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**Poverty and disadvantage among Australian children: a spatial
perspective**

Ann Harding, Justine McNamara, Robert Tanton,
Anne Daly and Mandy Yap,

National Centre for Social and Economic Modelling (NATSEM)

For additional information please contact:

Author Name(s) : Ann Harding

Author E-Mail(s) : ann.harding@natsem.canberra.edu.au

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The National Centre for Social and Economic Modelling was established on 1 January 1993, and supports its activities through research grants, commissioned research and longer term contracts for model maintenance and development with the federal departments of Families, Community Services and Indigenous Affairs; Employment and Workplace Relations; Treasury; and Education, Science and Training.

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Director: Ann Harding

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National Centre for Social and Economic Modelling
University of Canberra ACT 2601 Australia
170 Haydon Drive Bruce ACT 2617

Phone + 61 2 6201 2780 Fax + 61 2 6201 2751

Email natsem@natsem.canberra.edu.au

Website www.natsem.canberra.edu.au

Abstract

Much research about child poverty and disadvantage provides national estimates of child wellbeing, due to the ready availability of microdata at the national level. However, an increasing body of evidence suggests that there can be major differences in well-being between children living in different geographic areas. In addition, much recent debate has focussed on moving beyond income poverty to broader measures of social exclusion. This paper describes results from an innovative use of the 2001 Australian census microdata, in which tables were commissioned from the Australian Bureau of Statistics which focussed on well-being and disadvantage from the child's perspective. Using this data, a composite index of child social exclusion risk at a small area level was constructed and then regional differences in risk analysed. The paper also analyses the specific indicators of social exclusion which form the index. Substantial differences in child social exclusion, and in specific characteristics related to social exclusion, are found across local areas. The extent of correlation between a more traditional income-based measure of economic wellbeing and the composite index is also examined.

Author note

Ann Harding is Professor of Applied Economics and Social Policy, University of Canberra, and inaugural Director of NATSEM. Anne Daly is Associate Professor in Economics at the University of Canberra. Robert Tanton is a Principal Research Fellow, Justine McNamara is a Senior Research Fellow, and Mandy Yap is a Senior Research Officer at NATSEM.

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General caveat

NATSEM research findings are generally based on estimated characteristics of the population. Such estimates are usually derived from the application of microsimulation modelling techniques to microdata based on sample surveys.

These estimates may be different from the actual characteristics of the population because of sampling and nonsampling errors in the microdata and because of the assumptions underlying the modelling techniques.

The microdata do not contain any information that enables identification of the individuals or families to which they refer.

1 Introduction

Recent studies of poverty among children and families in Australia have tended to be based on income, often concentrating on changes in the level of income poverty over time (see, for example, Bradbury 2003; Harding and Szukalska 2000; Harding, Lloyd and Greenwell 2000; Rodgers and Rodgers 2000). A limited number of Australian studies have examined the *dynamics* of income-based child poverty (Abello and Harding 2006; Headey et al 2005). However, while there has been strong emphasis in recent policy and research in Europe on social exclusion, relatively few Australian studies have adopted this broader definition of disadvantage to look specifically at children and none have analysed child social exclusion at a small area level.

The multidimensional nature of child disadvantage has been discussed by a number of authors in an Australian context, in relation to the causes and correlates of income poverty. Bradbury (2003), for example, notes that Australia has a relatively high proportion of children living in households without a working adult. He found that both the increase in lone parent households and the increase in jobless households within each family type (lone parent and couple families) contributed to the high rate of jobless households. He also argued that the relatively low level of workforce-age social expenditure as a percentage of GDP contributed to Australia's position in the middle of the table of child poverty levels in developed countries.

The need to incorporate wider dimensions of disadvantage has become increasingly accepted – and the concept of social exclusion has become one widely recognised framework for understanding, measuring and addressing poverty and disadvantage at this multidimensional level. There is a very substantial body of literature relating to the definition and measurement of social exclusion and related concepts (reviewed in Daly, 2006). There is no single definition of social exclusion, but we are adopting here the following definition used by the British Social Exclusion Unit:

‘Social exclusion happens when people or places suffer from a series of problems such as unemployment, discrimination, poor skills, low incomes, poor housing, high crime, ill health and family breakdown.’ (Social Exclusion Unit 1997).

There has been limited empirical work using the concept of social exclusion in Australia. Saunders (2003) used data from the 1998/99 Household Expenditure Survey (HES) to make some preliminary calculations of the level of social exclusion among households in Australia. He found that the major form of social exclusion (defined as reporting two or more problems in each area examined in the study: social interaction, domestic deprivation, and extreme consumption hardship) was a lack of social interaction. Single parent households were the most excluded group.

Saunders found a limited overlap between those measured as income poor and those experiencing material deprivation.

Daly (2006) describes the extension of this work to compare outcomes in Australia with those in Britain (Saunders and Adelman 2005). These authors compared household equivalent income between the two countries and set the poverty line at 40, 50 and 60 per cent of median income, using the OECD modified scale to create equivalent income. They found that poverty was higher in Britain than in Australia. However, when they compared the two countries on material deprivation and social exclusion, they found that the levels were higher in Australia. Lone parents were the group with the largest percentage suffering from material deprivation and social exclusion in both countries.¹ The authors caution against making too much of the international comparisons of results given differences in social expectations and the phrasing of survey questions between the two countries.

Bray (2001) also used data from the HES 1998/99 to look at the incidence of financial hardship in Australia. He concluded that some financial deprivation was common among Australian households but a relatively small proportion of households, 3.1 per cent, faced multiple hardships (defined as having two or more hardship responses: being unable to afford heating or meals, or pawning and selling possessions, or asking for assistance from community organisations). He argued that multiple hardships were particularly important for children under 15 years. The factors associated with hardship were low income, absence of employment, income support, youth, rental housing and a disability restriction.

There have been a range of studies of disadvantaged children in Australia and the impact of poverty on indicators including their education and health, and the social and economic implications of poverty (See the Commonwealth of Australia Senate Community Affairs Reference Committee (2004) for a survey). These studies are often specific to particular fields and have not been conducted within the broad framework of social exclusion established in the literature. One example of a study within the social exclusion framework is the study by Daly and Smith (2005) which presents indicators of risk of social exclusion for Indigenous children. Based on data from the 2001 census, they found that Australian Indigenous children were more likely than their non-Indigenous counterparts to live in lone parent families or with relatives other than their biological parents, and in households with low incomes in which the adults were less likely to be employed. The households were more reliant

¹ They found in Australia that 12.7 per cent of lone parents had three or more indicators of material deprivation and 26.7 per cent had three or more indicators of social deprivation. In Britain the percentages for lone parents were 4.7 per cent for three or more indicators of material deprivation and 28.9 per cent for three or more indicators of social deprivation. Material deprivation and social exclusion are defined above.

on welfare and their parents had lower levels of educational attainment than among other Australians. Recent work by Scutella and Smyth (2005) also presents indicators of child well-being across a number of dimensions, using the capabilities framework initially developed by Amartya Sen.

Debates about the best indicators of social exclusion (for both children and adults) abound (see, for example, Atkinson et al 2002; Moore 1997), including the relative merits of composite measures and specific indicators (see Daly 2006 for further discussion). The use of a composite measure has the advantage of summarising a range of specific indicators and being easier to communicate to the wider public through a 'headline measure' (Micklewright 2001; Barnes 2001). Micklewright uses the example of the Human Development Index (HDI) calculated by the United Nations Development Programme (UNDP) to argue that a single composite measure can provide important input to public debates on development issues. The index is a simple average for each country of three indices: GDP per capita, life expectancy and educational attainment.² A composite index facilitates comparisons between countries or regions that might perform quite differently on each component of the index. It can also be used to highlight individuals at risk of facing particular disadvantages based on earlier evidence. For example, Barnes (2001) cites the use of a 'birth risk index' that includes three elements; mother under 20 years of age, mother unmarried and mother has fewer than 12 years of education. Children scoring highly on this index can be considered at risk on the basis of earlier evidence of a correlation between these indicators and disadvantage.

A disadvantage of a composite index is that, by summarising a number of components, it might obscure significant results – especially if there are substantial differences in the level of performance on each of the components. For example, two areas might look the same on an index but one might have high levels of child poverty and low levels of infant mortality while the other has the opposite. For the development of appropriate social policy a breakdown in this instance is important. A further disadvantage of a composite index is that the final result will reflect the choice of inputs and the method of construction, which are by necessity arbitrary (Micklewright 2001). On balance there are arguments for making both the final composite index and the component variables available, and this is the approach we have taken in this study.

An important focus of this study is the spatial distribution of childhood social exclusion. Regional differences in disadvantage, how these develop, and what can be done to overcome them, have also become an increasingly important part of research and policy. There is considerable international literature (reviewed in Daly 2006) about the effects of neighbourhood on both children and adults (see Bradshaw et al

² For the most recent report see UNDP (2005)

2004; Durlauf 2001). In an Australian context, in a series of papers Hunter and Gregory have questioned whether Australian cities have developed concentrations of disadvantaged people, separated from the job networks and social interactions of mainstream society (Gregory and Hunter 1996; Gregory and Hunter 2001; Hunter 1995; Hunter 2003). Using data from the 1976 and 1991 population censuses, they tracked the employment and income status of Census Collector Districts (CD) over time. Their results show that income and employment in the poorest CDs declined over this period. In a development from earlier papers, Hunter (1995) argues that changes in the structure of the Australian economy had a major impact on employment in the low income CDs. Hunter (2003) compares incomes across Australian postcodes (a spatial unit containing a larger number of households than a CD) with comparable spatial units in the US and Canada and found that there was less difference between neighbourhoods in Australia than in the other two countries. There was however, evidence of increasing differentiation between neighbourhoods over time from 1980/81 to 1990/91 in each of the three countries in his study. A more recent study of trends between 1996 and 2001 found that strong economic growth had delivered substantial increases in income across all spatial income deciles - but that slightly higher increases in gross household income had been experienced by the more affluent half of postcodes (Harding et al, 2004).

Other Australian research on the spatial dimension of disadvantage at a small area level has tended to focus on income-based measures (see, for example, Biddle 2001; Bray 2003; Lloyd et al 2000), and has not focused primarily on children. One Australian study that uses a wider range of indicators of area disadvantage focuses on Victoria and New South Wales only (Vinson 2000). Vinson uses postcode areas as the unit of analysis and presents evidence from a range of sources on indicators covering education, health, income, unemployment and crime.³ The results showed that there were a small number of postcodes that ranked highly on a wide range of the indicators used. Vinson argues that there is evidence of a 'disadvantage factor' linking social problems, as a small number of postcode areas contained significant concentrations of negative indicators. Other research has examined neighbourhood effects on educational outcomes. Jensen and Seltzer (2000) used the results of a small

³ The specific indicators used were: unemployed as a proportion of the labour force, the proportion of households with income below \$26,000 pa, the proportion of low birthweights in all births, the number of confirmed instances of child abuse as a proportion of all children, the proportion of the population who left school before the age of 15 years, the proportion of the population receiving emergency assistance, the proportion of the population aged 18 and over admitted to psychiatric hospitals, the proportion of court convictions in the population aged 18-50 years, proportion of child injuries in the population under 18 years, the number of deaths standardised for population rates, proportion of the population aged 18 who were long-term unemployed, proportion of the population 18-65 who were unskilled, and the proportion of the population 18-50 dealt with by the courts for criminal matters.

survey of 171 Year 12 students in Melbourne to study the influence of individual, family and neighbourhood characteristics in the decision to continue on to post-secondary education. They found some evidence that the neighbourhood unemployment rate, income and education and occupational mix influenced decisions about continuing in post-secondary education. Individuals in neighbourhoods with high unemployment, few degree holders and low incomes were less likely to be planning to continue with post-secondary schooling. These effects were identified separately from individual and family effects.

This study aims to add to our knowledge about both child disadvantage and the geographical distribution of this disadvantage, by developing a single, child-based indicator of social exclusion risk available at a small area level. We present results based on this indicator and on the regional distribution of the specific individual measures of disadvantage that were included, or considered for inclusion, in the final index. This research fits within a long tradition within Australia of creating socio-economic indexes for small areas, with the ABS Socio-Economic Indexes for Areas (SEIFA indexes) being very widely used, for example, in analysis of the relationships between socio-economic status and service usage (see for example Glover, Harris and Tennant 1999 and Australian Institute of Health and Welfare 2005).

However, the ABS SEIFA indexes are not specifically focussed on children (for example, an area may have a low SEIFA score because it is largely populated by older Australians on low incomes). In contrast, our index is specifically targeted towards children and the characteristics of the families in which they live, and so may give different results to the SEIFA (an issue which we will explore further in future work).

2 Methodology

2.1 Data source

This project uses data from the Australian 2001 Census of Population and Housing. This is a census of all people in Australia, collecting information on personal, household and family characteristics. It is conducted by the Australian Bureau of Statistics once every five years.

We chose the census as our data source because it is the only source of data in Australia which provides adequate information about indicators of social exclusion at a *small area level*. Spatially disaggregated analysis is an essential component of this study, due to the absence of existing child-focused information for small areas in

Australia. However, using the census has important limitations in terms of the level of detail and coverage of issues available through this source.

First, some aspects of social exclusion, such as health, are not covered at all by the census, and so cannot be captured within our social exclusion index. Second, some concepts are covered at a lower level of detail than would be ideal. For example, while some indicators of education are available through the census (type of school attended by the child, highest educational achievement of child's family), other variables which might capture more detailed aspects of the child's educational experience (literacy and numeracy, for example) are not available.

We chose Statistical Local Areas (SLAs) as our base spatial unit for this study. SLAs are part of the ABS Australian Standard Geographic Classification (ASGC), so data for them can easily be extracted from the 2001 census. SLAs were used for this analysis because of problems with confidentiality for smaller areas (such as Census Collection Districts), and because SLAs cover the whole of Australia (as opposed to Local Government Areas which do not cover areas with no local government). So the SLA is the smallest unit in the ASGC which does not present problems with confidentiality and that covers the whole of Australia.

The population in SLAs ranges from 12 to 181,327, so there is a huge disparity in populations across SLAs. Within the large SLAs, there can be a high degree of heterogeneity. Unfortunately, without direct access to the unit record data, it is difficult to see how much heterogeneity there is within these larger SLAs. It should also be noted that there is an uneven distribution of SLAs across Australia, with some relatively small states and territories (such as the Australian Capital Territory) being broken into quite large numbers of SLAs, while some larger and much more populous states have relatively few SLAs. For example, the Australian Capital Territory, which contains less than 2 per cent of Australia's population, has 107 SLAs (or 8 per cent), while New South Wales, which contains 34 per cent of the total population, has only 200 SLAs (or 15 per cent). Most notable is the position of Queensland, which is divided into 454 SLAs, many of them with very low population. Queensland thus contains 19 per cent of Australia's population, but 34 per cent of all SLAs. This of course means that Queensland will have a greater effect on any analysis of the data using quantiles (equal sized groups) of SLAs, simply because it has more SLAs. In order to overcome this issue, we present all our analysis of quantiles weighted by the child population, so that the uneven distribution of SLAs between states is controlled for.

Children are defined in this study as all children aged less than 16 years on census night. The highest age for inclusion in the sample (15) was chosen because for many

states in Australia, 16 is the age when a child can start work, either part time or full time.⁴

The data we used were created by the ABS as a special user request. Data on children 15 years of age and younger living in families within each Statistical Local Area were extracted from the 2001 census files. Characteristics potentially linked to social exclusion were chosen from variables available in the 2001 census file.

The SLA used was where the person was enumerated (i.e. where they were counted on census night), rather than their place of usual residence. We chose enumeration rather than usual place of residence because some people at risk of social exclusion may be itinerant. By using data as enumerated, we are identifying where socially excluded children are, rather than their last known permanent address. The disadvantage of this approach is that we are also picking up children away from home (for example, on holidays). The sample used was limited to children in occupied private dwellings (and thus excludes, for example, children in boarding schools and juvenile detention centres).

Because the data were cross tabulated by SLA and income quintiles, some cells had very small cell counts ($n \leq 3$), and these were randomised by the ABS. Most tables had between ten and twenty percent of cells randomised. The method used by the ABS for randomising cells has a minimal effect on the final aggregated data.

2.2 Definitions and measurement issues

In trying to define child social exclusion, we were fundamentally limited by the somewhat restricted list of variables collected in the census. When constructing potential indicators of child social exclusion, we drew on international research that has identified four dimensions of social exclusion (see Burchardt, Le Grand and Piachaud 2002).⁵ The first is *consumption*, where individuals do not have the capacity to purchase goods and services. This is partly captured within our study through family income. This is not a perfect measure of capacity to purchase goods and services, since some people with low income may have high wealth, so their potential consumption is higher than their income might suggest. However,

⁴ Data was requested for children divided into two age groups: 0-4 years old and 5-15 years old, but in this paper we present all our analysis for all children less than 16 years of age.

⁵ While these dimensions are not specifically related to children, they do cover aspects of social exclusion common to both adults and children. More child-specific definitions of social exclusion (see, for example, Adelman and Middleton, 2003), while incorporating many of the same concepts as the ones suggested by Burchardt et al, also include child-specific measures difficult to capture with census data (for example, participation in social activities and access to children's services and school resources).

generally people with low income will also have a limited capacity to purchase goods and services.

The second is *production*, where individuals are unable to find employment. This is captured in our analysis through parental labour force status and occupation.

The third is *involvement in local and national politics and organisations*. This was difficult to capture given the limited set of variables we had available to us, but education may be a partial proxy for this involvement. Research in the US suggests that those who invest in human capital also invest in social capital (see Brown and Ferris 2004; Glaeser, Laibson and Sacerdote 2002). In particular, Glaeser et al (2002) found membership in groups was positively associated with educational attainment.

The fourth is *social interaction and family support*. This is captured in our study through schooling, housing tenure, English language usage, personal computer usage and motor vehicle availability.

All the variables we have are proxies for these dimensions. The 2001 census gives excellent regional data, but at the cost of detail. As a result, we have had to fit the framework around the data we have available. While we refer throughout the paper to the index as a measure of child social exclusion, the limitations inherent in the data on which the index is based should be kept in mind when interpreting the results, and it should also be noted that the individual characteristics that have been combined in the index do not by themselves measure social exclusion, but are merely risk factors which, when taken as a whole, can be used to capture the concept of social exclusion. It should also be emphasised that our social exclusion measure is an *area-based measure*, which is used to summarise the general risk of social exclusion faced by all children living within that area. Obviously, even in an area with a particularly high risk of social exclusion, some children living in that small area will come from advantaged families and not face these high risks.

All the data used were based on children in families, except for two variables, which were only available on the census for households. These variables were housing tenure and number of motor vehicles. In our analysis, if the household was renting public housing, then all families in that household were taken to be public renters. The number of motor vehicles for the household was also applied to all families in the household.

Income

Income on the 2001 census is only available in ranges of *gross income*, with people who did not respond to the income question classified separately as “not stated”. As a result, the best income measure that we could derive was equivalent gross family income (rather than the more traditional equivalent disposable family income). To calculate this, we first estimated individual incomes by randomly assigning personal income within the income ranges available on the census. Individual incomes were then aggregated to families. Where a family had any person in it with a “not stated” income, the whole family was considered as having a “not stated” family income. About 25 per cent of children in families across Australia were excluded because at least one member of the family had a “not stated” income. While these families were left in the data to give us some idea of the number of families affected by “not stated” incomes, all our social exclusion variables were cross-classified by income – so that families with at least one person with a “not stated” income were excluded from the creation of our social exclusion index. Valid gross family incomes were then equivalised using the modified OECD equivalence scale (see Greenwell et al 2001, for further information about equivalence scales). The first adult was given a weight of 1, the second adult was given a weight of 0.5 and dependent children were given a weight of 0.3. Dependent children were identified on the 2001 census as children aged 0-14 years plus dependent students aged 15 – 24. Income quintiles were then calculated from these equivalised gross family incomes.

Note that the income quintiles were calculated for all Australian families (including both single person families and those without children), but after removing families with at least one person having a “not stated” income. This means that they are calculated for the whole Australian population, with the bottom quintile representing the bottom 20 per cent of all Australian families and singles with valid income data. Testing showed that about 37 per cent of children were in the bottom income quintile, about 55 per cent in the middle three quintiles and about 8 per cent in the top income quintile. (Based on our earlier research (Abello and Harding, 2004, p. 12) it seems likely that the use of equivalent *gross* income results in a higher proportion of Australian children being at the bottom of the income spectrum than when equivalent *disposable* income is used as the measure of resources – presumably partly as a result of the high non-taxable cash transfers paid for children in Australia.)

Membership in the bottom equivalent national gross family income quintile was used as a base requirement for social exclusion risk – in other words, children had to live in families whose income placed them in the bottom national income quintile *before* their other characteristics were assessed for potential inclusion in the calculation of social exclusion risk. Thus all other variables used in the index creation were first cross-tabulated with income quintile. While we found this a difficult

decision to make, the literature on social exclusion does emphasise the importance of financial disadvantage – and, to set up an extreme example, even if all of the children within a particular SLA lived in families where no parent completed year 12 of school or had any motor cars, if all of these children nonetheless lived in families in the top income quintile then we did not want to regard them as facing a high risk of social exclusion.

The gross income data available in the census was also used as the basis for calculating a measure of income poverty, which we then compared with our multidimensional measure of disadvantage. These poverty rates were provided especially for this project by the Australian Bureau of Statistics, but it is important to note that the measure of ‘poverty’ used in this case does not precisely match the usual definition of income poverty used in Australia, due to limitations in the available census data. The measure of economic resources used by the ABS was equivalised gross (not disposable) household income. In addition, the ABS data were coded into pre-set income ranges, so that any child living in a household with an equivalent gross household income of \$299 or less was placed in the ‘in poverty’ group. Analysis by the ABS of comparable income survey data suggested that a poverty line set at half median equivalent gross household income would have been around \$AU250 in 2001. Thus, it is clear that the measure of income poverty used here really captures families in *or near* poverty, and thus produces much higher ‘poverty rates’ than would generally be the case. However, this is not a particular concern, given that our purpose here is to evaluate whether more traditional income-based measures of disadvantage provide similar answers to our broader social exclusion measures about where disadvantaged children live.

Other variables

The non-income indicators of social exclusion chosen for use in this study are shown in Table 1. As noted in the table, for some variables, the highest value for the family was taken. This was because having someone in the family with better circumstances may reduce the child’s risk of social exclusion. For example, the presence in the family of an older sibling with post-school qualifications, even if the child’s parent may not have such qualifications, has the possibility of providing a child with additional assistance with school work, and an educational role model, both of which may promote the child’s own chances of staying in school, and pursuing post-school studies. For other variables (labour force status and English language usage), only the status of the parents was considered.

All variables were converted to proportions using the total child population in that SLA as the denominator. So, for example, the variable measuring children in single parent families was calculated by dividing the number of children in single parent

families in each SLA by the total number of children in that SLA. For the schooling variable only, the age group of 5-15, rather than 0-15, was used as the basis for calculating both the number and proportion of children with this characteristic, in order to isolate differences in type of school attendance from differences in the age distribution of children.

Table 1 List of social exclusion variables used

Variable in Census	Social Exclusion Measure Developed
<i>Family Type</i>	Proportion of children aged 0 – 15 in sole parent family with low income
<i>Schooling</i>	Proportion of children aged 5 – 15 in Government school with low income
<i>Education in family</i>	Proportion of children aged 0 – 15 with no-one in the family completed Year 12 and low income
<i>Occupation in family</i>	Proportion of children aged 0 – 15 with highest occupation in family blue collar worker and low income
<i>Housing tenure</i>	Proportion of children aged 0 – 15 in public housing and low income
<i>Parents speak English at home</i>	Proportion of children aged 0 – 15 in family where at least 1 parent speaks a language other than English at home and low income
<i>Labour force status of parents</i>	Proportion of children aged 0 – 15 in family where no parent working (both for couple families; 1 for sole parents) and low income
<i>Personal computer usage</i>	Proportion of children aged 0 – 15 in family where no-one used computer at home in last week and low income
<i>Motor Vehicle</i>	Proportion of children aged 0 – 15 in household with no motor vehicle and low income

Note: ‘Low income’ means in the bottom quintile of equivalent gross family income for all of Australia (with families including single persons).

Data source: ABS Census of Population and Housing 2001

For all variables, the “not stated” classification was identified separately. Where a family had any person with a “not stated” response on a variable, the whole family was removed from the analysis of that variable only (or for variables where only the parent or only the child were considered, a “not stated” response for either parent or for the child). The total number of families affected by this varies by variable and SLA but, on average across Australia, for each variable between 2 per cent and 5 per cent of children are in families with “not stated” classifications. As noted above, the social exclusion index also excludes analysis of children in families with incomplete income data (because income was used as a base requirement for social exclusion). When we present results about the specific characteristics associated with social exclusion risk, however, these estimates relate to children with valid (stated rather than not stated) data on that particular characteristic, regardless of whether or not the child’s family income data was also valid.

2.3 Statistical analysis

The method we used to summarise the chosen variables into a single measure of child social exclusion was principal components analysis, which has been used in Australia and overseas to create summary indexes from a number of correlated variables (see ABS 2003; Salmond and Crampton 2002).

Principal components analysis is a data summary technique. It transforms a set of correlated data (in this case, the set of variables we are using that serve as proxies for different aspects of social exclusion) into a smaller set of uncorrelated components that capture most of the variation of the original set of variables (Dunteman 1989). The aim of the method is to maximise the correlation between the components and the original variables. While the procedure produces several new principal component variables, the first principal component explains the largest amount of the variation in the original variables, and can be used to capture the underlying meaning of the original set of variables. This first principal component thus becomes the index.

The first step in producing the index was to remove any data that had low cell counts or had a very high non-response on the census. Low cell counts mean that even a very small change in the data can mean a large percentage change (so one extra child at risk of social exclusion may represent a 33 per cent increase if there are only 3 children in the SLA). High non-response for a particular variable means we do not have a reliable estimate of the value for that variable in that SLA. In regard to non-response, any SLA with an 80 per cent or higher non-response rate for any variable included in the social exclusion index was removed from the analysis.

To deal with the issue of low cell counts, we excluded from the analysis SLAs with fewer than 30 children in total. This cut-off was based on the total child population in the SLA, not the number of children at risk of a particular aspect of social exclusion. So, for example, there may be only 5 children with both parents unemployed and on a low income in a particular SLA but, as long as the total number of children in that SLA is greater than 30, we would include that SLA in the analysis.

There were a total of 54 SLAs excluded due to low child population, another 13 SLAs excluded due to high non-response, and 8 that had both low population and high non-response. This left a total of 1257 SLAs for the principal components analysis. Unfortunately, this also left much of the rural Northern Territory without an index, mainly due to high non-response on the income question. Results for the Northern Territory presented here, therefore, need to be treated cautiously.

The next step in creating the index was to explore the data, through examining the correlations among all the input variables. While many of the variables were highly correlated (as expected) we found very low correlations between English language

usage and the other social exclusion risk variables. This variable was included in our initial analysis but, as we found very low loadings (or correlations between the variable and the final index), we excluded it fairly early in our modelling.

As noted above, principal components analysis produces several new principal component variables from the original set of correlated variables. The first principal component explains the largest amount of the variation in the original variables, and can be used to summarise the original set of variables into a single indicator. For the purposes of this analysis, we only kept the first component as the index. This is standard practice when creating summary indexes. The ABS SEIFA indexes, and the NZ Indexes of Deprivation both use the first component only (see ABS 2003; Salmond and Crampton 2002). Further components can give some additional insights into other aspects of social exclusion but, if the aim of the research is to produce a summary measure of social exclusion, then it is appropriate to use the first component as the index.

Once the first principal components analysis was run, any variables with loadings less than 0.3 were removed. The loading is simply the correlation between the component and the variable. If this is low, then the component is not highly correlated with the variable, and the variable can be removed without affecting the component's explanatory power much. The only variable removed was the English language usage variable, which had very low loadings. This is consistent with the very low correlations we found in the initial correlation matrix, and this variable was thus removed from further analysis.

The final list of variables, loadings and eigenvalue for the child social exclusion index (CSE Index) are shown in Table 2. The eigenvalue shows the amount of total variance in the original variables accounted for by the final index (or first principal component). It is measured in terms of units of variance. It can then be expressed as a percent by dividing the eigenvalue by the number of variables used in the principal components analysis and multiplying by 100. Here, as shown in Table 2, this calculation produces a value of 52.7 per cent, indicating that 52.7 per cent of the variance in the original variables is explained by the index.

This is a good result, and compares well with the ABS SEIFA indexes, which explain between 32 per cent and 46 per cent of the variation in the original data (ABS 2004). This may be because all the CSE index variables had low income as part of their construction, so we would expect a higher correlation. The highest loadings were on the education, computer use and occupation variables. The education and occupation variables are mentioned in the literature as significant drivers of social exclusion (see for example ABS 2003; Marks, McMillan, Jones and Ainley 2000), so this result was expected. The loading on the computer use variable is also very high, suggesting it may be acting as a proxy for other social exclusion variables. As noted

above, use of a language other than English at home had a low loading in all the indexes, and was removed, although we do present some results about this variable as a specific indicator.

As our variable creation methodology had already controlled for different child populations within different SLAs, by using a proportion measure rather than an absolute number measure, and as we were using census data, not sample survey data, it was not necessary to population weight the principal components analysis. We did, however, test for the possible effects of the uneven distribution of SLAs across states, described earlier. We did this by running the principal components analysis with weights which gave states which had many SLAs compared with their total population size (such as Queensland) a lower weight, to see if we could detect any effect of this uneven distribution which might not have been controlled for by taking population into account when creating the variables. However, the results from this model were very similar to those produced by the original model – and so we were able to conclude that our index values were not driven by states with a high number of SLAs in proportion to their population.

Table 2 Table of variables and loadings for the Child Social Exclusion Index (all children aged 0 -15)

Variable	Loading
Proportion of children in sole parent family with low income	0.59
Proportion of children aged 5 – 15 in government school with low income	0.87
Proportion of children with no-one in the family completed Year 12 and low income	0.92
Proportion of children with highest occupation in family blue collar worker and low income	0.83
Proportion of children in public housing and low income	0.37
Proportion of children in family where at least 1 parent speaks a language other than English at home and low income	Low
Proportion of children in family where no parents employed	0.59
Proportion of children in family where no-one used computer at home in last week, low income	0.94
Proportion of children in family with no motor vehicle and low income	0.44
Eigenvalue	4.22 (52.7%)

Note: The final scores are reversed in calculating the index, so a high loading indicates a lower score, or greater social exclusion.

Data source: ABS Census of Population and Housing 2001, authors' calculations.

The CSE index is ordinal (so that it can be used to rank areas), but it cannot be used as an interval measure. So, an SLA with a score of 4 on the child social exclusion index could not be described as having half the child social exclusion risk of an SLA with a value of 2. Because of this, and the large population differences between SLAs, we do not present raw data from the social exclusion index, but instead use it to create child population weighted geographic deciles of social exclusion risk. To match with common practice when using income deciles to measure relative economic wellbeing (where the bottom decile is the decile that is relatively worst off), we ranked all SLAs by their social exclusion index value, and then divided them into child-weighted deciles of social exclusion, with the lowest decile indicating the highest risk of social exclusion, and higher deciles representing lower social exclusion. Our bottom social exclusion decile thus represents the 10 per cent of children facing the highest risks of being socially excluded.⁶

3 Results

3.1 Where do Australian children at risk of social exclusion live?

Figure 1 shows the distribution of child social exclusion by small area, for the whole of Australia and for each of the state and territory capital cities. The palest colour on the maps represents the areas with the highest risk of social exclusion (the bottom decile) with the darkest colour representing areas with the lowest risk of child social exclusion. Areas that are stippled on the map are those for which data was not reliable enough to be included in our calculations (as explained in the methodology section). It is important to note these areas, as they may affect the apparent distribution of social exclusion risk at a state-by-state level, as described below.

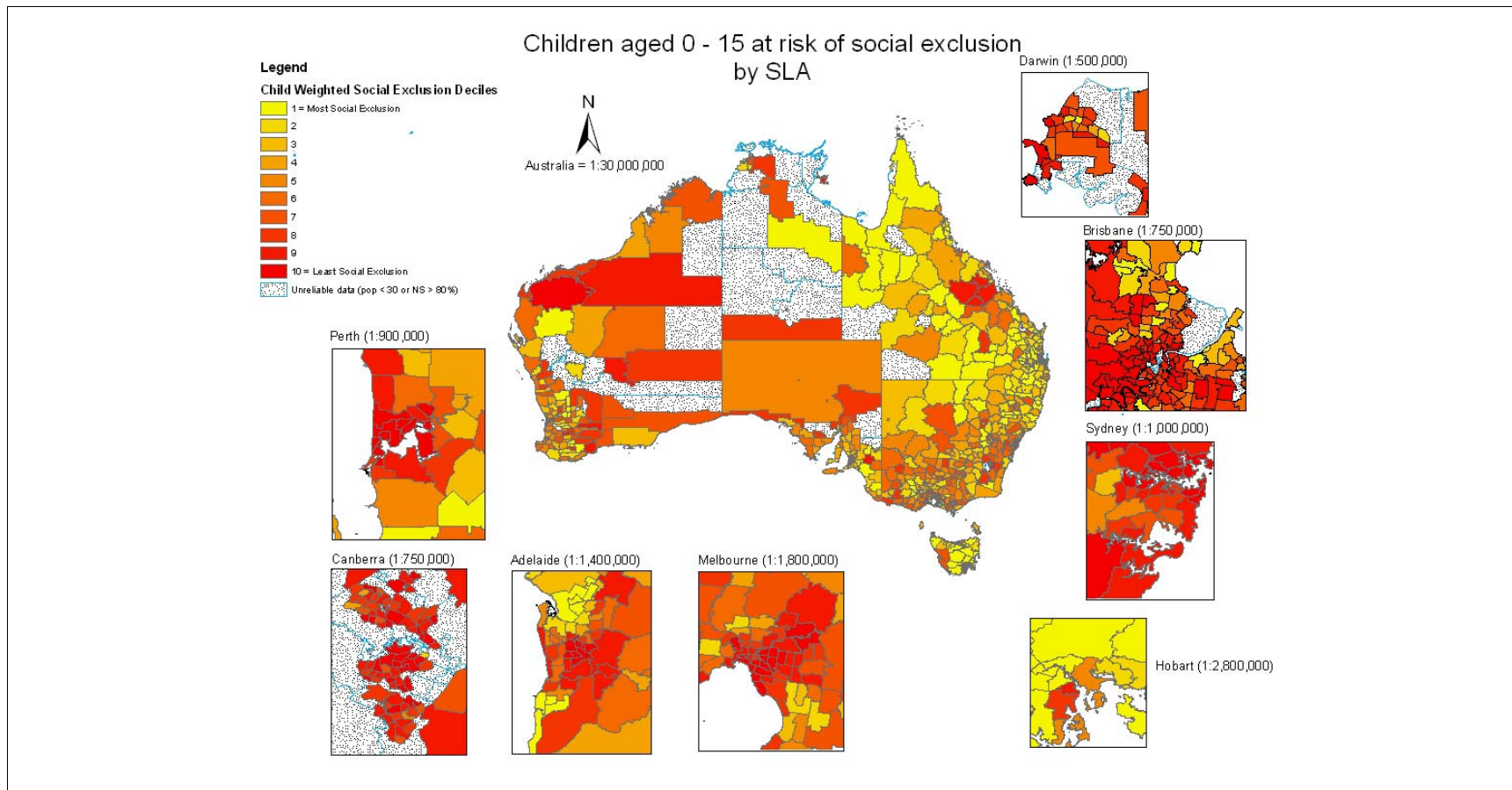
From the national map, some spatial patterns can be observed. First, areas with high child social exclusion are much more likely to be rural than urban, with large numbers of SLAs away from the populous and urbanised coastal areas falling into the bottom one or two social exclusion deciles. Some of the inland areas in Western

⁶ Because each SLA was assigned a single value of the social exclusion index, when constructing the child-weighted social exclusion deciles we had to allocate all the children in one SLA to a single decile so that, on occasion, very marginally more or less than 10 per cent of children were allocated to each social exclusion decile (because we could not split an SLA into pieces to create exactly the right number of children). This was still considered a better outcome than not weighting the deciles of social exclusion.

Australia and Queensland with lower child social exclusion (the darker areas on the map) incorporate mining areas, which, in comparison to other remote Australian regions, may have fewer children living in them, and may not be as disadvantaged in socioeconomic terms as non-mining remote areas.

The snapshots of the capital cities demonstrate that relatively small proportions of children in these cities (with the exception of Hobart) are at high risk of social exclusion although, within cities, spatial differences are present. For example, although Sydney SLAs generally fall into higher deciles of the CSE Index (demonstrating lower rates of social exclusion), the western and south-western areas of the city still have higher social exclusion risks than the northern and eastern areas. Similarly, Melbourne's eastern suburbs are characterised by very low child social exclusion, but some southern and western suburbs have relatively high risk. In a number of capital cities it is evident that inner city areas generally have reasonably low proportions of children in social exclusion, while areas on the fringes of these cities are characterised by somewhat higher proportions of children in social exclusion. These types of differences within cities, and the presence, particularly in outlying suburbs, of a reasonably large number of SLAs in the bottom two deciles of the CSE Index, make it clear that there is no clear urban/rural divide in relation to the geography of disadvantage among Australia's children.

Figure 1 Statistical local area distribution of child social exclusion



Note: Child weights are based on all children aged less than 16 years.

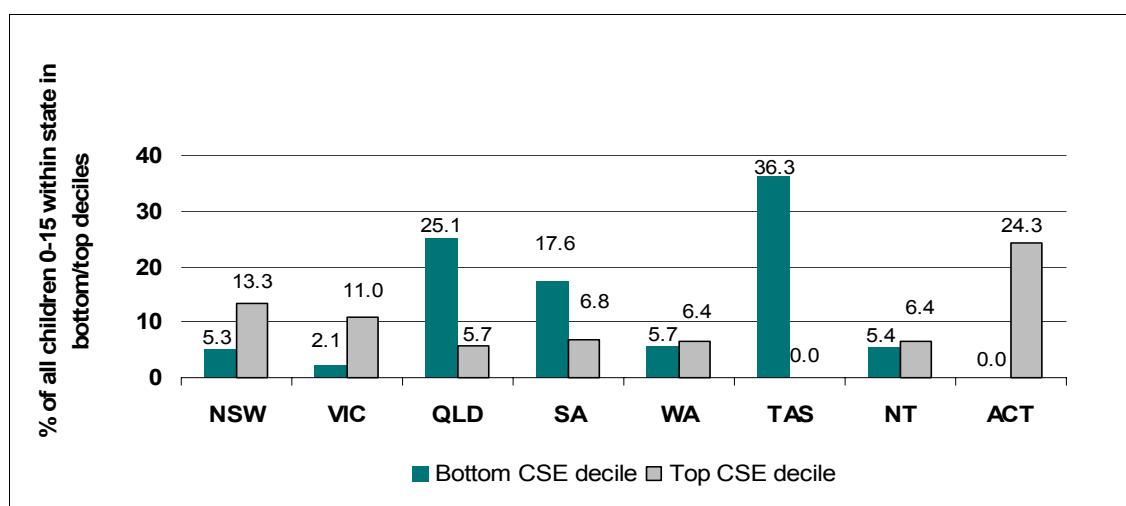
Data source: ABS Census of Population and Housing 2001, NATSEM calculations.

State and Territory

When we examine differences by state further, we find quite substantial gaps between states and territories in terms of the percentage of children facing the greatest risk of social exclusion. Figure 2 shows that a relatively high percentage of children in Tasmania and Queensland fall into the bottom Child Social Exclusion (CSE) decile – 36.3 per cent of all Tasmanian children fall into the lowest national CSE decile, and 25.1 per cent of all Queensland children. In contrast, the ACT and Victoria have very low percentages of their child population in the bottom CSE decile.

An alternative way of looking at spatial disparities in child social exclusion is to examine the percentage of children in each state and territory in the top CSE decile, that is, the ten per cent of children living in the areas *least at risk* of child social exclusion. These results are also included in Figure 2, and show that 24.3 per cent of all those children living in the Australian Capital Territory are in the top CSE decile, and 13.3 per cent of children living in New South Wales are in this top decile. As noted above, the substantial number of SLAs in the Northern Territory excluded from our analysis due to inadequate data may affect our estimates of child social exclusion risk, so the 6.4 per cent figure for children in the top CSE decile in the Northern Territory should be treated with extreme caution.

Figure 2 Percentage of children within each state/territory in bottom and top CSE deciles, 2001

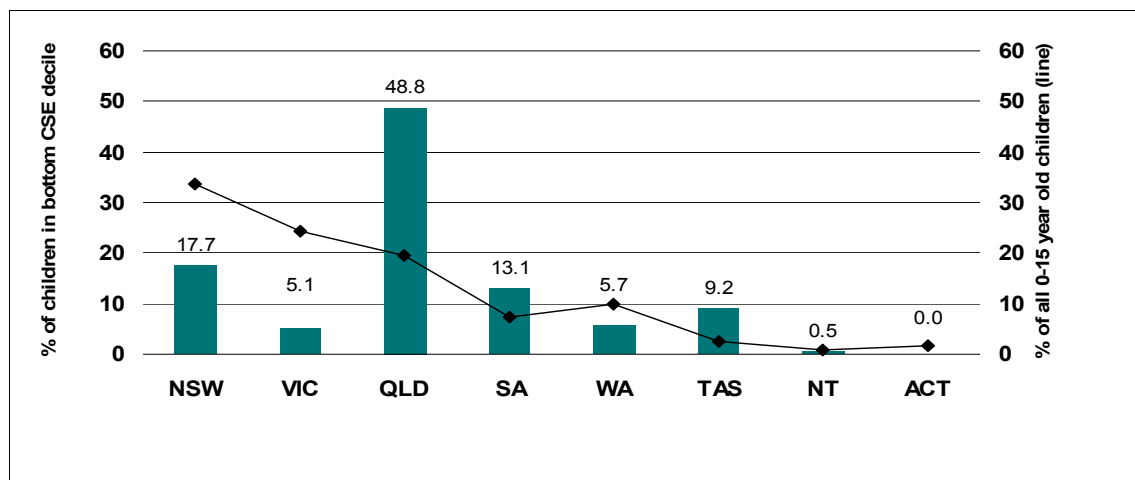


Note: Children refers to children aged less than 16 years

Data source: ABS Census of Population and Housing 2001, authors' calculations

An equally interesting perspective is to show in which state and territory the children facing the greatest risks of social exclusion live (results presented in Figure 3). Strikingly, although 34 per cent of all 0-15 year old children live in New South Wales, children in this state make up only 17.7 per cent of all those children in the bottom CSE decile. Conversely, although less than 3 per cent of all children live in Tasmania, 9.2 per cent of all those children in the bottom CSE decile come from Tasmania. Similarly while only 20 per cent of all Australian children aged 0 to 15 live in Queensland, almost 49 per cent of all those children in the bottom CSE decile come from this state.

Figure 3 Proportion of all children in bottom CSE decile and proportion of all 0-15 year old children, by state and territory, 2001



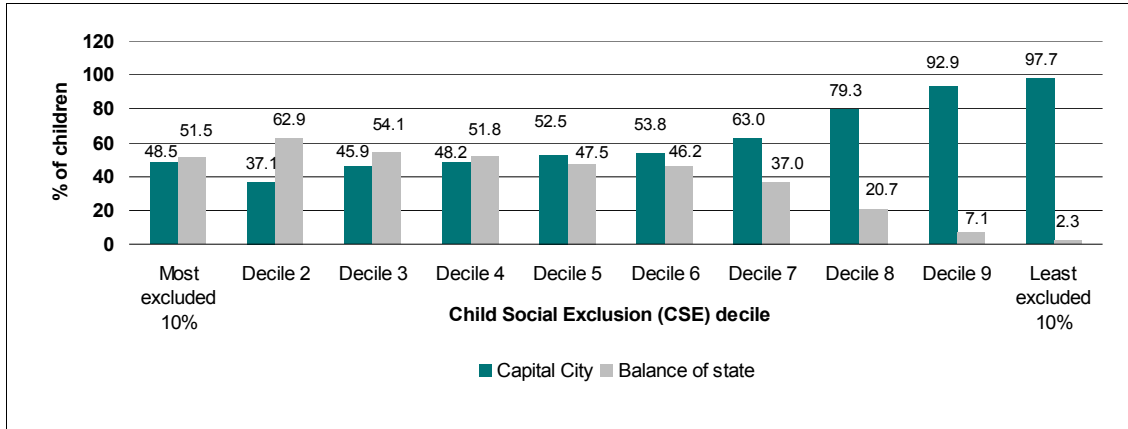
Note: Children refers to children aged less than 16 years.

Data source: ABS Census of Population and Housing 2001, authors' calculations.

Capital cities vs the balance

Further investigation into the differing distribution of child social exclusion across urban and rural areas reveals, as shown in Figure 4, that slightly under half of all those children in the bottom CSE decile live in capital cities while slightly over half live in rural, regional and non-capital city urban areas. Given that 62 per cent of all children 0-15 years of age live in Australia's capital cities, this result suggests that the likelihood of being socially excluded is higher for children living outside the capital cities. Figure 4 also shows that the second and third CSE deciles show substantial differences between capital cities and the balance of Australia. For example, only 37.1 per cent of children in this second CSE decile live in capital cities, with almost two-thirds of children in this decile coming from Australia's rural and regional balance. Even larger differences between capital cities and regional areas are evident at the advantaged end of the social exclusion spectrum, with over 9 in every 10 children in the top two CSE deciles living in capital cities.

Figure 4 Children ranked by CSE decile, capital cities vs balance, 2001

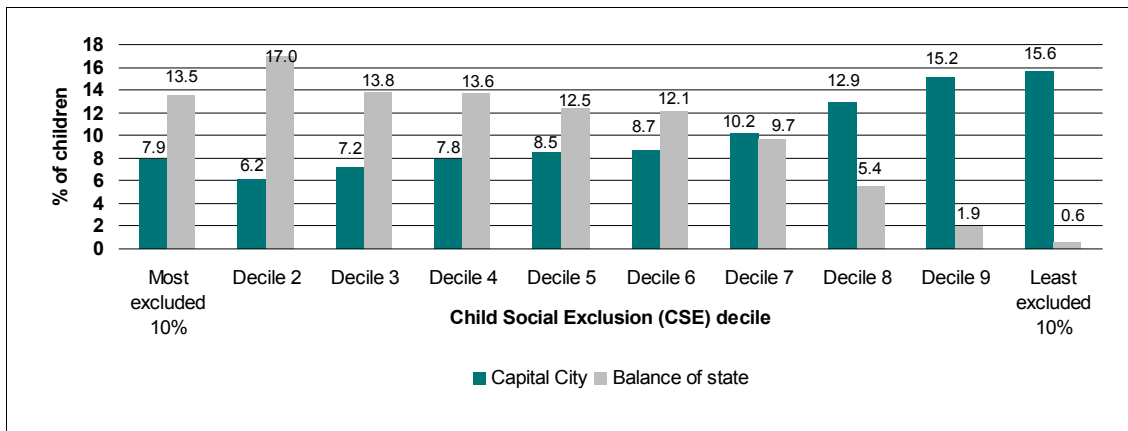


Note: Children refers to children aged less than 16 years.

Data source: ABS Census of Population and Housing 2001, authors' calculations.

Differences in child social exclusion between capital cities and the balance of Australia are presented in an alternative way in Figure 5, which shows the proportion of children in each CSE decile in each of the two broad regions. So while Figure 4 showed the distribution of children in Capital City and Balance of State *within* a decile, Figure 5 shows the distribution of children over *all deciles* by Capital City and Balance of State. This shows very marked differences, particularly if we take into account the second as well as bottom decile of the CSE Index. While only 14.1 per cent of children in capital cities fall into these two bottom deciles of social exclusion, 30.5 per cent of children living in Australia's rural and regional balance fall into these two most disadvantaged deciles. Similar sharp differences are seen in the top deciles, with 30.8 per cent of capital city children falling into the two most advantaged deciles, compared with only 2.5 per cent of those children living outside the capitals.

Figure 5 Proportion of children in CSE deciles, capital cities vs balance, 2001



Note: Children refers to children aged less than 16 years.

Data source: ABS Census of Population and Housing 2001, authors' calculations.

The proportions of children with specific characteristics associated with social exclusion risk (that is, those factors that make up the composite index, or were considered for inclusion in it) living in capital cities compared with the rest of Australia are presented in Table 3. In interpreting these results it should be noted that, while these variables were included in the CSE Index combined with income (that is, children had to be living in families in the bottom income quintile as well as having the social exclusion risk characteristic), the proportions referred to in these results relate to the characteristics only, not combined with low income.

These results show that the differences in capital city and rural social exclusion risk appear to arise more from some factors than others. The proportion of children living in sole parent families, and in families with relatively weak or strong labour market involvement, are quite similar for capital cities and regional areas. Other factors, however, show marked differences — in particular, measures related to education. The proportion of children attending non-government primary and secondary schools in capital cities is almost double that in regional areas (which may be in part due to the greater availability of non-government education in capital cities, and also due to the fact that children in non-government boarding schools are not included in our data because they are in non-private dwellings). In addition, the proportion of children living in a family where no member completed Year 12 is much higher in regional areas than in capital city areas. Similarly, while 62 per cent of children living in capital cities have parents or other family members who have completed post-school qualifications, the proportion is strikingly lower outside the capitals, at only 49 per cent.

Computer usage, too, is less common in regional than capital city areas. The proportion of children in the regional balance of Australia who have a family member with a white-collar occupation is substantially smaller (25.1 per cent) than in capital cities (40.5 per cent).

Table 3 Social exclusion characteristics by capital city/balance of Australia, 2001

	Capital cities	Balance of Australia	% point difference
Child and family characteristics	Mean proportion of children		
Couple family	80.8	81.4	0.6
One parent family	19.1	18.4	-0.7
Pre-school (aged 0-4)	15.0	14.7	-0.3
Government school (aged 5-15)	58.2	70.8	12.6
Catholic school (aged 5-15)	19.8	14.1	-5.7
Other non-government school (aged 5-15)	12.8	6.8	-6.0
Post-school qualifications	62.1	49.0	-13.1
Year 12	16.1	15.1	-1.0
Not Year 12	18.1	31.5	13.4
White collar	40.5	25.1	-15.4
Grey collar	28.1	33.0	4.9
Blue collar	12.9	20.3	7.4
Own home	68.2	63.5	-4.7
Rent -public	7.7	7.7	0.0
Rent - private	19.8	18.3	-1.5
Other than English	21.5	6.9	-14.6
English	78.5	93.2	14.7
Couple - 1 parent employed	28.8	29.6	0.8
Couple - 2 parents employed	44.5	42.6	-1.9
Couple - both parents not working	7.0	8.8	1.8
Single parent - employed	9.0	7.3	-1.7
Single parent - not working	9.7	10.7	1.0
Computer used at home	72.2	61.0	-11.2
Computer not used at home	24.6	35.5	10.9
At least one motor vehicle	93.0	92.4	-0.6
No motor vehicle	4.4	5.1	0.7

Note: Percentages shown here relate only to the characteristic listed, independent of whether or not the characteristic was accompanied by income in the bottom quintile of all families. Rows within each of the nine categories shown in column 1 which do not sum to 100 per cent reflect the exclusion from this table of children living in families where responses related to the characteristic were not stated or invalid.

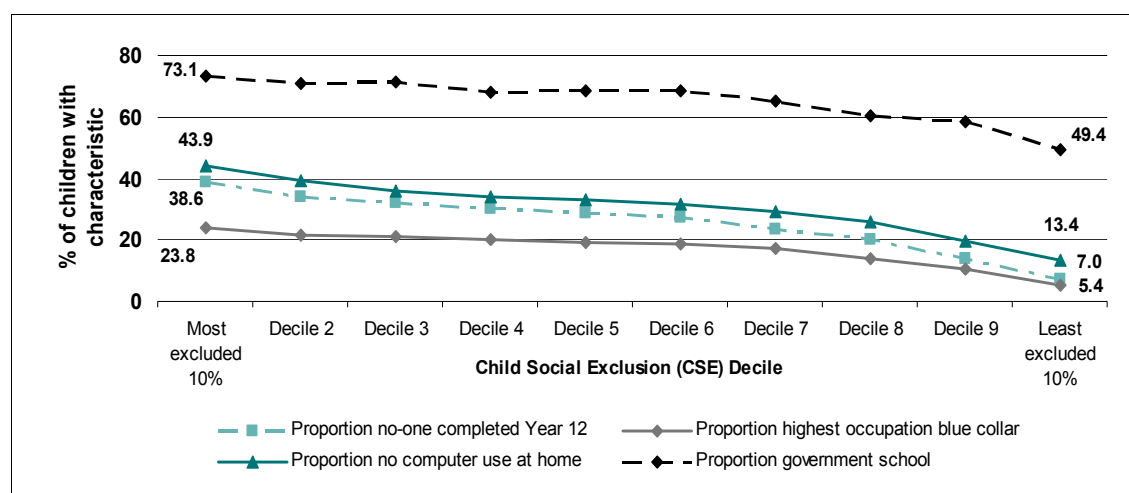
Source: ABS Census of Population and Housing 2001; authors' calculations.

Characteristics by CSE decile

Figure 6 provides further insight into how the four key factors most strongly underpinning the principal components analysis – no one in the family has completed Year 12, highest occupation is blue collar, no computer use at home, and attendance at a government school – vary across the CSE deciles. Once again, it should be noted that the proportions with particular characteristics referred to in these results relate to the characteristics only, not combined with low income (as was the case for the construction of the index). Figure 6 shows that 38.6 per cent of those children in the bottom CSE decile live in a family where no one has completed Year 12 schooling and 43.9 per cent live in a family where there is no computer use at home. Shifting to the most advantaged children at the other end of the spectrum, only 7 per cent of all those children in the top CSE decile live in a family where no

one has completed Year 12 and only 13.4 per cent live in a family in which no-one uses a computer at home. Similarly, Figure 6 shows that children facing the greatest risks of social exclusion are almost four times as likely to live in a blue collar family as children living in the top CSE decile. While relatively high proportions of school age children in both the highest and lowest deciles attend a government school, these proportions vary from 73.1 per cent in the lowest decile of the CSE Index, to just under half of all children in the highest CSE decile.

Figure 6 Proportion of children with specified characteristics, by CSE decile, 2001



Note: Percentages shown here relate only to the characteristic listed, independent of whether or not the characteristic was accompanied by income in the bottom quintile of all incomes.

Data source: ABS Census of Population and Housing 2001, authors' calculations.

3.2 Portrait of two worlds: highest and lowest risks

It is evident from the previous section that large differences exist across Australia in the risk of child social exclusion. The magnitude of these differences, and the extent to which they cut across many dimensions of children's social and economic environment, is made clearer by looking in detail at the characteristics of those small areas which experience both the highest and the lowest risk of child social exclusion. In Table 4 we present the mean proportion of children with a range of social exclusion risk factors in the 20 SLAs with the highest levels of child social exclusion (according to our CSE Index) compared with these same characteristics in the 20 SLAs with the lowest levels of child social exclusion.

Table 4 Comparison between SLAs most and least at risk of child social exclusion, 2001

		Bottom 20 SLAs	Top 20 SLAs	% point difference
Child and family characteristics		Mean proportion of children		
<i>Family type</i>	Couple family	72.0	89.5	17.5
	One parent family	27.9	10.4	-17.5
<i>Type of school</i>	Pre-school (aged 0-4)	11.0	21.0	10.0
	Government school (aged 5-15)	72.5	42.4	-30.1
	Catholic school (aged 5-15)	8.1	17.9	9.8
	Other non-government school (aged 5-15)	4.0	33.3	29.3
<i>Family highest qualifications</i>	Post-school qualifications	26.9	83.7	56.8
	Year 12	17.5	11.4	-6.1
<i>Family highest occupation</i>	Not Year 12	48.7	3.1	-45.6
	White collar	11.9	63.0	51.1
	Grey collar	23.4	24.7	1.3
<i>Tenure type</i>	Blue collar	28.1	2.0	-26.1
	Own home	39.6	78.3	38.7
	Rent -public	33.1	3.5	-29.6
<i>Family language</i>	Rent - private	19.7	15.2	-4.5
	Other than English	17.8	17.0	-0.8
<i>Parental employment status</i>	English	82.2	83.0	0.8
	Couple - 1 parent employed	31.5	31.1	-0.4
<i>Computer use at home</i>	Couple - 2 parents employed	24.9	53.8	28.9
	Couple - both parents not working	14.4	4.4	-10.0
	Single parent - employed	7.8	6.7	-1.1
	Single parent - not working	19.3	3.5	-15.8
<i>Motor vehicle at home</i>	Computer used at home	37.9	89.2	51.3
	Computer not used at home	56.5	8.5	-48.0
	At least one motor vehicle	78.8	96.5	17.7
	No motor vehicle	17.3	1.9	-15.4

Note: Percentages shown here relate only to the characteristic listed, independent of whether or not the characteristic was accompanied by income in the bottom quintile of all incomes. Rows within each of the nine categories shown in column 1 which do not sum to 100 per cent reflect the exclusion from this table of children living in families where responses related to the characteristic were not stated or invalid.

Data source: ABS Census of Population and Housing 2001; authors' calculations.

Dramatic differences in child well-being indicators exist between the two groups. Children in the most at-risk areas are almost three times as likely to come from a single parent family as children in the least at-risk areas, and just over one-third of those children in the most at-risk SLAs live in public housing. A reasonable proportion (17.3 per cent) of children in the highest-risk areas live in homes without a car. A geographical divide between jobless and multiple job families is also evident, with one-third of children in the most at-risk areas living in families where no parent is working, while 60.5 per cent of the children in the least at-risk areas have both parents (or their single parent) employed.

Education-related characteristics represent some of the most striking differences between the top 20 and bottom 20 SLAs. Almost half of children in the most at-risk

areas have no family member who has completed Year 12 (compared with a very small 3.1 per cent of children in the least at-risk areas). Over four times as many children in the least at-risk areas attend a Catholic or other independent school as in the most at-risk areas – and over half the children in the most at-risk areas have no access to a computer at home.

3.3 Are children at risk of social exclusion the same as those at risk of income poverty?

The current emphasis on multidimensional measures of poverty, of which social exclusion is a part, has developed in part due to concerns that measures of poverty which rely on income alone do not necessarily provide an accurate picture of which adults (or children) are truly disadvantaged. An interesting issue is thus whether our social exclusion results give very similar or very different answers than traditional income-based poverty measures to the question of where the most disadvantaged children live in Australia.

To test this, in this section we compare our child social exclusion results to a more traditional income-based measure of child poverty. As noted in the methodology section, this is not a straightforward exercise, due to a lack of disposable income data at a small area level in Australia. Accordingly, we commissioned from the ABS estimates of the child poverty rate for each SLA in Australia. A child aged 0 to 15 years was deemed to be in poverty if the equivalent gross income of the household in which they lived was below \$299 a week. The equivalence scale used was the modified OECD scale and, for a range of reasons, we used households rather than families as the income unit (following advice from the ABS that only 1.8 per cent of all households were multi-family households). For the purposes of calculating equivalised income, we used a definition of children that includes both 0-14 year olds and 15 to 24 year old dependent children in full time study. This definition is used just for the calculation of equivalised income, and differs from the definition of children which is the focus of the rest of this paper (that is, children aged 15 and under). Note that our SLA level poverty rates are calculated for children aged 0 to 15 years, thus being consistent with the definition of child used in the social exclusion measures and throughout this paper.

We then created child income poverty deciles, with the 10 per cent of children living in the SLAs with the highest income poverty rates being assigned to Child Income Poverty (CIP) decile 1. Thus, both the Child Social Exclusion deciles and the Child Income Poverty deciles were child-weighted. Table 5 shows the transition matrix between the two decile measures. It suggests that relatively low percentages of children overall fall into exactly the same CSE decile as they do CIP decile, but that this differs substantially across deciles. In total, 30 per cent of children were placed in

the same exclusion decile and income decile. However, 73 per cent of children placed in a particular income poverty decile were placed in a social exclusion decile that was either the same as or within one decile of their income poverty decile. Thus, for example, while only 2.2 per cent of all those children placed in poverty decile 2 were also in exclusion decile 2, nonetheless 7.6 per cent of all those children in poverty decile 2 were in exclusion deciles 1 to 3 (Table 5). Overall, therefore, about three-quarters of children were placed in a reasonably similar position within the spectrum of disadvantage, irrespective of whether the measure used was based only on income or on our wider range of exclusion indicators.

The correlation is greater at the top and the bottom ends of the spectrum. Of most interest is the first cell in Table 5, which shows the percentage of children (5.0) who fall into the bottom decile of both the CSE Index and child income poverty (most excluded *and* highest risk of income poverty). Thus half of those children who appear as the most disadvantaged using the CSE Index would also appear the most disadvantaged using our more traditional measure of income poverty. However, the other half of those children in the bottom CSE Index decile (around 200,000 children) fall into higher deciles of child income poverty – generally the second or third decile. The strongest correlation between the two measures occurs at the top end of the distribution, with 7.9 per cent of children in the highest (least excluded) CSE decile also falling into the highest (least poor) income poverty decile.

Table 5 Weighted CSE Index deciles and weighted child income poverty deciles comparison, 2001

Weighted CSE index decile	Weighted CIP decile										Total
	1	2	3	4	5	6	7	8	9	10	
1	5.0	2.2	2.1	0.3	0.1	0.3	0.0	0.0	0.0	0.0	10.0
2	2.6	2.2	2.2	1.8	0.7	0.6	0.1	0.0	0.0	0.0	10.3
3	0.8	3.2	1.6	3.0	0.6	0.4	0.1	0.0	0.0	0.0	9.7
4	0.5	1.1	1.2	1.1	3.3	2.3	0.4	0.0	0.0	0.0	10.0
5	0.4	0.4	1.4	2.3	2.2	0.8	2.5	0.1	0.0	0.0	10.0
6	0.6	0.7	1.2	1.0	1.8	1.3	2.8	0.7	0.0	0.0	10.0
7	0.1	0.0	0.1	0.3	1.0	3.1	1.5	2.9	0.9	0.0	10.0
8	0.1	0.0	0.2	0.0	0.5	0.9	2.4	3.5	2.3	0.2	10.0
9	0.0	0.0	0.1	0.2	0.0	0.1	0.2	2.3	5.2	1.9	10.1
10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	1.3	7.9	9.9
Total %	10.1	10.0	10.0	10.0	10.2	9.8	10.1	10.2	9.8	10.0	100

Note: Children refers to children aged less than 16 years. The proportion of children within each decile in some cases differs marginally from 10%, because we were unable to split a large SLA that fell at the extreme of one decile into pieces across deciles: thus an entire SLA had to be allocated to a single decile.

Data source: ABS Census of Population and Housing 2001, authors' calculations.

This suggests that a multidimensional measure of child social exclusion captures aspects of child disadvantage that income-only measures do not address, although an income-only measure provides similar results for about three in every four children.

4 Conclusions

The results presented in this paper are among the first that have been produced from this program of research. They provide some striking preliminary evidence about the geography of child disadvantage in Australia, and provide one method for combining measures of income with other indicators to develop a single measure of child disadvantage.

The study suggests that the likelihood of being in the bottom Child Social Exclusion (CSE) decile varies greatly by the state or territory within which children live with, for example, 25 per cent of children living in Queensland falling into the most disadvantaged CSE decile compared with less than 1 per cent of children in the Australian Capital Territory. Children living outside the capital cities face a much higher risk of social exclusion than those living within the capital cities, with some 14 per cent of all children living outside capital cities falling into the bottom CSE decile compared with only 8 per cent of those inside capital cities.

Our spatial analysis also shows that there are great differences between small areas in the family characteristics of children living in regions with high levels of social exclusion compared with those living in areas of lower social exclusion. Using our CSE deciles, bottom decile children are four times as likely to live in a blue collar family and five times as likely to live in a family where no-one has completed Year 12 when compared with top decile children living in advantaged areas and facing the lowest risks of social exclusion.

While these CSE decile averages paint a portrait of major spatial differences, the extremes of social exclusion are also confirmed by analysing the characteristics of the top and bottom 20 SLAs in Australia, when ranked by our social exclusion index. This shows, for example, that children living in the top 20 SLAs (with the lowest risk of social exclusion) are four times as likely to attend a private school and 14 times as likely to live in a white collar family as those living in the bottom 20 SLAs.

Our study also shows that a more traditional income-based measure of poverty gives similar answers to the social exclusion measures developed here for about three-quarters of all children. While income-based measures seem to capture multidimensional advantage reasonably closely, there can be considerable

divergence between the CSE index and child income poverty when examining disadvantage, with half of all the most disadvantaged decile of children as measured by the CSE index falling above the bottom decile of child income poverty. While our measure of income poverty was not one that would be commonly used by researchers in this area, due to deficiencies in the available census data, these results nevertheless provide some powerful preliminary evidence of the contribution which multidimensional measures of disadvantage can make to our understanding of child social exclusion.

While the work to date provides some initial evidence about spatial clustering of child disadvantage, further analysis is needed in order to examine the statistical significance of these patterns, and whether the effects of these concentrations of child disadvantage are compounding the effects of individual and family level disadvantage on children. In future work we hope to use spatial regression to unpack the impact of neighbourhood, family and individual characteristics upon child social exclusion. In addition, we hope to compare the ABS SEIFA indexes with our CSE index, to determine whether there are differences in the areas identified as having the greatest risk of disadvantage. We will also extend our analysis to earlier census years, to determine whether spatial patterns of child social exclusion have become more or less pronounced during the past decade.

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