.51]	[0.98]	[0.77]	[0.03]
Bachelor or higher [(b)]	-1.12***	-1.39	-6.37***	-1.64	-2.55***	-0.75	-1.40	-1.84	-3.12**	-1.29	-0.05
	[0.43]	[0.89]	[1.76]	[1.14]	[0.88]	[0.62]	[0.93]	[2.03]	[1.22]	[1.02]	[0.04]
Has disability	-3.48***	-6.36***	-13.27***	-6.74***	-6.58***	-1.66***	-3.04***	-6.61***	-6.22***	-4.76***	-0.02
	[0.18]	[0.39]	[0.81]	[0.44]	[0.34]	[0.19]	[0.30]	[0.72]	[0.47]	[0.35]	[0.01]
Part-time employed [(c)]	0.60***	1.62***	4.39***	0.95**	0.82**	0.92***	1.28***	4.23***	2.95***	0.65*	0.10***
	[0.18]	[0.40]	[0.77]	[0.46]	[0.35]	[0.22]	[0.35]	[0.76]	[0.50]	[0.39]	[0.02]
Full-time employed [(c)]	0.98***	2.04***	5.07***	2.02***	0.69*	0.39	1.11***	3.82***	2.56***	-1.22***	0.17***
	[0.20]	[0.45]	[0.84]	[0.53]	[0.39]	[0.25]	[0.39]	[0.82]	[0.56]	[0.43]	[0.02]
Married/de facto [(a)]	-0.95***	-2.01***	-1.26	-1.05	-0.58	0.70*	0.55	2.37*	1.76**	-1.65**	0.08***
	[0.30]	[0.67]	[1.18]	[0.82]	[0.62]	[0.38]	[0.58]	[1.25]	[0.83]	[0.66]	[0.03]
Separated/divorced/widowed [(a)]	-0.14	-2.35***	-2.70	-0.23	-0.85	-1.66***	-3.54***	-3.11*	-1.85	-3.06***	-0.16***
	[0.40]	[0.91]	[1.65]	[1.07]	[0.78]	[0.53]	[0.80]	[1.80]	[1.15]	[0.87]	[0.04]
Co-residing with mother	-0.39	-1.05	1.41	-1.16	0.68	0.89	0.25	3.59*	0.70	1.47	0.05

	Physical health and wellbeing					Mental health and wellbeing					Financial security perception
	PCS	Physical functioning	Role-physical	Bodily pain	General health	MCS	Mental health	Role-emotional	Social functioning	Vitality	
	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.
Variables	[SE]	[SE]	[SE]	[SE]	[SE]	[SE]	[SE]	[SE]	[SE]	[SE]	[SE]
	[0.50]	[1.26]	[1.89]	[1.29]	[0.94]	[0.58]	[0.98]	[2.02]	[1.25]	[1.05]	[0.04]
Co-residing with father	0.58	1.79	1.75	1.34	0.45	0.28	1.24	0.09	1.33	0.50	0.14***
	[0.52]	[1.31]	[1.87]	[1.30]	[0.99]	[0.61]	[1.00]	[2.05]	[1.31]	[1.09]	[0.05]
Number of household members aged 0-4	0.03	0.90***	0.12	-0.12	-0.59**	-0.06	0.56**	0.32	0.95***	-1.91***	-0.02*
	[0.12]	[0.27]	[0.47]	[0.32]	[0.23]	[0.14]	[0.22]	[0.48]	[0.32]	[0.25]	[0.01]
Number of household members aged 5-9	0.21*	0.89***	0.49	0.29	-0.05	0.03	0.29	0.28	0.82***	-0.35	-0.01
	[0.11]	[0.26]	[0.49]	[0.31]	[0.22]	[0.14]	[0.22]	[0.49]	[0.31]	[0.24]	[0.01]
Number of household members aged 10-14	0.24**	0.49**	0.57	0.49	0.21	-0.10	0.10	0.07	0.45	-0.75***	-0.02
	[0.11]	[0.24]	[0.46]	[0.30]	[0.22]	[0.13]	[0.21]	[0.47]	[0.30]	[0.23]	[0.01]
Number of household members aged 15-23	-0.01	0.27	-0.05	-0.09	-0.59***	-0.13	-0.10	0.30	-0.02	-0.70***	0.00
	[0.10]	[0.23]	[0.40]	[0.26]	[0.20]	[0.12]	[0.19]	[0.40]	[0.26]	[0.21]	[0.01]
Number of household members aged 25-64	-0.22	-0.71	-1.46**	-0.47	-0.40	-0.39*	-0.85***	-0.86	-0.72	-0.79**	0.03*
	[0.18]	[0.44]	[0.73]	[0.47]	[0.33]	[0.20]	[0.33]	[0.71]	[0.49]	[0.37]	[0.02]
Number of household members aged 65 or older	0.56*	0.89	0.69	0.77	0.89	-0.40	-0.48	-0.67	-0.43	0.01	-0.01
	[0.30]	[0.69]	[1.26]	[0.79]	[0.55]	[0.31]	[0.51]	[1.10]	[0.80]	[0.60]	[0.02]
Victoria [(d)]	-0.09	0.50	-0.18	1.75	0.97	1.58**	1.78	4.24*	2.97*	2.55**	0.00
	[0.56]	[1.29]	[2.20]	[1.48]	[1.10]	[0.72]	[1.09]	[2.29]	[1.61]	[1.23]	[0.06]
Queensland [(d)]	-0.59	-0.95	-2.92	0.90	0.53	0.45	1.27	1.56	-0.54	-1.53	0.01
	[0.48]	[1.01]	[1.93]	[1.25]	[0.91]	[0.60]	[0.94]	[2.10]	[1.34]	[1.01]	[0.05]
South Australia [(d)]	-0.75	-0.47	-3.66	0.13	0.91	0.66	1.55	2.57	-3.72	1.19	0.11
	[0.94]	[1.91]	[3.71]	[2.59]	[1.59]	[1.08]	[1.57]	[3.76]	[2.51]	[1.81]	[0.08]
Western Australia [(d)]	0.66	3.15*	-1.34	2.41	1.78	0.79	1.94	0.33	2.16	2.18	-0.01
	[0.77]	[1.65]	[2.60]	[1.94]	[1.56]	[0.96]	[1.48]	[3.23]	[1.87]	[1.69]	[0.07]
Tasmania [(d)]	-0.82	0.46	-1.84	-1.42	-3.61*	0.72	-0.26	3.99	1.57	1.19	-0.01

Variables	Physical health and wellbeing					Mental health and wellbeing					Financial security perception
	PCS	Physical functioning	Role-physical	Bodily pain	General health	MCS	Mental health	Role-emotional	Social functioning	Vitality	
	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.
	[SE]	[SE]	[SE]	[SE]	[SE]	[SE]	[SE]	[SE]	[SE]	[SE]	[SE]
	[0.88]	[1.84]	[4.90]	[2.60]	[2.10]	[1.18]	[1.92]	[4.27]	[2.95]	[2.04]	[0.12]
Northern Territory [d]	-0.39	-1.55	-2.14	-0.17	-1.07	-1.30	-1.65	1.19	-3.29	-5.78**	0.21**
	[0.91]	[1.64]	[3.95]	[2.48]	[2.04]	[1.20]	[1.86]	[3.51]	[2.58]	[2.41]	[0.10]
Australian Capital Territory [d]	0.28	-0.02	0.37	3.89**	0.58	0.80	1.63	2.27	1.54	0.65	0.03
	[0.74]	[1.41]	[3.08]	[1.97]	[1.49]	[1.13]	[1.77]	[3.43]	[2.04]	[1.88]	[0.08]
Inner Regional [e]	0.02	0.34	0.21	0.48	1.19**	0.75**	1.06**	1.43	1.32*	1.19**	0.00
	[0.27]	[0.57]	[1.15]	[0.75]	[0.52]	[0.33]	[0.54]	[1.15]	[0.76]	[0.59]	[0.03]
Outer Regional [e]	-0.07	0.12	0.05	0.37	0.17	0.63	0.70	0.84	2.39**	0.57	0.08**
	[0.38]	[0.80]	[1.51]	[1.07]	[0.74]	[0.52]	[0.81]	[1.69]	[1.10]	[0.87]	[0.04]
Remote [e]	-0.72	-0.48	-2.26	-0.99	-0.15	0.91	0.84	1.36	0.37	2.10	0.24***
	[0.59]	[1.19]	[2.16]	[1.67]	[1.18]	[0.87]	[1.46]	[2.67]	[1.72]	[1.52]	[0.07]
2010 [f]	-0.39***	-0.80**	-1.36**	-0.73*	-0.33	-0.15	-0.18	-0.49	-1.20***	-0.46	-0.03**
	[0.15]	[0.32]	[0.64]	[0.39]	[0.28]	[0.18]	[0.28]	[0.63]	[0.41]	[0.31]	[0.01]
Constant	49.05***	70.19***	67.16***	80.16***	77.29***	44.58***	69.82***	60.57***	63.67***	61.14***	3.55***
	[1.23]	[2.77]	[5.21]	[3.33]	[2.55]	[1.57]	[2.51]	[5.33]	[3.54]	[2.72]	[0.12]
N	34071	34071	34071	34071	34071	34071	34071	34071	34071	34071	34071
N groups	16682	16682	16682	16682	16682	16682	16682	16682	16682	16682	16682
R2	0.08	0.07	0.05	0.05	0.07	0.01	0.01	0.02	0.03	0.03	0.05

Source: HILDA waves 2, 6 and 10

Notes: Income and wealth are equivalised using the modified OECD scale. Negative income or wealth values area replaced by $1. Standard errors are in squared brackets. [a], [b], [c], [d], [e] and [f] denote single, no qualification, unemployed, New South Wales, major city, and 2002 as the base group, respectively. The symbol *denotes significance at the 10% level, **at the 5% level, and ***at the 1% level.

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