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2016

Document Version:
Other version

Working Paper 2016:20

Department of Economics
School of Economics and Management

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September 2016

THE DYNAMICS OF INCOME-RELATED HEALTH INEQUALITIES IN AUSTRALIA VERSUS GREAT BRITAIN

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Abstract

This study compares the evolution of income-related health inequality (IRHI) in Australia (2001–2006) and in Great Britain (1999–2004) by exploring patterns of morbidity- and mortality-related health changes across income groups. Using Australian longitudinal data, the change in health inequality is decomposed into those changes related to health changes (income-related health mobility) and income changes (health-related income mobility), and compared with recent results from Great Britain. Absolute IRHI increased for both sexes, indicating greater absolute health inequality in Australia over this period, similar to that seen in Great Britain. The income-related health mobility indicates that this was due to health losses over this period being concentrated in those initially poor who were significantly more likely to die. The health-related income mobility further indicates that those who moved up the income distribution during the period were more likely to be those who were healthy. Australian estimates of mobility measures are similar, if not greater, in magnitude than for Great Britain. While reducing health inequality remains high on the political agenda in Great Britain, it has received less attention in Australia even though the evidence provided here suggests it should receive more attention.

Acknowledgements

This paper uses unit record data from the Household, Income and Labour Dynamics in Australia (HILDA) Survey. The HILDA Project was initiated and is funded by the Australian Government Department of Social Services (DSS) and is managed by the Melbourne Institute of Applied Economic and Social Research (Melbourne Institute). The findings and views reported in this paper, however, are those of the author and should not be attributed to either DSS or the Melbourne Institute. Financial support from the Swedish Council for Working Life and Social Research (FAS) (dnr 2012-0419) and The Swedish Research Council (dnr 2014-646) is gratefully acknowledged. The Health Economics Program (HEP) at Lund University also receives core funding from the Government Grant for Clinical Research (ALF), and Region Skåne (Gerdtham). This research was supported under Australian Research Council's Discovery Early Career Awards funding scheme (Project DE150100309). The views expressed herein are those of the authors and are not necessarily those of the Australian Research Council.

1. Introduction

Inequalities in health related to socioeconomic status become a solemn question of fairness when we consider health as an important condition of human life and as a crucial constituent of human capabilities (Sen, 2002). In some countries, reducing health inequalities has been high on the political agenda and disparities in health status across socioeconomic groups are continually being monitored to gain insight into the state of health equity.

A country with a long engagement with socioeconomic inequalities in health is Great Britain. The British government has undertaken a number of initiatives over a decade (1997-2010) to address the issue (Mackenbach, 2011; Marmot, 2010). The measures adopted were motivated by evidence-gathering reports on inequalities in health commissioned by successive governments such as the Black Report in 1980, the Acheson Report in 1998, and finally the Marmot Review in 2010, which proposed a range of evidence-based effective strategies for reducing health inequalities.

By contrast, similar evidence-gathering activities coupled to policy initiatives have not been seen in Australia. Research on socioeconomic- (or income-) related health inequalities in Australia associates relative socioeconomic disadvantage to higher rates of mortality and morbidity, as in other countries (Clarke et al., 2002; Clarke & Smith, 2000; Stewart Williams et al., 2013). The studies have mainly focused on measuring inequality at a given point in time and do not indicate whether it has persisted or increased over time.

Studying the evolution of health inequalities over time can add important evidence for policy-making to reduce health inequalities. With the availability of longitudinal panel data, measuring health inequalities has shifted focus from cross-sectional health differences to exploring reasons for persistence in income-related health inequality (Allanson & Petrie, 2013a; Baeten et al., 2013a, b; Jones & Nicolás, 2004; Siegel & Allanson, 2015). Changes in cross-sectional health concentration indices over time can thus be seen as a single *moving picture,* rather than a series of cross-sectional snapshots, where income changes and health changes at the individual level are tracked (Allanson et al., 2010). An additional advantage from tracking individuals is that it is also possible to account for mortality, perhaps the most important health outcome (Petrie et al., 2011).

Viewing inequalities from a longitudinal perspective shows how income-related differences in health at the individual level may remain or even worsen, giving an indication of one's capability to improve (or prevent a decline in) one's health over time. Longitudinal analysis can thus assess whether divergent health outcomes between rich and poor is a structural problem, where the same individuals are always poor and sick, or a series of temporal episodes where individuals 'take turns' being poor and sick (Allanson et al., 2010). Crucially, it can also assess whether the divergence tends to be permanent or allow for recovery. This has implications for policy design as those policies which reduce structural problems are likely to be different from those which address temporal episodes.

In this paper, we present further evidence on the evolution of income-related health inequality in Australia by taking a longitudinal perspective. Specifically, we conduct the first analysis of the dynamics of income-related health inequalities in Australia by applying a robust measurement framework that also accounts for deaths. We illustrate our work by decomposing changes in cross-sectional income-related indices over two periods into changes in health (morbidity and mortality) and in income ranking respectively. We make the first international comparison of health inequality dynamics between Australia and an earlier study conducted in Great Britain using the same methodology.

The paper is structured as follows. Section 2 outlines the methodology used for the study while section 3 presents the empirical results. Section 4 discusses the overall trend of income-related health inequalities in Australia and its implications on policy-making. Section 5 concludes the study.

2. Data and methods

2.1 Data, Variables, and Samples

A representative sample of 7,682 households and 19,914 individuals across Australia from the Household, Income and Labour Dynamics in Australia (HILDA) survey is used. HILDA is an annual longitudinal household-based study that started in 2001 and covers a broad range of social and economic questions. The analysis considers all those who have been interviewed and answered a full self-completion questionnaire (SCQ) of the survey instrument in 2001. To have a comparable time period with an earlier analysis done for Great Britain, survey participants were followed from 2001 until 2006. Deaths and other sources of sample attrition for the health measure were reported from family, friends, and others when the survey participant was attempted to be contacted.

Health was measured using Quality Adjusted Life Years (QALYs), which is derived from the SF-6D instrument (Brazier et al., 2002). It is a bounded, continuous, and cardinal measure along an interval from 0 (death) to 1 (full health). Deaths were included in the sample with health given a value of zero.

Income ranks were determined for each respondent using their nominal household disposable income for a given financial year. Disposable income was calculated as total household income after receipt of government benefits and deduction of income tax. To allow comparability between households of different compositions and over time, the variable was transformed into household equivalised disposable income calculating using a modified equivalence scale (Hagenaars et al., 1994). Missing income data were imputed through various methods in the HILDA survey described in Hayes and Watson (2009). Currencies were not converted between countries since income ranks were considered instead of absolute values and similarly no adjustments were made for inflation.

Australian estimates were compared to those obtained for England and Wales (E&W), and Scotland from an earlier study by Petrie et al. (2011). In their study, the British Household Panel Survey (BHPS) was used, which is based on a representative sample of 10,300 private individuals from 5,500 households in Great Britain. Commencing in 1991, the survey provides information on a wide range of socioeconomic and demographic questions. Their analysis considered all those who answered a full questionnaire in 1999 and follows them until 2004. Similar to HILDA, deaths and other sources of sample attrition for the health measure were reported from family, friends, and others when the survey participant was contacted.

2.2 Construction of health inequality indices

Three health inequality indices were constructed where each provide complementary information on the nature of health changes. The original concentration index (CI) was first constructed in terms of health attainment and constructed in terms of ill-health or health shortfalls, using income as the measure in which individuals are ranked. A positive (negative) health attainment concentration index indicates that a lesser (greater) proportion of health resides with those with lower incomes. Conversely, a positive (negative) ill-health concentration index indicates that a lesser (greater) proportion of ill-health resides with lower incomes. These two measures represent very different value judgements about what distribution of health changes constitutes an inequality preserving increase in health. For the health attainment concentration index, a proportional increase in health attainments for everyone maintains the level of inequality while a proportional decrease in ill-health or health shortfalls maintains the same inequality for the ill-health concentration index. In depth discussion of these issues is available in other studies (Kjellsson & Gerdtham, 2013, 2014a; Kjellsson & Gerdtham, 2014b).

The base case for this study, however, used the Erreygers index (2009). It focuses on absolute inequalities unlike the CI, which measures relative inequalities and the measure produces equivalent results when either health attainment or ill-health is used. In this case the same absolute increase in health attainment (or decrease in ill-health) for everyone maintains the level of health inequality (Kjellsson et al., 2015). The standard equation for the Erreygers index is shown in Equation 1:

Equation 1: Erreygers index in covariance form

$$EI = \frac{8}{(b-a)} cov(h_i, y_i)$$

where, a and b are the lower and upper limits of the health measure – normally set to 0 and 1 respectively, h_i is the health measure and y_i is the rank measure in terms of income. This index of absolute inequality is equal to 1 when the richest 50% of the population have full health and the poor 50% of the population have no health.

Each health inequality index implicitly makes value judgments on vertical health equity (Allanson & Petrie, 2014; Bosmans, 2015; Kjellsson & Gerdtham, 2013; Kjellsson et al., 2015). Because these indices employ different criterion on what kind of health changes among a population preserve inequality, estimates can be sensitive to which index is used. In this study sensitivity to the choice of health inequality index is explored by comparing the results for all three indices to the benchmark value of having ‘no inequality’ set by each index (see Allanson et al. (2013)).

Explaining persistence or a lack of in health inequality takes the approach of Allanson et al. (2010) where it is supposed that changes in health inequality over time must arise from a combination of changes in health outcomes (i.e., health mobility) and changes in individuals’ position in the income distribution (i.e., income (rank) mobility). Given two cross-sectional estimates of the Erreygers index in a start year s and a final year f (EI_s and EI_f), the change in inequality ($EI_f - EI_s$) is decomposed into the income-related health mobility index (M_H) and health-related income mobility index (M_R) (see Allanson et al. (2013)). Both morbidity and mortality changes in health can be accounted for in the longitudinal measure, as formulated in Petrie et al. (2011).

Here the income-related health mobility index (M_H) can be further decomposed by splitting changes in health between those due to morbidity (health remains positive) and to mortality (health becomes zero). The impact of morbidity- and mortality-related causes on health inequality can be further decomposed into its progressivity captured by a Kakwani-type (1979) progressivity index (p^{MB} and p^{MT}) and its relative scale captured by the scale factor (q^{MB} and q^{MT}). M_H is positive (negative) if health changes are progressive (regressive), i.e. a negative progressivity index value leads to a positive M_H value when multiplied by the scale factor, which is expected to be always negative since health is lost over time.

The health-related income mobility index (M_R) can also be further decomposed by splitting re-ranking due to shuffling between those still alive (M_R^{MB}) and to the dead dropping out of the population (M_R^{MT}). M_R is positive (negative) if upward (downward) income re-rankings tend to occur more to those that have better health status in the final period.

The equivalent health attainment and ill-health CI decompositions were also derived to explore the sensitivity to the inequality measure selected in the results across studies. Bootstrap estimates from Australia and Great Britain were used to test for significance differences using standard t-tests.

2.3 Missing data and non-mortality related attrition

To account for missing health data and sample attrition due to non-mortality-related sources (such as incomplete questionnaires, refusal, etc.), however, Inverse Probability Weights (IPWs) were derived using sex, annual equivalised household income, and age in 2001 as independent variables. This re-weighting also includes attrition related to population changes like migration which can also be investigated directly (see Allanson and Petrie (2013a) and Allanson and Petrie (2013b)).

IPWs for complete health data were calculated by firstly estimating the following probit model:

Equation 2: Probit Model of Complete Health Data

$$F_i = \begin{cases} 1 \quad if \quad \beta_0 + \beta_1 y_{0i} + \beta_2 Male_i + \beta_3 Age_{0i} + e_{1i} > 0 \\ \quad 0 \quad if \quad otherwise \end{cases}$$

where the dependent variable $\boldsymbol{F_i}$ is equal to 1 if the individual has data on health at initial wave in 2001 (HILDA) or 1999 (BHPS) and e_{1i} is assumed to be normally distributed.

The predicted probability of the dependent variable for each individual is then used to adjust $\boldsymbol{WN_{0i}}$ to derive new weights:

Equation 3: Inverse Probability Weights for Missing Health Data at Initial Wave

$$WN_{1i} = \frac{WN_{0i}}{\hat{P}(F_i)}$$

IPWs for sample attrition (excluding mortality-related reasons) were constructed by estimating a similar probit model:

Equation 4: Probit Model of No Sample Attrition

$$NOA_i = \begin{cases} 1 \quad if \quad \alpha_0 + \alpha_1 y_{0i} + \alpha_2 Male_i + \alpha_3 Age_{0i} + \alpha_4 Health_{0i} + e_{2i} > 0 \\ 0 \quad if \quad otherwise \end{cases}$$

where the dependent variable $\boldsymbol{NOA_i}$ is equal to 1 if the individual had data on health in the final period or had been recorded as having died before the final period in 2006 (HILDA) or 2004 (BHPS) and e_{1i} is assumed again to be normally distributed.

The predicted probability of the dependent variable for each individual is then used to adjust $\boldsymbol{WN}_{1i}$ to derive new weights that accounts for non-mortality-related attrition:

Equation 5: Inverse Probability Weights for Missing Health Data

$$WN_{2i} = \frac{WN_{1i}}{\hat{P}(NOA_i)}$$

In order to explore the statistical significance of estimates across sexes and countries, a bootstrapping resampling procedure was applied 2000 times producing bootstrap standard errors and 95% confidence intervals on estimates. In addition, using the bootstrapped estimates and the percentile method we explored whether differences between Australian, E&W, and Scotland were significant.

3. Results

3.1 Descriptive Statistics

Table 1 provides the descriptive statistics of the full study sample and sub-samples by sex and attrition status for Australia. Out of the initial 13,969 responding persons in 2001, 1,774 persons were excluded due to incomplete health data in 2001. The study sample thus comprised 12,195 persons of which 3,863 persons (31.7%) were not followed up in 2006 due to non-mortality-related sample attrition, and 331 persons (2.7%) died before follow-up in 2006.

The sample has slightly more females than males (53% as opposed to 47%). The females were, on average, older although males, in general, had above-average health and income in 2001. At the five-year follow-up (2006), mean health for both sexes were mostly unchanged who were alive while mean incomes had risen.

Those who attrite due to mortality had lower average health (0.66) than that of the full sample (0.76) in 2001, which is also reflected by their corresponding high average age (70.4 years old) compared to the full sample average (43.4 years old). Those who attrite due to non-mortality reasons earned less and were younger than those that did not attrite but had similar average health in 2001.

3.2 Sample weights and inverse probability weightings (IPWs)

Appendix A, Table 1, provides the regression results of the probit models used to derive the inverse probability weightings (IPW) for our three samples. Non-mortality related response was significantly related to initial age, health and income whereas sex was significantly related to a lesser extent. Older individuals were associated with higher likelihood of attrition than younger individuals. Persons with worse health were related to lower likelihood of reporting health data in the final year.

3.3 Evolution of income-related health inequality in Australia

The first columns of tables 2 and 3 provide EI estimates and subsequent decompositions of IRHI for Australia by males and females respectively. The Australian cross-sectional estimates of IRHI for both sexes in 2001 were positive, suggesting that the rich were, in general, healthier than the poor, and this increased from 0.058 to 0.075 for males and 0.048 to 0.073 for females from 2001 to 2006. The change in the cross-sectional IRHI estimates over time (0.017 for males and 0.026 for females), however, hides what is happening at the individual level.

The increase in income-related health inequalities from 2001 to 2006 was partly explained by income-related health mobility where the indices were negative for both sexes (-0.062 males; -0.042 females) indicating regressivity in the health changes that occurred over time. On closer inspection this is made up by, the scale factor which shows that males experienced more health losses, on average, than females and the progressivity index which shows that health losses were more concentrated among the poor for females than for males. Crucially, mortality-related health changes were shown to contribute heavily to income-related health mobility. It was more than five times bigger than the contribution of morbidity-related health changes for males and double for females.

The increase in IRHI over time due to negative income-related health mobility was somewhat offset by positive health-related income mobility. The impact of income re-ranking among the survivors increased income-related health inequality over time for both sexes. This illustrates that those who were sicker in 2006 were more likely to have moved down the income distribution from 2001 compared to those who were healthier in 2006. Nevertheless, this unequalising effect was more than offset by the re-ranking that occurred due to the dead dropping out of the remaining population. Mortality had an equalising effect because most of those who survive had higher income ranks in 2001 than those who died. Consequently, income re-ranking had the impact of decreasing IRHI over time, making the final cross-sectional IRHI estimate appear lower than it otherwise would have.

3.4 Comparison of income-related health inequality between Australia and Great Britain

Tables 2 and 3 also provide EI estimates for E&W, and Scotland, as compared to Australia for males and females. The male and female cross-sectional estimates of IRHI for Australia in 2001 and 2006 were not significantly different from E&W and Scotland in 1999 and 2004. The Australian male estimates were largely in-between estimates obtained for E&W, and Scotland. In addition, there were no significant difference in the change in the EI for between the start and final years between all three populations.

Estimates of income-related health mobility indices and health-related income mobility indices were not significantly different between Australia, E&W, and Scotland, except when females were compared between Australia and E&W. Australia had the highest estimates of the progressivity index for both sexes out of the three populations. Health-related income mobility indices were also comparatively the highest for Australian females, while for Australian males, it was in-between the estimates for the other populations.

3.5 Sensitivity analyses

Bootstrap sampling

Estimates from bootstrap samples of EI estimates were significant at a 1% level for all measures except for the income-related morbidity index for males and health-related income mobility index for females.

Standard CI indices

Full results of the standard CI in health attainments and health shortfalls are shown in Appendix tables 2 and 3 for males and females. Male and female estimates of start and final inequality were positive for CI of health and negative for CI of ill-health confirming a pro-rich inequality in health. Once again, Australian estimates were amongst those obtained in Great Britain though Australian females are notable for having had the largest change in inequality between time periods. Overall, health inequality estimates from the base case were lesser in absolute value than those obtained from the CI of ill-health but were greater than those obtained from the CI of health. From the benchmark value of 0 (no inequality), the EI in 2001 deviated by -0.633 for females and by -0.452 for males respectively. The CI of health however deviated the least while the CI of ill-health deviated the most for both sexes.

4. Discussion

The study supports evidence of socioeconomic-related health inequalities favouring the rich over the poor in Australia found in previous studies (Gunasekara et al., 2013; Kavanagh et al., 2013; Stewart Williams et al., 2013) but highlights and accounts for its continual growth and persistence from 2001 to 2006. From a longitudinal perspective, those who were initially poor suffered systematically more health losses than the rich which increased inequality. It therefore indicates that there is lesser capability to maintain better health as far as one remained poor. The factor however that perpetuated socioeconomic-related health inequalities were deaths that occurred during the study period, which would otherwise have been treated as a form of attrition in cross-sectional analysis. This was largely due to the large contribution that deaths made to the overall scale factor of health changes. In comparison, morbidity factors did not play a significant role as the scale of morbidity-related health changes occurred incrementally both in the positive and negative direction. Furthermore, as the dead, who were mostly the initially poor, dropped out of the income distribution, those who survived move down in income rank. The impact of attributing health losses due to deaths, not just morbidity, is thus an important factor to consider when evaluating policies which tackle socioeconomic health inequalities.

The evidence of a pro-rich inequality in health holds irrespective of different vertical equity judgements implied in the choice of IRHI index. While the concentration index of health attainments deviated the most from its benchmark value and the concentration index of health losses the least, these alternative IRHI indices still produced consistent results to the absolute EI measure. This has important implications when considering health inequality from across the political spectrum since different value judgements inevitably plays a role on equity issues.

From international comparisons, estimates from the concentration and mobility indices for Australia were amongst those obtained for England and Wales, and Scotland, suggesting that both Australia and Great Britain witnessed similar experiences of socioeconomic-related inequalities in health around the same period. IRHI increased over time for both sexes, with changes in health being biased against the initially poor. Mortality losses underlined the trend in all cases, validating further the significance of accounting for deaths in IRHI analysis. If mortality is unaccounted for, the extent of income-related health inequalities would be severely underestimated. It is also notable that Australian males and females had the most regressive pattern of health changes as indicated by their progressivity indices.

The Australian cross-sectional concentration index was close to estimates for Great Britain by the end of the study, underlining the presence of socioeconomic differences in health in both countries. While reducing health inequality remains high on the political agenda in Great

Britain, in contrast, it has received less attention in Australia even though the evidence provided in the empirical analysis suggests otherwise. Future policy action should consider the structural nature of health inequalities, where the same individuals tend to remain poor and sick and the life expectancy of the poor is lower than the rich.

There are a number of caveats worth mentioning to the analysis conducted in the study. The use of IPWs for non-mortality related attrition assumes that those who attrite but did not die during the study period experienced similar patterns of health and income rank changes as their supposed counterparts that did not attrite from which values were imputed. Secondly, mobility indices could be affected by fluctuations in the business cycle as declines or increases in economic growth may have different impacts on the real incomes of different socioeconomic groups. Thirdly, though an absolute measure was used, socioeconomic differentials within populations could act as key drivers of health inequalities, for instance, the rate of population ageing (Islam et al., 2010). Health inequalities may therefore rise faster for one population than another. We therefore relied on the assumption in this study that there are similar differentials between Australia and Great Britain. Accounting for these differential, particularly on ageing and other factors that affect inequality and exploring further on what is driving these changes (see Allanson and Petrie (2013a) and Allanson and Petrie (2013b)), however requires further research.

5. Conclusion

Explaining the dynamics of IRHI informs how health inequality persists over time and how mortalities play a role in this phenomenon. Our empirical analysis took a longitudinal perspective on IRHI in Australia by exploring patterns of morbidity- and mortality-related health changes across income groups that occurred between 2001 and 2006 and comparing them to estimates obtained for Great Britain during a similar time period. The results revealed evidence of enlarging socioeconomic health differences in Australia and demonstrate that the differences arise because of widening gaps in morbidity losses and the poor being also more likely to die than the rich. The results were consistent irrespective of alternate IRHI indices and the different vertical equity judgements that they imply. In comparison to estimates from Great Britain, Australia's performance had been similar, if not worse; yet, while tackling health inequalities has been high in the political agenda in Great Britain, there has not been the same response seen in Australia.

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APPENDIX

Appendix Table 1: Probit models used to adjust sample weights for Australia

Dependent Variable	**Health data available at start wave (2001)**	**Health data available for final wave (2006) and not reported dead**
Constant	1.302 (0.047)***	-0.152 (0.084)*
Age (2001)	-0.007 (0.001)***	0.008 (0.001)***
Income (2001) †	0.006 (0.001)***	0.003 (0.001)***
Health (2001)	N/A	0.307 (0.096)***
Male	-0.057 (0.027)**	-0.056 (0.024)**
Sample Size	13969	12195
Pseudo R^2	0.0152	0.0104

Note

† Annual household equivalised disposable income for (nominal AUD '000) – A household unit is composed of one adult with each extra adult and child member adding 0.5 and 0.3 units respectively

* 10% ** 5% *** 1% significance level

Appendix Table 2: Males – Relative health inequality measures for Australia, Scotland and England & Wales

	Health					**Ill-health**				
	Concentration index (CI)					Concentration index (CI^U)				
	Australia (A)	Difference S	Difference E&W	Scotland (S)	England & Wales (E&W)	Australia (A)	Difference S	Difference E&W	Scotland (S)	England & Wales (E&W)
Health Inequality at 2001 (A) / 1999 (S and E&W)	0.019 (0.002)			0.020 (0.003)	0.018 (0.001)	-0.062 (0.005)	**	**	-0.089 (0.003)	-0.081 (0.001)
Health Inequality at 2006 (A) / 2004 (S and E&W)	0.024 (0.002)			0.023 (0.003)	0.022 (0.003)	-0.081 (0.005)	**	**	-0.110 (0.003)	-0.098 (0.001)
Change in inequality	0.005 (0.002)			0.003 (0.003)	0.004 (0.001)	-0.012 (0.006)			-0.021 (0.003)	-0.018 (0.001)
Income-related health mobility	-0.022 (0.003)			-0.018 (0.005)	-0.026 (0.003)	0.050 (0.007)			0.044 (0.005)	0.061 (0.003)
Health-related income mobility	-0.017 (0.003)			-0.015 (0.005)	-0.022 (0.003)	0.030 (0.007)			0.022 (0.005)	0.044 (0.003)

Note: Bootstrap standard errors based on 2000 replications are in parentheses
* 10% ** 5% *** 1% significance level from bootstrap sampling

Appendix Table 3: Females - Relative health inequality measures for Australia, Scotland and England & Wales

	Health					**Ill-health**				
	Concentration index (CI)					Concentration index (CI^U)				
	Australia (A)	Difference S	Difference E&W	Scotland (S)	England & Wales (E&W)	Australia (A)	Difference S	Difference E&W	Scotland (S)	England & Wales (E&W)
Health Inequality at 2001 (A) / 1999 (S and E&W)	0.016 (0.002)		**	0.019 (0.003)	0.020 (0.002)	-0.047 (0.005)	*	***	-0.068 (0.003)	-0.073 (0.002)
Health Inequality at 2006 (A) / 2004 (S and E&W)	0.024 (0.002)			0.022 (0.003)	0.026 (0.002)	-0.075 (0.005)		***	-0.079 (0.003)	-0.093 (0.002)
Change in inequality	0.008 (0.002)			0.003 (0.005)	0.006 (0.002)	-0.028 (0.005)			-0.011 (0.003)	-0.020 (0.002)
Income-related health mobility	-0.015 (0.002)		***	-0.020 (0.004)	-0.027 (0.003)	0.036 (0.006)		***	0.036 (0.004)	0.058 (0.003)
Health-related income mobility	-0.006 (0.002)	**	***	-0.016 (0.005)	-0.022 (0.003)	0.008 (0.006)		***	0.025 (0.005)	0.038 (0.003)

Note: Bootstrap standard errors based on 2000 replications are in parentheses
* 10% ** 5% *** 1% significance level from bootstrap sampling

TABLES AND FIGURES

Table 1: Descriptive statistics of study sample (by sex and attrition category) for Australia; values presented are means with standard deviation (SD) in brackets, unless otherwise stated.

	Sample Size 2001, n(%)	Health 2001	Health 2006	Income 2001†	Income 2006†	Age 2001
Full Sample*	12195 (100)	0.76 (0.13)	0.76 (0.12)	27.4 (18.5)	36.1 (26.6)	43.4 (17.7)
Sex						
Males	5765 (47)	0.77 (0.13)	0.77 (0.12)	28.3 (19.1)	37.7 (27.7)	43.1 (17.5)
Females	6430 (53)	0.75 (0.12)	0.75 (0.12)	26.5 (17.8)	34.7 (25.6)	43.6 (17.9)
Attrition						
No attrition	8001 (66)	0.76 (0.12)	0.76 (0.12)	28.4 (18.4)	36.7 (25.7)	43.2 (16.4)
Non-mortality-related attrition‡	3863 (32)	0.76 (0.13)	N/A	26.2 (18.7)	32.6 (30.7)	41.2 (18.2)
Mortality-related attrition‡	331 (3)	0.66 (0.14)	N/A	18.8 (13.2)	N/A	70.4 (14.2)

Notes * Responding persons with full health data in wave 1

† Annual household equivalised disposable income for (nominal AUD '000) – A household unit is composed of one adult with each extra adult and child member adding 0.5 and 0.3 units respectively

‡ Attrition is denoted for the health measure only; thus the income measure can be available when the health measure is not (unless the respondent has died)

Table 2: Males – Erreygers Index (EI) and Mobility Indices for Australia, Scotland and England & Wales

	Australia (A)	Scotland (S)	Difference: A to S	England & Wales (E&W)	Difference: A to E&W
Health Inequality at 2001 (A) / 1999 (S and E&W)	0.058 (0.005) ***	0.058 (0.009) ***	<0.001	0.064 (0.005) ***	-0.006
Health Inequality at 2006 (A) / 2004 (S and E&W)	0.075 (0.005) ***	0.069 (0.008) ***	0.006	0.082 (0.005) ***	-0.007
Change in Health Inequality	0.017 (0.006) ***	0.010 (0.010)	0.007	0.018 (0.006) ***	-0.001
Income-related health mobility Index	-0.062 (0.008) ***	-0.054 (0.011) ***	-0.009	-0.076 (0.007) ***	0.014
Progressivity Index	0.452 (0.057) ***	0.246 (0.053) ***	0.206 ***	0.398 (0.037) ***	0.054
Scale Factor	-0.138 (0.013) ***	-0.218 (0.024) ***	0.080 ***	-0.191 (0.014) ***	0.053 ***
Income-related health mobility (morbidity-related only)	-0.009 (0.005) **	<0.001 (0.008)	-0.009	-0.015 (0.004) ***	0.006
Income-related health mobility (mortality-related only)	-0.053 (0.006) ***	-0.053 (0.010) ***	<0.001	-0.061 (0.006) ***	0.008
Health-related income mobility Index	-0.046 (0.008) ***	-0.043 (0.013) ***	-0.002	-0.058 (0.008) ***	0.013
Due to income re-ranking of those still alive	0.014 (0.004) ***	0.015 (0.009) *	-0.002	0.011 (0.004) ***	0.002
Due to income re-ranking as the dead drop-out	-0.063 (0.007) ***	-0.063 (0.011) ***	<0.001	-0.075 (0.007) ***	0.012
Concentration Index of health changes	-0.452 (0.057) ***	-0.336 (0.094) ***	-0.116	-0.334 (0.035) ***	-0.112 *

Notes Bootstrap standard errors are based on 2000 replications are in parentheses
* 10% ** 5% *** 1% significance level from bootstrap sampling

Table 3: Females - Erreygers Index (EI) and Mobility Indices for Australia, Scotland and England & Wales

	Australia (A)	Scotland (S)	Difference: A to S	England & Wales (E&W)	Difference: A to E&W
Health Inequality at 2001 (A) / 1999 (S and E&W)	0.048 (0.005) ***	0.065 (0.008) ***	-0.017 *	0.058 (0.004) ***	-0.010
Health Inequality at 2006 (A) / 2004 (S and E&W)	0.073 (0.005) ***	0.075 (0.009) ***	-0.002	0.071 (0.005) ***	0.002
Change in Health Inequality	0.026 (0.005) ***	0.010 (0.009)	0.015	0.014 (0.005) ***	0.012 *
Income-related health mobility Index	-0.042 (0.006) ***	-0.053 (0.016) ***	0.011	-0.075 (0.008) ***	0.034 ***
Progressivity Index	0.633 (0.123) ***	0.336 (0.094) ***	0.297 **	0.340 (0.035) ***	0.293 ***
Scale Factor	-0.066 (0.010) ***	-0.157 (0.024) ***	0.091 ***	-0.221 (0.014) ***	-0.155 ***
Income-related health mobility (morbidity-related only)	-0.014 (0.004) ***	0.002 (0.008)	-0.016 *	-0.009 (0.004) **	-0.005
Income-related health mobility (mortality-related only)	-0.028 (0.005) ***	-0.055 (0.012) ***	0.027 **	-0.066 (0.007) ***	0.038 ***
Health-related income mobility Index	-0.016 (0.006) **	-0.042 (0.016) ***	0.026	-0.062 (0.009) ***	0.046 ***
Due to income re-ranking of those still alive	0.016 (0.004) ***	0.021 (0.006) ***	-0.006	0.014 (0.004) ***	0.002
Due to income re-ranking as the dead drop-out	-0.034 (0.005) ***	-0.068 (0.014) ***	0.035 **	-0.080 (0.008) ***	0.046 ***
Concentration Index of health changes	-0.633 (0.123) ***	-0.246 (0.053) ***	-0.386 **	-0.398 (0.037) ***	-0.234 **

Notes Bootstrap standard errors are based on 2000 replications are in parentheses
* 10% ** 5% *** 1% significance level from bootstrap sampling