INDICATORS OF RISK OF SOCIAL EXCLUSION FOR CHILDREN IN AUSTRALIAN HOUSEHOLDS: AN ANALYSIS BY STATE AND AGE GROUP[1]

Anne Daly
Associate Professor (Economics), University of Canberra ACT 2601.

Justine McNamara
Senior Research Fellow, NATSEM, University of Canberra, ACT 2601.

Robert Tanton
Principal Research Fellow, NATSEM, University of Canberra, ACT 2601.

Ann Harding
Director, NATSEM, University of Canberra, ACT 2601.

Mandy Yap
Centre for Aboriginal Economic Policy Research, Australian National University, Canberra ACT 2601.

ABSTRACT: The concept of social exclusion, encompassing a wider view of disadvantage than that of income poverty, is now used extensively in European debates about social disadvantage. While international evidence shows children experience a higher rate of income poverty than other groups in society, the research on social exclusion for children has been limited, especially in Australia. The purpose of this paper is to begin to fill this gap by presenting some results for the spatial distribution of children at risk of social exclusion in Australia. The child social exclusion (CSE) index, calculated for each Statistical Local Area (SLA) in Australia for which data were available from the 2001 Census, incorporates a range of factors that might put a child at risk of social exclusion. The results show that the addition of extra elements in defining social exclusion adds to our knowledge of those areas where children are more likely to be at risk of social disadvantage compared to a reliance on an income measure of disadvantage alone.

1. INTRODUCTION

There has been a growing interest in the development of indicators of social

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disadvantage that are wider in scope than an income measure of poverty. Sen's (1987) description of poverty as the lack of the necessary capabilities to function successfully in society — and Townsend's (1979) wider definition of poverty as a 'lack of resources necessary to permit participation in the activities, customs and diets commonly approved by society' (1979:88) — have shifted the emphasis in debates over disadvantage to a wider range of factors.

Different terminology has been used to describe this broader concept. The debate in the US has referred to the underclass, defined by Wilson (1987:8) as:

> *'individuals who lack training and skills and either experience long-term unemployment or are not members of the labour force, individuals who are engaged in street crime and other forms of aberrant behavior, and families that experience long-term spells of poverty and/or welfare dependency'.*

The European debate has adopted the terminology of social exclusion to encompass this broader view of the components of poverty. According to the British Social Exclusion Unit (SEU) established by the Blair government in 1997:

> 'Social exclusion is what can happen when people or areas suffer from a combination of linked problems such as unemployment, poor skills, low incomes, poor housing, high crime, poor health and family breakdown.' (SEU, Office of the Deputy Prime Minister:2)

While there has been considerable research on social exclusion of adults, especially in Britain and the European Union (EU), there has been less research undertaken on the position of children (see for example, EU 2005, Noble et. al 2004, Noble et. al. 2001, and Daly 2006 for a survey of this literature). This is an important omission as studies show that children are over-represented among those with low incomes (UNICEF 2005, 2007; Fraser and Marlier 2007, Lindsey, 2004:231). A recent study by Headey et. al (2005) estimated that the child poverty rate in Australia in 2002/03, measured against a poverty line set at half median equivalised household disposable income, was 13.2 percent compared with an adult rate of 12.1 percent.

In this paper, we have chosen to focus on a geographical analysis of risk of social exclusion because many policies aimed at overcoming disadvantage — for example, in education, access to new technologies and employment — have a geographic dimension. Our results based on spatial analysis can therefore be linked more easily with policy initiatives. The geographical dimension of disadvantage may be related to externalities that arise where there are people with particular social or economic characteristics concentrated in certain locations. Barnes, Wright, Noble and Dawes (2006) justify their development of an index of multiple deprivation for South African children at a small area level by arguing that the geographical distribution of the population is not random but reflects historical, social and economic processes. They also argue that identifying concentrations of disadvantage can improve the targeting of policies. Other international examples of child-based indicators disaggregated within countries include the official US Childstats (2008) and the Annie E. Casey Foundation (2008) statistics for the fifty American states.

There are Australian studies that present indices of disadvantage at the small

area level for the whole population and national indicators that relate to children (with respect to children, see for example, Scutella and Smyth 2005, Stanley, Richardson and Prior 2005 and the Commonwealth of Australia Senate Community Affairs Reference Committee 2004 for a survey). Since 1986, the ABS has calculated the Socio-economic Indexes for Areas (SEIFA) for the whole population using Census data. The index compares outcomes with respect to income, educational attainment, unemployment and dwellings without motor vehicles at the local area level (ABS 2008). Vinson (2007) included a wider range of indicators than those included in SEIFA to construct an index of disadvantage for the total population at the postcode level. He found that low incomes, education levels and employment, and high levels of criminal convictions were concentrated in particular postcodes. More than half the disadvantaged postcodes were in rural areas.

The remainder of this paper provides a brief outline of the methodology used to develop an index of child social exclusion risk (fuller discussions of the methodology employed can be found in Harding et al (2006) and Tanton et al (2006)). Some results from the index are then presented, along with some data about geographical differences in the individual variables that make up the index. Finally, a comparison between income poverty and social exclusion is provided, followed by a brief conclusion. It is important, however, to remember that the identification of a spatial unit as at high risk of social exclusion does not imply that all children living within that area are at high risk of experiencing social exclusion.

2. METHODOLOGY

2.1 Data

The data used in this research project are taken from the Census of Population and Housing, which is conducted every five years by the Australian Bureau of Statistics (ABS). While the census has the advantages over other data sources of breadth of coverage and the ability to track changes at a detailed geographical level over time, it is limited in the range of variables collected. As the focus of the project is the calculation of indices of risk of social exclusion for children on a geographical basis, we wanted to analyse data at the smallest geographical level consistent with meaningful results. We therefore decided to sacrifice the potential for a wider range of indicators from other sources in exchange for greater geographical disaggregation and the possibility of tracking changes in the index over time. As a result of this decision, there are certain key indicators, notably health, developmental measures and sources of family income, that are unfortunately not included in our index. The variables that were used in this study are presented below.

The indices reported here from the 2001 Census of Population and Housing use the Statistical Local Area (SLA) as their spatial unit of analysis. This geographical unit was chosen from the ABS Australian Standard Geographical Classification (ASGC) because it was the smallest unit with complete coverage of Australia that did not introduce the problems of data confidentiality evident at

smaller area levels such as Census Collection Districts. There were 1,332 SLAs in Australia in 2001, ranging in population from 12 to 181,327 people. These were distributed unevenly across Australia, with some small states and territories being broken into relatively large numbers of SLAs and other larger states consisting of relatively few. For example, the Australian Capital Territory, which contains less than 2 percent of Australia's population, had 107 SLAs (or 8 percent), while New South Wales, which contains 34 percent of the total population, had only 200 SLAs (or 15 percent). Of particular note was Queensland, which was divided into 454 SLAs, many of them in Brisbane and with quite low populations. Queensland thus contained 19 percent of Australia's population, but 34 percent of all SLAs.

We have addressed the issue of uneven population sizes within SLAs in two ways. First, we have aggregated up SLAs in Brisbane and Canberra (the areas most affected by relatively small population sizes within SLAs) so that they are more similar in population terms to SLAs in other areas of Australia, using a method developed by Baum et. al (2005). Secondly, we present all our analysis of quantiles (equal sized groups within a distribution) weighted by the child population in each SLA, to further control for the uneven distribution of population between SLAs.

The data used in this study were specially prepared for the authors by the ABS from the census unit record files. All dependent children under the age of 16 years are included in our definition of children, and separate composite measures of social exclusion are calculated for all children aged 0 to 15 years, children aged 0 to 4 years, and children aged 5 to 15 years. The data are presented as a child's eye view — that is, each child has been given the characteristics of the family and household in which they were enumerated on census night. The sample is limited to children in occupied private dwellings (so excludes children in boarding schools, juvenile detention centres and hospitals). An important omission from the census data in the context of analysis of social exclusion are the homeless children who were not staying in a private dwelling on the night of the census.

The data were provided in cross tabulated form by SLA and therefore some cells had very small cell counts (n <=3), and these were randomised using standardised procedures by the ABS. It is estimated that this randomisation has a minimal effect on the final aggregated data.

2.2 Components of the Social Exclusion Index and their Measurement

Our choice of variables for inclusion in the index was limited to those recorded in the census. A widely recognised classification of the components of social exclusion has been developed by Burchardt, Le Grand and Piachaud (2002) following Atkinson (1998) and used in empirical studies in Britain and the European Union. Although this was designed with adults in mind, the broad categories are appropriate for considering the social exclusion of 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). Burchardt, Le Grand and Piachaud (2002) identify four dimensions in a continuum of potential social exclusion ranging from low risk to high risk of social exclusion.

The first dimension is consumption, where individuals do not have the capacity to purchase goods and services. In our study this is proxied by household income. While this is an inadequate measure of a household's command over goods and services, as there is no wealth or expenditure measure in the census, it has not been possible to adopt an alternative indicator. The second dimension relates to production and an individual's employment status. In this study, social exclusion on the production dimension is captured by parental labour force status and the occupation levels of persons in the child's household. The third dimension of social exclusion is in involvement in local and national politics and organisations. These types of involvement are not measured in the census. Research in the United States 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. We have therefore taken measures of the education levels of adults in the child's household to represent this dimension. The final dimension identified by Burchardt, Le Grand and Piachaud (2002) is in social interaction and support at a family and community level. There are a number of variables used in our study to capture this dimension of potential social exclusion: housing tenure, personal computer usage and motor vehicle availability.

The data for most variables relate to the household, or family characteristics of the household within which the children were enumerated. For example if a household was renting public housing, then all families and children in that household were taken to be public renters. Table 1 lists all the variables used in this analysis.

2.3 Income

The census measure of income has a number of shortcomings for our purposes. Respondents were asked to indicate their gross income from all sources in a range of categories but the preferred measure in most poverty studies is disposable household income. The ABS calculated individual incomes for this project by assigning median income values (calculated from their Survey of Income and Housing) within the ranges recorded in the census to each individual. Individual incomes were then aggregated to calculate gross household income. Gross household income was then equivalised using the OECD equivalence scale. This gives the first adult in the household a weight of one, second and subsequent adults a weight of 0.5 and each child less than 15 years a weight of 0.3.

The distribution of gross equivalent household income in Australia was then divided into quintiles of households. The bottom quintile therefore represents the families, couples and single person households whose equivalent income was in the bottom 20 percent of all Australian family, couple and single person

households. About 19 percent of children were in the bottom income quintile, 58 per cent in the middle three quintiles and about 11 percent in the top quintile. Approximately 12 percent of children had "not stated" household income.

Table 1. List of Social Exclusion Variables Included

Variable in Census	Social Exclusion Measure Developed
Family Type	Proportion of children aged 0 – 15 in sole parent family
Education in family	Proportion of children aged 0 – 15 with no-one in the family having completed Year 12
Occupation in family	Proportion of children aged 0 – 15 with highest occupation in family blue collar worker
Housing tenure	Proportion of children aged 0 – 15 in public housing
Labour force status of parents	Proportion of children aged 0 – 15 in family where no parent working
Personal computer usage	Proportion of children aged 0 – 15 living in dwellings where no-one used computer at home in last week
Motor Vehicle	Proportion of children aged 0 – 15 in household with no motor vehicle
Income	Proportion of children aged 0 – 15 in household with income in bottom quintile of equivalent gross household income for all households in Australia

Source: ABS Census of Population and Housing 2001.

We have also used the gross equivalised income data from the census to construct a measure of income poverty which we will then use to compare with our multidimensional measure (see section 3.3 below). The measure is not directly comparable to measures of poverty usually used in Australia and is likely to over-state the extent of poverty among children (see Harding et al. 2006 for a fuller discussion). It can nevertheless be useful as an indicator of the correlation between an income-based poverty measure and a more broadly-based measure of disadvantage.

2.4 Other Variables

The framework developed by Burchardt, Le Grand and Piachaud (2002) described above, has directed our choice of other variables. Our specific choice of variables also reflects those that have been found to be important in other studies of disadvantage among children. Demographic structures (for example sole parenthood), conditions in the labour market (the unemployment rate, hours of employment) and social policies (government tax and transfer systems) have all been found to be important drivers of child poverty and social exclusion among adults in a range of international studies (see for example UNICEF (2005), Bradbury (2003), Bradshaw, Kemp, Baldwin and Rowe (2004)). More specifically, low levels of education, ill health, poor housing and homelessness and the lack of reliable and affordable transport have been found to be significant indicators of social exclusion. We have chosen the available variables from the

census that best reflect these indicators.

The variables have been calculated as the proportion of the children aged 0-15 years in each SLA having the relevant "disadvantage" characteristic. The same approach has been used for each of the age sub-categories. For some variables, notably education and computer usage, we have taken into account the responses of all family or household members and only counted those children in families where no one had completed year 12, or no one used a computer at home, in the category of risk. For labour force status, we have only taken into account the responses of the parents.

The 'not stated' category was identified separately for each variable. Where any family member had a 'not stated' response, the children in that family were deleted from the sample for that variable alone. Response rates differed between questions and SLAs but, for Australia as a whole, between 2 and 5 per cent of children were excluded because of a 'not stated' classification in the non-income variables.

2.4 Statistical Analysis

Principal components analysis has been used to create an index to rank SLAs according to the risk of social exclusion for children. This is a data summary technique that maximises the correlation between the underlying components in a group of new variables and the original set of variables. The technique searches for a common underlying component that best describes the variables under analysis and has been used by the ABS and others in constructing socio-economic indices (see ABS 2003 and Salmond and Crampton 2002).

We began the analysis by removing SLAs where there were less than 30 children in total or where there was less than a 20 percent response rate on any of the variables included in the index. There were a total of 43 SLAs excluded due to low child population, and an additional 3 SLAs that had both low population and low response. This left a total of 1017 small areas for the principal components analysis.

Our initial analysis of the data showed that many of the variables were highly correlated (as expected). This confirmed our use of principal components analysis, which is used to derive weights when combining highly correlated variables. 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.

The final list of variables, loadings and eigenvalues for the child social exclusion index (CSE Index) are shown in Table 2. The results are presented for

the total sample of children and also for two sub-groups of children: those below school age (0-4 years) and those of school age (5-15 years). 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 61.5 percent, indicating that 61.5 percent of the variance in the original variables is explained by the underlying component of the social exclusion index for all children. For children aged 0-4 years, 61 percent of the variance was explained, while 60.5 percent of the variance for older children was explained.

Table 2. Variables, Loadings and Eigenvalues for the Social Exclusion Index

	Loadings		
	All children 0- 15 years	Children 0 to 4 years	Children 5-15 years
Sole parent	0.60	0.71	0.55
Education	0.87	0.91	0.84
Occupation	0.49	0.42	0.51
Tenure type	0.80	0.77	0.79
Labour force status	0.82	0.84	0.81
Computer use	0.93	0.91	0.95
Motor vehicle	0.80	0.80	0.81
Income	0.84	0.82	0.86
% variance explained	61.54	60.96	60.46

Source: Authors calculations based on data obtained from ABS Census of Population and Housing.

These are good results, and compare well with the ABS Socio-Economic Indexes for Areas (SEIFA), which explain between 32 and 46 percent of the variation in the original data (ABS 2004).

There are some interesting differences in the loadings on the index for younger and older children (see Table 2). When compared with the results for children aged 5-15 years, index loadings were higher for the 0 – 4 group for the proportion of children in sole parent families and families where no-one had completed year 12, and were smaller for the proportion of children in a family with the highest occupation being blue collar worker. These differences suggest that there are some differences in the relationship between the underlying principal component and the original variables for different age groups of children.

The CSE index provides a ranking of SLAs according to the risk of social exclusion for the children living in the SLA, but the value of the rank is an ordinal measure. So, for example, an SLA with the index value of 5 does not have half the risk of social exclusion for children as an SLA with the index value of 10. To match with common practice when using income quintiles to measure

relative economic wellbeing (where the bottom quintile is the quintile that is the worst off), we ranked all SLAs by their social exclusion index value, and then divided them into child-weighted quintiles of social exclusion risk. The lowest quintile indicates the highest risk of social exclusion, with higher quintiles representing lower risk of social exclusion.

3. RESULTS

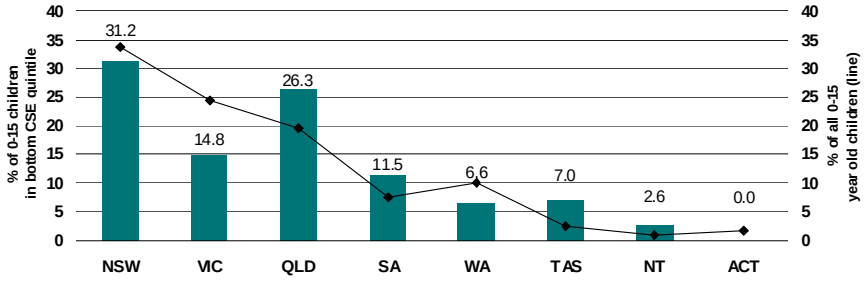
The results for the index are presented here for child-weighted quintiles. About half the areas found in the first quintile (the most disadvantaged) for all children aged 0 – 15 years were in New South Wales and Queensland. Eighty per cent of them were located outside the capital cities. It is important when considering the results discussed below, to recognise that the choice of geographical boundaries is essentially arbitrary, and the inclusion of a given SLA among the most disadvantaged areas in Australia, may hide the fact that there is considerable variation in risk of social exclusion within each SLA. Similarly, a description of the results on a state basis may disguise importance differences within states. The results presented here summarise the major findings at the level of the state and will require further analysis at an intra-state level.

3.1 Differences between the States

This section will further explore differences between the states in components of the index. Figure 1 compares the percentage of children aged 0-15 living in each of the states and territories (the line on the graph) with the percentage who lived in SLAs that were in the bottom quintile of our CSE index (the bars). While 33.6 percent of Australian children lived in New South Wales and 24.4 percent in Victoria, these states, especially Victoria, were under-represented among the SLAs in the bottom quintile of the CSE index. Around 31per cent of children in the bottom quintile came from SLAs in New South Wales and only 14.8 per cent from Victoria. Children from SLAs in Queensland and Tasmania accounted for a larger share of the population in the bottom CSE quintile than they did in the population of Australian children as a whole. Just over 26 percent of the children in the bottom quintile of the index were from Queensland, although Queensland's share of Australia's child population is only 19.5 percent, and 7 percent in the bottom CSE quintile were from Tasmania compared with 2.5 percent of the total Australian child population. Children in South Australia and the Northern Territory were also over-represented in the bottom quintile and children in Western Australia were under-represented (although it should be noted that a number of rural Western Australian SLAs were not included in our analysis because of data problems).

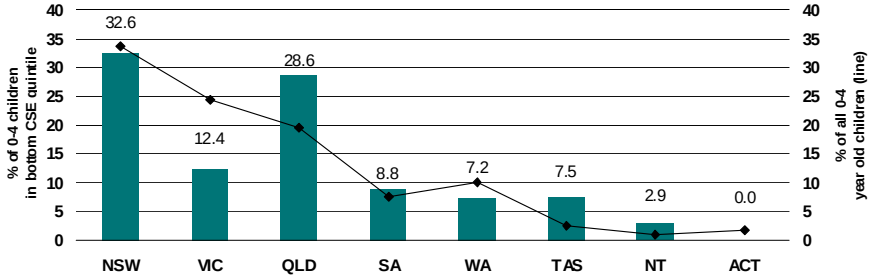
Figures 2 and 3 divide the children into two age categories: children aged 0-4 years and those aged 5-15 years. The figures show a similar pattern to the aggregate picture. Children aged 0-4 years in Queensland, Tasmania and the Northern Territory were over-represented in the bottom quintile. Children aged 5-15 years in these three states/territories and South Australia were over-represented in the bottom quintile. The slight under-representation of NSW children in the bottom quintile was much more marked for children aged 5-15

years than for the younger group of children — while the 0-4 year old group was more sharply under-represented in Victoria than the older group. However, the findings overall were similar for each age group, and therefore the following discussion will focus on outcomes for the aggregate.



Source: Authors calculations based on data from ABS Census of Population and Housing, 2001.

Figure 1. Proportion of all 0-15 year old children in bottom CSE quintile and proportion of all 0-15 year old children, by state and territory, 2001.

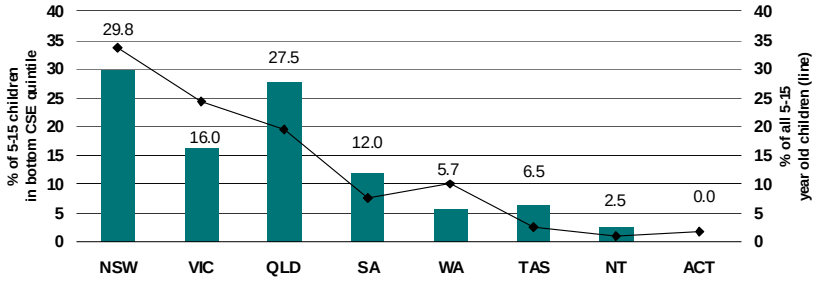


Source: Authors calculations based on data from ABS Census of Population and Housing, 2001.

Figure 2. Proportion of all 0-4 year old children in bottom CSE quintile and proportion of all 0-4 year old children, by state and territory, 2001.

Further analysis of each of the variables included in the index was conducted in an attempt to highlight the underlying reasons for the relatively high risk of social exclusion for children in particular states and territories. The charts that show the distributions for the individual characteristics are based on child-weighted quintiles of the characteristic. For example, in Figure 4 the bars refer to the percentage of children in that state who fall into the 20 percent of children nationally who live in SLAs with the highest proportion of children living in single parent families where the parent does not work. The line refers to the

percentage of all children aged 0-15 living in each state (for those SLAs included in the modelling only). Where the bar lies above the line, there are disproportionately more children living in SLAs in the state/territory which are in the bottom quintile with this characteristic than would be predicted on the basis of the share of the Australian population of children living in that state/territory.



Source: Authors calculations based on data from ABS Census of Population and Housing, 2001.

Figure 3. Proportion of all 5-15 year old children in bottom CSE quintile and proportion of all 5-15 year old children, by state and territory, 2001.

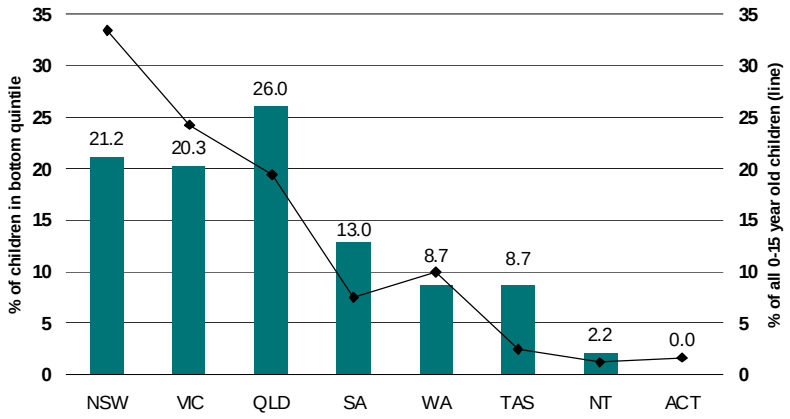
Source: Authors calculations based on data from ABS Census of Population and Housing, 2001. Note that children refers to children aged less than 16 years.

Figure 4. Jobless single parent family: child-weighted bottom quintile, 2001.

There were some interesting differences between the states for each of the individual explanatory variables and the highlights will be discussed in turn for each state. Children in the most populous states, NSW and Victoria, and in the ACT, faced the lowest risk of social exclusion in general. Children in NSW were generally under-represented in the bottom quintile for each indicator except

on the indicators for computer usage and access to a car in the household. The latter result may reflect a 'Sydney effect', where a car is less important in a large city than in regional and remote Australia. Children in Victoria and Western Australia were under-represented in the bottom quintile on all of the indicators except that a larger proportion were from blue collar families.

As noted earlier, about a quarter of the children in the bottom quintile of SLAs on the risk of social exclusion index were living in Queensland. About 30 percent of the children in the bottom quintile of the indicator 'living in jobless sole parent families' (Figure 4) were in Queensland. Queensland children were also over-represented in households where no person had completed year 12 (Figure 5), and in sole parent households generally. Among the less populous states and territories, South Australia, Tasmania and the Northern Territory, children in the bottom quintile were more likely to live in families where no-one had completed year 12 than would be expected given their share of the Australian population of children. Tasmania performed poorly on the access to computers, joblessness and low income indicators (Figure 6). There was an over-representation of children from South Australia in sole parent families, low income households (Figures 4 and 6) and in public housing in the bottom quintile. Although children in the Northern Territory only accounted for about 3 percent of Australian children, they were over-represented in the bottom quintile on most indicators.



Source: Authors calculations based on data from ABS Census of Population and Housing, 2001. Note that children refers to children aged less than 16 years.

Figure 5. Completion of Year 12 by a parent: child-weighted bottom quintile, 2001

Source: Authors calculations based on data from ABS Census of Population and Housing, 2001. Note that children refers to children aged less than 16 years.

Figure 6. Low income: child-weighted bottom quintile, 2001.

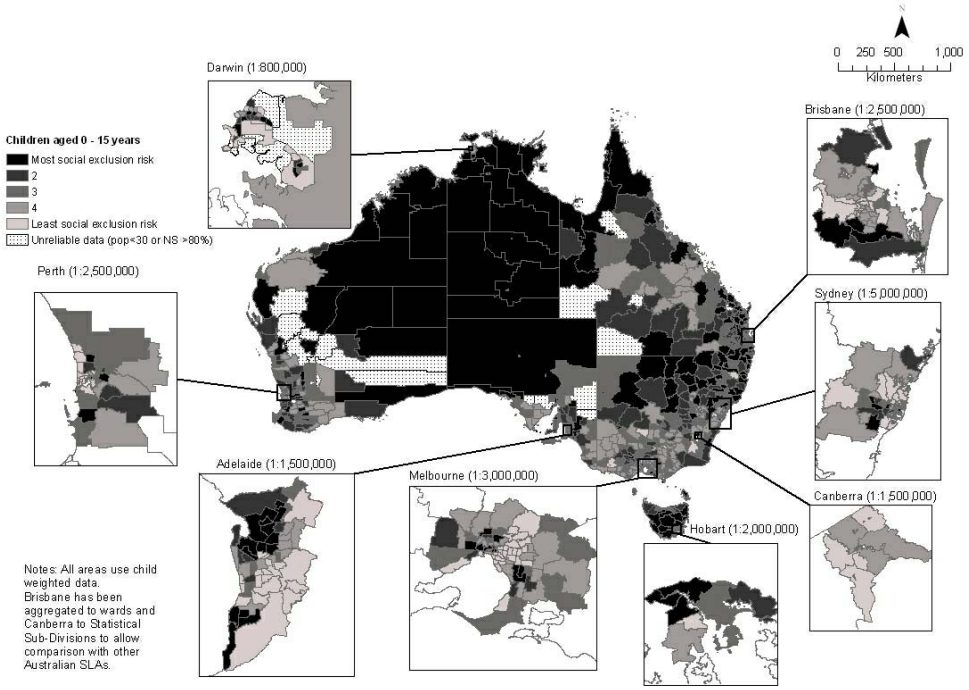
3.2 Location of children at risk of social exclusion by age group

A mapping of the child social exclusion index for all children is presented in Figure 7. Figures 8 and 9 present the distribution of risk of social exclusion by SLA for children aged 0-4 and 5-15 years. The darkest colour on the maps represents the areas with the highest risk of social exclusion (the bottom quintile), with the lightest colour representing areas with the lowest risk of child social exclusion. Areas that are stippled on the maps are those for which data were 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. However, only 0.04 per cent of Australian children were excluded from the analysis so these results are comprehensive.

The maps highlight the result that the major areas of high risk of social exclusion were outside the capital cities. SLAs in the bottom quintile of the CSE index were mainly in Tasmania, Queensland and northern New South Wales. This was true for both the 0-4 year olds and the older children.

3.3 The relationship between social exclusion and income poverty

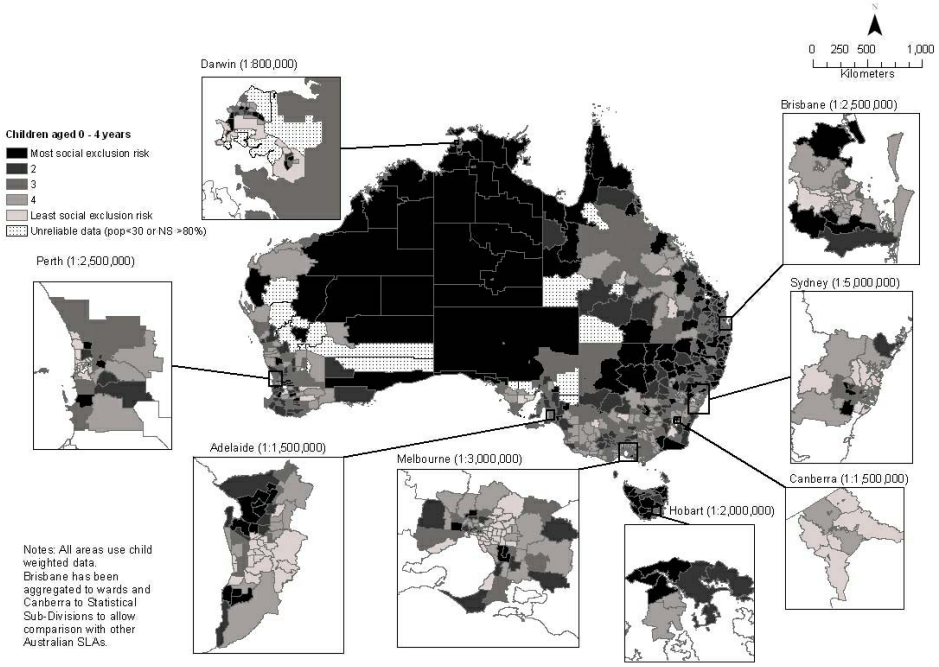
Considerable additional resources have been used in the calculation of the multidimensional indices reported here compared with an analysis of income poverty data alone. The question then arises as to whether this method provides additional useful information for policy makers and analysts and identifies potential areas of disadvantage that would not be identified if only an income measure of poverty was applied.



Source: Authors calculations based on data from ABS Census of Population and Housing, 2001.

Figure 7. Statistical local area distribution of child social exclusion risk, children aged 0-15 years, 2001

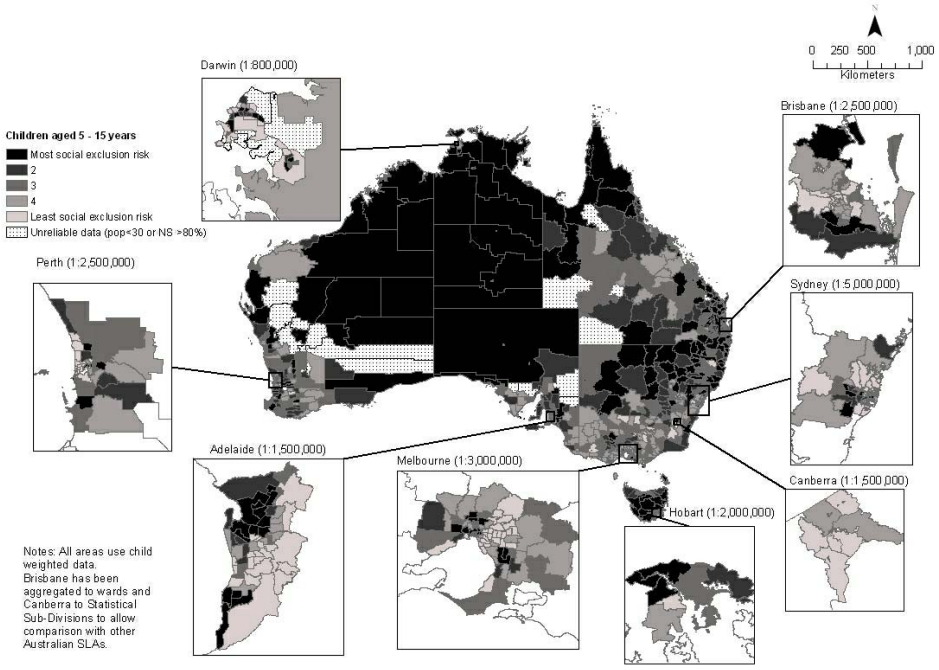
We have investigated this by asking the ABS to construct an income-only measure of poverty at the SLA level and then compared it with the results of the CSE index we have calculated. As noted earlier, this was not a straightforward exercise, due to the lack of data on disposable income at the SLA level of disaggregation, so the income poverty measure used is based on gross equivalised income. The equivalence scale used was the modified OECD scale and, following advice from the ABS that only 1.8 percent of all households were multi-family households, we used households rather than families as the income-sharing unit. Note that our SLA level poverty rates are calculated for children aged 0 to 15 years to be consistent with the definition of a child used in the social exclusion measures throughout this paper. A child was considered to be in poverty if equivalent gross household income was less than $299 per week in 2001.



Source: Authors calculations based on data from ABS Census of Population and Housing, 2001.

Figure 8. Statistical local area distribution of child social exclusion risk, children aged 0-4 years, 2001

We then created child income poverty quintiles, with the 20 per cent of children living in the SLAs with the highest income poverty rates being assigned to Child Income Poverty (CIP) quintile 1. Thus, both the CSE quintile and the CIP quintiles were child-weighted. If the two measures produced the same results, each cell on the diagonal in Table 3 would contain 20 per cent of all children — but this was not the case. Half of the children were in the same quintile on both measures of disadvantage. The children who were in different quintiles according to which measure was used were more likely to be in the most disadvantaged quintiles. For example, 5.4 percent of children were classified in the bottom quintile on the income measure but in the second quintile on the CSE index. 6.2 percent of children were classified in the bottom quintile on the CSE measure but the second quintile on the income measure. For this group equivalised household income was sufficient to keep them out of the bottom income quintile but the other factors included in the CSE index placed them more at risk of social exclusion. These results suggest that our index is capturing aspects of regional and familial disadvantage that are not being measured using a more standard income-based definition of poverty.



Source: Authors calculations based on data from ABS Census of Population and Housing, 2001.

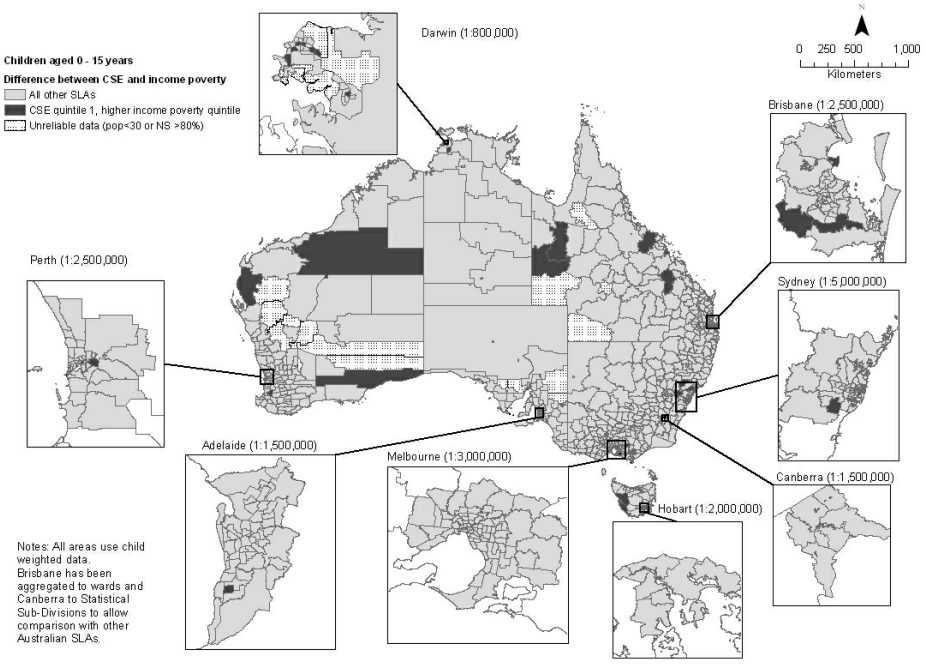
Figure 9. Statistical local area distribution of child social exclusion risk, children aged 5-15 years, 2001

Table 3. Weighted CSE quintiles and weighted child income poverty quintiles comparison, children aged 0 – 15 years, 2001

	Weighted CIP quintile					Total
Weighted CSE index quintile	1	2	3	4	5	
1	**13.5**	6.2	0.4	0.0	0.0	20.2
2	5.4	**8.8**	5.1	0.5	0.1	19.9
3	1.1	3.8	**11.9**	2.9	0.2	19.9
4	0.4	0.9	2.4	**14.1**	2.4	20.2
5	0.0	0.0	0.0	2.6	**17.2**	19.8
Total %	19.7	20.4	19.9	20.1	19.8	100.0

Note: The proportion of children within each quintile differs marginally from 20%, because we were unable to split SLAs that fell at the extreme of one quintile into pieces across quintiles, thus a whole SLA is allocated to a single quintile.
Source: Authors calculations based on data from ABS Census of Population and Housing, 2001.

Figures 10 and 11 compare the SLAs that were in the bottom quintile on one measure but not on the other. Figure 10 shows that those SLAs that fall into the bottom quintile on the risk of social exclusion index but a higher quintile on the income poverty measure were spread across the country in both urban and regional areas. However, those SLAs which fell into the bottom quintile of income poverty but were in higher quintiles on the risk of social exclusion index (shown in Figure 11) were almost all outside capital cities. This may suggest that while the CSE index indicates substantial differences in disadvantage risk between children in capital cities and those living elsewhere, these differences may be slightly less pronounced than when using an income-based measure of poverty.



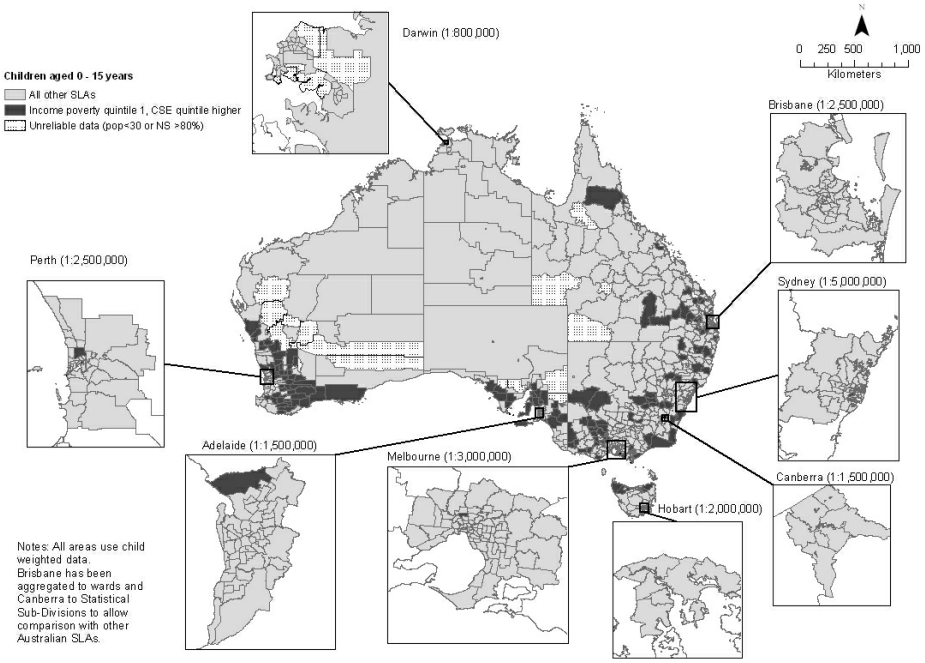
Source: Authors calculations based on data from ABS Census of Population and Housing, 2001.

Figure 10. SLAs in bottom social exclusion quintile but higher income poverty quintiles.

4. CONCLUSION

This paper presents estimates of the risk of social exclusion for Australian children in a spatial framework. The CSE index calculated uses a wider concept of disadvantage than one focussed purely on income. The results show that children living in Queensland, Tasmania, the Northern Territory and, to a lesser extent, in South Australia, are more likely to be living in a small area where

children are at high risk of experiencing social exclusion than children living in the other states. This reflects the fact that more children in Queensland, Tasmania and the Northern Territory live in sole parent families, particularly where no one is in employment, and in families with low levels of education.



Source: Authors calculations based on data from ABS Census of Population and Housing, 2001.

Figure 11. SLAs in bottom income poverty quintile but higher social exclusion quintiles.

We also presented results that divided children into two age categories; the preschoolers (0-4 years) and those of school age (5-15 years). The results are similar for these two sub-categories, with Tasmania, the Northern Territory and Queensland identified as the states with the largest concentrations of children in each age category at risk of social exclusion. The results also show that children living outside the capital cities face a higher risk of social exclusion than those in major urban areas.

Finally we considered whether there was a close correlation between our CSE index and a more traditional income-based measure of poverty. While there was some overlap in the two measures, our results suggest that the CSE index is measuring something different to just low income, as there are sizeable groups of children living in SLAs that are classified differently according to the two measures. This supports the development of wider measures of disadvantage

than a pure income measure. While children living outside the capital cities were disadvantaged compared with those in the capital cities on both measures, the disadvantage was smaller on the CSE measure than on the pure income measure of disadvantage. Our results, focussed on children, provide additional information compared with population estimates of areas of disadvantage. In a companion paper, we have compared the rankings of this index with SEIFA results published by the ABS. We find that there are similarities between this index and SEIFA but the ranking of areas is not identical (Tanton et.al 2008).

The results have important implications for policy makers. They highlight those small areas where children may be at risk of social exclusion and where policy interventions such as policies to promote stronger families and communities, educational support and access to new technologies may be most needed. The index presents a summary measure of risk of social exclusion and can be used to identify the small areas where further detailed investigation of the status of children is required. As a summary measure, however, the results are likely to conceal considerable variation in risk of social exclusion within SLAs.

Particular SLAs may fall into the most disadvantaged quintile for different reasons. This means that a 'one size fits all' policy is unlikely to be appropriate to all locations. The preferred mix of policy interventions will vary between areas. Our results suggest that promoting employment opportunities for single parents and developing educational opportunities for children living in households where the parents have low levels of education, may do most to support the children in the areas which were most disadvantaged according to this index, but there may be some SLAs for which these are not the key factors that require policy attention.

Our results show that computer access is correlated with the underlying component of disadvantage. The digital divide in computer and internet usage has a geographical dimension and the investment required to promote access to broadband connections will differ substantially between the capital cities and outside. The most appropriate way of supplying these services to families and children is likely to differ between locations depending on existing services and the proposed future applications of these services (Gans 2006).

Further directions for this research include the calculation of indices for earlier census years to see if there is a consistent spatial pattern of risk of social exclusion for children. Our future research program also includes spatial regression analysis of the determinants of the risk of social exclusion.

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