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# Extended Abstract

In this paper we measure the extent of poverty and social exclusion in Australia using data from the Household, Income and Labour Dynamics in Australia (HILDA) Survey. For each individual we construct a measure of social exclusion that recognises its multidimensionality, including its potential variability in depth at a point in time and in persistence over time. We distinguish seven dimensions or domains, as proposed in Scutella *et al.* (2009): material resources; employment; education and skills; health and disability; social; community; and personal safety. For each of these seven domains, several indicators of social exclusion are produced. A simple 'sum-score' method is then used to estimate the extent or depth of exclusion, with our measure a function of (1) the number of domains in which exclusions is experienced, (2) the number of indicators of exclusion present within each domain, and (3) the length of time the indicators are present for the individual. We also implement the methods proposed by Capellari and Jenkins (2007) as an alternative to the simple summation approach and examine sensitivity of findings to alternative weighting regimes for the indicators.

Our 'sum-score' measure identifies 20 to 30 per cent of the Australian population aged 15 years and over as experiencing what we refer to as 'marginal exclusion' at any given point in time. Four to six per cent are 'deeply excluded', and less than one per cent are 'very deeply excluded'. Strong employment growth over the period 2001 to 2007 led to an associated fall in measured exclusion over this period. Groups found to be most prone to exclusion include: females, the young and the old, single parents, persons in regional areas, indigenous Australians, persons born in non-English speaking countries, persons in private rental accommodation, persons with a long term health condition and persons not completing secondary school (or its equivalent). Examination of household measures of exclusion further reveals a relatively high rate of exclusion for children under 15 years of age.

While there are commonalities in the demographic composition of the socially excluded and the income poor, we find some important differences. In particular, persons 65 years and over represent a much smaller share of the most 'excluded' group than they do of the 'poorest', while couple and single families with children represent a larger share of the most excluded than do the poorest. Our measure of exclusion also captures a larger share of persons with a long-term health condition than an income measure does. We furthermore find that relative income poverty remained broadly unchanged over the 2001 to 2007 period, whereas social

exclusion declined markedly, primarily due to the employment growth experienced in this period.

Cursory examination of the persistence of exclusion over time shows, as expected, that short-term exclusion is more frequent than long-term, persistent exclusion. However, there are significant sections of the population that experience exclusion for lengthy periods. For instance, we find that five per cent of the population face deep exclusion for three or more years. The proportion of children under 15 years of age persistently in deep exclusion is slightly smaller, but is nonetheless a cause for concern.

# 1. Introduction

In 2008, the Brotherhood of St Laurence and the Melbourne Institute of Applied Economic and Social Research formed a partnership to measure and monitor the extent and poverty and social exclusion in Australia taking a multidimensional approach. In early 2009 a proposed framework for undertaking this exercise was developed, full details on which are reported in Scutella *et al.* (2009). In the current paper, we report on the initial implementation phase of this project, in which we 'operationalise' the framework to produce measures of the extent and nature of poverty and social exclusion in Australia.

The motivation for this project is the widely shared view that income-based poverty concept is too narrow and simplistic. Socio-economic disadvantage is by its nature multidimensional and its extent, nature, causes and consequences cannot be understood merely by looking to the cash incomes of individuals' households. As Secretary to the Treasury Ken Henry recently stated,

> …the distributional goals of government must relate to a much broader concept of prosperity or wellbeing; one that goes well beyond standard inequality measures, or poverty lines constructs, based on crude statistical measures of dispersion around mean or median income. These traditional income based measures of poverty and disadvantage are just too simplistic for the task. The dispersion of money income is of consequence, to be sure, but it is not enough. (Henry 2007)

It is this perspective that underpins the analysis undertaken for this paper. Using a nationally representative household panel survey – the Household, Income and Labour Dynamics in Australia (HILDA) Survey – we construct a measure of social exclusion for each individual that recognises both its multidimensionality and its potential variability in both depth at a point in time and in its persistence over time. We distinguish seven dimensions or domains, as proposed in Scutella *et al.* (2009): material resources; employment; education and skills; health and disability; social; community; and personal safety. For each of these seven domains, various indicators of social exclusion are produced.

While our approach is premised on the multidimensionality of socioeconomic disadvantage, our purpose is to produce a single overall measure of the level of disadvantage, or social exclusion, experienced by the individual. Thus, a method is required for moving from a catalogue of indicators to a single index. The approach we take to estimate the extent or depth

of exclusion is a type of 'counting' or 'sum-of-scores' method, with the level of exclusion a function of (1) the number of domains in which exclusion is experienced, (2) the number of indicators of exclusion present within each domain, and (3) the length of time the indicators are present for the individual. We explore sensitivity of inferences to alternative weighting regimes for the domains and indicators within them – for example, increasing the relative weight assigned to material deprivation – and also examine how the level of exclusion as measured by the simple summation approach (which essentially tallies the number of indicators present for the individual) compares with the level of exclusion as measured by the 'item response model' method proposed by Capellari and Jenkins (2007).

The plan of the paper is as follows. In Section 2 we explain in general terms the method we adopt for measuring social exclusion. The HILDA Survey data we use is described in Section 3, while in Section 4 we provide full details on the individual indicators. Cross-sectional results on exclusion measured at the individual level are presented in Section 5 for persons over 15 years of age. In Section 6, cross-sectional results are presented for exclusion measured at the household level, which allows the inclusion in the analysis of children under 15 years of age. Persistence of poverty and social exclusion over time is briefly examined in Section 7, and conclusions and plans for future work are provided in Section 8.

## 2. Approach

### 2.1 Capturing multidimensionality

Our framework and subsequent measures build on work by Headey (2006) and Saunders *et al.* (2007) for Australia and are strongly influenced by recent international work on social exclusion; including Burchardt *et al.* (2002), Atkinson *et al.* (2002) and Levitas *et al.* (2007). Fundamentally motivating our approach is the goal of a better measure of the *extent* of socio-economic deprivation in Australia. Thus, the focus is on measures that capture participation in society, or the ability to participate. We emphasise that we are not aiming to understand causal relationships in this analysis, although we hope that the results help facilitate analyses of these causal relationships in the future.

The seven 'life domains' for the measurement of social exclusion in our framework comprise (1) material resources; (2) employment; (3) education and skills; (4) health and disability; (5) social; (6) community; and (7) personal safety. Table 1 lists the components of each domain proposed in Scutella *et al.* (2009) be examined. For each component, specific measures of

exclusion are produced, which collectively produce a measure of the overall extent and nature of exclusion for each individual. The measures we create are all binary indicators of exclusion – for example, an indicator equal to one if income is below a certain threshold and zero otherwise. These indicators are dependent on the data source used, and we defer discussion of the individual indicators until Section 4, after first discussing the data we use and our reasons for using it. We have, however, flagged in Table 1 the components for which no suitable measure is available in our chosen data source, the HILDA Survey.

Table 1: Domains of poverty and social exclusion in Australia and their components

| Domain | Components |
|---|---|
| Material resources | Household income |
| | Household net worth |
| | Household consumption expenditure |
| | Homelessness* |
| | Financial hardship |
| Employment | Paid work |
| | Unpaid work |
| Education and skills | Basic skills (literacy and numeracy) |
| | Educational attainment |
| | Lifelong learning |
| Health and disability | Physical health |
| | Mental health |
| | Disability or long-term health condition |
| Social | Institutionalisation/separation from family* |
| | Social support |
| | Participation in common social activities |
| | Internet access* |
| Community | Access to transport* |
| | Access to health, utilities and financial services* |
| | Neighbourhood quality |
| | Voter enrolment* |
| | Civic participation and voluntary activity/membership |
| Personal safety | Victim of crime |
| | Subjective safety |
| | Victim of discrimination* |

Note: * No indicator available in HILDA Survey data used for this paper.

## 2.2 'Sum-score' approach

To move from a number of separate indicators of exclusion across the seven domains to an overall measure of an individual's exclusion requires some form of aggregation across the indicators. As we have indicated, we are seeking to produce an overall measure that takes into account multidimensionality, depth at a point in time and persistence over time. With these considerations in mind, our overall measure of an individual's exclusion at a point in time is a function of the number of life domains in which exclusions is experienced and the number of

indicators of exclusion present within each domain. Persistence over time is then considered by using the longitudinal structure of the data we use to examine the length of time the indicators are present for the individual.

Our core approach is a simple summation – or 'sum-score' – approach that assigns equal weight to each of the seven life domains, on the implicit assumption that each is an equally important contributor to overall social exclusion. In a static or cross-sectional context, this is achieved by measuring the extent of exclusion of individual $i$ within each life domain, $x_{id}$, as equal to the proportion of indicators within the domain that are present, and measuring the overall extent of exclusion, $x_i^S$, as the sum of these 'scores' across the seven domains, i.e.,

$$x_i^S = \sum_{d=1}^{7} x_{id} \tag{1}$$

where $x_{id} = \dfrac{\sum_{k=1}^{K_d} x_{id}^k}{K_d}$, $x_{id}^k$ is a binary indicator reflecting the presence of indicator $k$ of social exclusion in life domain $d$ for individual $i$, and $K_d$ refers to the total number of indicators for domain $d$.

Taking the example of the material resources domain ($d$ = material resources) and assuming only one indicator for each component available in the HILDA data (such that the indicators consist of 'low income', 'low net worth', 'low consumption' and 'financial stress'), we have $K_{material\ resources} = 4$. An individual with all four indicators present has a score for the material resources domain of $x_{i\ material\ resources} = \dfrac{1+1+1+1}{4} = 1$, while an individual with only low income and no other indicator present has a score of $x_{i\ material\ resources} = \dfrac{1+0+0+0}{4} = 0.25$.

Since the proportion of indicators present for each domain lies between zero and one, the measured total extent of exclusion at a point in time has a maximum of seven and a minimum of zero.

To allow implementation of this approach, all indicators are designed so that any number of indicators of exclusion – from zero through to all of them – could be in principle be present for each domain. For example, for the employment domain, we distinguish long-term unemployment, current unemployment, marginal attachment and underemployment, and define four indicators such that all four are present for a long-term unemployed person, three

are present for a currently unemployed person who is not long-term unemployed, two are present for a marginally attached person, and only one is present for an underemployed worker. Full details on the construction of the indicators are presented in Section 4.

Atkinson (2003), among others, has discussed how multidimensional approaches to deprivation can be broadly classified as either 'union' or 'intersection' approaches. In essence, in the current context, the intersection approach requires all indicators to be present for a person to be excluded, while the union approach requires only that any one of the indicators be present for a person to be excluded. The approach taken in this paper has elements of both approaches. It is a union approach in the sense that the presence of any indicator indicates some degree of exclusion. It is an intersection approach in the sense that the depth of an individual's exclusion depends on the extent of intersection of indicators within that individual. We also note that our approach is a form of what Atkinson (2003) describes as 'counting' approaches, as opposed to 'social welfare function' approaches, such as adopted by Bourguignon and Chakravarty (1998a, 1998b, 2002).

### 2.3 Alternative weighting regimes

A key and potentially contentious issue concerns the relative weight assigned to each indicator, since some indicators may be regarded as more important to social exclusion than other indicators. For example, the information content is likely to vary across indicators. Our sum-score approach does not necessarily assign equal weight to each indicator, but it does give equal weight to each of the seven life domains and it gives equal weight to each indicator within a domain. This weighting scheme may not be considered appropriate. Most notably, income has long been considered a key determinant of economic wellbeing and there is a strong tradition of measuring poverty in terms of low income.

We therefore investigate sensitivity of estimates to alternative weighting regimes. First, we present estimates adopting an approach that creates a pre-eminent role for income, by specifying that income be below median income for an individual to be classified as excluded. That is, a pre-condition for social exclusion is that an individual have equivalent household income less than median equivalent income. The premise for this restriction is that those in the top half of the income distribution cannot be regarded as experiencing poverty or social exclusion. Under this measure, the pre-condition of income less than median income needs to be satisfied for the measure of overall social exclusion to exceed zero.

The choice of the median as the threshold may itself be controversial, but it has the appeal that a person can only be considered socially excluded if they are located in the bottom half of the income distribution. That is, the median threshold would seem to be something of a focal point. One alternative would be to choose an income poverty threshold (such as 60% of median income), but this is in our view too low a threshold, since it restricts the socially excluded to a subset of the income poor.

We additionally explore sensitivity of our aggregate measure of social exclusion to variations in the weight assigned to each life domain, although only in two limited ways. First, we examine the effects of doubling the weight assigned to the 'material resources' domain, the rationale being that access to material resources is more important to the ability to participate in the economic and social life of society than any other single factor. Second, we examine the effects of halving the weight assigned to the social, community and personal safety domains, on the basis that these are harder to objectively measure, and therefore the indicators we have for these domains are likely to have relatively lower information content on ability to participate.

### 2.4 Item response model

As a further test of sensitivity of inferences to the weighting scheme, we implement the methods proposed by Capellari and Jenkins (2007) as an alternative to the sum-score approach. Capellari and Jenkins estimate 'item response models' in the context of producing an overall measure of deprivation. The underlying premise is that the various indicators collectively provide information on a latent single-dimension deprivation measure, a premise that is consistent with our goal of producing an overall measure of social exclusion from a variety of indicators.

The Capellari and Jenkins (2007) one-parameter item response model takes the form:

$$I_{ik}^* = \gamma_k + X_i^* + \varepsilon_{ik},$$
$$I_{ik} = 1 \text{ if } I_{ik}^* > 0 \text{ and } I_{ik} = 0 \text{ otherwise} \tag{2}$$

where there are $k$ indicators for each individual $i$ and $X_i^*$ is the 'true' but latent measure of exclusion of individual $i$. The error terms $\varepsilon_{ik}$ are assumed to have a logistic distribution and the $X_i^*$ are assumed to be random individual effects. Estimation is thus analogous to a random effects logit model, with each individual having an observation for each indicator rather than an observation for each time period, and with $X_i^*$ equivalent to the unobserved

individual heterogeneity term. The predicted value of $X_i^*$ represents the estimated level of exclusion of individual $i$. Capellari and Jenkins (2007) refer to the $\gamma_k$ as 'intrinsic cheapness' parameters, with relatively common indicators having higher values of the parameter and therefore contributing less to the measured level of exclusion $X_i^*$.

The item response model approach can be conceived as a data-driven approach to determining the weight assigned to each indicator in constructing the overall index. In the above one-parameter model, weights are in essence determined by the relative prevalence of each indicator. This is both a strength and weakness of the approach. On the one hand, it allows the data to inform us regarding the independent information content of each indicator, which is inherently less arbitrary than, for example, assigning equal weight to each indicator. On the other hand, this can in fact lead to inappropriate weights. For example, the approach may give less weight to an indicator that is relatively prevalent, when in fact it could be that it is pivotal to the extent of exclusion and it is simply the case that empirically, in this time and place, it happens to be quite common.[1] In practice, Capellari and Jenkins find inferences are little-affected by whether a sum-score or item response model approach is taken.

### 2.5 Exclusion measured at the household level

As is common in household surveys, relatively little direct information is gathered by the HILDA Survey on children in the household under 15 years of age. This constrains the individual-level measures of exclusion that can be constructed for children under 15. Our analysis of individual-level exclusion therefore examines only persons over 15 years of age. Social exclusion is in any case not well defined at the personal level for children under 15, who are by law all in school, not employed and ineligible to vote.

Adverse consequences associated with social exclusion are of course very important for children, but it would seem that it is exclusion of the household in which they reside that is

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[1] Capellari and Jenkins (2007) also present a two-parameter item response model that allows for the implications of indicators for estimated exclusion to depend on correlations between the indicators. While this is a more sophisticated model for determining the weights assigned to each indicator, as a data-driven approach it is still potentially problematic. For example, indicators that are found to be highly correlated with each other may be given lower individual weight, on the basis they are "communicating the same information". They may in fact be communicating different information, but just happen to frequently coincide in the time and place under study. That is, the indicators may, in another time and place, be found not to coincide so frequently.

the most appropriate focus. In particular, a child's ability to participate is critically dependent on his or her parents' fortunes. We therefore construct a measure of household exclusion, defined as the average of the exclusion scores of all members of the household over 15 years of age. This measure is then assigned to every member of the household, including children, to examine the distribution of household exclusion across the entire population. That is, our analysis of exclusion among the entire population is conducted by defining an individual's exclusion to be the average level of exclusion of the household members over 15 years of age. Note that this approach has strong parallels with the approach taken in narrower income poverty analyses, in which it is the (equivalised) income of the household that is used to determine an individual's poverty status. The results of this analysis are presented in Section 6.

### *2.6 Persistence of exclusion*

Exclusion for a short period of time is not nearly of as much policy concern as persistent social exclusion. Uniquely among nationally representative data sources in Australia, the HILDA Survey data allow us to investigate the extent to which exclusion persists over time. Up to seven years of data are available for each sample member, facilitating examination of the persistence and recurrence of exclusion at the individual level. As we indicated in the introduction, we conceive of the total depth of exclusion experienced by an individual as the product of the extent of exclusion at a point in time and the length of time that exclusion persists. We therefore in Section 7 consider persistence in exclusion, albeit only in a cursory fashion. Persistence is a complex phenomenon that raises important methodological issues, and so we defer more comprehensive investigation of this dimension of exclusion to future research.


## 3. Data

Scutella *et al.* (2009) show that no one data source is able to comprehensively measure social exclusion in Australia across the range of dimensions proposed. The closest to doing so is the HILDA Survey, which is also the only available data source that is longitudinal. In related work conducted by the Australian Social Inclusion Unit (SIU) within the Department of Prime Minister and Cabinet, a variety of indicators of social exclusion are produced using several independent data sources. However, the SIU indicators are produced as independent community-level indicators, such as the proportion of persons with low income or the

proportion of persons in poor health. The purpose of our project is to measure poverty and social exclusion at the individual level. That is, we are interested in the experience of multiple dimensions of disadvantage within the one individual – for example, how many people have both low income and poor health. The SIU approach examines the incidence of low income and the incidence of poor health, but does not examine the incidence of the intersection of these two indicators.

Given our focus on measurement of exclusion at the individual level, we therefore use the HILDA Survey for our analysis. This data source is not only the best available for producing multi-dimensional measures of poverty and social exclusion for a nationally representative sample of the Australian population, it is also the only source that facilitates examination of the persistence of poverty and exclusion in the Australian community. Specifically, the data used for this study comprise the first seven waves of the HILDA Survey (Release 7.0), providing information collected annually over the period 2001 to 2007. Described in detail in Goode and Watson (2006), the HILDA Survey began in 2001 with 13,969 respondents in 7,682 households. Of these, 8,409 were interviewed in all seven waves, although the number of respondents in Wave 7 was 12,089 due to re-entry of Wave 1 respondents as well as new entrants to the sample between Waves 1 and 7 (for example, because an individual has joined a household containing a sample member or because a child of a sample member has turned 15 years of age).

Non-response rates are similar to those experienced by comparable household panel studies internationally, such as the British Household Panel Study (BHPS) and the German Socio-Economic Panel (GSOEP), but there are nonetheless some concerns about the ongoing representativeness of the sample. Rates of sample attrition are, for example, highest among persons who are young, living alone or in de facto relationships, born overseas and from a non-English-speaking background and who, at Wave 1, were living in Sydney. However, analysis by Watson and Wooden (2004) suggests that the impact of any resultant bias is, at least for the first few waves, likely to be relatively small.

There are limitations to using the HILDA data. As is almost always the case for household surveys, those at greatest risk of social exclusion – most notably the homeless and many of those living in institutions – are omitted entirely from the HILDA Survey sample. Other groups who might be expected to have higher rates of exclusion, including Indigenous Australians and recent immigrants, are also under-represented in the sample. These problems afflict other Australian household surveys and even the Census, but the under-representation

of recent immigrants is particularly acute in the HILDA Survey, which by design has a very low probability of including immigrants who arrived after the initial sample was selected in 2001.[2]

A further problem with the available data, that applies to all of the representative population based surveys, and even to the 1% Census sample, is that the sample sizes of those groups at risk of exclusion can be quite small, making it difficult to determine patterns in exclusion with any degree of accuracy. In addition, the data do not support analysis for specific regions smaller than capital city, balance of state or territory. As noted in Scutella *et al.* (2009), this limitation applies to all publicly-available unit record data in Australia.

## 4. Indicators

The indicators constructed for this study are based on the components identified in Scutella *et al.* (2009), although they are also a function of the information available in the HILDA data. We have, furthermore, attempted to follow the recommendations of Atkinson *et al.* (2002) that indicators be unambiguous, robust, responsive to policy without being subject to manipulation, consistent with international standards, balanced across the different dimensions and readily understood by lay members of the community.

Table 2 summarises the indicators we construct from the HILDA data. Not all indicators are available every wave and so we also provide information in the table on which waves the indicators are available. Table 3 further provides summary information on the number of indicators available in each domain in each wave. In total, there are 29 indicators across the seven life domains, although the number available in a given wave ranges from 23 (in Wave 1) to 27 (in Wave 6). Twenty-one indicators are available in all of the seven waves. The number of indicators within each domain ranges from as low as one to as high as five.

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[2] A sample top-up is planned for 2011 which would attempt to address this under-representation of immigrants.

Table 2: Indicators of poverty and social exclusion

| Domain | Component | Indicator | Waves available |
|---|---|---|---|
| Material resources | Household income | (1) Income less than 60% of median income | All waves |
| | Household net worth | (2) Household net worth less than 60% of median household net worth | Waves 2 and 6 |
| | Household consumption expenditure | (3) Consumption expenditure less than 60% of median consumption expenditure | Waves 6 and 7 |
| | Financial hardship | (4) Three or more indicators of financial stress | All waves |
| Employment | Paid work and unpaid work | (5) Long-term unemployed | All waves |
| | | (6) Unemployed | All waves |
| | | (7) Unemployed or marginally attached | All waves |
| | | (8) Unemployed, marginally attached or underemployed | All waves |
| | | (9) In a jobless household | All waves |
| Education and skills | Basic skills (literacy and numeracy) | (10) Low literacy | Wave 7 |
| | | (11) Low numeracy | Wave 7 |
| | | (12) Poor English proficiency | All waves |
| | Educational attainment | (13) Low level of formal education | All waves |
| | Lifelong learning | (14) Little or no work experience | All waves |
| Health and disability | General health | (15) Poor general health | All waves |
| | Physical health | (16) Poor physical health | All waves |
| | Mental health | (17) Poor mental health | All waves |
| | Disability or long-term health condition | (18) Has a long term health condition or disability | All waves |
| | | (19) Household has a disabled child | All waves |
| Social | Social support | (20) Little social support | All waves |
| | Participation in common social activities | (21) Get together with friends/relatives less than once a month | Waves 1 to 6 |
| Community | Neighbourhood quality | (22) Low neighbourhood quality | Waves 1 to 4, 6 |
| | | (23) Reported satisfaction with 'the neighbourhood in which you live' low | All waves |
| | | (24) Reported satisfaction with 'feeling part of local community' low | All waves |
| | Civic participation and voluntary activity/membership | (25) Not currently a member of a sporting, hobby or community-based club or association | All waves |
| | | (26) No voluntary activity in a typical week | All waves |
| Personal safety | Victim of violent crime | (27) Victim of physical violence in the last 12 months | Waves 2 to 7 |
| | Victim of property crime | (28) Victim of property crime in the last 12 months | Waves 2 to 7 |
| | Subjective safety | (29) Low level of satisfaction with 'how safe you feel' | All waves |

Table 3: Number of indicators in each life domain in each wave

| | Wave 1 | Wave 2 | Wave 3 | Wave 4 | Wave 5 | Wave 6 | Wave 7 | All waves |
|---|---|---|---|---|---|---|---|---|
| Material resources | 2 | 3 | 2 | 2 | 2 | 4 | 3 | 2 |
| Employment | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| Education and skills | 3 | 3 | 3 | 3 | 3 | 3 | 5 | 3 |
| Health and disability | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| Social | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 1 |
| Community | 5 | 5 | 5 | 5 | 4 | 5 | 4 | 4 |
| Personal safety | 1 | 3 | 3 | 3 | 3 | 3 | 3 | 1 |
| All domains | 23 | 26 | 25 | 25 | 24 | 27 | 26 | 21 |

Given the variation in the number of indicators available across waves, we produce two distinct series of estimates. The first uses all available indicators in each wave, and therefore provides for each wave the most complete information on poverty and social exclusion

possible for that wave. Differences across waves in measured social exclusion for this first series will reflect not only real changes over time in the level and incidence of exclusion, but also differences in the indicators available across waves. We therefore also produce a series that restricts to the 21 indicators available in all seven waves, thereby allowing investigation of not only changes over time in exclusion, but also persistence over time of exclusion at the individual level.

In the remainder of this section we provide details on the 29 indicators.

## Material resources domain

The material resources domain has considerable overlap with the income poverty conception of disadvantage. Depending on the wave, there are up to four indicators in this domain: low household income, low household net worth, low household consumption expenditure and experience of financial hardship. Each of these indicators corresponds to one component. No indicator is available for homelessness, one of the components identified for this domain in Scutella *et al.* (2009).

### (1) Household income

The income variable we use is annual disposable income of the household, adjusted for household composition using the modified OECD equivalence scale.[3] Under the OECD scale, per-adult equivalent household income is obtained by dividing total disposable income by one plus 0.6 for each member over 15 years of age after the first and 0.3 for each child under 15 years of age. For example, income is divided by 2.1 (1 + 0.6 + 0.3 + 0.3) for a family of two adults and two children under 15 years of age. By definition, every individual in the same

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[3] In future research we intend to explore the effect of including imputed rent from owner-occupied housing, public housing and rent free housing. A candidate strategy for owner-occupied housing is to compute imputed rent on owner-occupied housing as equal to five per cent of the difference between the estimated house value and the remaining mortgage principal. For public housing, one possible strategy is to follow the ABS approach taken in *Government Benefits, Taxes and Household Income* (Catalogue No. 6537.0), which imputes rent based on the difference between the public housing rent paid and median rent in the private market for the location, type of dwelling and number of bedrooms. Median market rents for the 2001 and 2006 waves can be obtained from the Censuses, with estimates for other waves adjusted according to the ABS rent CPI (Table 14 of 6401.0). An alternative approach for public housing is to estimate the difference between rents paid by public housing residents and the rents of income support recipients renting in the private market. We are yet to determine a strategy for free accommodation.

household is assigned the same equivalent income. Thus, the income of a household with four members is counted four times. The indicator for 'low income' applies if equivalised income is less than 60% of the median equivalised income in the population, which is an income poverty standard adopted by the European Union (see, for example, Eurostat 2009). Note that the median relates to the median person, not the median household; it is obtained by sorting all members of the population, including children under 15 years of age, from lowest to highest equivalised income.

*(2)   Household wealth*

Household wealth has been obtained in Waves 2 and 6 of the HILDA Survey and it is intended to be measured every four years thereafter. In these waves, household members are asked to provide detailed information on most assets and debts.[4] Asset components include housing, motor vehicles, shares, superannuation, bank accounts and businesses owned. Debt components include home loans, other loans, HECS debt, unpaid credit card debt and unpaid bills. A measure of total wealth – or net worth – can thus be constructed as equal to the sum of all assets less the sum of all debts.

The indicator for low wealth is defined in an analogous manner to the indicator for low income: equivalised household wealth less than 60% of median equivalised household wealth. As with income, we equivalise wealth using the modified OECD scale. There is no established basis for equivalising wealth, but the rationale for our doing so is that wealth can be interpreted as delivering income, either in-kind or via capital gains (whether realised or not—neither realised or unrealised capital gains are treated as income in HILDA or ABS household surveys). On the assumption that the implicit income from wealth is directly proportional to the value of net worth – that is, a fixed percentage of net worth – it is appropriate to apply an equivalence scale. Like with income, equalised household net worth is assigned to each individual in the household (including children under 15 years) and the median is obtained by sorting all individuals from lowest to highest net worth.[5]

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[4] The most important omission is consumer durables, which are reportedly difficult for respondents to value.

[5] In future work, in which imputed rental income is included in our income measure, it will be appropriate to measure net worth exclusive of net home worth – that is, excluding the value of the primary residence and the value of loans secured against the home.

*(3) Household expenditure*

As argued by Headey (2008), low consumption expenditure may be used as an indicator of poverty, and is valuable in the context of imperfections in measured income. For example, a person may report low income but have relatively high consumption because of inter-household transfers. We define an indicator for low consumption expenditure to be present if equivalised consumption expenditure is less than 60% of median equivalised consumption expenditure, where equivalisation is via the OECD equivalence scale.

Household expenditure data is available in Waves 5, 6 and 7 of the HILDA Survey, although the Wave-5 data is not comparable with the later data due to large changes in the questionnaires. We therefore restrict the indicator to Waves 6 and 7. Even in these two waves, in common with all household surveys that measure expenditure, complete consumption expenditure data is not available. Consumption of durables cannot be estimated without complete information on stocks of goods and claims on services, while some non-durable consumption items are very difficult to measure with any precision (for example, gambling expenditure).

In estimating consumption expenditure, we follow the approach of Crossley and Pendakur (2006) and focus on producing a measure of *non-durable* consumption expenditure. This involves aggregation of 22 data items: groceries; alcohol; cigarettes and tobacco; public transport and taxis; meals eaten out; motor vehicle fuel; men's clothing and footwear; women's clothing and footwear; children's clothing and footwear; telephone rent, calls and internet charges; holidays and holiday travel; private health insurance; other insurance; fees paid to health practitioners; medicines, prescriptions, pharmaceuticals and alternative medicines; electricity bills, gas bills and other heating fuel; home repairs, renovations and maintenance; motor vehicle repairs and maintenance; education fees; rent on housing; imputed rent on owner-occupied housing; and child care. Imputed rent for owner-occupiers is calculated as 5% of the householder's estimated value of the home.

*(4) Financial Hardship*

Experience of financial hardship, or financial stress, refers to an inability to meet basic financial commitments because of a shortage of money. Measures of financial stress therefore provide direct evidence on the adequacy of economic resources of individuals and households. In all of the first seven waves of the HILDA Survey, respondents have been asked if, because of a shortage of money, in the current calendar year they:

1. Could not pay electricity, gas or telephone bills on time;

2. Could not pay the mortgage or rent on time;

3. Pawned or sold something;

4. Went without meals;

5. Were unable to heat the home;

6. Asked for financial help from friends or family;

7. Asked for help from welfare or community organisation.

The incidence of financial stress may be quite divergent from the incidence of low income poverty, which could be interpreted as suggesting that, for some people, financial hardship reflects a budgeting or money management problem, rather than inadequacy of income. However, it should be noted that expenses to meet basic needs can vary substantially across individuals. For example, a person with a long-term health condition may genuinely experience financial hardship without being classified as income poor or being a bad manager of money. Similarly, certain significant life events—in particular unforseen adverse events such as injury—may result in financial problems for people who are not classified as income poor.

We define individuals as in financial hardship if they reported experiencing three or more of the above seven indicators of financial stress.

**Employment domain**

Although paid employment is a key determinant of income, at least for working age persons, the employment domain is treated as distinct from the material resources domain because of the importance of employment to social inclusion beyond its financial benefits. Most notably, unemployment is associated with adverse effects that extend beyond lack of income. Our indicators for employment-related social exclusion comprise a 'set' of connected indicators based on an individual's labour force status, as well as an additional indicator for joblessness of the entire household.

The indicators based on an individual's labour force status are applied to all persons aged 15 years over. The states distinguished are long-term unemployed, unemployed, marginally attached and underemployed. Unemployment, marginal attachment and underemployment are mutually exclusive states and do not correspond to equivalent levels of employment exclusion. For example, unemployment clearly represents greater exclusion from employment than does underemployment. We address this by creating four 'nested' indicators of

employment exclusion, such that the long-term unemployed are deemed to have all four indicators present, other unemployed persons have three indicators present, the marginally attached have two indicators present and the underemployed have one indicator present. This reflects our assessment of the ordering of the extent of employment exclusion across the four states.

In Scutella *et al.* (2009), two broad components of the employment domain were identified: paid work and unpaid work. We do not explicitly examine unpaid work, but the above indicators essentially combine together paid and unpaid work by defining employment exclusion in terms of inability to achieve *desired* levels of paid employment. Thus, some degree of employment-related social exclusion arises if a person is unemployed, underemployed or marginally attached to the labour force, but not if that person is not employed and doesn't want paid work. Implicit is the assumption that a person is undertaking (sufficient) unpaid work if that person is not in paid employment and is not marginally attached to the labour force.[6]

There have been proposals to include indicators seeking to capture in-work exclusion resulting from poor job quality. For example, Levitas *et al.* (2007) include such indicators in their framework. However, we do not include specific indicators to capture job quality. While decent work is clearly important to quality of life, and is a legitimate policy concern, our view is that it is a somewhat distinct issue from that of social exclusion. Note that some of our other indicators will in any case capture adverse effects of poor job quality. For instance, in-work poverty will be captured by the material deprivation indicators, insufficient hours of work will be captured by the underemployment measure, and adverse effects of excessive hours of work may be captured by the indicators for social participation.

*(5) Long-term unemployed*

An individual is defined to be long-term unemployed if currently unemployed (not employed in the last week, looked for work within the last four weeks, and available to start work in the last week) and has been unemployed for the preceding twelve months. The measure is based on currently-reported labour force status as well as the respondent's recollection of labour force status in each third of the month for the preceding twelve months. Unlike current

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[6] Note also that an indicator for voluntary activity is included as part of the community life domain.

unemployment status, unemployment over the preceding twelve methods is based simply on the respondent's own interpretation of the term 'unemployed'.

### (6) Unemployed

This is defined as a situation in which the individual is not currently employed (has not worked in the last week), has looked for work within the last four weeks, and was available to start work in the last week.

### (7) Marginally attached

A person is marginally attached to the labour force if that person is not employed and is either (i) looking for work and, while not available to start within one week, is available within four weeks; or (ii) available to start work within four weeks but is not looking for work because of the belief that he or she is unlikely to find work. This indicator is equal to one if the individual is marginally attached or unemployed.

### (8) Underemployed

A person is underemployed if currently employed part-time (usual weekly hours of employment in all jobs are less than 35) and hours per week usually worked in all jobs are less than the hours the individual would like to work, having regard to the effect this would have on income. The indicator is equal to one if the individual is underemployed, marginally attached or unemployed.

### (9) Household joblessness

A person resides in a jobless household if no member of the household is in paid employment and at least one member is of 'working age' (defined to be 15-64 years). This indicator captures exclusion associated with non-employment, irrespective of whether it is involuntary or not, on the grounds that the absence of any connection to the labour market by any household member contributes to social exclusion of all members. This may be particularly relevant to children, for example, because they lack an employed role model in the household.

**Education and skills domain**

Education and skills provide information on an individual's human capital. Three components were identified in Scutella *et al.* (2009) for this domain: basic skills (literacy and numeracy), educational attainment and lifelong learning. There are three indicators for basic skills – low literacy, low numeracy and low English language proficiency – although the literacy and numeracy indicators are only available in Wave 7. There is one indicator for low educational

attainment. There is also one indicator which has some connection to 'lifelong learning': low levels of work experience.

*(10)  Literacy*

In Wave 7, respondents were asked 'Thinking about the needs of your daily life, both at work and at home, how would you rate your reading skills in English? Would you say your reading skills are excellent, good, moderate or poor? We define a person to have a low level of literacy if that person reported having poor reading skills.

*(11)  Numeracy*

Similar to the question on literacy, respondents were also asked in Wave 7 'Thinking about the needs of your daily life, both at work and at home, how would you rate your mathematical skills? Would you say your skills are excellent, good, moderate or poor? We define a person to have a low level of numeracy if that person reported having poor mathematical skills.

*(12)  English proficiency*

An indicator of low English proficiency is defined to be present if the individual speaks a language other than English at home and reports that he or she does not speak English well or does not speak English at all.

*(13)  Formal education*

The indicator for low formal educational qualifications is a situation in which an individual is not currently studying full-time and has a highest educational qualification of less than high school completion. Vocational qualifications at the levels of Certificate 1 and Certificate 2 are treated as lower level qualifications than high school completion.

*(14)  Work experience*

As with formal education, the accumulation of work experience is associated with increases in skills, not only because of on-the-job training, but also because of more general acquisition of knowledge and skills in the course of carrying out a job. The first time a respondent is interviewed for the HILDA Survey, detailed information is collected on work history, allowing estimation of the number of years spent in paid employment. This information is then updated annually based on reported labour market activity in the period between interviews. We define a person to have low work experience if he or she has spent fewer than three years in paid employment.

**Health and disability domain**

Health and disability can also be conceived as representing a form of human capital, but they can contribute to social exclusion in other ways. For example, in addition to adversely impacting on productivity, disability can raise the costs of achieving a given level of inclusion because of the need for aids, equipment, medical services and so on. Poor health and disability can also be products of social exclusion. The specific components for which indicators are produced comprise measures of general health, physical health and mental health, and measures of disability – both of the individual and of children in the household. The health measures are all from the SF-36 health survey (Ware *et al.* 1993), a 36-question survey administered each wave in the self-completion questionnaire of the HILDA Survey.

*(15) General health*

An indicator of low general health is defined based on the SF-36 general health sub-scale, which is derived from respondent answers to five questions. One question asks respondents to rate their health on a scale of excellent, very good, good, fair or poor, while the other questions take the form of statements, for each of which respondents are asked to indicate whether the statement is 'definitely true', 'mostly true', 'don't know', 'mostly false', or 'definitely false'. The statements are 'my health is excellent', 'I am as healthy as anybody I know', 'I seem to get sick a little easier than other people', and 'I expect my health to get worse'. Responses are transformed to a combined score that ranges between 0 and 100. Higher scores correspond to better general health.

There is no universal standard for defining a threshold score below which a person is regarded as in poor health. We adopt a threshold of 50, which is relatively commonly used in studies and has the intuitive appeal of being half the maximum possible score.

*(16) Physical Health*

We base our indicator of low physical health on the SF-36 physical health sub-scale, which comes from respondent answers to ten of the SF-36 health survey questions. Respondents are asked to indicated whether they are limited a lot, limited a little, or not limited all in each of ten activities: (1) Vigorous activities, such as running, lifting heavy objects, participating in strenuous sports; (2) Moderate activities, such as moving a table, pushing a vacuum cleaner, bowling, or playing golf; (3) Lifting or carrying groceries; (4) Climbing several flights of stairs; (5) Climbing one flight of stairs; (6) Bending, kneeling, or stooping; (7) Walking more than one kilometre; (8) Walking half a kilometre; (9) Walking 100 metres; and (10) Bathing

or dressing yourself. Responses are transformed to a combined score that ranges between 0 and 100. Higher scores correspond to better physical functioning.

As with the general health sub-scale, in the absence of a universal standard for defining a threshold score for physical functioning, below which a person is regarded as having poor functioning, we adopt a threshold of 50.

### (17) Mental Health

The indicator for low mental health comes from the SF-36 mental health sub-scale, which is derived from five of the SF-36 health survey questions. Respondents are asked how much of the last four weeks (all of the time, most of the time, a good bit of the time, some of the time, a little bit of the time, or none of the time) 'have you been a very nervous person', 'have you felt so down in the dumps that nothing could cheer you up', 'have you felt calm and peaceful', 'have you felt downhearted and blue', and 'have you been a happy person'. Responses are again transformed to a combined score that ranges between 0 and 100, higher scores corresponding to better mental health.

As with the general health and physical functioning sub-scales, we adopt a threshold of 50 for defining poor mental health.

### (18) Disability

Our indicator of disability is based on whether an individual reports a long-term health condition, impairment or disability that restricts everyday activities, and has lasted or is likely to last for six months or more. The HILDA Survey lists 17 items which are presented to respondents as examples of long-term conditions, impairments or disabilities. Comparisons with ABS data from the Survey of Disability, Ageing and Carers suggest that the HILDA Survey definition produces a relatively high rate of disability in the community. We considered the additional criterion that the condition(s) limit the type or amount of work the individual can do. However, this would seem to be unnecessarily narrowing the type of exclusion that the variable can capture, since disability is likely to be associated with exclusion from participation in non-employment activities, such as social activities.

### (19) Household with a disabled child

Caring responsibilities associated with having a child with a disability can be a source of social exclusion, because of the time requirements of care, the financial cost of care and possibly even physical constraints, for example if a child is wheel-chair bound. We define this

indicator to be present if any children under 15 years of age in the household have a disability (as reported by a single household member, who is usually the primary carer of the children).

**Social domain**

The social domain refers to individuals' interactions with and support from their families, friends and society more generally. While it is clearly an important dimension of social inclusion – indeed, it could be viewed as the *defining* dimension – it is somewhat more difficult to objectively measure than the first four domains. With this significant constraint in mind, and the additional constraint that an objective measure be available in the HILDA Survey data, we adopt a limited number of indicators in this domain. Scutella *et al.* (2009) listed four components of the social domain, but only for two of these – social support and participation in common social activities – do we produce indicators. No indicators are produced for the 'institutionalisation/separation from family' and 'internet access' components.

*(20) Social Support*

Our indicator of low social support is based on transformed scores for ten items that describe the amount of support received from other people. The self-completion questionnaire in HILDA obtains from respondents their extent of agreement, on a seven-point scale (ranging from 1 for strongly disagree through to 7 for strongly agree), with ten statements about how much support they receive from other people. The statements are: (1) People don't come to visit me as often as I would like; (2) I often need help from other people but can't get it; (3) I seem to have a lot of friends; (4) I don't have anyone I can confide in; (5) I have no one to lean on in times of trouble; (6) There is someone who can always cheer me up when I'm down; (7) I often feel very lonely; (8) I enjoy the time I spend with the people who are important to me; (9) When something's on my mind, just talking with the people I know can make me feel better; and (10) When I need someone to help me out, I can usually find someone. The scales for items (1), (2), (4), (5) and (7) are inverted so that a higher score corresponds to greater social support for every item. Thus, the maximum score is 70 and the minimum score is 10.

A score less than 30 is interpreted as a situation of low social support, since on average the respondent is agreeing with statements reflecting the absence of social support and disagreeing with statements reflecting the presence of social support.

(21) *Participation in common social activities – Frequency get together with friends/relatives*

In Waves 1 to 6, the self-completion questionnaire contains the question 'In general, about how often do you get together socially with friends or relatives not living with you?' Seven response categories are offered: every day; several times a week; about once a week; two or three times a month; about once a month; once or twice every three months; and less often than once every three months. We classify persons who select either of the last two responses – that is, get together with friends or relatives less than once per month – as excluded on this indicator.

**Community domain**

The sixth domain, community, encompasses access to community services, institutional resources, neighbourhood quality, and political and civic participation. Scutella *et al.* (2009) propose that, in the context of a focus in social exclusion in modern-day Australia, the components be limited to access to transport, access to health, utilities and financial services, neighbourhood quality, voter enrolment, civic participation and voluntary activity/membership. Using the HILDA Survey data further limits the components for which indicators are produced to neighbourhood quality, civic participation and voluntary activity. Three indicators of poor neighbourhood quality, one indicator of low civic participation and one indicator of low voluntary activity are produced.

(22) *Neighbourhood quality – Perceptions of neighbourhood characteristics*

There is a ten-item question in the self-completion questionnaire of Waves 1 to 4 and Wave 6 of the HILDA Survey about how common various phenomena are in the local neighbourhood, with response options 'never happens', 'very rare', 'not common', 'fairly common', 'very common', and 'don't know'. The ten aspects are (1) Neighbours helping each other out; (2) Neighbours doing things together; (3) Loud traffic noise; (4) Noise from airplanes, trains or industry; (5) Homes and gardens in bad condition; (6) Rubbish and litter lying around; (7) Teenagers hanging around on the streets; (8) People being hostile and aggressive; (9) Vandalism and deliberate damage to property; and (10) Burglary and theft. Items (1) and (2) are positive neighbourhood attributes, while the remainder would generally be regarded as negative aspects. A scale running from 1 to 5 is adopted, whereby a higher value corresponds to better neighbourhood quality – consequently, the response 'very common' attracts a score of 5 for items (1) and (2) but a score of 1 for the remaining items. The aggregate score

potentially ranges from 10 to 50. A threshold of 20 for defining low neighbourhood quality is adopted, implying that on average the individual regards negative aspects as fairly or very common, and positive aspects as very rare or never happening.

*(23) Neighbourhood quality – Satisfaction with neighbourhood*

Reported satisfaction with 'the neighbourhood in which you live' is rated by HILDA Survey respondents on a scale from 0 (completely dissatisfied) to 10 (completely satisfied). A value of less than 5 is taken to denote a low level of satisfaction with the neighbourhood

*(24) Neighbourhood quality – Feeling part of community*

Satisfaction with 'feeling part of your local community' is rated on the same 11-point scale as satisfaction with neighbourhood. As with neighbourhood satisfaction, a value of less than 5 is taken to denote a low level of satisfaction with feeling part of the local community.

*(25) Civic participation – Membership of clubs or associations*

Civic participation broadly defined is not measured by the HILDA Survey, but one indicator for civic participation is provided by a question on whether the respondent is a member of a sporting, hobby or community-based club or association. Low civic participation is indicated by an individual not being a member of any such body.

*(26) Civic participation – Voluntary activity*

Each wave, the self-completion questionnaire obtains estimates of the total time spent in a typical week on each of nine activities. One of these activities is 'volunteer or charity work (for example, canteen work at the local school, unpaid work for a community club or organisation)'. We use this information to define an indicator that is present if an individual spends no time on volunteer or charity work in a typical week and is not in paid employment or studying (full-time or part-time).

**Personal safety domain**

The last domain is labelled 'personal safety'. Here we have in mind the actual experience of breaches of personal safety, or perceptions of lack of safety, which are likely to provide very important information on the extent of participation. Being exposed to crime or discrimination can impact on a person's participation in a range of economic, social, civic or political activities and thus has been identified as a distinct life domain relevant to social inclusion. Scutella *et al.* (2009) list three components: victim of crime, subjective safety and victim of

discrimination. Indicators for the first two components are available in the HILDA data, but there is no information on experience of discrimination available.[7]

### (27) Victim of violent crime

From Wave 2 onwards, the self-completion questionnaire asks whether each of 21 major life events has occurred in the last 12 months. One of these events is 'victim of physical violence (e.g., assault)'. We define an indicator for experience of this event.

### (28) Victim of property crime

Similar to the indicator for violent crime, from Wave 2 onwards an indicator for experience of property crime can be produced. Specifically, this indicator is present if the respondent reports being a 'victim of a property crime (e.g., theft, housebreaking)' within the preceding 12 months.

### (29) Subjective safety

An indicator for low perceived personal safety is derived from the reported level of satisfaction with 'how safe you feel', which is rated on a scale from 0 (completely dissatisfied) to 10 (completely satisfied). A score less than 5 is taken to indicate low perceived safety.

It would be preferable to have available how safe the individual actually feels, rather than how satisfied that person is with the perceived level of safety. However, in practice, the question probably amounts to the same thing, since a person satisfied with how safe he or she feels is unlikely to think he or she is unsafe, while a person dissatisfied with how safe he or she feels is unlikely to think he or she is safe.

**Prevalence of each indicator**

Table 4 presents, for each of the 29 indicators, the proportion of individuals with the indicator present. The estimates are for all waves (2001 to 2007) pooled, with rates calculated over only those waves in which the indicator is available. For example, the proportion with low wealth is calculated using only data from Waves 2 and 6.[8] The table shows that the incidence of each

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[7] Questions on experience of job discrimination were introduced in Wave 8, data from which will become available in 2010.

[8] Estimates broken down by wave presented in Table A1 in the Appendix.

indicator varies, with certain indicators such as long-term unemployment, little social support, low neighbourhood quality and victim of violence affecting very small proportions of the population (0.6, 1.4, 1.6 and 1.6 per cent respectively), while others such as low wealth and low formal education affect more than one-third of the population. In our study we wish to examine whether the incidence of these indicators of disadvantage are felt by the same people or not. We turn to this in the next section.

Table 4: Incidence of each individual indicator of poverty and social exclusion – All waves pooled – Population aged 15 years and over (%)

| Material resources domain | | Health domain | |
|---|---|---|---|
| Low income | 19.9 | Poor general health | 18.3 |
| Low net worth | 38.0 | Poor physical health | 10.9 |
| Low consumption | 12.8 | Poor mental health | 10.0 |
| In financial hardship | 6.3 | Long-term health condition | 26.2 |
| **Employment domain** | | Disabled child in the household | 3.6 |
| Long-term unemployed | 0.6 | **Social domain** | |
| Unemployed | 3.4 | Little social support | 1.4 |
| Underemployed or unemployed | 9.7 | Infrequent social activity | 10.6 |
| Marginally attached, underemployed or unemployed | 16.5 | **Community domain** | |
| In a jobless household | 12.2 | Low neighbourhood quality | 1.6 |
| **Education and skills domain** | | Low satisfaction with neighbourhood | 4.5 |
| Low literacy | 3.1 | Low satisfaction with feeling part of community | 13.9 |
| Low numeracy | 4.6 | Low civic participation – membership | 18.8 |
| Poor English proficiency | 2.7 | Low civic participation – voluntary activity | 23.3 |
| Low formal education | 36.2 | **Personal safety domain** | |
| Little work experience | 11.3 | Victim of violence | 1.6 |
| | | Victim of property crime | 5.1 |
| | | Low subjective safety | 4.3 |

# 5. Individual-level measures of exclusion

## 5.1 Overall extent of social exclusion

In this section, we provide a relatively succinct presentation of cross-sectional findings on the level and demographic incidence of social exclusion among the population aged 15 years and over when measured at the individual level. We begin by describing the distribution of our overall measure – the 'sum-score'. Figure 1a presents histograms of the sum-score distribution in each wave using all indicators available in the wave, while Figure 1b presents a histogram of the distribution for all waves combined restricting to the 21 indicators available in all seven waves. All of the histograms have a bin width of 0.2, meaning each bar

corresponds to a sum-score range of 0.2 – for example, the first bar gives the percentage of individuals with a sum-score less than 0.2.

Figure 1a: Distribution of sum-score using all available indicators
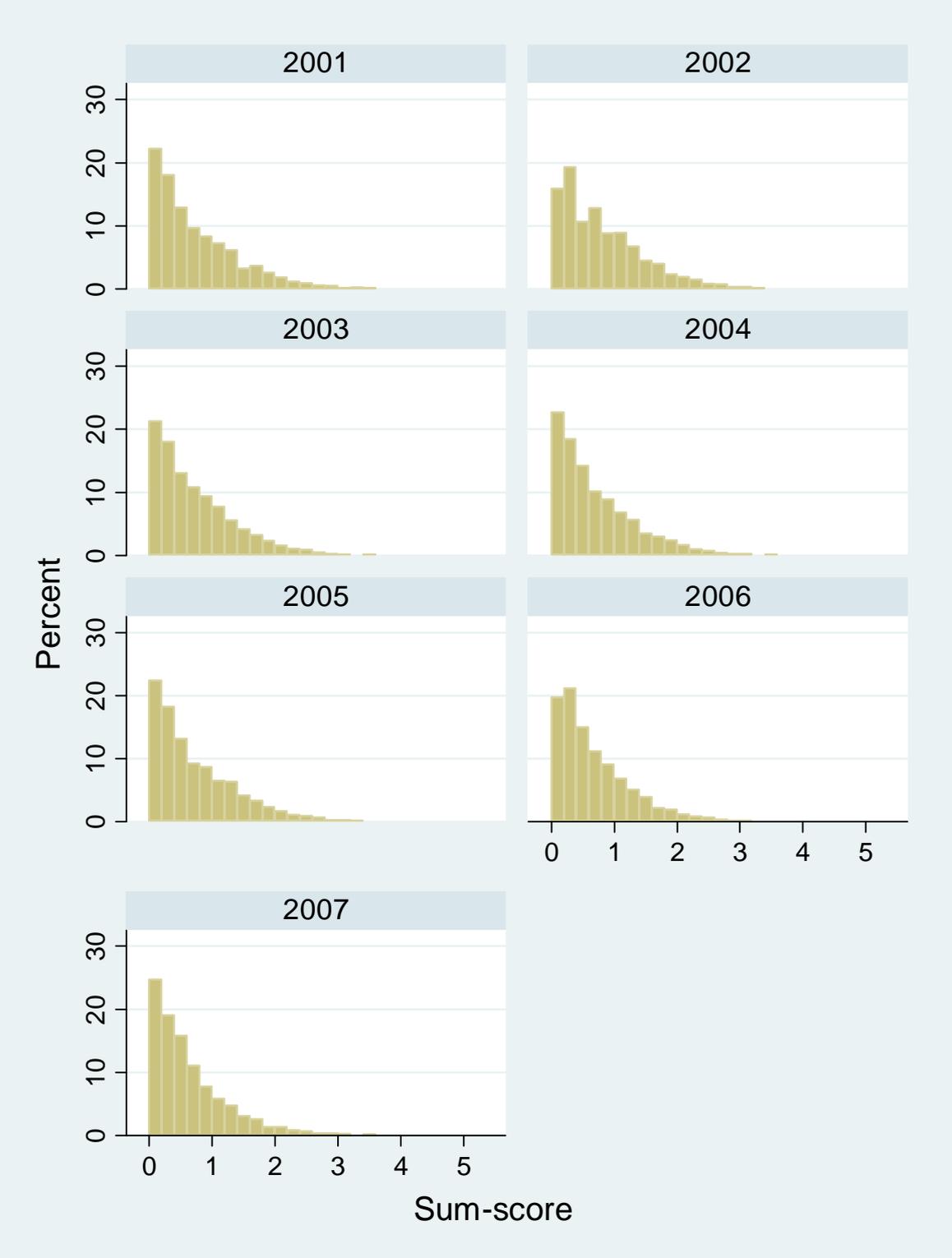
Figure 1b: Distribution of sum-score using indicators common to all waves (all waves pooled)
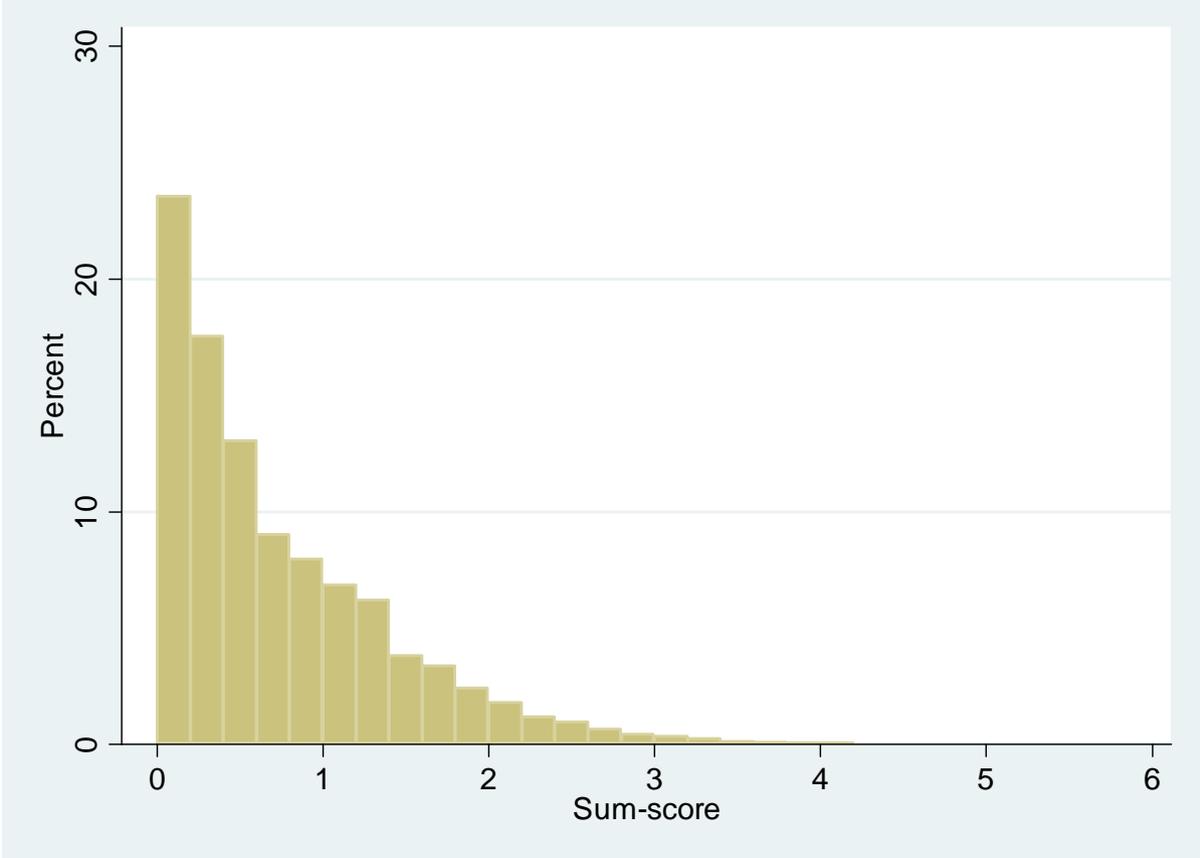


All figures show the proportion of the population in each sum-score range is generally declining in the sum-score, with the rate of decline itself declining as the sum-score increases. Most individuals have a sum-score less than 1, and few people have a sum score greater than 2. Almost no one has a score greater than 3. Comparing across the seven waves when all available indicators are used, patterns are similar with the notable difference being that in Waves 2 and 6, the proportion with a sum-score in the 0.2-0.4 range is higher than the proportion in the 0-0.2 range. This reflects the effects of the 'low wealth' indicator, which is present for a relatively high proportion of the population and is only available in Waves 2 and 6.

Figure 2 plots the percentage of the population aged 15 years and over that can be classified as 'excluded' in each wave for alternative sum-score thresholds used to define exclusion. The thresholds are 1, 2 and 3. One interpretation of these thresholds is that they represent progressive increases in depth of exclusion as we move from the first threshold to the third threshold. Thus, the proportion with a sum-score greater than 1 can be viewed as the proportion experiencing marginal or worse exclusion, while the proportion with a sum-score greater than 2 or 3 can be viewed as the proportion experiencing deep and very deep

exclusion respectively. Similar to Figure 1, Panel (a) of Figure 2 presents results when all available indicators are used in each wave and Panel (b) presents results when only indicators common to all waves are used. Differences across waves shown in Panel (a) derive from both changes in the level of exclusion and differences across waves in the indicators available, whereas differences across waves in Panel (b) reflect only changes in the level of exclusion over time.

Panel (a) of Figure 2 shows between 20-30 per cent of the population 15 years and over experiencing what we refer to as marginal exclusion or worse (i.e. a score of at least one)  at any given point in time over the 2001 to 2007 time period. Four to six per cent were deeply excluded with a score of at least two, and less than one per cent was very deeply excluded with a score of at least three.

The differences in exclusion across the seven waves evident in Panel (a) of Figure 2 will at least in part reflect differences in the indicators available in each wave. Panel (b) of Figure 2 presents the proportions above each of the three sum-score thresholds when we restrict to the 21 indicators common to all waves. It is clear that the spikes in exclusion apparent in 2002 and 2005 in Panel (a) are caused by the inclusion/exclusion of important indicators in these years. Specifically, the inclusion of wealth in 2002 and the lack of neighbourhood quality information in 2005 appear to be responsible for the spikes. Note that a similar spike as occurred in 2002 did not occur in 2006, when information on wealth also appeared. This would appear to reflect offsetting effects of the inclusion of an indicator for consumption expenditure in the material resources domain.

Figure 2: Rates of exclusion

(a) All indicators
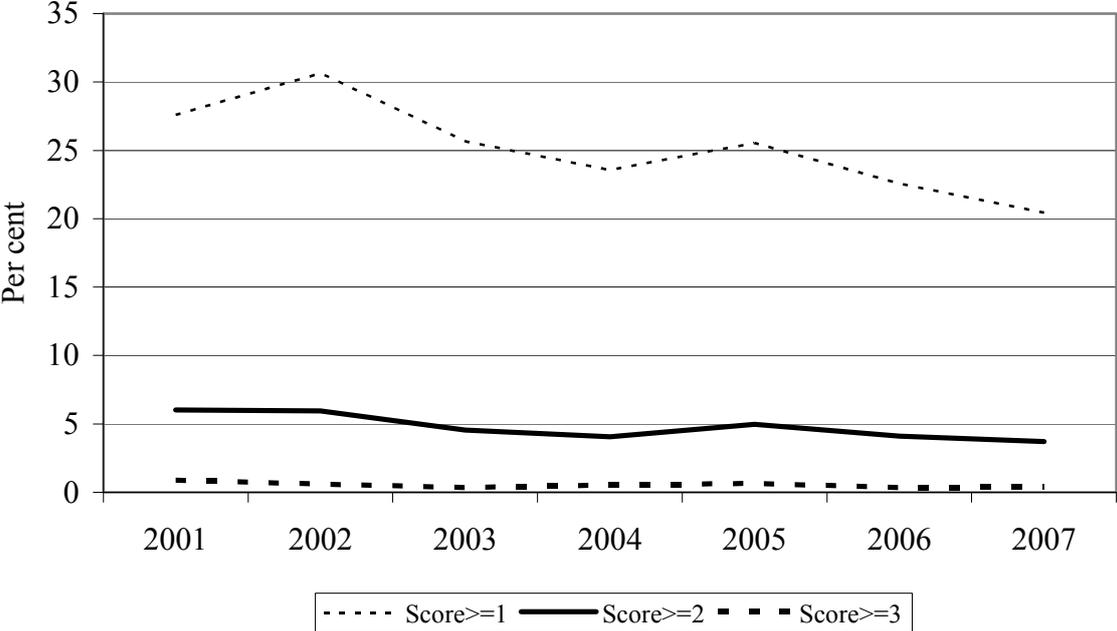


(b) Common indicators
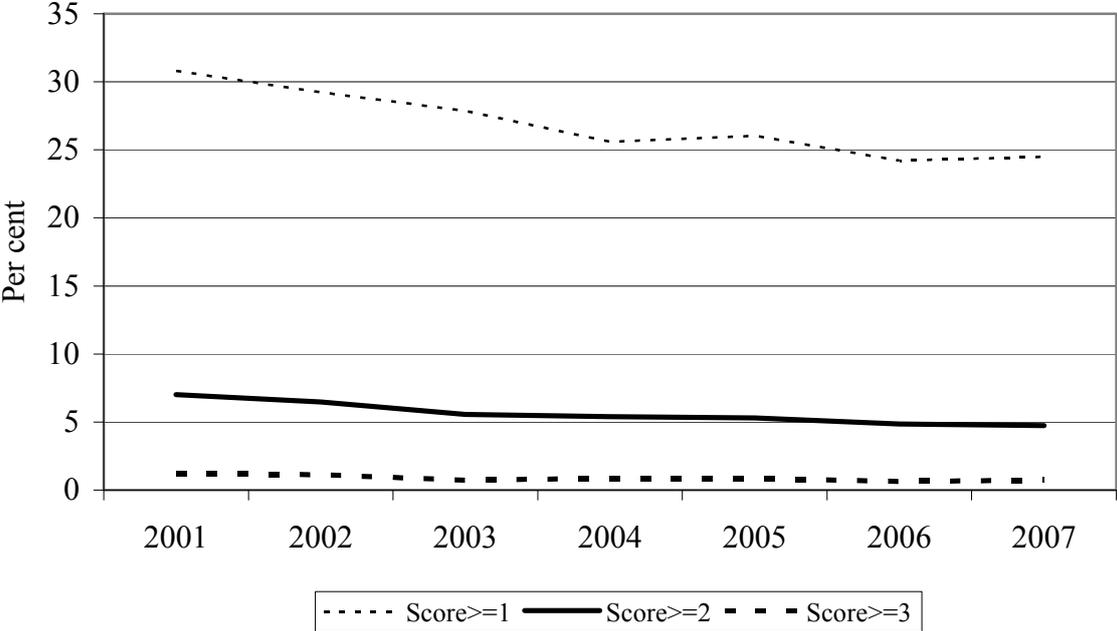


Panel (b) of Figure 2 also shows that the incidence of social exclusion declined over the seven-year period spanned by the HILDA data. This is perhaps unsurprising in the context of the strong economic and employment growth experienced by Australia over the 2001 to 2007

period. Employment growth in particular is likely to have been important to the reduction in social exclusion – that is, favourable business cycle conditions have been an important factor. However, we also note that Berthoud *et al.* (2004) have found, in a more general sense, that measured exclusion or deprivation tends to decline over time as living standards improve. The components of the social exclusion measure that are 'absolute' as opposed to 'relative' in nature predispose it to progress over time, in much the same way as adoption of an absolute poverty standard tends to result in declining poverty rates over time. The response of Berthoud *et al.* (2004) was to standardise sum-scores by subtracting from each individual's sum-score the mean sum-score for that year and dividing the result by the standard deviation of the sum-score for that year. We have not similarly standardised sum-scores, since this defeats a key purpose of tracking performance on social exclusion over time.

### *5.2 Demographic incidence of exclusion*

Tables 5 and 6 present rates of exclusion across groups defined by demographic characteristics – namely, sex, age, location of residence, household type, country of birth and Indigenous status, housing situation, disability status and educational attainment. Table 5 presents the proportions with a sum-score in excess of 1, corresponding to marginal exclusion, while Table 6 presents the proportions with a sum-score in excess of 2, corresponding to deep exclusion.

Consistent with most measures of disadvantage, females experience higher rates of marginal exclusion than males, with roughly a third of females identified as marginally excluded (or slightly less depending on the year and indicators available). Table 5 also shows a U-shaped relationship between marginal exclusion and age, with the highest rates of marginal exclusion experienced by the young (under 25 years) and older (55 years plus) age groups. Marginal exclusion rates for persons aged 65 years, at between 40 and 50 per cent, are the highest.

Tasmania has the highest rates of marginal exclusion. Rates of exclusion are also higher in regional areas than in the major cities, with the outer regional areas experiencing the highest rates of marginal exclusion. Rates in remote Australia appear similar to those in the major cities although note that the initial sample frame of the HILDA Survey excluded approximately 80,000 people living in the most remote parts of Australia.

Table 5: Rates of exclusion (sum-score ≥ 1) by demographic characteristics – All indicators (%)

| | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|
| Males | 26.3 | 29.5 | 25.4 | 24.1 | 24.9 | 20.7 | 19.3 |
| Females | 31.5 | 35.4 | 29.9 | 27.3 | 31.6 | 27.2 | 24.0 |
| 15-24 yrs | 31.1 | 44.7 | 32.5 | 29.8 | 29.0 | 31.8 | 21.3 |
| 25-34 yrs | 21.5 | 25.8 | 17.7 | 16.6 | 18.7 | 15.6 | 13.8 |
| 35-44 yrs | 24.2 | 25.4 | 19.8 | 17.3 | 19.8 | 18.4 | 15.0 |
| 45-54 yrs | 21.4 | 23.1 | 21.5 | 19.8 | 20.5 | 18.2 | 16.9 |
| 55-64 yrs | 36.2 | 37.7 | 34.1 | 32.1 | 35.4 | 28.2 | 26.9 |
| 65 yrs plus | 49.8 | 45.6 | 48.9 | 46.6 | 54.0 | 37.4 | 42.3 |
| New South Wales | 28.8 | 30.4 | 27.2 | 24.7 | 28.6 | 24.6 | 22.6 |
| Victoria | 26.6 | 30.7 | 25.4 | 23.2 | 26.9 | 20.5 | 17.4 |
| Queensland | 31.5 | 35.6 | 29.1 | 27.6 | 29.5 | 24.0 | 23.5 |
| South Australia | 32.9 | 35.8 | 32.4 | 30.6 | 32.9 | 30.3 | 28.0 |
| Western Australia | 26.6 | 32.8 | 28.7 | 25.5 | 24.6 | 22.5 | 21.2 |
| Tasmania | 37.2 | 48.5 | 34.5 | 35.9 | 34.2 | 39.9 | 24.0 |
| Northern Territory | 17.5 | 18.6 | 26.4 | 13.7 | 19.3 | 21.7 | 13.2 |
| Australian Capital Territory | 21.9 | 23.7 | 15.1 | 23.0 | 21.8 | 13.8 | 12.6 |
| Major City | 27.0 | 30.3 | 25.4 | 23.8 | 26.3 | 22.2 | 19.6 |
| Inner Regional Australia | 31.0 | 35.9 | 31.1 | 29.3 | 32.4 | 25.4 | 25.6 |
| Outer Regional Australia | 36.4 | 38.3 | 33.7 | 29.6 | 33.1 | 31.0 | 27.2 |
| Remote Australia | 25.5 | 33.1 | 29.9 | 24.8 | 19.8 | 20.5 | 16.7 |
| Couple, no children | 28.8 | 29.5 | 28.8 | 28.0 | 30.2 | 21.3 | 22.2 |
| Couple, children under 15 | 22.0 | 26.9 | 20.1 | 18.1 | 20.0 | 20.2 | 15.9 |
| Couple, dependent students | 21.2 | 28.9 | 23.3 | 18.4 | 16.6 | 17.2 | 11.6 |
| Couple, non-dependent children only | 27.0 | 26.7 | 20.9 | 21.1 | 28.2 | 25.9 | 20.4 |
| Lone parent, children under 15 | 56.6 | 63.2 | 53.4 | 48.4 | 48.5 | 49.0 | 43.8 |
| Lone parent, dependent students | 37.6 | 47.0 | 37.2 | 26.9 | 37.7 | 40.4 | 27.0 |
| Lone parent, non-dependent children only | 36.7 | 35.3 | 33.1 | 27.6 | 34.7 | 39.7 | 35.4 |
| Lone person | 40.5 | 44.9 | 38.8 | 39.2 | 40.6 | 30.0 | 31.0 |
| Other household type | 32.1 | 38.7 | 30.7 | 27.8 | 32.3 | 25.1 | 23.0 |
| Australian born | 27.8 | 31.2 | 27.1 | 24.4 | 27.1 | 23.3 | 21.0 |
| Immigrant - English speaking country | 26.3 | 30.6 | 24.5 | 25.2 | 28.8 | 20.9 | 22.3 |
| Immigrant - Non-English speaking country | 36.7 | 41.3 | 32.8 | 33.3 | 34.5 | 29.5 | 25.0 |
| Indigenous | 49.7 | 58.8 | 52.0 | 49.6 | 49.9 | 55.3 | 42.4 |
| Has long term health condition | 56.1 | 62.9 | 55.6 | 53.8 | 56.3 | 51.8 | 49.2 |
| Postgrad - masters or doctorate | 8.6 | 12.1 | 11.1 | 12.1 | 11.1 | 8.8 | 5.0 |
| Grad diploma, grad certificate | 7.5 | 11.7 | 7.5 | 6.6 | 10.1 | 5.2 | 9.0 |
| Bachelor or honours | 13.4 | 14.5 | 12.5 | 9.8 | 10.6 | 9.8 | 7.2 |
| Adv diploma, diploma | 18.1 | 16.1 | 17.3 | 14.7 | 14.6 | 11.6 | 11.6 |
| Cert III or IV | 22.3 | 22.4 | 18.8 | 19.8 | 22.0 | 18.2 | 18.7 |
| Cert I or II | 49.3 | 54.0 | 41.6 | 34.7 | 44.0 | 43.8 | 44.3 |
| Cert not defined | 48.4 | 49.3 | 52.6 | 56.6 | 60.6 | 54.2 | 39.7 |
| Year 12 | 21.2 | 27.4 | 21.7 | 22.5 | 20.2 | 17.9 | 17.5 |
| Year 11 and below | 46.0 | 52.5 | 46.0 | 42.1 | 48.6 | 43.5 | 37.9 |
| All persons aged 15 years and over | 28.8 | 32.5 | 27.6 | 25.7 | 28.3 | 23.8 | 21.6 |

Table 6: Rates of exclusion (sum-score ≥ 2) by demographic characteristics – All indicators (%)

| | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|
| Males | 5.5 | 5.8 | 4.6 | 4.1 | 4.9 | 3.2 | 3.7 |
| Females | 6.5 | 6.1 | 4.8 | 4.7 | 5.9 | 4.4 | 4.5 |
| | | | | | | | |
| 15-24 yrs | 5.0 | 6.2 | 3.8 | 4.2 | 4.5 | 3.8 | 3.1 |
| 25-34 yrs | 5.4 | 6.0 | 4.1 | 3.6 | 3.7 | 3.2 | 2.7 |
| 35-44 yrs | 6.0 | 4.8 | 4.7 | 4.1 | 5.0 | 3.3 | 3.5 |
| 45-54 yrs | 4.4 | 5.0 | 4.8 | 4.2 | 4.2 | 2.9 | 4.0 |
| 55-64 yrs | 9.2 | 8.6 | 7.1 | 5.0 | 7.6 | 5.6 | 6.7 |
| 65 yrs plus | 7.2 | 6.3 | 4.1 | 5.4 | 8.4 | 4.7 | 5.0 |
| | | | | | | | |
| New South Wales | 6.0 | 5.3 | 4.0 | 4.3 | 4.9 | 3.8 | 4.5 |
| Victoria | 4.3 | 5.1 | 4.0 | 3.0 | 5.3 | 3.0 | 2.3 |
| Queensland | 7.4 | 6.5 | 5.5 | 4.6 | 5.8 | 3.9 | 5.0 |
| South Australia | 6.8 | 8.7 | 6.8 | 5.8 | 7.6 | 6.7 | 6.3 |
| Western Australia | 6.4 | 5.8 | 5.3 | 4.8 | 4.0 | 2.4 | 3.3 |
| Tasmania | 9.9 | 13.4 | 9.7 | 12.1 | 9.9 | 10.8 | 7.7 |
| Northern Territory | 3.5 | 2.6 | | 1.8 | 3.7 | | 0.9 |
| Australian Capital Territory | 5.3 | 5.4 | 1.7 | 2.6 | 3.1 | 1.7 | 1.0 |
| | | | | | | | |
| Major City | 5.4 | 5.2 | 4.2 | 3.9 | 4.8 | 3.2 | 3.7 |
| Inner Regional Australia | 6.7 | 7.2 | 5.8 | 5.4 | 7.0 | 4.9 | 4.8 |
| Outer Regional Australia | 7.7 | 8.7 | 5.9 | 5.1 | 6.0 | 5.5 | 4.9 |
| Remote Australia | 6.7 | 3.3 | 5.2 | 3.3 | 2.6 | 0.5 | 3.7 |
| | | | | | | | |
| Couple, no children | 5.2 | 5.3 | 4.3 | 3.4 | 5.3 | 2.8 | 3.1 |
| Couple, children under 15 | 3.5 | 2.9 | 2.7 | 3.0 | 3.3 | 3.3 | 2.7 |
| Couple, dependent students | 2.8 | 2.8 | 2.4 | 1.8 | 1.2 | 0.7 | 1.3 |
| Couple, non-dependent children only | 4.1 | 4.8 | 2.9 | 4.0 | 3.5 | 3.2 | 4.2 |
| Lone parent, children under 15 | 19.7 | 17.5 | 16.8 | 13.7 | 17.7 | 10.2 | 10.9 |
| Lone parent, dependent students | 10.4 | 12.7 | 6.2 | 5.3 | 6.5 | 4.4 | 5.8 |
| Lone parent, non-dependent children only | 13.8 | 10.2 | 6.8 | 5.0 | 8.4 | 9.0 | 11.6 |
| Lone person | 10.4 | 13.0 | 8.8 | 8.6 | 8.9 | 6.5 | 6.7 |
| Other household type | 8.0 | 4.3 | 4.6 | 6.7 | 9.8 | 8.8 | 7.2 |
| | | | | | | | |
| Australian born | 5.7 | 5.9 | 4.7 | 4.3 | 5.2 | 3.8 | 3.7 |
| Immigrant - English speaking country | 4.8 | 4.4 | 4.5 | 4.1 | 4.8 | 4.0 | 3.9 |
| Immigrant - Non-English speaking country | 8.2 | 7.9 | 5.2 | 5.1 | 7.2 | 3.4 | 6.3 |
| Indigenous | 17.1 | 19.0 | 14.5 | 8.6 | 18.0 | 10.6 | 14.5 |
| | | | | | | | |
| Has long term health condition | 15.6 | 18.9 | 13.2 | 12.4 | 14.1 | 11.7 | 12.6 |
| | | | | | | | |
| Postgrad - masters or doctorate | 1.4 | 1.8 | 0.6 | 3.1 | 1.7 | 0.4 | 1.1 |
| Grad diploma, grad certificate | 1.4 | 1.5 | 1.6 | 0.8 | 1.1 | 0.4 | 1.0 |
| Bachelor or honours | 1.8 | 1.5 | 1.2 | 1.3 | 1.0 | 0.6 | 0.7 |
| Adv diploma, diploma | 1.9 | 1.7 | 2.0 | 1.6 | 1.9 | 1.2 | 1.8 |
| Cert III or IV | 5.1 | 4.0 | 3.8 | 3.4 | 4.3 | 2.5 | 4.2 |
| Cert I or II | 14.4 | 12.2 | 10.5 | 3.5 | 8.3 | 11.6 | 11.7 |
| Cert not defined | 9.8 | 18.3 | 17.3 | 16.3 | 13.7 | 26.4 | 12.9 |
| Year 12 | 3.3 | 3.8 | 3.5 | 3.6 | 3.2 | 2.5 | 3.3 |
| Year 11 and below | 10.4 | 10.9 | 8.1 | 7.5 | 10.2 | 7.8 | 7.0 |
| | | | | | | | |
| All persons aged 15 years and over | 6.0 | 6.0 | 4.7 | 4.4 | 5.4 | 3.8 | 4.1 |

Single parents have particularly high rates of marginal exclusion, especially if they have children under 15 years of age. Lone person families are also prone to marginal exclusion.

Other particularly disadvantaged groups include indigenous Australians, persons born in non-English speaking countries, persons in private rental accommodation, persons with a long-term health condition and persons who have not completed secondary school (or its equivalent).

Table 6 shows that the patterns of marginal exclusion identified similarly apply to 'deep exclusion', with one notable exception: exclusion rates by age. Deep exclusion appears to be much more indiscriminate with respect to age than does marginal exclusion. Deep exclusion is relatively evenly felt across the age distribution. That said, rates of deep exclusion are generally slightly higher for those aged 55 years plus; but the differences are nowhere near as stark as is the case for marginal exclusion.

Table 7 presents rates of exclusion in Waves 1 and 7 restricting to the 21 indicators common to all waves. As noted earlier, this allows change over time in the rate of exclusion to be examined for each demographic group.

The overall general pattern of decline in the incidence of social exclusion over the seven years to 2007 evident in Figure 2b holds for most demographic groups. As was noted in respect of Figure 2b, absolute gains in employment have been particularly important to lower measured social exclusion for all groups, be it marginal exclusion or deep exclusion. As the decline in exclusion is largely driven by employment growth (and to some extent increasing rates of formal education attainment), groups with typically low employment rates, in particular the older age groups and single parents, have experienced less dramatic declines in exclusion than have others.

Table 7: Rates of exclusion by demographic characteristics – Indicators common to all waves (%)

| | Sum-score ≥ 1 | | Sum-score ≥ 2 | |
|---|---|---|---|---|
| | 2001 | 2007 | 2001 | 2007 |
| Males | 28.5 | 22.8 | 6.8 | 4.8 |
| Females | 35.7 | 29.2 | 8.0 | 5.8 |
| 15-24 yrs | 34.8 | 27.6 | 6.6 | 4.0 |
| 25-34 yrs | 22.8 | 15.3 | 5.6 | 3.0 |
| 35-44 yrs | 26.1 | 16.7 | 7.2 | 4.5 |
| 45-54 yrs | 23.8 | 18.6 | 6.1 | 4.6 |
| 55-64 yrs | 40.9 | 31.5 | 11.3 | 7.7 |
| 65 yrs plus | 58.0 | 53.0 | 9.9 | 8.5 |
| New South Wales | 31.7 | 27.4 | 7.5 | 5.7 |
| Victoria | 29.7 | 23.0 | 5.8 | 3.6 |
| Queensland | 34.9 | 27.5 | 8.7 | 6.1 |
| South Australia | 36.5 | 31.7 | 8.6 | 6.7 |
| Western Australia | 31.0 | 25.5 | 7.6 | 4.7 |
| Tasmania | 40.4 | 26.9 | 11.1 | 9.7 |
| Northern Territory | 22.4 | 8.0 | 5.8 | 0.8 |
| Australian Capital Territory | 23.9 | 12.7 | 4.9 | 3.5 |
| Major City | 30.5 | 24.2 | 6.8 | 5.1 |
| Inner Regional Australia | 34.3 | 30.6 | 8.2 | 5.7 |
| Outer Regional Australia | 39.0 | 29.5 | 9.6 | 5.9 |
| Remote Australia | 28.0 | 20.5 | 8.3 | 3.4 |
| Couple, no children | 32.0 | 28.3 | 6.7 | 4.9 |
| Couple, children under 15 | 24.6 | 17.2 | 4.1 | 3.2 |
| Couple, dependent students | 24.4 | 16.7 | 4.2 | 1.3 |
| Couple, non-dependent children only | 30.7 | 20.3 | 5.3 | 3.6 |
| Lone parent, children under 15 | 58.1 | 48.5 | 20.5 | 15.0 |
| Lone parent, dependent students | 40.4 | 34.0 | 13.0 | 4.3 |
| Lone parent, non-dependent children only | 39.6 | 39.7 | 15.6 | 13.5 |
| Lone person | 43.7 | 39.0 | 12.2 | 8.0 |
| Other household type | 34.8 | 26.8 | 10.5 | 9.8 |
| Australian born | 30.5 | 25.3 | 7.0 | 4.8 |
| Immigrant - English speaking country | 32.0 | 25.5 | 6.1 | 5.2 |
| Immigrant - Non-English speaking country | 40.1 | 30.9 | 10.5 | 7.7 |
| Indigenous | 54.1 | 44.9 | 20.1 | 13.4 |
| Has long-term health condition | 60.2 | 53.5 | 19.1 | 15.1 |
| Postgrad - masters or doctorate | 9.7 | 7.9 | 2.1 | 1.8 |
| Grad diploma, grad certificate | 9.2 | 9.7 | 1.8 | 1.3 |
| Bachelor or honours | 14.2 | 8.3 | 2.3 | 0.9 |
| Adv diploma, diploma | 19.4 | 12.9 | 3.4 | 1.7 |
| Cert III or IV | 24.5 | 20.0 | 6.1 | 4.5 |
| Cert I or II | 49.4 | 47.8 | 12.5 | 14.0 |
| Cert not defined | 58.8 | 58.2 | 15.3 | 12.8 |
| Year 12 | 24.1 | 19.9 | 4.5 | 3.5 |
| Year 11 and below | 51.0 | 47.0 | 12.6 | 9.9 |
| All persons aged 15 years and over | 32.1 | 26.1 | 7.4 | 5.3 |

## 5.3 Exclusion using an Item Response Model

We implement two item response models. The first treats each indicator as its own item, which most closely parallels the approach taken by Capellari and Jenkins. For analysis of each wave using all available indicators, the number of items ranges from 23 to 27, while for the analysis of indicators common to all waves, the number of items is 21. This approach gives the model complete flexibility to determine the weight assigned to each indicator. The second model treats each life domain as its own item, and is thus a 7-item model. For this approach, an item is assumed to equal 1 if the score for the domain is at least 0.5 and is 0 otherwise. This approach forces the model to consider only seven pieces of information: ex ante, each domain is given equal weight in the sense that it contributes only one piece of information. This is somewhat analogous to the sum-score approach we take, which assigns equal weight to each domain. However, as implemented in the item response model, less information is utilised in the 7-item model, since each domain is reduced to a 0-1 indicator rather than a proportion that can lie between 0 and 1. Table A2 in the Appendix presents the logit random effects estimates for the one-parameter item response models.

To examine the implications of taking the item response model approach, in Figure 3 we plot the latent exclusion variable $X_i^*$ against the sum-score of each individual. We restrict comparisons in Figure 3 to the case were all available indicators in each wave are used and the item response model has maximum flexibility (that is, the number of items is between 22 and 27, depending on the wave). Table 8 additionally presents correlation coefficients, for the same comparisons and also when using indicators common to all waves and when estimating the 7-item model.

As found by Jenkins and Capellari (2007), sum-score and item response models lead to very similar rankings of exclusion across individuals. The results show that there is clearly a strong positive correlation between the sum-score and latent exclusion index obtained from the item response models. The correlation coefficients in Table 8 are all approximately 0.8 or 0.9. The association between the sum-score and latent exclusion index is particularly strong in the fully flexible item response models, which we might expect, since, in essence, these models have available the same amount of information as the sum-score approach. Inferences on social exclusion are therefore unlikely to be substantially affected by whether a sum-score or item response model approach is taken.

Figure 3: Plots of individuals' latent exclusion against their sum-score − Flexible IRM − Using all available indicators in each wave
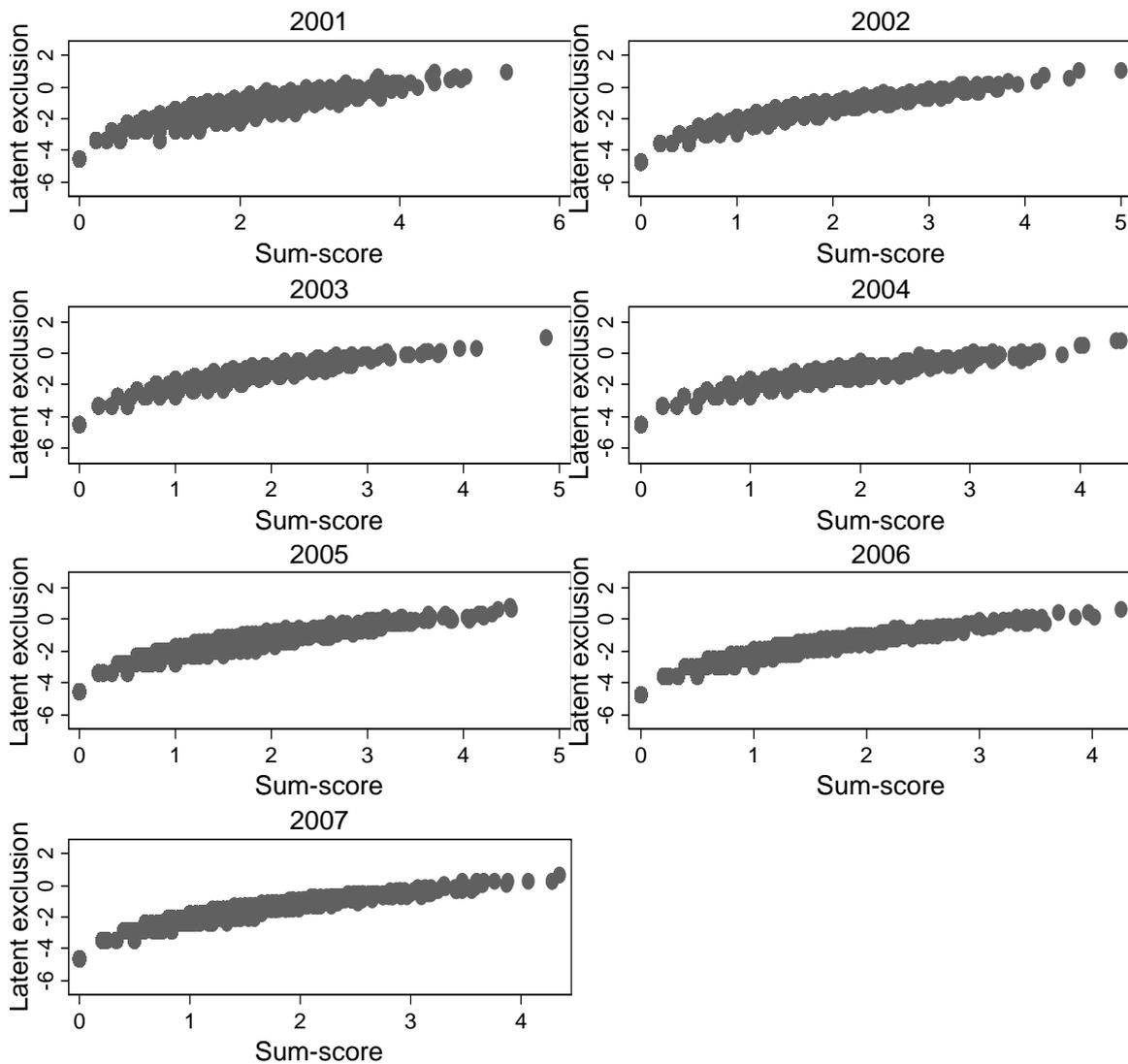


Table 8: Correlation coefficients for latent exclusion index and sum-score

|  | Using all available indicators in each wave | | Using only indicators common to all waves | |
|  | Flexible IRM (22-27 items) | 7-item IRM | Flexible IRM (22-27 items) | 7-item IRM |
| --- | --- | --- | --- | --- |
| 2001 | 0.9013 | 0.8646 | 0.9076 | 0.8921 |
| 2002 | 0.9328 | 0.7925 | 0.9087 | 0.8897 |
| 2003 | 0.9229 | 0.8423 | 0.9113 | 0.8860 |
| 2004 | 0.9206 | 0.8435 | 0.9105 | 0.8889 |
| 2005 | 0.9237 | 0.8784 | 0.9114 | 0.8905 |
| 2006 | 0.9290 | 0.8041 | 0.9114 | 0.8927 |
| 2007 | 0.9141 | 0.8382 | 0.9118 | 0.8896 |

## 5.4 Alternative weighting regimes

The information content of indicators is likely to be variable, with some indicators more important signals of social exclusion than others. Traditionally, socio-economic disadvantage has been defined purely in terms of income. While this does not reflect the view that income is the only consideration, it does reflect the view that income is the primary determinant of disadvantage. We therefore explore sensitivity of results to assigning primacy to income, while remaining faithful to our multidimensional framework. We do this by imposing the pre-condition that income be less than median income. Note that this is not a poverty standard, with common poverty lines set at some fraction of median income (typically 50 or 60 per cent). Rather, this pre-condition simply ensures that only persons in the bottom half of the (equivalised household) income distribution can ever be considered excluded.

Figure 4 shows the effects on estimated rates of exclusion in each wave when the low-income precondition is imposed. As might be expected, rates of marginal exclusion (i.e., score greater than or equal to one) are considerably lower when the additional income restriction is applied, decreasing by around six to eight percentage points. Interestingly – and importantly – rates of deep exclusion are not very sensitive to the additional restriction. Persons identified as deeply excluded without the low-income restriction are almost all in the bottom half of the household income distribution anyway.

Panel (b) shows that declines in exclusion rates over the period are slightly less pronounced when only those in the bottom half of the income distribution can be considered excluded. However, a general decline in rates of exclusion (both marginal and deep exclusion) nonetheless remains apparent.

Figure 4: Rates of exclusion with additional income restriction

(a) All available indicators
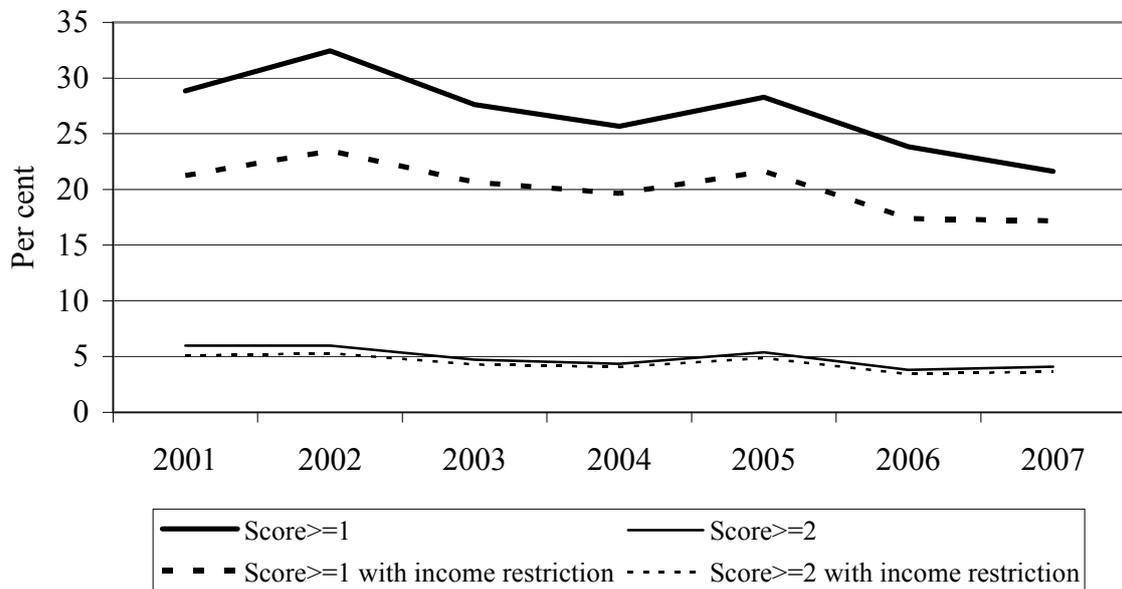


(b) Common indicators
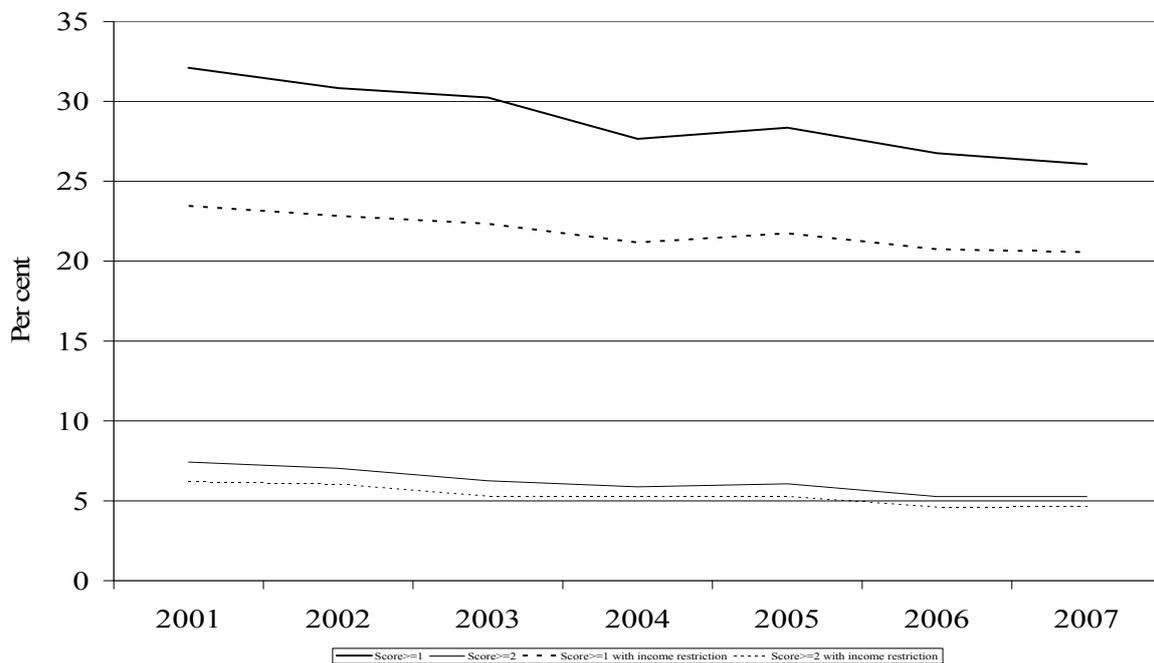


For similar reasons to the imposition of the income restriction, we explore two alternative weighting regimes for the seven domains. This highlights an advantage of the sum-score approach (for example, compared with the item response model approach), which is that we can directly control the weighting given to each domain and to each component within each domain.

Figure 5: Rates of exclusion with weighting of the material resources domain doubled

(a) All available indicators
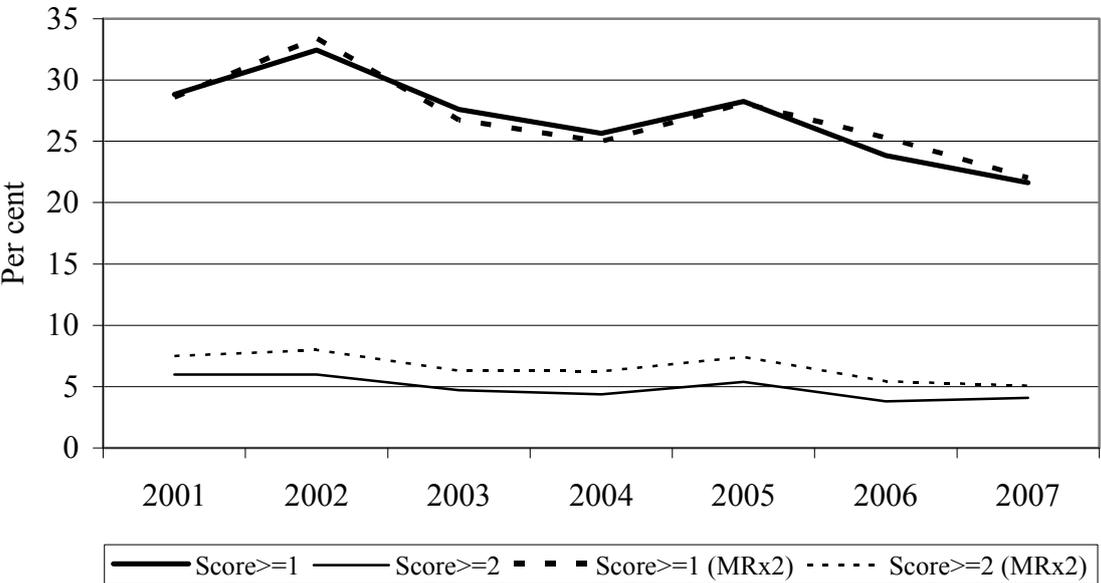


(b) Common indicators



In the first regime we explore the sensitivity of the measures to doubling the weighting on the material resources domain, rescaling the resulting sum-score to be constrained to the 0-7 interval to ensure consistency when making comparisons with the equal-weighting regime. The results are presented in Figure 5. As shown in the figure, doubling the weight of material resources makes little difference to the incidence of marginal exclusion (score $\geq$ 1) at any

particular point in time. It does, however, substantially increase the rate of deep exclusion (score $\geq 2$) at each point time by an average of two percentage points. Panel (b) of the figure shows that the decline in exclusion is ever so slightly less pronounced when the material resources domain weight is doubled. However, the difference is marginal.

In our second exploration of the sensitivity to different weightings, we explore the effect of halving the community, social and safety domains of our measure, again rescaling the final measure to lie within the 0-7 interval. The resulting rates of exclusion are presented in Figure 6. Placing a lower weight on community, social and safety – or, equivalently, placing a higher weight on the material resources, employment, education and health domains – increases the rates of both marginal and deep exclusion. This reflects the relative rarity of experience of indicators for the community, social and safety domains compared with experience of indicators for the other domains. Nonetheless, as Panel (b) shows, reducing the weight given to these three domains has little effect on trends in overall exclusion over time.

In summary, our estimated measures of social exclusion can be sensitive to the weight placed on particular domains, and to the imposition of an additional restriction that an individual's household income place them in the bottom half of the income distribution. Rates of marginal exclusion are lower when an additional income restriction is imposed and higher when the community, social and safety domains are given less weight. Rates of deep exclusion are higher if the material resources domain is given increased weighting or the community, social and safety domains are given less weighting – although, importantly, deep exclusion is little-affected by changes to the weight given to material resources. The downward trend in exclusion over the seven-year time frame is also slightly less pronounced when an additional income restriction is imposed. This sensitivity of our findings to the weighting regime would suggest that further research into the most appropriate weighting regime, or research into methods by which the most appropriate regime could be identified, would be beneficial.

Figure 6: Rates of exclusion with weighting of the community, social and safety domains halved

(a) All available indicators
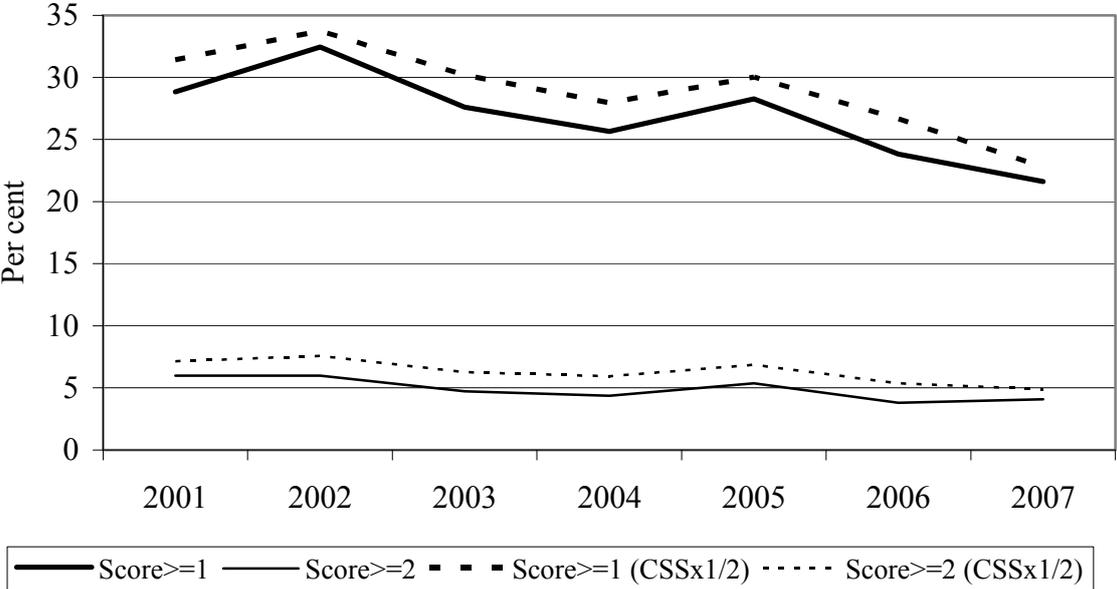


(b) Common indicators
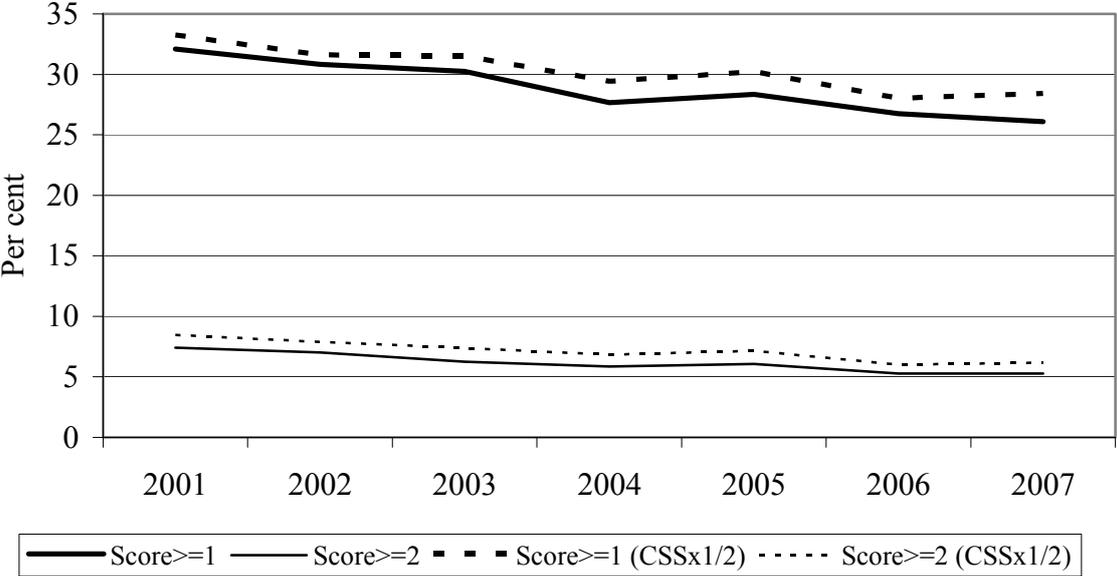


### 5.5 Comparing exclusion with income poverty

A key question for this study is whether taking a multidimensional approach makes any difference compared with an income poverty approach. If it does not make a substantive difference, income poverty is a sufficient measure of socio-economic disadvantage and a multidimensional approach is not required. We therefore in this section compare results

obtained from our sum-score approach with results of applying an income poverty standard to the determination of disadvantage. We compare the rate of exclusion with the rate of poverty, the correlation between exclusion and income poverty and the demographic composition of the socially excluded and the income poor.

Figure 7 compares rates of exclusion with rates of income poverty. Looking at Panel (a), our measured 'marginally excluded' are the largest population group, with between 22 to 33 per cent of the population aged 15 years and over disadvantaged using this measure. Next are the income poor, with just over 20 per cent of the population 15 years plus in households with incomes below 60 per cent of median equivalised household income, and just under 15 per cent with incomes below 50 per cent of median equivalised household income. The deeply excluded are the smallest identified group, representing around five per cent of the population 15 years plus.

Turning to Panel (b), as discussed, our results show the incidence of social exclusion declining over the seven-year period spanned by the HILDA data, a period in which income poverty did not change appreciably. Economic growth over the period was good. This does not appear to have had a discernible impact on relative income poverty, which is consistent with a 'rising tide' lifting all boats equally. However, social exclusion was reduced, because this is not purely a relative measure. Absolute gains in employment in particular translate to lower measured social exclusion. Thus, we can infer that social exclusion will in general be more sensitive to the business cycle than will relative income poverty.

Figure 7: Rates of exclusion and income poverty

(a) All available indicators
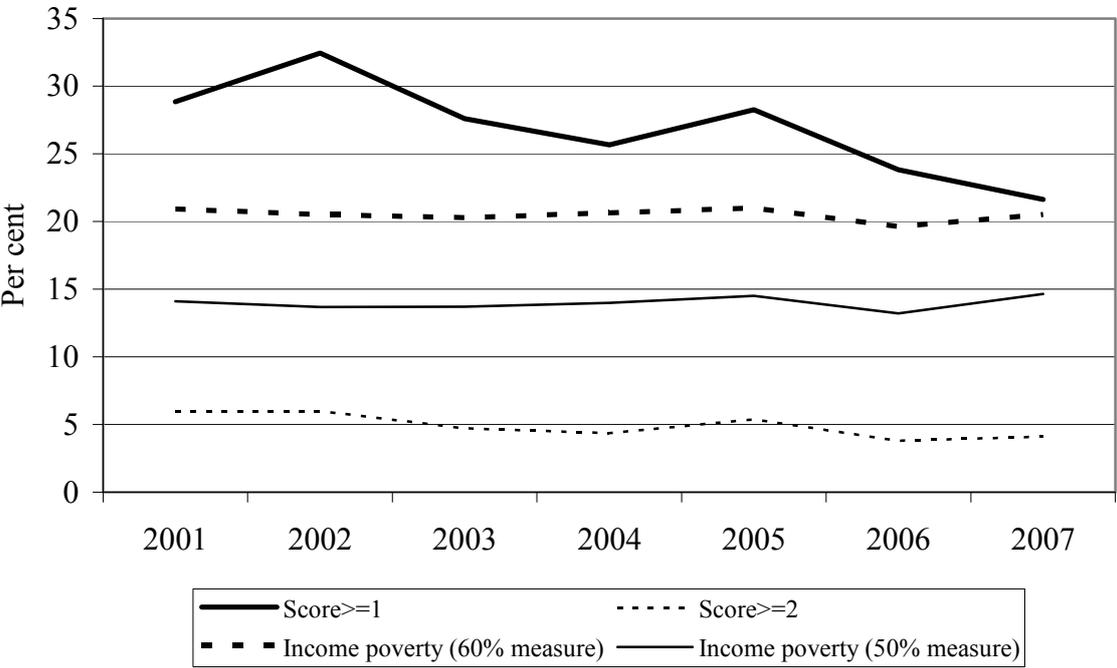


(b) Common indicators
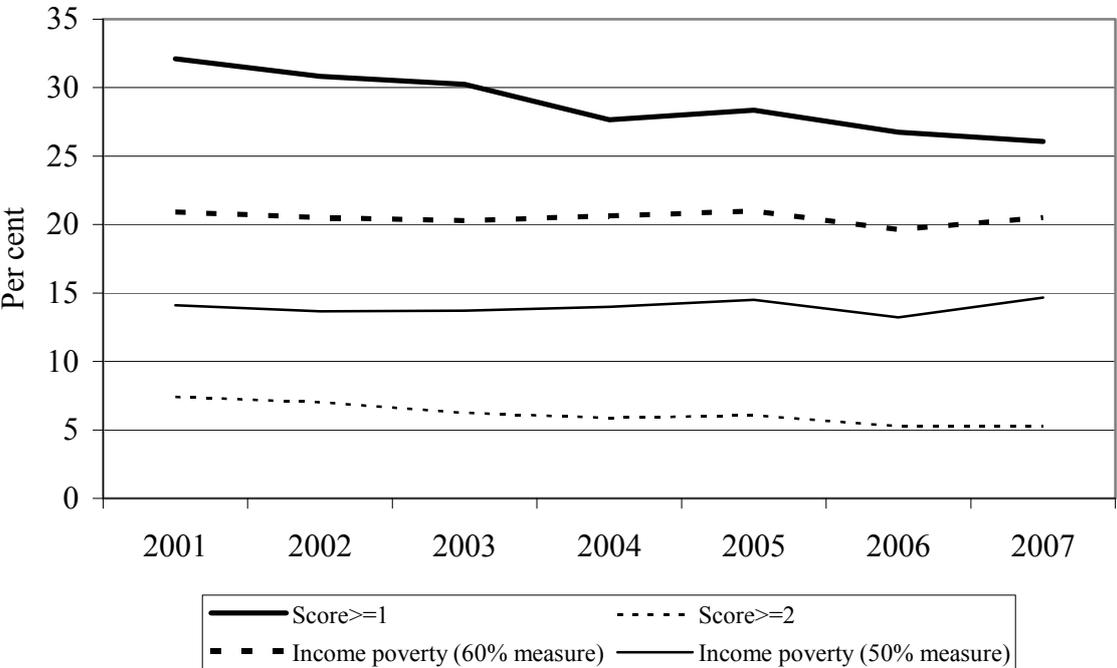


Overall rates of exclusion and poverty depend on somewhat arbitrarily imposed thresholds, and as shown above can vary considerably depending on where these thresholds are set. Of

more interest is a fuller analysis of the empirical association between our measure of exclusion and incomes. Table 9 therefore presents a range of statistics on the association between these two ways of ranking people. The first panel simply presents the correlation coefficient for incomes and sum-scores. It shows the correlation between our measured sum-score and income, while negative (as expected), is in fact quite low, at -0.4.[9] The two measures are thus likely to carry different information.

While income and social exclusion have differences in information content, this may not translate to different inferences on who is disadvantaged. For example, even with a low correlation coefficient, it is possible that all low-income persons have high measured exclusion, and all people with higher incomes people have the same, equally-low, measured exclusion. The lower two panels of Table 9 therefore examine the incomes and sum-scores of the bottom (worst-off) 20% of the sum-score and income distributions. We see that the mean sum-score is considerably higher among the worst-off 20% based on sum-score than the mean score among the worst-off 20% based on income. Likewise, the mean income among the worst-off 20% based on income is considerably lower than the mean income among the worst-off 20% based on sum-score. Furthermore, the minimum score among the bottom 20% of the sum-score distribution is around 1.1-1.3, compared with 0-0.5 for the bottom 20% of the income distribution; and the maximum income among the bottom 20% of the income distribution is around $10,000-$13,000, compared with $64,000-$137,000 for the bottom 20% of the sum-score distribution. Clearly, then, there are poor people who are not socially excluded and non-poor people who are excluded.

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[9] Note that correlation coefficients with income were substantively similar for sum-scores calculated using all indicators and for indicators common across all seven periods.

Table 9: Association between sum-scores (using all indicators) and incomes

|  | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|
| Correlation coefficient | -0.4 | -0.4 | -0.4 | -0.4 | -0.4 | -0.4 | -0.4 |
| *Worst-off 20% based on sum-score* | | | | | | | |
| Average score | 1.9 | 1.9 | 1.7 | 1.7 | 1.8 | 1.6 | 1.6 |
| Average annual equivalised income | 11,309 | 11,762 | 11,217 | 12,117 | 12,757 | 15,926 | 15,921 |
| Min score | 1.3 | 1.3 | 1.2 | 1.2 | 1.3 | 1.1 | 1.1 |
| Max income | 64,237 | 63,226 | 62,916 | 72,461 | 74,538 | 137,255 | 107,226 |
| *Worst-off 20% based on income* | | | | | | | |
| Average score | 1.5 | 1.5 | 1.5 | 1.5 | 1.6 | 1.3 | 1.4 |
| Average income | 6,149 | 6,443 | 6,252 | 7,277 | 7,557 | 8,626 | 8,038 |
| Min score | 0.5 | 0.3 | 0.5 | 0.5 | 0.5 | 0.0 | 0.3 |
| Max income | 8,849 | 9,347 | 9,754 | 10,334 | 11,001 | 12,217 | 12,891 |

To shed further light on the association between our measure of exclusion and incomes we now compare the demographic composition of those identified as the 'worst off' using each respective measure, presented in Table 10 using all indicators available in each wave and in Table 11 using only indicators common to all periods.

Table 10 shows significant differences in the compositions of the two groups. The differences are greatest when examining age and family type compositions. Persons 65 years and over represent a much larger share of the poorest 20 per cent than they do of the most 'excluded'. The most excluded group has a much more balanced age composition than that of the poorest individuals. Correspondingly, couple and single families with children represent a larger share of the most 'excluded' than they do of the poor. Our measure of exclusion also captures a larger share of persons with a long-term health condition than an income measure does.

The difference in the age composition of the worst-off is much starker in 2002 and 2006 when information on household wealth is taken into account. This highlights the importance of taking wealth into consideration when identifying disadvantaged groups in society. In future research we will further examine the impact of wealth on measures of disadvantage by either imputing wealth values in survey periods in which there is no wealth data, or at the very least including the value of imputed rents for owner-occupiers (and public housing residents) in our material resources domain.

Table 10: Composition of the worst-off 20 per cent, by measure of disadvantage – Sum-score based on all indicators – Percentage in each demographic group

| | 2001 | | 2002 | | 2003 | | 2004 | | 2005 | | 2006 | | 2007 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Score | Income | Score | Income | Score | Income | Score | Income | Score | Income | Score | Income | Score | Income |
| Female | 53.9 | 57.2 | 55.5 | 56.6 | 53.8 | 56.8 | 53.4 | 55.9 | 56.8 | 55.8 | 55.2 | 54.9 | 55.3 | 55.7 |
| 15-24 yrs | 15.6 | 14.7 | 20.8 | 15.8 | 17.7 | 17.0 | 16.9 | 16.5 | 14.9 | 16.2 | 18.5 | 14.6 | 14.0 | 14.6 |
| 25-34 yrs | 14.4 | 9.6 | 13.9 | 10.7 | 11.4 | 9.6 | 11.5 | 9.7 | 11.3 | 9.4 | 9.1 | 9.1 | 11.3 | 9.6 |
| 35-44 yrs | 17.8 | 12.5 | 17.0 | 11.9 | 15.7 | 12.2 | 14.2 | 11.2 | 14.2 | 10.6 | 16.7 | 11.9 | 13.5 | 11.7 |
| 45-54 yrs | 15.4 | 12.2 | 14.1 | 11.0 | 16.2 | 11.6 | 14.9 | 12.4 | 12.3 | 11.3 | 14.2 | 11.2 | 15.3 | 11.3 |
| 55-64 yrs | 16.0 | 15.6 | 16.2 | 15.5 | 15.3 | 13.5 | 18.4 | 14.4 | 18.9 | 15.1 | 19.3 | 14.2 | 20.0 | 14.4 |
| 65 yrs plus | 20.9 | 35.4 | 18.0 | 35.1 | 23.8 | 36.0 | 24.1 | 35.9 | 28.4 | 37.5 | 22.3 | 39.1 | 26.0 | 38.4 |
| New South Wales | 34.2 | 32.7 | 30.9 | 33.9 | 31.4 | 33.0 | 30.4 | 33.5 | 31.4 | 33.1 | 31.2 | 36.0 | 33.7 | 33.4 |
| Victoria | 22.1 | 22.9 | 20.8 | 23.0 | 22.6 | 24.7 | 22.6 | 25.4 | 23.4 | 25.3 | 22.2 | 24.6 | 19.4 | 24.2 |
| Queensland | 19.9 | 19.2 | 22.8 | 18.5 | 20.9 | 19.3 | 22.5 | 17.7 | 20.9 | 18.3 | 20.6 | 16.7 | 23.0 | 20.1 |
| South Australia | 9.0 | 10.8 | 9.4 | 10.1 | 9.5 | 9.7 | 9.1 | 9.8 | 9.9 | 10.4 | 10.3 | 9.3 | 10.5 | 10.0 |
| Western Australia | 9.6 | 9.6 | 10.3 | 10.0 | 10.8 | 8.4 | 9.5 | 8.7 | 9.2 | 9.0 | 10.3 | 8.7 | 9.2 | 8.5 |
| Tasmania | 3.6 | 3.6 | 4.1 | 3.6 | 3.1 | 3.5 | 3.9 | 3.6 | 3.4 | 3.3 | 4.2 | 4.2 | 2.7 | 3.4 |
| Northern Territory | 0.3 | 0.5 | 0.4 | 0.5 | 0.8 | 0.6 | 0.4 | 0.5 | 0.5 | 0.3 | 0.2 | 0.2 | 0.6 | 0.1 |
| Australian Capital Territory | 1.3 | 0.7 | 1.5 | 0.4 | 1.0 | 0.9 | 1.6 | 0.8 | 1.2 | 0.5 | 1.0 | 0.3 | 0.8 | 0.4 |
| Major City | 61.8 | 58.3 | 60.9 | 59.7 | 59.1 | 59.8 | 60.6 | 59.7 | 60.7 | 60.4 | 60.9 | 59.0 | 59.3 | 57.4 |
| Inner Regional Australia | 23.0 | 25.0 | 24.6 | 25.1 | 25.6 | 24.0 | 26.5 | 25.5 | 26.9 | 25.3 | 25.3 | 25.9 | 27.2 | 27.8 |
| Outer Regional Australia | 13.7 | 14.7 | 13.1 | 13.2 | 13.3 | 14.1 | 11.2 | 12.8 | 11.6 | 12.7 | 12.6 | 13.3 | 12.5 | 13.0 |
| Remote Australia | 1.6 | 2.0 | 1.4 | 2.0 | 2.0 | 2.1 | 1.6 | 2.1 | 0.8 | 1.6 | 1.2 | 1.8 | 1.0 | 1.8 |
| Couple, no children | 27.3 | 32.7 | 25.7 | 31.8 | 29.3 | 31.8 | 31.1 | 32.0 | 33.4 | 33.2 | 27.6 | 33.1 | 30.8 | 33.3 |
| Couple, children under 15 | 20.7 | 14.4 | 20.9 | 14.5 | 20.6 | 14.2 | 20.2 | 13.8 | 18.0 | 14.0 | 23.6 | 13.7 | 20.6 | 13.9 |
| Couple, dependent students | 6.0 | 4.8 | 6.3 | 3.8 | 6.3 | 4.0 | 5.8 | 4.9 | 3.9 | 2.8 | 5.8 | 4.7 | 4.8 | 3.8 |
| Couple, non-dependent children only | 9.3 | 3.5 | 7.8 | 4.4 | 7.2 | 3.1 | 7.6 | 3.2 | 8.3 | 4.0 | 11.3 | 3.8 | 9.2 | 4.0 |
| Lone parent, children under 15 | 9.2 | 7.5 | 9.7 | 9.1 | 8.9 | 8.9 | 8.1 | 8.7 | 7.6 | 9.5 | 7.1 | 8.2 | 7.2 | 8.6 |
| Lone parent, dependent students | 2.4 | 1.7 | 3.2 | 1.5 | 2.4 | 2.5 | 2.1 | 1.2 | 2.3 | 2.6 | 2.3 | 3.5 | 2.2 | 2.5 |
| Lone parent, non-dependent children only | 5.2 | 2.7 | 4.5 | 2.8 | 3.9 | 1.7 | 4.0 | 3.9 | 5.3 | 2.6 | 5.7 | 3.3 | 7.4 | 3.6 |
| Lone person | 15.6 | 28.1 | 18.6 | 27.8 | 17.9 | 28.2 | 18.5 | 28.3 | 17.8 | 27.8 | 13.2 | 27.2 | 15.1 | 27.0 |
| Other household type | 4.3 | 4.5 | 3.4 | 4.3 | 3.6 | 5.6 | 2.7 | 4.2 | 3.4 | 3.4 | 3.5 | 2.5 | 2.8 | 3.4 |

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| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Australian born | 72.6 | 66.2 | 71.9 | 66.8 | 75.5 | 66.2 | 72.4 | 67.0 | 71.0 | 67.0 | 75.9 | 67.6 | 74.1 | 69.0 |
| Immigrant - English speaking country | 9.9 | 9.7 | 10.3 | 9.1 | 9.4 | 9.9 | 9.7 | 8.9 | 11.1 | 10.3 | 9.1 | 8.4 | 10.3 | 9.8 |
| Immigrant - Non-English speaking country | 17.6 | 24.1 | 17.8 | 24.1 | 15.2 | 23.9 | 17.9 | 24.1 | 17.9 | 22.8 | 15.1 | 24.0 | 15.6 | 21.1 |
| Indigenous | 3.5 | 4.1 | 3.8 | 5.3 | 4.2 | 4.5 | 3.3 | 4.8 | 4.3 | 5.8 | 3.7 | 5.0 | 4.3 | 5.3 |
| Has long term health condition | 49.0 | 41.2 | 47.2 | 39.7 | 55.6 | 54.4 | 55.2 | 55.1 | 60.6 | 51.6 | 59.0 | 52.6 | 60.5 | 50.9 |
| Postgrad - masters or doctorate | 0.9 | 1.1 | 0.7 | 1.5 | 1.0 | 1.3 | 1.4 | 1.5 | 1.3 | 1.2 | 1.1 | 0.9 | 0.9 | 1.3 |
| Grad diploma, grad certificate | 1.1 | 1.1 | 1.5 | 1.2 | 0.9 | 1.2 | 1.3 | 1.5 | 1.3 | 1.5 | 1.0 | 1.4 | 2.2 | 1.8 |
| Bachelor or honours | 4.5 | 5.4 | 4.8 | 5.1 | 4.7 | 5.8 | 4.2 | 5.5 | 4.7 | 5.5 | 4.8 | 4.7 | 4.2 | 4.8 |
| Adv diploma, diploma | 5.1 | 5.8 | 4.6 | 5.3 | 4.5 | 6.8 | 4.5 | 5.9 | 3.6 | 5.6 | 3.7 | 5.8 | 5.0 | 5.9 |
| Cert III or IV | 13.5 | 14.1 | 12.3 | 14.1 | 12.4 | 14.3 | 14.3 | 15.0 | 14.4 | 15.1 | 14.4 | 16.5 | 17.4 | 16.4 |
| Cert I or II | 2.1 | 1.3 | 2.3 | 1.3 | 1.8 | 1.4 | 1.8 | 1.6 | 2.4 | 1.7 | 2.7 | 1.8 | 3.1 | 1.7 |
| Cert not defined | 1.2 | 1.0 | 0.7 | 1.0 | 1.3 | 1.3 | 1.3 | 1.5 | 1.5 | 1.3 | 1.1 | 1.1 | 1.0 | 1.1 |
| Year 12 | 9.8 | 11.8 | 11.2 | 12.8 | 11.0 | 13.4 | 13.4 | 13.5 | 9.2 | 12.3 | 10.9 | 14.1 | 12.2 | 13.3 |
| Year 11 and below | 61.9 | 58.3 | 61.8 | 57.5 | 62.5 | 54.5 | 57.8 | 54.0 | 61.6 | 55.9 | 60.3 | 53.8 | 54.0 | 53.9 |

Table 11: Composition of the worst-off 20 per cent, by measure of disadvantage – Sum-score based on indicators common to all waves – Percentage in each demographic group

| | 2001 | | 2007 | |
|---|---|---|---|---|
| | Score | Income | Score | Income |
| Female | 55.6 | 57.2 | 56.2 | 55.7 |
| | | | | |
| 15-24 yrs | 16.7 | 14.7 | 15.0 | 14.6 |
| 25-34 yrs | 14.2 | 9.6 | 9.6 | 9.6 |
| 35-44 yrs | 17.3 | 12.5 | 11.9 | 11.7 |
| 45-54 yrs | 14.6 | 12.2 | 14.1 | 11.3 |
| 55-64 yrs | 16.1 | 15.6 | 19.1 | 14.4 |
| 65 yrs plus | 21.1 | 35.4 | 30.3 | 38.4 |
| | | | | |
| New South Wales | 33.9 | 32.7 | 34.1 | 33.4 |
| Victoria | 22.0 | 22.9 | 21.0 | 24.2 |
| Queensland | 20.1 | 19.2 | 22.0 | 20.1 |
| South Australia | 9.1 | 10.8 | 9.7 | 10.0 |
| Western Australia | 9.7 | 9.6 | 9.3 | 8.5 |
| Tasmania | 3.6 | 3.6 | 2.9 | 3.4 |
| Northern Territory | 0.4 | 0.5 | 0.4 | 0.1 |
| Australian Capital Territory | 1.2 | 0.7 | 0.7 | 0.4 |
| | | | | |
| Major City | 62.9 | 58.3 | 61.2 | 57.4 |
| Inner Regional Australia | 22.8 | 25.0 | 26.3 | 27.8 |
| Outer Regional Australia | 12.8 | 14.7 | 11.3 | 13.0 |
| Remote Australia | 1.5 | 2.0 | 1.2 | 1.8 |
| | | | | |
| Couple, no children | 27.5 | 32.7 | 31.8 | 33.3 |
| Couple, children under 15 | 19.2 | 14.4 | 16.9 | 13.9 |
| Couple, dependent students | 5.8 | 4.8 | 4.3 | 3.8 |
| Couple, non-dependent children only | 8.8 | 3.5 | 8.4 | 4.0 |
| Lone parent, children under 15 | 9.3 | 7.5 | 7.8 | 8.6 |
| Lone parent, dependent students | 2.4 | 1.7 | 2.0 | 2.5 |
| Lone parent, non-dependent children only | 5.3 | 2.7 | 7.5 | 3.6 |
| Lone person | 16.5 | 28.1 | 18.5 | 27.0 |
| Other household type | 5.2 | 4.5 | 2.8 | 3.4 |
| | | | | |
| Australian born | 70.4 | 66.2 | 73.3 | 69.0 |
| Immigrant - English speaking country | 10.7 | 9.7 | 9.9 | 9.8 |
| Immigrant - Non-English speaking country | 19.0 | 24.1 | 16.8 | 21.1 |
| Indigenous | 3.6 | 4.1 | 4.4 | 5.3 |
| | | | | |
| Has long term health condition | 49.7 | 41.2 | 58.6 | 50.9 |
| | | | | |
| Postgrad - masters or doctorate | 0.9 | 1.1 | 1.1 | 1.3 |
| Grad diploma, grad certificate | 1.3 | 1.1 | 1.3 | 1.8 |
| Bachelor or honours | 4.3 | 5.4 | 3.5 | 4.8 |
| Adv diploma, diploma | 5.1 | 5.8 | 3.7 | 5.9 |
| Cert III or IV | 13.3 | 14.1 | 14.6 | 16.4 |
| Cert I or II | 1.9 | 1.3 | 3.4 | 1.7 |
| Cert not defined | 1.2 | 1.0 | 1.2 | 1.1 |
| Year 12 | 10.8 | 11.8 | 10.6 | 13.3 |
| Year 11 and below | 61.3 | 58.3 | 60.7 | 53.9 |

### 5.6 Identifying the characteristics associated with exclusion: Tobit models

To more formally investigate the demographic characteristics associated with exclusion we estimate Tobit models of the sum-score as a function of characteristics. The Tobit model is appropriate in the context of a continuous dependent variable censored at 0 and 7. We estimate models for each wave separately using all available indicators in the wave, and also estimate a model on all waves pooled together using the 21 indicators common to all waves, and including wave dummies to capture changes over time in the average level of exclusion.

Coefficient estimates are reported in Table 12. These results confirm that certain groups are more prone to being significantly more excluded than others, including: females, the young and the old, single persons and sole parents, non-home owners (especially when wealth is measured), indigenous Australians, persons born in non-English speaking countries, persons residing outside of major cities and persons with low levels of formal education. Persons in a household with a disabled child are also significantly more likely to be excluded than others. The year dummy coefficients presented in the final column of the table confirm a fall in the incidence of exclusion over the time-period examined.

Table 12: Tobit model coefficient estimates

| | All indicators | | | | | | | Common indicators |
|---|---|---|---|---|---|---|---|---|
| | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | All waves |
| Male | -0.113*** | -0.0790*** | -0.0595*** | -0.0939*** | -0.0920*** | -0.0729*** | -0.0966*** | -0.112*** |
| *State/territory (*New South Wales *omitted)* | | | | | | | | |
| ACT | -0.089 | -0.026 | -0.0655 | -0.0703 | -0.0803 | -0.147*** | -0.0895 | -0.0855*** |
| Victoria | -0.020 | -0.015 | -0.0144 | 0.0146 | -0.00908 | -0.0278 | -0.0326* | -0.0183** |
| Queensland | 0.0597*** | 0.0784*** | 0.00738 | 0.0529** | 0.0322 | -0.00651 | 0.0235 | 0.0372*** |
| South Australia | 0.012 | 0.0705*** | 0.0433 | 0.0625** | 0.0726*** | 0.0968*** | 0.0776*** | 0.0426*** |
| Western Australia | 0.014 | 0.021 | 0.0298 | 0.0812*** | 0.0282 | -0.0429* | -0.0012 | 0.0104 |
| Tasmania | 0.007 | 0.145*** | 0.0441 | 0.182*** | 0.0850* | 0.134*** | -0.0181 | 0.0569*** |
| Northern Territory | -0.321*** | -0.209** | -0.197* | -0.118 | -0.276*** | -0.199*** | -0.201** | -0.252*** |
| *Age group (*35-44 *omitted)* | | | | | | | | |
| 15-24 | 0.0949*** | 0.204*** | 0.153*** | 0.195*** | 0.207*** | 0.224*** | 0.157*** | 0.170*** |
| 25-34 | -0.0843*** | 0.028 | -0.0653** | -0.0498* | -0.0417 | 0.0336 | -0.0116 | -0.0773*** |
| 45-54 | -0.014 | -0.0364* | 0.0125 | 0.017 | 0.0392* | -0.0365 | 0.0168 | 0.0109 |
| 55-64 | 0.245*** | 0.165*** | 0.192*** | 0.164*** | 0.251*** | 0.145*** | 0.209*** | 0.238*** |
| 65-74 | 0.260*** | 0.183*** | 0.257*** | 0.301*** | 0.386*** | 0.201*** | 0.383*** | 0.364*** |
| 75+ | 0.330*** | 0.192*** | 0.293*** | 0.333*** | 0.433*** | 0.265*** | 0.357*** | 0.409*** |
| *Family type (*Lone person *omitted)* | | | | | | | | |
| Couple with children | 0 | -0.0301 | -0.0649*** | -0.0769*** | -0.0102 | 0.0195 | 0.0343 | -0.0314*** |
| Couple, no children | -0.148*** | -0.127*** | -0.164*** | -0.147*** | -0.117*** | -0.0710*** | -0.127*** | -0.142*** |
| Sole parent | 0.288*** | 0.222*** | 0.173*** | 0.153*** | 0.175*** | 0.224*** | 0.247*** | 0.228*** |
| Home-owner | -0.313*** | -0.478*** | -0.314*** | -0.299*** | -0.318*** | -0.406*** | -0.324*** | -0.313*** |
| Major city | -0.0727*** | -0.0614*** | -0.0572*** | -0.0469*** | -0.0885*** | -0.0813*** | -0.115*** | -0.0723*** |
| *Educational attainment (*No post-school qualifications *omitted)* | | | | | | | | |
| Degree or higher | -0.642*** | -0.567*** | -0.567*** | -0.593*** | -0.590*** | -0.542*** | -0.508*** | -0.648*** |
| Diploma or certificate | -0.418*** | -0.368*** | -0.397*** | -0.377*** | -0.362*** | -0.364*** | -0.285*** | -0.416*** |
| *Place of birth/ethnicity (*non-indigenous Aus-born *omitted)* | | | | | | | | |
| Immigrant – ESB | 0.014 | 0.016 | 0.0031 | 0.00463 | 0.0112 | -0.0111 | 0.0329 | 0.00713 |
| Immigrant – NESB | 0.112*** | 0.0960*** | 0.0790*** | 0.0892*** | 0.102*** | 0.0779*** | 0.0838*** | 0.114*** |
| Indigenous | 0.163*** | 0.139*** | 0.137*** | 0.124*** | 0.118*** | 0.120*** | 0.0954*** | 0.134*** |
| Long-term health cond. | 0.712*** | 0.687*** | 0.674*** | 0.703*** | 0.736*** | 0.665*** | 0.727*** | 0.767*** |
| *Year (*2001 *omitted)* | | | | | | | | |
| 2002 | | | | | | | | -0.015 |
| 2003 | | | | | | | | -0.0859*** |
| 2004 | | | | | | | | -0.102*** |
| 2005 | | | | | | | | -0.126*** |
| 2006 | | | | | | | | -0.155*** |
| 2007 | | | | | | | | -0.160*** |
| Constant | 0.979*** | 1.144*** | 0.923*** | 0.853*** | 0.822*** | 0.952*** | 0.738*** | 0.984*** |
| Sample size | | | | | | | 7951 | 70557 |

Notes: ***, ** and * indicate statistical significance at the 1%, 5% and 10% levels, respectively.

# 6. Household-level measures of exclusion

An important limitation of the individual-level analysis presented in Section 5 is that it excludes children under the age of 15, for whom the indicators are either inappropriate or unavailable at the individual level. Yet, clearly, socioeconomic disadvantage is relevant to

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children. Indeed, social exclusion of children is arguably of greater importance than exclusion of older persons because of its potential long-term adverse consequences. To incorporate children into our analysis, in this section we now turn to an analysis of household-level measures of exclusion. As explained earlier, household measures of exclusion are taken as the average of the individual sum-score measures for each member of the household 15 years and over, and are then assigned to all household members, including children younger than 15 years.

Figure 8a presents histograms of the household sum-score distribution in each wave using all indicators available in the wave, while Figure 8b presents a histogram of the distribution for all waves combined restricting to the 21 indicators available in all seven waves. Note that, although our measure is a household-level one, we are examining its distribution across individuals. Thus, the frequency distributions present the proportion of the entire population with a household sum-score in each range. As might be expected, the overall distributions are visually very similar to those presented in Figure 1 for the individual-level measure. However, it is notable that the proportion with a sum-score below 0.2 is lower when examining exclusion measured at the household-level among all persons.

Figure 8a: Distribution of household sum-score using all available indicators
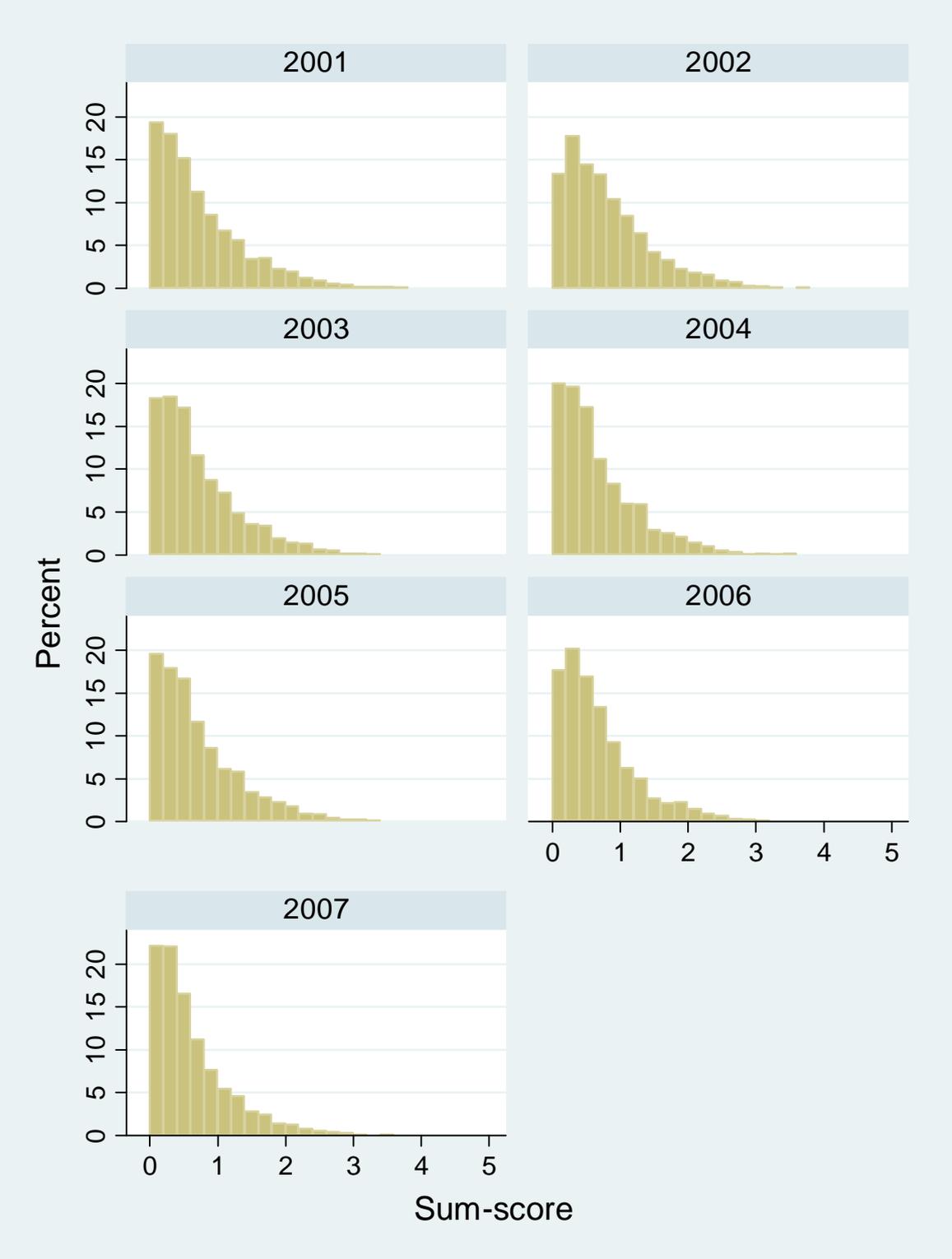
Figure 8b: Distribution of household sum-score using indicators common across years, 2001 to 2007 pooled
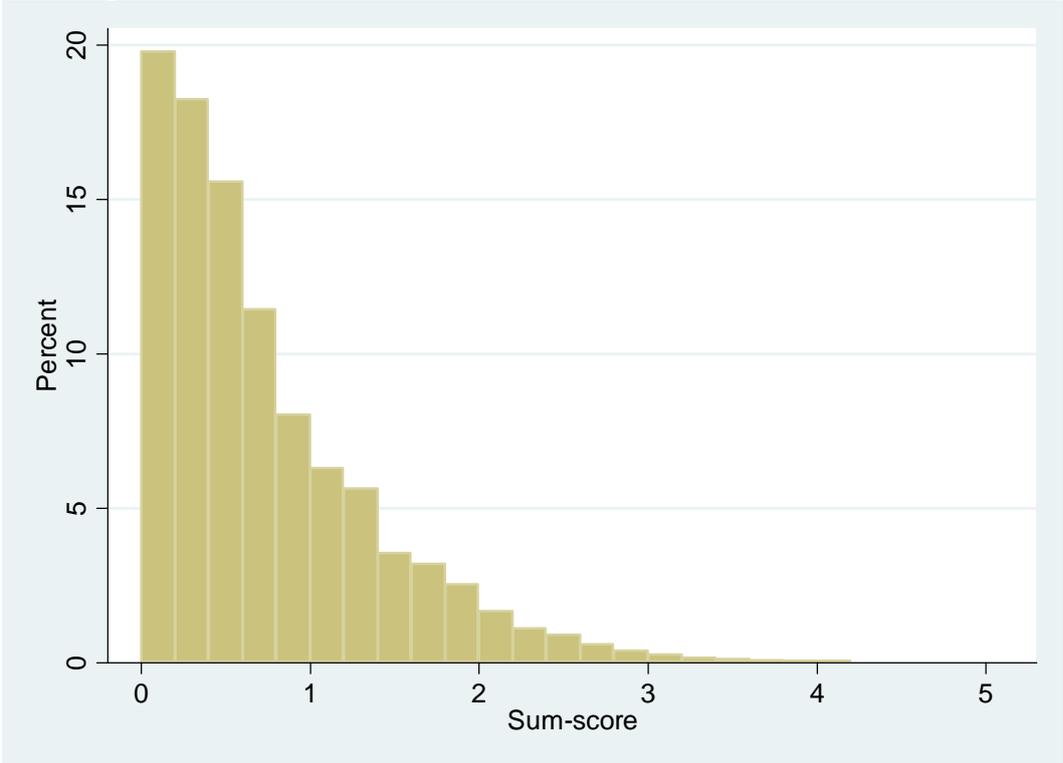


Figure 9 plots the percentage of the total population that can be classified as 'excluded' for alternative household sum-score thresholds used to define exclusion. As with the individual measures presented in Figure 2, the thresholds of 1, 2 and 3 can be interpreted as identifying those with marginal, deep or very deep household exclusion. Comparisons of rates of income poverty are also provided in the figure. Figure 9a presents results when all available indicators are used in each wave and Figure 9b presents results when only indicators common to all waves are used.

The household measures tell a similar story to the individual measures presented earlier. Between 20 and 30 per cent of the population are marginally excluded at any point in time, with approximately five per cent deeply excluded. Rates of income poverty lie between these two rates. As with the individual-level measure, household-level social exclusion declined over the 2001 to 2007 period.

Figure 9: Rates of household-level exclusion and income poverty, 2001 to 2007

(a) All indicators
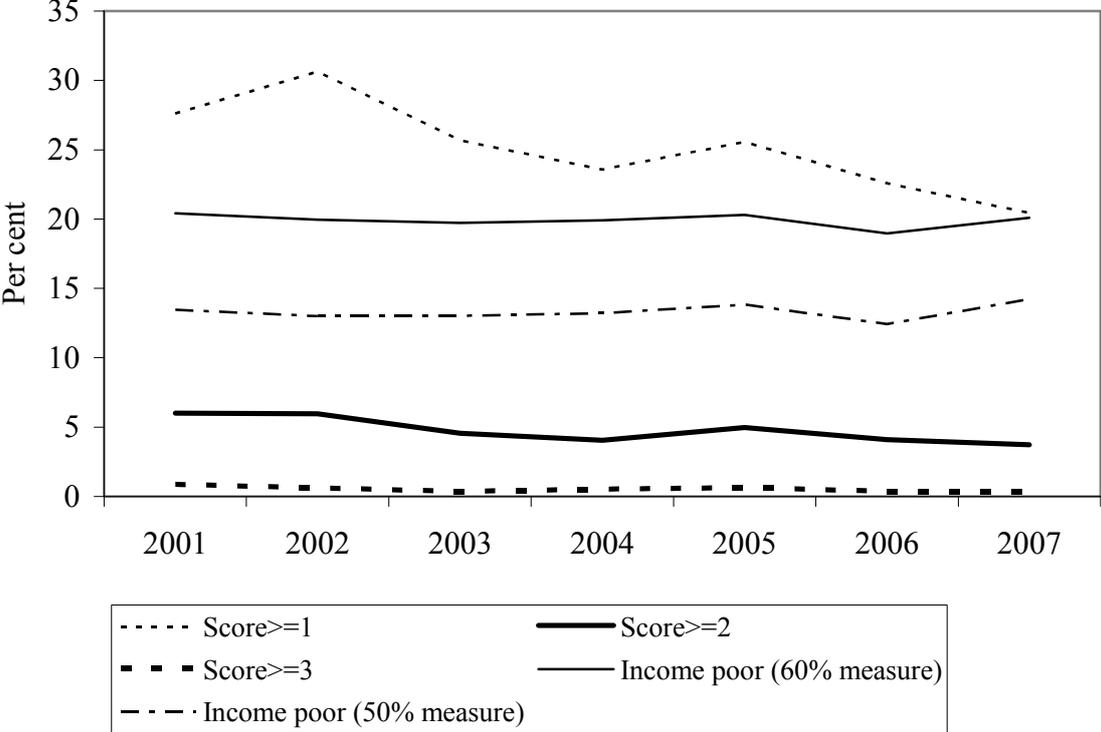


(b) Common indicators
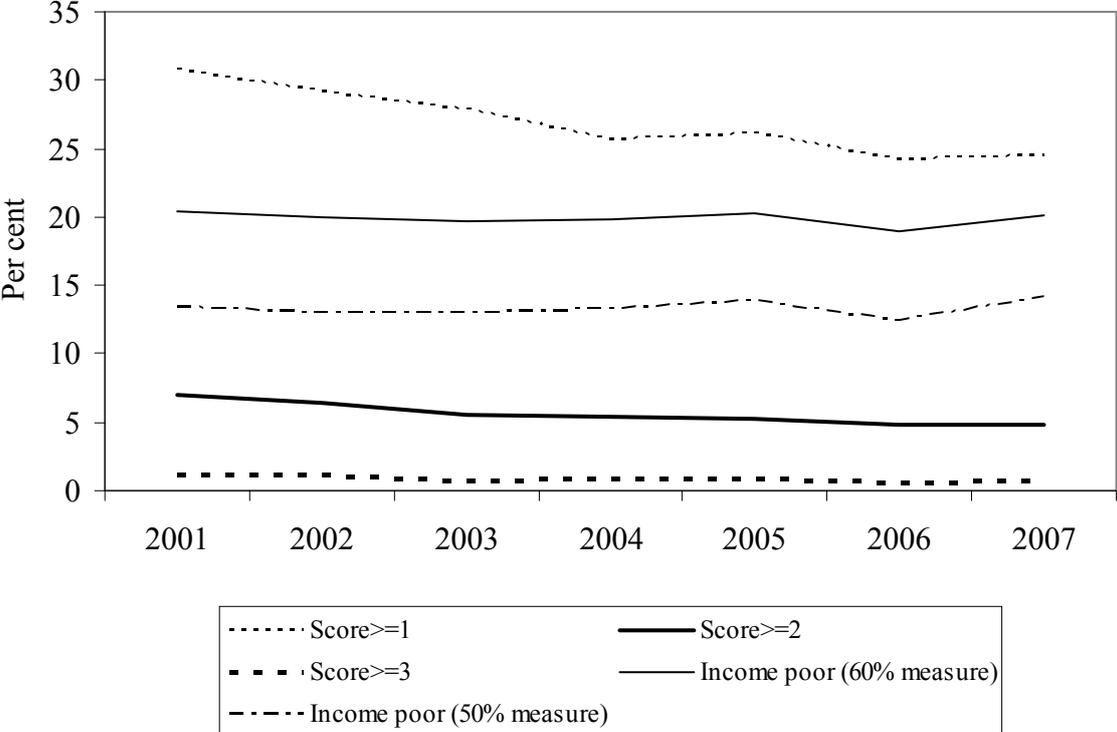
Table 13 presents rates of household-level exclusion by age. Marginal exclusion rates using all indicators available in each wave are presented in the upper left panel, and rates of deep exclusion for the same indicators are presented in the lower left panel. To enable comparisons of exclusion rates over time, the table also provides estimates for 2001 and 2007 of both marginal and deep exclusion restricting to the 21 indicators common to all waves. Income poverty rates by age, based on a 60% median poverty line, are presented for comparison purposes in Table 14.

Table 13: Rates of household exclusion by age (%)

| | All indicators available in each wave | | | | | | | Indicators common to all waves | |
|---|---|---|---|---|---|---|---|---|---|
| | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2001 | 2007 |
| *Sum-score ≥ 1* | | | | | | | | | |
| Under 15 years | 27.1 | 31.7 | 25.0 | 21.6 | 24.3 | 23.0 | 21.0 | 30.3 | 23.0 |
| 15-24 yrs | 27.3 | 33.0 | 25.0 | 23.1 | 22.0 | 23.3 | 16.9 | 30.2 | 20.4 |
| 25-34 yrs | 20.7 | 26.1 | 18.5 | 17.6 | 17.4 | 18.2 | 13.6 | 23.3 | 16.2 |
| 35-44 yrs | 22.7 | 28.5 | 20.4 | 17.5 | 19.9 | 19.5 | 15.1 | 25.0 | 18.1 |
| 45-54 yrs | 23.1 | 22.4 | 21.8 | 18.9 | 18.5 | 16.7 | 16.6 | 24.7 | 19.1 |
| 55-64 yrs | 33.3 | 31.5 | 29.7 | 30.2 | 33.7 | 25.1 | 25.0 | 37.6 | 29.3 |
| 65 yrs plus | 48.3 | 46.0 | 46.3 | 43.4 | 50.5 | 36.3 | 39.4 | 54.3 | 50.8 |
| Total | 27.6 | 30.6 | 25.7 | 23.6 | 25.6 | 22.6 | 20.4 | 30.8 | 24.5 |
| | | | | | | | | | |
| *Sum-score ≥ 2* | | | | | | | | | |
| Under 15 years | 7.2 | 6.8 | 5.5 | 5.5 | 5.4 | 5.8 | 4.2 | 7.9 | 5.2 |
| 15-24 yrs | 4.8 | 6.2 | 5.3 | 4.1 | 4.4 | 4.0 | 3.2 | 6.2 | 3.9 |
| 25-34 yrs | 5.5 | 5.9 | 3.6 | 3.2 | 3.2 | 3.8 | 2.2 | 5.7 | 2.8 |
| 35-44 yrs | 5.3 | 5.2 | 3.4 | 3.6 | 3.9 | 3.6 | 3.3 | 6.0 | 4.0 |
| 45-54 yrs | 4.8 | 4.3 | 4.6 | 3.5 | 3.9 | 2.9 | 3.3 | 5.5 | 3.4 |
| 55-64 yrs | 7.4 | 7.0 | 5.0 | 3.6 | 6.9 | 5.1 | 5.5 | 9.4 | 6.9 |
| 65 yrs plus | 7.3 | 6.4 | 4.2 | 4.2 | 7.8 | 2.6 | 4.9 | 9.6 | 7.5 |
| Total | 6.0 | 6.0 | 4.6 | 4.1 | 5.0 | 4.1 | 3.7 | 7.0 | 4.7 |

Table 13 shows that, as with income poverty, rates of exclusion are highest for the youngest and the oldest. Persons aged 65 years and over have significantly higher marginal exclusion rates and income poverty rates than all other age groups. However, this pattern does not hold with our measure of deep exclusion. Children younger than 15 years and persons aged 55-64 years share the highest rates of deep exclusion at any point in time. There have been reductions in measured household exclusion over the time period examined for all age groups. Persons aged 65 years and over experienced a more moderate reduction in marginal exclusion

than other age groups. However, when examining changes in rates of deep exclusion, age differences are less pronounced.[10]

Table 14: Income poverty rates by age (poverty line = 60% median equivalised household income) per cent of total population, 2001 to 2007 (%)

|  | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|
| Under 15 years | 19.3 | 19.2 | 18.8 | 18.7 | 20.0 | 18.5 | 19.8 |
| 15-24 yrs | 17.1 | 18.9 | 19.6 | 19.0 | 18.7 | 16.5 | 17.5 |
| 25-34 yrs | 11.1 | 11.4 | 10.6 | 11.7 | 11.3 | 9.9 | 11.3 |
| 35-44 yrs | 13.8 | 12.9 | 12.8 | 11.7 | 11.9 | 12.1 | 12.8 |
| 45-54 yrs | 14.4 | 12.7 | 13.1 | 13.8 | 13.4 | 11.8 | 13.4 |
| 55-64 yrs | 26.5 | 24.2 | 21.1 | 22.0 | 22.1 | 19.5 | 19.6 |
| 65 yrs plus | 48.8 | 47.3 | 47.9 | 48.1 | 49.6 | 48.5 | 49.5 |
| Total | 20.4 | 20.0 | 19.7 | 19.9 | 20.3 | 19.0 | 20.1 |

# 7. Persistence

The analysis to date has focused on identifying levels of exclusion at a particular point in time. In this final results section we consider the persistence of exclusion. That is, we examine whether the individuals identified as excluded at various points in time are the same people or not. As explained in Section 2, we provide only a limited analysis of persistence in this paper, since this is an important and complex dimension of exclusion which we propose to examine in depth in future research. Note that as we are examining the persistence of exclusion over time, we are constrained to only examining indicators that are available over each of the seven years. Thus, important indicators such as wealth, consumption expenditure and literacy and numeracy are not included in our measures of exclusion in this section.

Table 15 sheds some light on the persistence of exclusion by presenting information on the number of years an individual is classified as 'excluded'. The first two columns in the table present the results of the individual-level measures and thus capture the proportion of the population 15 years and over that are excluded, whereas the last two columns present results of the household measures of exclusion. The tables show that over half of the population experience marginal exclusion (i.e., a score ≥ 1) at some stage over the seven-year period spanned by the HILDA data. A much smaller proportion of the population experience deep exclusion at some stage over the time frame examined. As you might expect, the tables also

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[10] Tobit models were also estimated for household-level exclusion. Results are very similar to the individual-level results presented in Section 5.6 and are therefore not reported here.

show that short-term exclusion is more common than long-term or persistent exclusion. However, a considerable share of the population experiences exclusion for lengthy periods. For instance, when examining individual-level exclusion, around 27 per cent of the population 15 years and over is marginally excluded for three or more years. Likewise, five per cent is deeply excluded for three or more years.

Table 15: Number of years excluded

|  | Individual Score ≥1 | Individual Score ≥2 | Household Score ≥ 1 | Household Score ≥ 2 |
|---|---|---|---|---|
|  | % 15 yrs plus | % 15 yrs plus | % total | % total |
| 1 year plus | 52.5 | 16.6 | 53.0 | 15.9 |
| 2 years plus | 36.8 | 8.5 | 37.7 | 7.8 |
| 3 years plus | 26.9 | 4.9 | 27.3 | 4.4 |
| 4 years plus | 19.3 | 2.9 | 19.9 | 2.9 |
| 5 years plus | 13.0 | 1.6 | 14.0 | 1.7 |

The persistence of exclusion for key demographic groups is presented in Table 16. For time-varying characteristics, an individual is assigned to a demographic group based on his or her characteristics in Wave 1. Consistent with findings on exclusion at a point in time, females are more likely to have experienced both marginal and deep exclusion at some stage over the seven-year period than males. They are also more likely to be persistently excluded than males. The young and the old are the most likely age groups to be excluded at some stage over the time frame examined. When examining the marginally excluded, the young appear to have more transitory experiences of exclusion, whilst the old are more likely to be persistently marginally excluded. However, when deep exclusion is examined, the differences in persistence across age groups are less pronounced, with the young and pre-retirement age groups exposed to deep exclusion experiencing quite persistent exclusion. Further research is required to examine the effect of wealth (or at least the value of imputed rent for owner-occupiers) on the persistence of exclusion for particular age groups.

Turning to household type, of the household types distinguished in Table 16, single-parent households are the most prone to marginal or deep exclusion. Just under one-third of persons in single-parent households were exposed to deep exclusion at some stage over the seven-year period. Worryingly, around one-third of these individuals – 10.5 per cent of all persons in single-parent households – were deeply excluded for three or more years.

Table 16: Persistence of individual level exclusion by demographic groups, per cent of population 15 years and over

|  | 1 year plus | 2 years plus | 3 years plus | 4 years plus | 5 years plus |
|---|---|---|---|---|---|
| *Individual-level score ≥ 1* | | | | | |
| Males | 47.5 | 32.2 | 23 | 16.5 | 11.2 |
| Females | 57.2 | 41.2 | 30.7 | 22 | 14.7 |
| 15-24 yrs | 64.8 | 39.7 | 26.5 | 15.4 | 8.8 |
| 25-34 yrs | 43.6 | 25 | 17.3 | 10.6 | 6.2 |
| 35-44 yrs | 44.5 | 28.4 | 19.8 | 13.7 | 9 |
| 45-54 yrs | 45.2 | 30.1 | 21 | 14.5 | 9.5 |
| 55-64 yrs | 52 | 38.4 | 28.8 | 22.3 | 15.6 |
| 65 yrs plus | 70.6 | 59.4 | 46.7 | 36.2 | 25.6 |
| Couple no kids | 53.7 | 38.7 | 28.4 | 21.4 | 15.3 |
| Couple with kids | 43 | 25.9 | 17.8 | 11.4 | 6.7 |
| Single parent | 68.5 | 52.3 | 40 | 28.1 | 19.1 |
| Single person | 61.7 | 47.8 | 36.8 | 28 | 19.3 |
| Other | 67 | 55.7 | 38.7 | 25.4 | 16.3 |
| | | | | | |
| *Individual-level score ≥ 2* | | | | | |
| Males | 15.7 | 7.4 | 4.3 | 2.7 | 1.5 |
| Females | 17.5 | 9.6 | 5.5 | 3.1 | 1.6 |
| 15-24 yrs | 16.9 | 8.4 | 5.3 | 2 | 1.1 |
| 25-34 yrs | 14.5 | 6.8 | 3.5 | 2.2 | 1 |
| 35-44 yrs | 14 | 6.6 | 4.2 | 2.2 | 1.4 |
| 45-54 yrs | 15.8 | 7.5 | 4.5 | 3.5 | 1.9 |
| 55-64 yrs | 18.1 | 10.9 | 6.1 | 3.6 | 2.1 |
| 65 yrs plus | 20.5 | 10.7 | 5.9 | 3.3 | 1.6 |
| Couple no kids | 15 | 7.7 | 4.2 | 2.4 | 1.1 |
| Couple with kids | 11.1 | 4.9 | 2.9 | 1.4 | 0.9 |
| Single parent | 32.7 | 18.5 | 10.5 | 6.2 | 3.4 |
| Single person | 22.4 | 12.1 | 6.9 | 4.9 | 3 |
| Other | 29.4 | 14.8 | 13 | 7.5 | 1 |

In the Table 17, persistence of household-level exclusion is examined disaggregated by age group, allowing consideration of young children. On the basis of the characteristics of their households (and of other household members aged 15 and over), just over half of children younger than 15 years were marginally excluded at some point in time over the seven-year time frame. Over one-quarter were marginally excluded for three or more years. Perhaps more concerning is that just under twenty per cent (18.5%) of children were deeply excluded at some point over the seven years. While the proportions of children persistently in deep exclusion are somewhat smaller, rates are nonetheless a cause for concern. For example, 4.3 per cent of children are found to be deeply excluded for three or more years.

Table 17: Persistence of household level exclusion by age, per cent of population

|  | Under 15 | 15-24 yrs | 25-34 yrs | 35-44 yrs | 45-54 yrs | 55-64 yrs | 65yrs plus |
|---|---|---|---|---|---|---|---|
| *Household-level score ≥ 1* |  |  |  |  |  |  |  |
| 1 year plus | 51.0 | 55.4 | 44.6 | 43.7 | 46.9 | 51.9 | 75.2 |
| 2 years plus | 37.9 | 36.2 | 27.2 | 28.6 | 31.1 | 38.0 | 62.9 |
| 3 years plus | 26.7 | 25.1 | 17.1 | 18.9 | 21.0 | 29.7 | 50.9 |
| 4 years plus | 18.7 | 17.4 | 11.4 | 13.0 | 14.6 | 22.8 | 40.2 |
| 5 years plus | 12.8 | 10.9 | 6.5 | 9.2 | 9.9 | 17.6 | 30.1 |
|  |  |  |  |  |  |  |  |
| *Household-level score ≥ 2* |  |  |  |  |  |  |  |
| 1 year plus | 18.5 | 16.8 | 12.9 | 13.2 | 12.6 | 16.9 | 20.6 |
| 2 years plus | 9.1 | 7.3 | 6.2 | 6.1 | 6.4 | 9.8 | 10.2 |
| 3 years plus | 4.3 | 3.9 | 3.0 | 3.9 | 3.7 | 6.6 | 5.4 |
| 4 years plus | 3.1 | 2.3 | 1.9 | 2.2 | 2.6 | 4.8 | 3.6 |
| 5 years plus | 2.2 | 1.2 | 1.6 | 1.5 | 1.6 | 2.6 | 1.6 |

## 8. Conclusions and further work

Underpinning the analysis presented in this paper is the view that social exclusion is inherently multidimensional and is most appropriately measured at the individual level rather than at the societal level. For example, it is much more valuable to know how many people have all three of low income, low wealth and low consumption expenditure than it is to know the number of people with low income, the number with low wealth and the number with low consumption expenditure. That is, it is the *intersection* of multiple sources or indicators of disadvantage within the one individual that it is important to know.

Our approach involves distinguishing between the seven life domains proposed in Scutella *et al*. (2009) – material resources, employment, education and skills, health and disability, social, community, and personal safety – and producing various indicators of social exclusion within each domain. A simple 'sum-score' method is used to estimate the extent or depth of exclusion, with our measure a function of (1) the number of domains in which exclusion is experienced, and (2) the number of indicators of exclusion present within each domain. Our analysis has also recognised that persistence over time is an important dimension of exclusion. We have only considered this dimension is a limited way in this paper, using the longitudinal structure of the HILDA data to examine the length of time the indicators are present for each individual.

Our 'sum-score' measure identifies that 20 to 30 per cent of the Australian population aged 15 years and over experience what we refer to as 'marginal exclusion' at any given point in time. Four to six per cent are 'deeply excluded', and less than one per cent are 'very deeply excluded'. Strong employment growth over the period 2001 to 2007 led to an associated fall

in measured exclusion over this period. Groups found to be most prone to exclusion include: females, the young and the old, single parents, persons in regional areas, indigenous Australians, persons born in non-English speaking countries, persons in private rental accommodation, persons with a long term health condition and persons not completing secondary school (or its equivalent). Examination of household measures of exclusion further reveal a relatively high rate of exclusion for children under 15 years of age.

While there are commonalities in the demographic composition of the socially excluded and the income poor, we find some important differences. In particular, persons 65 years and over make up a much smaller share of the 'most excluded' group than they do of the 'poorest', while couple and single families with children account for a larger share of the most excluded than the poorest. Our measure of exclusion also captures a larger share of persons with a long-term health condition than an income measure does. We furthermore find that relative income poverty remained broadly unchanged over the 2001 to 2007 period, whereas social exclusion declined markedly, primarily due to the employment growth experienced in this period.

Cursory examination of the persistence of exclusion over time shows, as expected, that short-term exclusion is more frequent than long-term, persistent exclusion. However, there are significant sections of the population that experience exclusion for lengthy periods. For instance, we find that five per cent of the population face deep exclusion for three or more years. The proportion of children under 15 years of age persistently in deep exclusion is slightly smaller, but is nonetheless a cause for concern.

While a significant amount of work has been undertaken for this study of social exclusion, much remains to be done. Indeed, there are at least seven ways in which this program of research can be furthered. First, while we find our results are robust to using item response models in place of the sum-score approach, we do find some degree of sensitivity to the imposition of a below-median income restriction and to the particular weights assigned to each of the life domains. Further research on the appropriate weighting of domains would therefore seem valuable. For example, one option to potentially be pursued is to survey members of the community to ascertain the relative importance they assign to each domain.

Second, we find that the age composition of the socially excluded is considerably different in 2002 and 2006, when information on household wealth is taken into account. This demonstrates the importance of taking wealth into consideration when identifying disadvantaged groups in society. In future research, we will further examine the impact of wealth on measures of disadvantage by either imputing wealth values in intervening survey

periods, or at the very least including the value of imputed rents for owner-occupiers (and public housing residents) in our material resources domain.

Third, the aggregate index of exclusion that we produce for each individual has limited value from a policy perspective. The nature of an individual's exclusion is not communicated by the score, and so it is not immediately informative on the appropriate policy responses. It is correspondingly a priority for future work to describe the domains of exclusion of the most severely excluded individuals. That is, we should examine, by level of overall exclusion, the individual domains and indicators within those domains.

The fourth area requiring further research is, as we have flagged, the extent and nature of persistence of exclusion over time. Fifth, the work presented in this paper is merely descriptive of social exclusion. Notwithstanding the above-mentioned limitations of our analysis that require further work, the logical next step is to use available data to investigate the causes of exclusion – including understanding the determinants of its depth at a point in time and its persistence over time. The panel structure of the HILDA data naturally lends it to panel estimation methods that have been developed to facilitate identification of causal relationships. This includes estimation of dynamic panel models that can identify exclusion 'traps'.

Sixth, our analysis of social exclusion uses a single data source, the HILDA Survey. As has been noted in our, and other studies, the HILDA survey is not the appropriate information source for groups most at risk of exclusion, including the homeless, new immigrants, indigenous Australians, persons living in very remote areas and the institutionalised. It is therefore imperative that future research be undertaken using additional data sources to comprehensively examine the nature of social exclusion for these groups. Of course, for some of these groups, data options are very limited, but there is no doubt that there is potential for augmentation of the analysis of the HILDA data with analysis of additional data.

Finally, we note that it is essential for researchers and policy makers to monitor levels of social exclusion on an ongoing basis, and therefore regular updating of the measures will be required in future. It is thus our intention to produce annual updates of our measures of social exclusion.

# Appendix

Table A1: Incidence of individual dimensions of poverty and social exclusion, per cent of population aged 15 years and over

| | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|
| **Material resources domain** | | | | | | | |
| Low income | 20.4 | 20.0 | 19.7 | 19.9 | 20.3 | 19.0 | 20.1 |
| Low net worth | - | 38.4 | - | - | - | 37.5 | - |
| Low consumption | - | - | - | - | - | 13.4 | 12.3 |
| In financial hardship | 8.8 | 6.7 | 6.7 | 5.7 | 5.8 | 5.0 | 5.5 |
| **Employment domain** | | | | | | | |
| Long-term unemployed | 1.0 | 0.7 | 0.6 | 0.4 | 0.5 | 0.3 | 0.4 |
| Unemployed | 4.4 | 3.9 | 3.6 | 3.3 | 3.2 | 2.9 | 2.8 |
| Underemployed or unemployed | 10.6 | 10.5 | 10.5 | 9.5 | 9.3 | 8.9 | 8.8 |
| Marginally attached, underemployed or unemployed | 18.3 | 18.0 | 18.0 | 16.3 | 15.8 | 15.2 | 14.1 |
| In a jobless household | 13.3 | 13.6 | 13.0 | 12.4 | 11.8 | 10.9 | 10.3 |
| **Education and skills domain** | | | | | | | |
| Low literacy | - | - | - | - | - | - | 3.1 |
| Low numeracy | - | - | - | - | - | - | 4.6 |
| Poor English proficiency | 2.7 | 3.2 | 2.9 | 2.9 | 2.7 | 2.3 | 2.3 |
| Low formal education | 39.5 | 38.1 | 37.0 | 36.3 | 35.0 | 34.5 | 33.3 |
| Little work experience | 10.2 | 12.0 | 11.8 | 11.6 | 11.1 | 11.2 | 11.1 |
| **Health domain** | | | | | | | |
| Poor general health | 17.3 | 18.1 | 18.2 | 18.7 | 19.0 | 18.3 | 18.3 |
| Poor physical health | 11.4 | 11.3 | 10.8 | 10.4 | 11.2 | 10.5 | 10.9 |
| Poor mental health | 10.4 | 9.9 | 10.1 | 10.1 | 10.1 | 9.8 | 9.6 |
| Long-term health condition | 23.8 | 22.0 | 27.8 | 26.6 | 28.7 | 27.1 | 27.4 |
| Disabled child in the household | 3.8 | 3.5 | 3.9 | 3.8 | 3.4 | 3.3 | 3.2 |
| **Social domain** | | | | | | | |
| Little social support | 1.3 | 1.3 | 1.4 | 1.5 | 1.5 | 1.1 | 1.4 |
| Infrequent social activity | 10.2 | 10.3 | 10.4 | 10.5 | 11.6 | 11.4 | 10.0 |
| **Community domain** | | | | | | | |
| Low neighbourhood quality | 1.6 | 1.7 | 1.6 | 1.6 | - | 1.6 | - |
| Low satisfaction with neighbourhood | 5.3 | 5.0 | 4.5 | 4.4 | 4.3 | 4.3 | 4.1 |
| Low satisfaction with feeling part of community | 16.4 | 15.6 | 14.5 | 13.3 | 13.2 | 12.3 | 12.4 |
| Low civic participation – membership | 19.6 | 20.1 | 20.3 | 19.7 | 17.9 | 17.1 | 17.3 |
| Low civic participation – voluntary activity | 22.7 | 24.3 | 24.1 | 23.7 | 23.3 | 22.7 | 22.7 |
| **Personal safety domain** | | | | | | | |
| Victim of violence | - | 2.0 | 1.9 | 1.5 | 1.5 | 1.5 | 1.4 |
| Victim of property crime | - | 6.9 | 6.9 | 6.2 | 5.3 | 4.9 | 3.5 |
| Low subjective safety | 6.7 | 5.3 | 4.4 | 3.6 | 3.6 | 3.4 | 3.1 |

Table A2: Estimates of logit random effects item response models ($\gamma_k$)

| Item | Using all available indicators | | Using indicators common to all waves | |
|---|---|---|---|---|
| | $\gamma_k$ | Standard error | $\gamma_k$ | Standard error |
| *Flexible model* | | | | |
| Low income | -1.35 | 0.007 | -1.212 | 0.008 |
| Low net worth | -2.145 | 0.056 | | |
| Low consumption | -0.677 | 0.012 | | |
| In financial hardship | 0.132 | 0.01 | 0.282 | 0.011 |
| Long-term unemployed | 2.777 | 0.014 | 2.931 | 0.016 |
| Unemployed | 0.888 | 0.011 | 1.039 | 0.013 |
| Underemployed or unemployed | -0.329 | 0.009 | -0.183 | 0.01 |
| Marginally attached or worse | -0.969 | 0.008 | -0.827 | 0.008 |
| In a jobless household | -0.516 | 0.009 | -0.371 | 0.009 |
| Low literacy | 1.279 | 0.014 | | |
| Low numeracy | 0.546 | 0.014 | | |
| Poor English proficiency | 1.803 | 0.013 | 1.956 | 0.015 |
| Low formal education | -2.22 | 0.007 | -2.091 | 0.007 |
| Little work experience | -0.468 | 0.009 | -0.322 | 0.01 |
| Poor general health | -1.054 | 0.008 | -0.911 | 0.009 |
| Poor physical health | -0.37 | 0.009 | -0.222 | 0.01 |
| Poor mental health | -0.278 | 0.009 | -0.13 | 0.01 |
| Long-term health condition | -1.626 | 0.007 | -1.49 | 0.008 |
| Disabled child in the household | 0.748 | 0.011 | 0.899 | 0.049 |
| Little social support | 1.9 | 0.013 | 2.054 | 0.015 |
| Infrequent social activity | -0.355 | 0.009 | -0.208 | 0.01 |
| Low neighbourhood quality | 1.734 | 0.013 | | |
| Low satisfaction with neighbourhood | 0.604 | 0.011 | 0.755 | 0.012 |
| Low satisfaction with feeling part of community | -0.705 | 0.008 | -0.561 | 0.009 |
| Low civic participation – membership | -1.134 | 0.008 | -0.994 | 0.008 |
| Low civic participation – voluntary activity | -1.45 | 0.008 | -1.314 | 0.008 |
| Victim of violence | 1.801 | 0.013 | | |
| Victim of property crime | 0.664 | 0.012 | | |
| Low subjective safety | 0.769 | 0.011 | 0.92 | 0.012 |
| | | | | |
| *7-item model* | | | | |
| Material resources | -1.385 | 0.007 | -1.534 | 0.007 |
| Employment | 2.007 | 0.01 | 1.639 | 0.013 |
| Education | 0.749 | 0.009 | 0.386 | 0.01 |
| Health | -0.316 | 0.008 | -0.519 | 0.008 |
| Social | -0.6 | 0.007 | -0.782 | 0.008 |
| Community | -1.027 | 0.007 | -0.751 | 0.008 |
| Safety | 0.572 | 0.02 | 1.561 | 0.023 |

# References

Atkinson, A. (2003) 'Multidimensional deprivation: contrasting social welfare and counting approaches,' Journal of Economic Inequality 1(1), pp. 51-65.

Atkinson, A, Cantillon, B, Marlier, E and Nolan, B (2002) *Social indicators: The EU and social inclusion*, Oxford: Oxford University Press.

Berthoud, R., Bryan, M. and Bardasi, E. (2004) *The Relationship between Income and Material Deprivation over Time*, Department of Work and Pensions Research Report 219, Leeds: Corporate Document Services.

Bourguignon, F. and S. Chakravarty (1998a) 'A Family of Multidimensional Poverty Measures,' DELTA Document 98-03, Paris.

Bourguignon, F. and S. Chakravarty (1998b) 'Multi-dimensional Poverty Orderings,' DELTA Document, Paris.

Bourguignon, F. and S. Chakravarty (2002) 'The Measurement of Multidimensional Poverty,' DELTA Document 98-12, Paris.

Burchardt, T, Le Grand, J & Piachaud D. (2002) 'Degrees of exclusion: developing a dynamic, multidimensional measure', in J. Hills, J. Le Grand & D. Piachaud (eds) *Understanding Social Exclusion*, Oxford University Press, pp. 30 -43.

Capellari, L. and Jenkins, S. (2007) 'Summarizing multiple deprivation indicators,' in Jenkins, S. and Micklewright, J. (eds) *Inequality and Poverty Revisited*, Oxford University Press.

Crossley and Pendakur (2006) 'The social cost-of-living: Welfare foundations and estimation,' IFS Working Papers W06/10, Institute for Fiscal Studies, Britain.

Goode and Watson (eds) (2006), HILDA User Manual – Release 4.0, Melbourne Institute of Applied Economic and Social Research, University of Melbourne, viewed 1/29/2007 <http://www.melbourneinstitute.com/hilda/doc/doc_hildamanual.htm.>

Eurostat (2009) *Europe in Figures: Eurostat Yearbook 2009*, Luxembourg.

Headey, B (2006), *A Framework for Assessing Poverty, Disadvantage and Low Capabilities in Australia*, Melbourne Institute Report No. 6, Melbourne Institute of Applied Economic and Social Research, The University of Melbourne, Melbourne.

Headey, B. (2008) 'Poverty Is Low Consumption and Low Wealth, Not Just Low Income,' *Social Indicators Research*, 89(1), 23-39.

Levitas, R, Pantazis, C, Fahmy, E, Gordon, D, Lloyd, E & Patsios, D (2007), *The Multi-Dimensional Analysis of Social Exclusion*, A Research Report for the Social Exclusion Task Force, viewed 30 June 2007 <http://www.cabinetoffice.gov.uk/social_exclusion_task_force/publications/multidimensional.aspx>.

OECD (2007) *Benefits and Wages*, OECD, Paris.

Saunders, P, Naidoo, Y & Griffiths, M (2007), *Towards New Indicators of Disadvantage: Deprivation and Social Exclusion in Australia*, Social Policy Research Centre, Sydney.

Scutella, R., R. Wilkins and M Horn (2009) 'Measuring Poverty and Social Exclusion in Australia: A Proposed Multidimensional Framework for Identifying Socio-Economic Disadvantage,' Melbourne Institute Working Paper, No. 04/2009.

Ware, J. E., Jr., Snow, K. K., Kosinski, M., & Gandek, B. (1993). SF-36 health survey. Manual and interpretation guide. Boston: The Health institute, New England Medical Center.

Watson, N and Wooden, M (2004) 'The HILDA Survey Four Years On', *Australian Economic Review,* 37(3), pp. 343-349.