Australian Bureau of Statistics

Information Paper

Measures of Socioeconomic Status

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Measures of
Socioeconomic Status

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CONTENTS

MEASURES OF SOCIOECONOMIC STATUS

ABSTRACT

Measuring, and using measures of, socioeconomic status is not straightforward. Measurement can be undertaken for various units of analysis: for individuals, families, households, geographic areas or communities. Deciding which measure to use, and for which unit, is important and dependent on the proposed use. This paper raises issues relating to the measurement of socioeconomic status, and discusses different types of socioeconomic status measures and the uses for which they should be applied.

1. OVERVIEW OF SOCIOECONOMIC STATUS

1.1 What is socioeconomic status?

Socioeconomic status refers to the social and economic position of a given individual, or group of individuals, within the larger society. Socioeconomic status is usually, but not always, conceived of as a relative concept and can be measured for the individual, family, household or community/area. The ABS defines 'relative socioeconomic advantage and disadvantage in terms of people's access to material and social resources, and their ability to participate in society' (ABS, 2008, p. 5).

Socioeconomic status is generally unobserved and hence proxy measures are required. Common concepts considered in searching for proxy measures include income, consumption, wealth, education and employment. However, the relative importance of these and other concepts in terms of capturing socioeconomic status can change substantially through time and across populations. For example, whether or not a house has a broadband internet connection can be used as a measure of socioeconomic advantage/disadvantage. Being a relatively recent phenomenon, such a measure would not have been relevant in previous years (even if it were available). On the other hand, consumer items (like colour televisions) have become so ubiquitous that not having one is more likely to be a choice made by households, as opposed to measuring material wealth.

Certain concepts associated with socioeconomic status are likely to be more important in different geographical or demographic contexts. For example, lack of access to a car may be highly relevant to socioeconomic status in much of Australia. However, in places where public transport is widely available and many amenities are close by, it is of less relevance.

Finally, certain concepts that may be highly relevant in measuring socioeconomic status in one country may take on less importance in another. This could be because of the geographical, cultural or institutional structure of the country. For example, the use of private health insurance is likely to vary depending on the quality of the public health system in the country.

Ultimately, in most contexts, income, consumption, wealth, education and employment are the key concepts used to measure socioeconomic status. In one face-to-face Health Omnibus survey, carried out by Walker and Hiller (2005), around three quarters of respondents rated these fields as being important in 'determining whether an area is disadvantaged'.

1.2 Uses of socioeconomic status

Measures of socioeconomic status are often combined to create a single summary index that can be used to rank the particular unit of observation. Such rankings allow the comparison of relative socioeconomic status at a point in time across other characteristics of an individual (for example by country of birth), a family (for example single parent versus couple parent families) or an area (for example by state or by remoteness classification). As an alternative to looking at the socioeconomic status of individuals across personal characteristics at a point in time, measures of socioeconomic status can also be used to track the relative position of individuals, families, households or areas over time.

Measures of socioeconomic status are often used in performance reporting and to assess achievement of policy targets. Analysis uses measures of socioeconomic status to understand whether overall societal progress or regress is masking a different outcome for sub-populations of particular interest.

Measures of socioeconomic status can also be used in various forms of exploration, such as an explanatory variable in statistical or econometric analysis. For example, one may be interested in the relationship between the socioeconomic status of a child's family and the health or education outcomes of that child. Another use is for socioeconomic status to be a control variable in modelling. For example, in looking at the relationship between internal migration and education participation, it may be important to control for the fact that migration and education participation are both related to socioeconomic status.

1.3 Alternative concepts to socioeconomic status

Socioeconomic status is one of a number of measures of position within a society. There are a number of alternative concepts to socioeconomic status that are used to classify, on average, populations of policy interest or to explain individual outcomes. Other related concepts include poverty, wellbeing, social exclusion and human

development. While these concepts have a number of things in common, including some of the underlying measures, they should not be used interchangeably as there are important differences in terms of scope and implications.

One concept that predates socioeconomic status is poverty. While related to socioeconomic status, poverty has a much greater focus on lack of access to economic resources. Those in absolute poverty are generally considered unable to afford basic needs like food, clothing and shelter, whereas those in relative poverty tend not to have access to the minimum economic resources that one would expect in the particular society or economy. In essence, poverty is a slightly different concept than socioeconomic status. Those in poverty are likely to have low socioeconomic status. However, there are also likely to be a number of people who would be accorded low socioeconomic status based on a composite indicator, but who would not be considered as being in poverty using a more restricted set of indicators.

Wellbeing, on the other hand, is a broader concept than both poverty and socioeconomic status. According to the ABS, wellbeing is 'a state of health or sufficiency in all aspects of life' (ABS, 2001). So, while a person's socioeconomic status would tend to be a component of their wellbeing, a person's interaction with the natural, built and social environments, as well as their physical, mental and emotional health, are also vital components.

A third related concept is that of social exclusion. The definition of social exclusion is often highly contested and may be interpreted very differently in different contexts. However, a useful definition of social exclusion and one that highlights the difference between it and socioeconomic status is 'an individual is socially excluded if he or she does not participate in key activities of the society in which he or she lives' (Burchardt *et al.,* 2002, p. 30). Social exclusion, therefore, focuses on a person's activities or actions, whereas socioeconomic status refers to a person's access to social and economic resources.

A fourth alternative concept, human development, focuses on ensuring that people have the capabilities to lead lives that they value. Without basic capabilities, such as health care and education, many opportunities in life are inaccessible. This is also known as capability deprivation, which is a concept initiated by Amartya Sen as an alternative measure of poverty (Sen, 1999). Capabilities are influenced by an individual's characteristics such as age, sex, disability status and educational attainment. Some characteristics, such as having a disability or illness, being on older person or having low educational attainment can then lead to particular population groups earning lower incomes which, in turn, lead to being deprived of some basic capabilities and, therefore, potentially to a lower quality of life.

2. MEASURING SOCIOECONOMIC STATUS

In most circumstances, socioeconomic status is *conceptualised* for the individual, family or household. However, socioeconomic status is often *measured* for an area. In this circumstance, socioeconomic status of an area may be properly used for context, but is sometimes also used (arguably inappropriately) as a socioeconomic status measure of the person, family or household living within an area.

More often than not, socioeconomic status of an area is measured by comparing the average characteristics of the area's usual residents, as opposed to something about the area itself. If a relatively wealthy family with high levels of education and both parents working for a high income moved into a neighbourhood, then most area-based measures would record that as a reduction in socioeconomic disadvantage. However, it may be that nothing about the area itself has actually changed and the residents who were already there have not in any way become more advantaged (though this may happen through time via network effects).

The example above is not a criticism of area-based measures of socioeconomic status, as when constructed well and interpreted correctly they serve a very useful purpose. The point is, that to understand socioeconomic status of an area and how to measure it, one must first be aware of how the context affects individuals, families and households.

This section of the paper outlines various individual, family, household and area based measures of socioeconomic status, and outlines a number of limitations that relate to their measurement. Ultimately, the way in which socioeconomic status is measured should be determined by the intended use of the measure.

2.1 Socioeconomic status measures

As mentioned earlier, socioeconomic status can be used in relative terms to make comparisons across individuals, families, households or areas. It is not only income, consumption, wealth, education and occupation that can be used as concepts for socioeconomic status, but demographic and cultural activity variables are also of interest, particularly for population sub-groups.

The following table shows a number of concepts for socioeconomic status that can be used for various units of analysis, and some example measures for each of these concepts. Most of these measures can be used for socioeconomic status of individuals, families, households or areas. For example, marital status could be used as a measure of socioeconomic status for an individual, or marital status of parents could be used as a measure of socioeconomic status for a child. Similarly, the household size in which a person lives may be strongly associated with both household socioeconomic status, and also individual socioeconomic status, as it reflects overcrowded living conditions. The table is therefore not exhaustive and is designed as a prompt.

2.1 Measures of socioeconomic status

Concept	*Example measures of socioeconomic status*
Consumption	• Total personal consumption • Equivalised household consumption
Demographics	• Own marital status • Parents' marital status • Marital status of people in household • Country of birth • Main language spoken at home • Proficiency in English
Education	• Completed year 12 • Highest educational attainment • Parents' educational attainment
Employment	• Own employment status • Parents' employment status • Number of family members employed/not employed • Number of people employed in the household • Proportion of community who are employed/unemployed
Family structure	• Family size • Family composition
Health	• Disability status • Whether require assistance
Household structure	• Household size • Household composition
Income	• Equivalised final household income • Equivalised final family income • Own income • Parents' income
Location	• Remoteness • SEIFA (various indexes)
Wealth	• Own occupation • Parents' occupation • Home ownership • Cost of rent or mortgage • Value of dwelling • Whether family owns a car • Number of cars in household • Internet connection / Broadband access

Ultimately, the choice of whether individual, family, household or area based measures of socioeconomic status are most appropriate will be determined by the population being studied and the expected use of the particular socioeconomic measure. A theme that will be returned to again and again in this paper is that there is no single measure or composite measure of socioeconomic status that is appropriate for use in all contexts. Rather, a researcher or policy analyst who is interested in socioeconomic status for their analysis needs to be clear of the proposed use and then make informed decisions on both the appropriate unit of analysis (individual, family, household or community/area) and the most appropriate measures to be included in the analysis.

Socioeconomic status of sub-populations

Demographic variables are important in analysing socioeconomic status as they can be used to divide the population into sub-groups of interest (for example, males, migrants, persons aged 65 years and over). Analysis or policy requirements may focus on one particular population group, across multiple groups or across the country as a whole.

One example of a population group is the Aboriginal and Torres Strait Islander population. According to ABS (2010):

> Aboriginal and Torres Strait Islander peoples are culturally and linguistically diverse. However, common to most Aboriginal and Torres Strait Islander communities is a culture that is very different to the non-Indigenous Australian culture. Elements of cultural difference may include, but are not limited to: conceptions of family structure and community obligation, language, obligations to country and continuation of traditional knowledge.

If one is analysing socioeconomic status for a particular population sub-group in isolation, then there is greater scope to tailor measures accordingly. A couple of single variables could be used as proxies for socioeconomic status for a population sub-group, or an index could be used. However, the sub-population identifier shouldn't be a component in the measure of socioeconomic status because the inclusion of this variable in the measure and the fact it has been taken into account for measuring socioeconomic status will influence the results. For example, Indigenous status shouldn't be used to analyse socioeconomic status for the Aboriginal and Torres Strait Islander sub-population.

It may be necessary to create a separate index for a particular population subgroup in some circumstances. For example, Biddle (2009) created an index of relative Aboriginal and Torres Strait Islander socioeconomic outcomes for 37 Aboriginal and Torres Strait Islander Regions and, separately, for 531 Aboriginal and Torres Strait Islander Areas. Once again, careful interpretation of specific indices such as these is very important. The index created in Biddle (2009) does not show the distribution of the Aboriginal and Torres Strait Islander population according to the socioeconomic status of an area. Rather it shows the distribution of the Aboriginal and Torres Strait Islander population according to the socioeconomic status of the Aboriginal and Torres Strait Islander population in an area.

When making comparisons across multiple groups or across the country as a whole, there is less scope to vary the measures used. In these circumstances, undertaking sensitivity tests is an important part of the process to ensure results are robust. For example, a researcher or policy analyst should ideally test whether a population group is still identified as having relatively low socioeconomic status if particular concepts (like income, consumption, wealth, employment and education) are excluded from the analysis or a different index is used.

Comparing different population groups within a society assumes that the concept is relevant to and can be applied to the whole population and across the lifecourse. However, there are a number of population groups for whom different components of socioeconomic status take on greater or lesser relevance. For example, employment status is most obviously relevant for the sub-population of working age, but its relevance for children and the retired population depends on the context. For example, employment and occupation of parents can be powerful determinants of a child's socioeconomic status. Similarly, lack of employment (even part-time employment) for healthy but relatively poor retired people may be an indicator of exclusion and of their overall socioeconomic status. On the other hand, there are a number of stages in life where employment (and full-time employment in particular) might be considered an indication of poor socioeconomic status. This could be the case when the person would like to focus on other activities and is working out of necessity as opposed to choice. This includes those who are studying full-time, those who have caring responsibilities and those who would otherwise be retired.

Education

Two related concepts for socioeconomic status that have been shown to exhibit a strong socioeconomic gradient are educational participation and educational attainment (Coleman *et al.*, 1966; Fryer and Levitt, 2006). The focus for analysis when using these two socioeconomic status concepts has usually been on the child or adolescent. The reason for this is that a poor educational outcome from a young age is a key and perhaps even dominant predictor of poor outcomes into adulthood.

Level of education is the most commonly used socioeconomic status measure for an individual and its face validity is broadly accepted in the community. As identified by a Health Omnibus survey carried out by Walker and Hiller (2005), 82.7 per cent of respondents said that having not attended school was an important indicator of socioeconomic disadvantage, with 77.5 per cent saying the same thing about not having a qualification.

Apart from face validity, there are two main reasons for using education as a concept for measuring socioeconomic status. Firstly, those who complete additional years of education may experience a range of positive outcomes throughout their lives. Their incomes may be higher, employment easier to obtain and their health better (Card, 2001; Wolfe and Havemann, 2001; and Borland, 2002). There are also likely to be spillover effects to the household and community as a result of the individual's and society's investment in education. In other words, higher levels of education are directly related to other aspects of socioeconomic status. To the extent that these other aspects are difficult to measure (for example, permanent as opposed to transitory income), education could be a useful proxy. Secondly, higher levels of education have direct benefits themselves. Education leads to higher social status

even after controlling for income (Singh-Manoux *et al.,* 2003) and helps individuals make efficient decisions across a number of domains (Wolfe and Havemann, 2001).

An individual's level of education can be viewed in more than one way: a human capital model of education (where education contributes to productivity directly) and a signalling approach. Under the latter, employers assume that those with higher innate ability find education easier (or less costly) and are therefore more likely to invest heavily in education than those who find education a struggle. The employer is therefore more likely to hire the educated person not because the education they have undergone has made them more productive, but because it has demonstrated that they were more productive in the first place. From a cross-sectional perspective, this distinction is of little importance when calculating a person's socioeconomic status.

However, when measuring socioeconomic status over time, it does affect whether one uses a constant level of education as the benchmark for analysis of socioeconomic status, or whether the benchmark level of education is allowed to change over time. One of the difficulties of using education as a concept in measuring socioeconomic status is that the social and economic benefits an individual receives from a particular level of education are dependent on the general level of education in the economy/community. The income of someone with a Bachelor Degree will be very different in a labour market where the average person has not completed Year 12 compared to one where the majority of people have a Masters Degree. There is also the difficulty of change over time, as there is a much larger proportion of the population with a Bachelor Degree today than 50 years ago. This means that the level of educational attainment is likely to have a different impact on socioeconomic status today than it did previously.

Employment

A person's employment status is also a standard concept for measuring socioeconomic status. Not being able to find employment whilst actively seeking work, or growing up in a household where no one is employed, are both strong predictors of socioeconomic disadvantage. The link between employment and income is clear. However, there is also strong evidence that even after controlling for income, individuals who are unemployed (or not employed) have worse outcomes than those who are employed (Scutella and Wooden, 2008).

For those who are employed, the type of job held is also an important socioeconomic status measure. Firstly, those who are underemployed (that is they worked part-time but would prefer to work more hours) are likely to have their socioeconomic status influenced in the negative direction compared with those who work their desired number of hours. On the other hand, working excessively long hours has also been

shown to be associated with socioeconomic status in this negative direction (Sparks *et al.*, 1997). Finally, a person's occupation is both directly and indirectly linked to their socioeconomic status. In the famous Whitehall studies, it was shown that, for civil servants in the UK, those in managerial or administrative positions had significantly better health outcomes than those on lower grades (Marmot and Wilkinson, 2006).

Family structure

Analysis of child outcomes necessitates family or household socioeconomic status measures. This could include a simple linkage of the socioeconomic status of the child's father and/or mother to the child. However, more complete measures would also include the structure of the family as well as access to economic resources. For example, it has been shown that growing up in a single parent family, compared with a couple family (after controlling for wealth or income), is associated with lower educational attainment. This could then lead to lower earnings into adulthood (Krein, 1986).

The socioeconomic status of a family member could be linked to that of other adults in the family, not just the children. Through a process known as 'assortative mating' (Mare and Schwartz, 2006) it is well established that there is a strong correlation between the educational and occupational status of husband and wife pairs. This is likely to reinforce socioeconomic disparities within a population.

Income

One of the more common socioeconomic status measures is income or equivalised income, as a proxy for economic resources. Returning to the previous example of measuring the socioeconomic status of children, it is clear that the child's own income is of little use. Instead, equivalised final household income[1] should be used. However, the data required to generate this income measure is often not available and instead, family income is generally relied upon, where family income includes all income to family members that will support the family's consumption.

Even when aggregating income within a family though, there are two key issues that need to be considered. Firstly, how does one take into account economies of scale, where the cost of living of two people is not double the cost of living for one. Secondly, does one assume that income is shared equally within the family or are certain members likely to benefit disproportionately from a given income.

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1 Equivalised final household income includes the income of all household members, adjusted for size of the household to take account both income sharing and economies of scale in accommodation and associated services.

When a good or service is used by more than one member of a family or household simultaneously, the economic cost is often less than it would be if purchased by each member separately. For example, large consumer goods like fridges, washing machines or televisions can be used either concurrently or sequentially with the only additional cost being electricity and wear-and-tear. In addition, once a house has been heated or cooled to a comfortable temperature, all members would benefit. On the other hand, there are other items like food or movie tickets that cannot be as easily shared. However there are still discounts in bulk purchase, less waste and economies of scale for storage and preparation, and therefore the additional costs do not rise proportionally to the number of additional people. Overall, to maintain the same standard of living after the addition of an extra member, a higher income is needed, but the additional cost would be less than that of the first member.

To control for intra-household or intra-family economies of scale, the standard approach is to use an equivalence scale (Buhman *et al.*, 1988). When income is adjusted according to an equivalence scale, the equivalised income can be viewed as a proxy for the economic resources available to a standardised family or household. For a lone person household the equivalised income is equal to lone person household income. For a family or household comprising more than one person, it is an indicator of the family or household income that would need to be received by a lone person to enjoy the same level of economic wellbeing as the family or household in question.

The choice of equivalence scale can be difficult as the assumptions used for one type of family or household, or one level of income do not necessarily hold for others. As such, the equivalence scale used can have a significant impact on the conclusions made regarding the socioeconomic status of one family or household relative to another (Hunter, Kennedy and Biddle, 2004). However, as noted by Atkinson *et al.* (1995) not applying any equivalence scale at all and using either total family or household income, or family/household income per usual household resident is in fact an implicit choice of an equivalence scale at one or other extreme value.

While there is no universally accepted equivalence scale, the ABS uses the 'modified OECD' equivalence scale. Taking the first adult in the family or household as having a weight of 1 point, each additional person who is 15 years or older is allocated 0.5 points, and each child under the age of 15 is allocated 0.3 points. Equivalised family/household income is derived by dividing total family/household income by a factor equal to the sum of the equivalence points allocated to the family/household members. The equivalised income of a lone person family/household is the same as their individual income. The equivalised final income of a family or household comprising more than one person lies between the total value and the per capita value of its unequivalised income.

Although controlling for economies of scale is relatively straightforward in practical terms, it is less clear regarding the assumptions that should be made in terms of how that equivalised income is shared across family or household members. Is it valid to assume that income is spread evenly, or do certain members of the family or household benefit disproportionately from a given level of income? According to Phipps and Burton (1995, p. 198) 'it matters a great deal what we assume about how financial resources are shared within families'. An assumption of complete sharing of family/household resources can have the effect of understating socioeconomic disadvantage for vulnerable groups and for groups that consume a relatively high proportion of family/household resources.

It is very difficult to take into account family/household sharing when measuring socioeconomic status for individuals within families/households as this requires detailed consumption data for all individuals present. Nonetheless, it is important to keep the potential biases in mind when interpreting results.

Wealth

Fluctuations of income through time can lead to individuals, families or households being mistakenly classified as either socioeconomically advantaged or disadvantaged, depending on which direction they are deviating from their long-term average income at the particular point at which the measure was taken.[2] Reserves of wealth, such as accumulated savings, are one way to smooth consumption over time, and can also be used to support current consumption, at least for a period of time when shocks reduce income for a time.

One of the most commonly used wealth measures is home ownership, especially for groups that make up too small a proportion of the population to be separately identifiable in surveys with more inclusive measures. While not owning one's own home is a reasonable indication, on average, of low household wealth, a simple binary indicator for home ownership misses a large amount of the variation in wealth across Australian households. It misses remaining assets including superannuation, savings held in a bank and financial equities. Secondly, it does not take into account the actual value of the home nor the amount which is still owed on the home. As this information is not available from most data sources, the limitations of commonly used variables for wealth should be kept in mind when calculating the socioeconomic status of particular households.

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2 The fact that people draw from, or contribute to, savings on a regular basis highlights one of the weaknesses of using income as the sole proxy for access to economic resources when measuring socioeconomic status.

2.2 Area / community measures

While an individual's own socioeconomic status is important, in some contexts it is the socioeconomic status of one's community or the area in which they reside, work or go to school that is either of greater interest or the only measure available for analysis. While the community is usually taken to mean a person's geographical community (neighbourhood, suburb, etc.), as outlined later in this section, community can also be used more generally and include a non-geographic grouping of people with a common social interest or a common service interest (for example, a school community).

Community or area based socioeconomic status measures are often used to target resources or policy interventions. If a particular area has, on average, a greater proportion of people with relevant measures of disadvantage, then that area may require a greater level, or at least a different mix of government resources. A researcher or policy analyst may be interested in area-based measures of socioeconomic status because of the assumed effect on the individuals who live in the area. The average socioeconomic status in an area may influence, for example, job networks, crime and social norms. The strength and direction of these effects have generated strong research interest for a number of years.

Area based measures of socioeconomic status give contextual information about the area in which people live. They do not, however, provide information about individuals, but only about the area where the individuals live. As with any area or community, there is variation in the characteristics of the overall population in any one place. Judgements about individuals based solely on the area in which they live have a high potential for error in the conclusions, due to this variation in the characteristics of the individuals. Ignoring within area heterogeneity is often referred to as the Ecological Fallacy (Robinson, 1950).

Socioeconomic indexes for areas

One of the most commonly used area based measures of socioeconomic status in Australia is the suite of Socioeconomic Indexes for Areas (SEIFA). These indexes have been created by the ABS after every Census since the 1986 Census. While the underlying variables included in the SEIFA indexes have changed through time to reflect the evolution of the Census and changes in what may constitute advantage/disadvantage, the underlying concept has remained the same. That is:

> SEIFA indexes summarise a number of socioeconomic variables that represent disadvantage [or advantage] in an area. This single measure can be used to rank CDs to identify areas that are more or less disadvantaged [or advantaged] relative to others. These indexes measure different aspects of socioeconomic conditions at a CD level and ... [summarise] the information from a variety of social and economic variables into a single measure (Adhikari, 2006, p. 2).

Sometimes area or community based measures of socioeconomic status are used in the absence of individual, family or household measures and when there is a need for a proxy. An example would be a school, where there may be little information available for the individual students, families, households or the school itself, but there is information available about the area where the school is located. An area-based measure of the socioeconomic status of a school, for example, could be based on the areas containing the addresses of the enrolled students. Socioeconomic status could also be based on the socioeconomic status measures of the parents of students enrolled at the school. Overall though, there are limited measures of socioeconomic status for a school as there is little information available on the individual students or their family or household characteristics.

Another example of an area based measure of socioeconomic status is the Index of Community Socio-Educational Advantage (ICSEA), developed in 2009 by the Australian Curriculum, Assessment and Reporting Authority. The motivation for calculating the ICSEA was to control for the socioeconomic status of a school's student body in order to facilitate comparisons across schools in meeting certain minimum benchmarks. However at the time, schools generally had limited and incomplete information on the socioeconomic status of their students. Because of this, it was necessary to construct an index based on the socioeconomic status of the areas in which their students lived, rather than of the students themselves. A simpler (and less relevant) measure would have been to construct an index based on the socioeconomic status of the area where the school was located.

Remoteness

Another area-based measure of socioeconomic status is remoteness. This measure is used regularly to give an indication of 'access to services'. One way this information is used is to distribute resources across areas according to assumed need, a fundamental objective of government policy. Providing additional health services is one example where remoteness might be used as a measure for the socioeconomic status of an area. This can then be used to help analyse where additional health services are in more need and how accessible health services are to the population.

2.2.1 Choice of geography

The first step in any geographic analysis of socioeconomic status is to choose the boundaries by which areas are delineated. This process involves making a decision on the average size of the areas to be analysed and then, once that decision has been made, where one area ends and another begins. In a number of situations (especially historically) researchers have been forced to make a decision between geographical groupings that have already been constructed (e.g. Statistical Local Areas or SLA's).

These choices may not always have been ideal as many of the standard geographies were constructed for administrative purposes as opposed to analytical reasons.

The level of geography might be crucial to policy decisions being made. For example, if a government program is administered to local governments, then the analysis is best undertaken at the Local Government Area (LGA) level. The area level chosen, or if in fact there is no choice but to use the given geographic level, influences which measures of socioeconomic status can be used.

The replacement of the Australian Standard Geographical Classification (ASGC) with the new Australian Statistical Geography Standard (ASGS) from the 2011 Census onwards will allow researchers both within and outside the ABS to create more customised geographies than has previously been possible. In essence, the 38,704 Census Collection Districts (CDs) will be replaced by approximately 55,000 Statistical Area level 1 (SA1s) that can be used to form more customisable areas.

In deciding whether and how to aggregate areas for socioeconomic analysis, researchers need to make a conscious trade-off. Firstly, areas that are too small may have data that are too unreliable and dominated by a few observations. This is especially the case when variables are for population sub-groups (for example the proportion of the population aged 15 to 24 who are participating in education). Furthermore, measures created for areas that are too small may miss out on important social interactions that occur across the boundaries. On the other hand, measures of socioeconomic status for areas that are large may be too heterogeneous for the analysis being undertaken.

While there is literature on the appropriate size of geographic areas for socioeconomic analysis (Flowerdew *et al.*, 2008), ultimately the choice of size will be influenced by the type of analysis required, the availability of variables and the population density in the surrounding area. An analysis of the socioeconomic determinants of health might use a different geography to an analysis of the determinants of preschool participation, crime, labour market outcomes, etc.. Neighbourhoods with 10,000 people or more may be perfectly suitable for high density inner-city areas, but too large geographically for rural or remote parts of the country. Therefore researchers and policy analysts need to carefully consider the purpose for which they intend to use an area based socioeconomic status measure and make a decision on geographic size accordingly.

In addition to choosing the size of the geographic unit, it is also necessary when using area based socioeconomic status measures in analysis to choose boundaries that delineate areas. Like the size of the area, the choice of boundary can also have substantial impacts on the conclusions drawn from the analysis. This is known as the Modifiable Areal Unit Problem (MAUP) and was first introduced in Openshaw (1984) (see Appendix B for more information).

The way in which areas should be grouped should also depend on the aim and type of analysis being undertaken. It would generally be best to group those neighbourhoods with similar characteristics of interest together, but it may only be feasible for researchers or policy analysts to use pre-existing boundaries that are determined by administrative criteria. Even in this instance though, it is important to be aware of how the administrative boundaries were constructed and the implications for the analysis being undertaken.

2.2.2 Issues with area measures of socioeconomic status

The concept of socioeconomic status and relevance of variables for measuring socioeconomic status for sub-populations was discussed earlier. Ensuring relevant measures of socioeconomic status for sub-populations is also applicable for analysis and for international comparisons.

Sub-populations and indicators for socioeconomic status

In the first instance, one should be careful in making statements about population sub-groups when using area based measures that were not created specifically for that sub-group. For example, if an analyst was using the SEIFA Index of Relative Socioeconomic Disadvantage (IRSD) to look at the geographic distribution of school children by area, it would not be accurate to say that one particular group of school children was more disadvantaged on average than another. Rather, one could only say that one group of school children lived in an area where the total population was more disadvantaged than the average characteristics of the people who lived in another area, (where the second group of students lived). This concept of area, where the children usually live, is an important point to make and to keep in mind when interpreting results.

Another issue to be aware of is whether or not the population sub-group is used as a component in the area based index. For example, the SEIFA Index of Relative Socio-economic Disadvantage includes the proportion of individuals in the area who are Aboriginal or Torres Strait Islander, the proportion who are divorced/separated, and the proportion who were not proficient in spoken English. Therefore it would not be appropriate to look at the distribution of these population groups by the socio-economic status of their areas using the Index of Relative Socioeconomic Disadvantage. If this were done, the results would be biased towards these population groups living in more disadvantaged areas. It may be more appropriate to use a different measure of socioeconomic status for these population groups, one that doesn't include their sub-group variable in the measure of socioeconomic status. In some cases it will be possible to identify another index that doesn't include Indigenous status, marital status or proficiency in spoken English, such as the Index of Relative Socioeconomic Advantage

and Disadvantage, and in other cases it would be best to use single variables as socioeconomic status measures rather than an area-based index.

Often the most relevant measure of socioeconomic status won't be readily available. The decision on which measure of socioeconomic status to use or construct will often be based on the availability of relevant variables, as well as on the focus of analysis. An example could be undertaking analysis of the Aboriginal and Torres Strait Islander population group, when the SEIFA index of relative disadvantage, which includes Indigenous status as a component, is the only socioeconomic status measure available in the dataset. As this index includes Indigenous status as a component, it would be best not to use this particular index as the socioeconomic status measure.[3] The researcher's decision is then whether to use some single variable measures instead.

The use of explanatory variables in econometric modelling also raises an issue regarding the components of a socioeconomic index. There is the potential for the duplication of variables in a model, once as an individual variable and once as a component of an index (such as SEIFA). This issue is likely to only have a minor effect on the results of modelling, but should be considered if using both individual variables and a socioeconomic index in a model.

International comparisons of socioeconomic status

The examples given above have focused primarily on comparisons within a country. That is, in regard to comparisons across geography within a country, whether or not those who live in one area have worse socioeconomic outcomes on average than those in another area; or whether a particular population sub-group lives in areas that are, on average, more disadvantaged than the areas where another population sub-group lives. However, there is also a strong demand for international comparisons of socioeconomic outcomes.

Traditionally, Gross Domestic Product (GDP) or Gross National Income (GNI) have been used to give an indication of the socioeconomic status of a country. The GDP of a country refers to the total value of goods and services produced in Australia within a given period after deducting the costs of goods and services used in the process of production, but before deducting allowances for consumption of fixed capital. GNI is the aggregate value of gross primary incomes for all institutional sectors, including the net primary income receivable from non-residents. GNI was formerly called Gross National Product (GNP). To compare across countries, income is either adjusted using current exchange rates, or preferably purchasing power parities (PPPs). The latter takes into account fluctuations in exchange rates but also the relative prices of goods and services in each country.

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3   The ABS is aware that limited SEIFA indexes are released on particular confidentialised microdata, such as ABS Confidentialised Unit Record Files, and is working to address this issue.

Just as income is a useful but not sufficient concept for measuring socioeconomic status for an individual, family, household or community/area, the limitations of GDP/GNI for comparing countries have long been recognised. For example, GDP and GNI don't take into account non-market transactions, environmental externalities or the sustainability of the current level of production.

Perhaps an even greater difficulty with measuring socioeconomic status at the national level is how to incorporate inequality. This needs to be considered in order to facilitate international comparisons, but the issue is somewhat less of an issue for an area and not present for individual based analysis. While it is relatively straight forward conceptually to measure inequality, for example through a summary distributional measure such as the Gini coefficient (which is the most commonly used summary measure of variation in the income distribution), it is not always clear how to objectively evaluate an increase in average income or wealth that coincides with an increase in inequality.

Because of these limitations, a number of other summary measures for international comparisons have been proposed. One that is used extensively for cross national comparisons is the Human Development Index (HDI) which summarises a country's income, education and health into a single index (UNDP, 2008). The 2010 HDI report introduced the Inequality-adjusted HDI (IHDI), a measure of the level of human development of people in a society that accounts for inequality. However the HDI is only a summary indicator and is not suitable for analysing the short term impacts of policy change. It also suffers from some well-documented methodological limitations.

Rather than summarising changes in socioeconomic status at a national level into a single index, the ABS focuses on producing a suite of indicators under its flagship publication *Measures of Australia's Progress* (ABS, 2010). Change through time is summarised across a range of dimensions including the Society, Economy and Environment. A number of the dimensions, such as income, education, labour force status and housing affordability, are used as concepts underlying socioeconomic status for individuals, families, households and areas.

3. DATA USED TO MEASURE SOCIOECONOMIC STATUS

The measurement of socioeconomic status can be a highly data intensive exercise. As discussed throughout this paper, socioeconomic status is generally unobserved and proxies need to be relied upon. The robustness of measures of socioeconomic status is therefore determined by the robustness of the underlying concepts.

There are three main sources of data used to measure socioeconomic status in Australia: The Census of Population and Housing (the Census); administrative data sources; and sample surveys (both ABS and non-ABS surveys).

3.1 The Census of Population and Housing

Every five years, the ABS conducts a Census of Population and Housing. The most recent Census was carried out in 2006 with the next Census scheduled for August 2011. It is the largest statistical collection undertaken in Australia with the aim to support accurate measurement of the number of people in Australia on a particular night, where they live and the dwellings in which they live, and report on key characteristics of the people and their dwellings.

While the primary aim of the Census is to produce a population and dwelling count, a lot of other information is collected. This includes a person's demographic characteristics (for example age, sex, country of birth) as well as a range of socioeconomic information. The key benefit of using the Census for socioeconomic analysis is the demographic detail and complete enumeration of the population. This may allow for comparisons across very small geographic areas or population sub-groups that comprise only a small proportion of the overall population. In essence, every Australian in the country on the night of the Census is in scope, with data available for the vast majority of the population who filled out the form.

One way in which the Census is used for socioeconomic analysis is through the suite of SEIFA indexes produced by the ABS. As discussed previously, the SEIFA indexes allow users to compare the average socioeconomic outcomes of individuals in one area with the average socioeconomic outcomes of individuals in another area (in relative terms). Furthermore, when combined with datasets which contain information about individuals, they allow users to look at the socioeconomic ranking of the area in which a person lives in conjunction with the characteristics of the individual.

3.2 Administrative data sources

It is often the case that administrative data records include limited person level information. For example, while some datasets capture age, sex and occupation, they may not have details on income, family composition or educational attainment. Often administrative data sets contain limited demographic information. Without this demographic detail, it becomes difficult to use the administrative datasets for socioeconomic analysis.

In this situation though, there are still a couple of possibilities for analysis. One option is to use an area based measure such as SEIFA as this can be linked to the administrative datasets assuming address of usual residence is included on the administrative data source. Another option is data linking between the administrative data source and other data sources that do contain socioeconomic variables, such as the Census.

3.3 Sample surveys

3.3.1 ABS sample surveys

The Census is generally undertaken using a self-completed form, and is generally completed by a single household member. This limits the range of data that can be collected. As an example, up until now in Australia, a single income question is used with respondents asked to identify their 'gross' weekly income within defined income range categories. However, it is likely that many people understate their gross incomes when reporting in the Census, such as not adjusting for salary sacrifice or for other forms of income (like payment in kind). Various approximations are then required to measure income aggregated across family or household members. No information is available from the Census on after-tax income, nor is there any information on the values of a person's assets and liabilities. Furthermore, because the Census is collected only every five years, the information available can become dated before information from the subsequent Census is made available.

For the above reasons, amongst others, the ABS also undertakes a range of sample surveys. The aim of these surveys is to obtain information from a nationally representative sample on a single topic or range of topics. All ABS household surveys contain indicators that can be used for socioeconomic analysis. However, the six most relevant surveys are the General Social Survey (GSS), the Survey of Income and Housing (SIH), the Household Expenditure Survey (HES), the National Aboriginal and Torres Strait Islander Social Survey (NATSISS), the National Health Survey (NHS) and the National Aboriginal and Torres Strait Islander Health Survey (NATSIHS).

General Social Survey (GSS)

The GSS is a household survey that ranges across many aspects of life to enable analysis of the interrelationships in social circumstances and outcomes. The GSS does not have a specific domain of analysis as its focus. Rather, the GSS contains, as well as socioeconomic and demographic information, information across a range of areas including:

- financial stress;
- assets and liabilities;
- crime and feelings of safety;
- attendance at culture and leisure venues;
- social networks and social participation;
- experiences of homelessness;
- experiences of discrimination; and
- voluntary work.

The most recently published GSS data is from 2006, with the 2010 survey results planned for release in September 2011. The 2010 GSS had a larger sample of targeted areas to increase the number of people and households experiencing multiple disadvantage. It is expected that this will facilitate increased analysis of these population groups.

Survey of Income and Housing (SIH)

The SIH is a household survey, with the most recently published data from 2007–08 and the next survey data (2009–10) due for release in August 2011. The survey collects the amount of income receivable through each source of income, wealth information, housing characteristics and demographic and person level information for household members. Income data are collected on both a current basis and for the previous financial year. The primary purpose of the survey is to inform on the social and economic welfare of Australians, including the distribution of household income and wealth. In addition, the data collected contribute to the compilation of key performance indicators for housing affordability that have been agreed by the Council of Australian Governments. This survey is routinely coded to the SEIFA for disadvantage and advantage.

Household Expenditure Survey (HES)

The HES is run as a sub-sample of the SIH every six years. The latest survey was run in 2009–10 and results will be released in August 2011. In addition to the data collected in SIH, the HES includes information on expenditure, financial stress and disability status for all persons age 15 years and over. The 2009–10 HES included an increased sample of 3,000 households where the main source of household income was a government pension, benefit or allowance.

National Aboriginal and Torres Strait Islander Social Survey (NATSISS)

As discussed earlier, the variables for the measurement of socioeconomic status are likely to vary for different population groups. One group identified in the previous discussion is the Aboriginal and Torres Strait Islander population. Recognising the unique cultural background of Aboriginal and Torres Strait Islanders, the ABS runs separate surveys of the Aboriginal and Torres Strait Islander population, including the NATSISS, which was last carried out in 2008. Similar in scope and aim to the GSS in terms of the content coverage, the NATSISS contains a range of socioeconomic status measures. However, it also includes information that is of particular relevance to the Aboriginal and Torres Strait Islander population. This includes questions on Aboriginal and Torres Strait Islander language and culture, and also tailored questions on social capital, education, work, income and housing.

National Health Survey (NHS)

A range of health information is collected in the NHS, which is a household survey and was last run in 2007–08. It includes a person's self-assessed health status, risk factors, the presence of long-term conditions and health service usage. There is also a large range of socioeconomic information including a person's education level, their income, their housing situation, their employment status and an area based indicator of socioeconomic status for their place of usual residence (SEIFA index of relative disadvantage). This range of socioeconomic information allows users to undertake detailed analysis of the relationship between socioeconomic status and health.

National Aboriginal and Torres Strait Islander Health Survey (NATSIHS)

The National Aboriginal and Torres Strait Islander Health Survey (NATSIHS) was last run in 2004–05 and is the largest health survey of the Aboriginal and Torres Strait Islander population conducted by the ABS. Similar in aim to the NHS, the NATSIHS was conducted across all areas of Australia, including remote and very remote areas, and collected a broad range of health related information for the Aboriginal and Torres Strait Islander population, including health status, risk factors and actions and socioeconomic circumstances.

3.3.2 Non-ABS sample surveys

While the Census and sample surveys run by the ABS are generally the largest statistical collections available for socioeconomic analysis, a number of other government agencies and research bodies run their own collections. Many of these collections are also useful for analysis of specific topics or populations.

One limitation of most ABS collections is that they do not track individuals through time. So, while they perform their primary aim of providing a nationally representative snapshot for a particular point in time, and can be used effectively for cohort analysis, they are not suitable for longitudinal analysis that would allow one to observe whether socioeconomic outcomes of particular individuals are changing through time. Some key datasets that fill this gap are the Household, Income and Labour Dynamics in Australia (HILDA) survey[4], the Longitudinal Study of Australian Children[5] and the Longitudinal Survey of Indigenous Children.[6]

The strength of these and similar surveys is that they allow researchers to analyse whether a person's socioeconomic status at a particular point in time is associated with other outcomes into the future, as well as whether changes in socioeconomic status are associated with changes in other outcomes. The biggest drawback from longitudinal surveys, however, is that it is not always possible to keep track of individuals over successive waves of data collection. Furthermore, longitudinal studies have low initial response rates, potentially making the initial sample biased, and between wave sample attrition is non-random, which means that the data can become less and less representative through time (Fitzgerald *et al.*, 1998).

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4   < http://www.melbourneinstitute.com/hilda/ >
5   < http://www.aifs.gov.au/growingup/ >
6   <http:/www.fahcsia.gov.au/sa/indigenous/progserv/famchild/lsic/ >

4. USING MEASURES OF SOCIOECONOMIC STATUS

In either choosing the best variables or constructing the best measure for socioeconomic status for a particular analysis, the following few key questions should be asked:

Is socioeconomic status the most relevant concept?

ABS (2008, p. 5) defines socioeconomic status as a person's 'access to material and social resources, and their ability to participate in society.' However, depending on the particular analysis that is being undertaken, a researcher or policy analyst may consider using a concept that has a different focus (for example: poverty, wellbeing, social exclusion or human development).

What is the most relevant unit of analysis?

Socioeconomic status can be measured and analysed for individuals, families, households or areas. However, these different units of analysis should not be used interchangeably. For example, it is incorrect to apply an area based measure of socioeconomic disadvantage (like SEIFA) to an individual within that area and then assume that it represents that individual's socioeconomic status. That is not to say that such analysis is not feasible nor that such analyses do not yield important research findings. Applying a SEIFA (an area-based measure) to an individual (the chosen unit of analysis) living in that area provides context for the unit of analysis. However, it is very important to be clear regarding the assumptions being made and whether a particular outcome observed for an individual is associated with the context (i.e. the average characteristics of those who live in that person's area), and not associated with other aspects of the person themselves.

What aspects of socioeconomic status are most relevant for your intended use?

There is no single correct measure of socioeconomic status and most researchers use proxy variables. However, a measure of socioeconomic status that is relevant for one segment of the population may not be relevant for another (e.g. employment status may be more relevant for the working age population than students or the elderly). If a particular stage of the lifecourse or a particular population sub-group is being examined, then it is important to choose concepts and variables that are applicable to that group. If comparisons are being made across groups then it is important to choose appropriate concepts and variables and test whether the conclusions made are robust. As part of this decision, consideration should also be given to which concepts are most appropriate, or whether individual variables or an index (and its components) is more relevant.

What data are available?

The decision as to which concepts for socioeconomic status to use individually or as components in an index will be influenced by the data items and data sources available. Not all data sources will have a large variety of variables to choose from.

When thinking about which aspects of socioeconomic status are most relevant, a key consideration is whether just one variable, or even a couple, is likely to be more meaningful than an index. The key difference is that an index includes multiple variables and some might be more relevant than others to your piece of analysis. An example of when an index might be more appropriate than individual variables could be people's fear of crime, where an influencing factor would be the 'neighbourhood' context available in an area index. An example where an index may not be appropriate could be home ownership, where the income and occupation concepts alone may explain almost all of the socioeconomic outcome of home ownership.

One way to help overcome the paucity of choice in variables in some datasets for analysing socioeconomic status may be through data linking. By combining multiple data sources, additional variables which are better suited to the aim of the particular analysis could then be available to analyse socioeconomic status.

4.1 Example measures of socioeconomic status

Measure of socioeconomic position

A summary measure of 'socioeconomic position' for Australian families has been calculated from both the Household, Income and Labour Dynamics in Australia (HILDA) survey and the Longitudinal Study of Australian Children (LSAC). Socioeconomic position influences family and child outcomes, with associations observed over the life course, so it is an important focus for policy and intervention.

Socioeconomic position is a composite measure encompassing both resource based factors, such as income, wealth and educational attainment, and prestige based factors, such as the status associated with different occupations. The measure developed includes information about three elements of the family: Parents' educational attainments, parents' occupations and combined annual income (Blakemore, Gibbings and Strazdins, 2006).

The measure can be calculated for populations of interest, such as families where the family socioeconomic position describes the key resources for parents and their children, and access to them. The measure has been developed for different family types, such as families with infants, families with children and families with teenagers and then comparisons can be made on socioeconomic position of different family types (Blakemore, Gibbings and Strazdins, 2006). The measure ranks families relative

to the sample it is calculated for, and as such, the socioeconomic position described by the measure varies and is dependent on the characteristics of the sample.

Aboriginal and Torres Strait Islander socioeconomic status

In 2009 the Centre for Aboriginal Economic Policy Research (CAEPR) calculated a single index to rank Aboriginal and Torres Strait Islander Regions by socioeconomic outcomes. There are nine components to calculate the index, which include variables across employment, occupation, education, housing and income. The variables were chosen to capture access to economic resources for the Aboriginal and Torres Strait Islander population.

To successfully achieve targets for improved socioeconomic status in the Aboriginal and Torres Strait Islander population, there is a need to understand where Aboriginal and Torres Strait Islander people live, where their needs are greatest and what challenges are facing the different regions across Australia. In policy terms, it is important to acknowledge the difference between the Aboriginal and Torres Strait Islander and non-Indigenous lifecourse in Australia, so being able to focus on just one population group is beneficial in such analysis.

Socioeconomic status for higher education students

The Department of Education, Employment and Workplace Relations (DEEWR) has been investigating the potential of creating a socioeconomic status measure for higher education students to help determine whether Australia is meeting the target of improved participation of higher education students from low socioeconomic status backgrounds (DEEWR, 2009). Previous research has found a relationship between young people's participation in higher education and their parents' education levels. Strong correlations have also been found between young people's participation in higher education and their parents' occupation, the wealth of the household and geographic location of a student's usual residence.

For the potential new measure, the variables being considered for inclusion are the education level of a student's parent, the occupation of a student's parent, parents' income and the location of a student's usual residence. Income is included as a proxy to give an indication of household wealth. This is because an increased participation of children in higher education is found for families who have more economic capacity to support their children through study. The location of a student's usual residence is included because a student might be relatively advantaged based on other dimensions, but could experience educational disadvantage due to their location (DEEWR, 2009). An alternative way to capture the effect of location could be to measure the socioeconomic status of the school the higher education student previously attended.

This example shows that there are multiple dimensions to consider when measuring socioeconomic status for children's participation in higher education. A single variable versus a composite measure that combines all of the factors that contribute to educational disadvantage is due to be considered as part of DEEWR's investigations.

Jarman 8: An index of social disadvantage

The Jarman 8 index was developed in England for the purpose of making special payments to general practitioners in socially deprived areas. It comprises a number of variables, covering the concepts of family and household composition, employment and occupation, frequency of house moves and ethnic background.

The combination of variables in Jarman 8 has been adopted and validated for use in Australia, primarily to assess links between disadvantage and health issues (Forrest, McCracken and Whitecross, 1992). To date Jarman 8 has been used as a composite measure of social disadvantage and has raised awareness of different socioeconomic status indicators that could be used to signify health status.

Socio-Economic Indexes For Areas (SEIFA)

In 1986 the ABS first developed a suite of Socio-Economic Indexes for Areas (SEIFA), to aid in the assessment of the welfare of Australian communities.

There are four indexes in the SEIFA suite, providing a method of determining the level of social and economic well-being of people living in an area. Each of the four indexes summarise different aspects of the socio-economic conditions of people living in an area and each is based upon a different set of social and economic variables from the Census. The indexes are area based measures of socioeconomic status and provide more general measures than is given by measuring, for example, income or unemployment alone.

4.2 Example uses of socioeconomic status measures

Council of Australian Governments

The Council of Australian Governments (COAG) has a number of National Agreements in place to improve the outcomes for Australians across a number of key areas. These Agreements use performance indicators to present progress being made toward set objectives. Under each of the Agreements, data are reported by socioeconomic status, however the variables used to describe socioeconomic status tend to be different for each Agreement. This is in part because the performance indicators incorporate different concepts, and using socioeconomic status measures that include variables that are part of the relevant concept is not recommended. The socioeconomic status measures were chosen to cover the most relevant aspects for each Agreement. Data availability was also considered in each case.

The National Housing Agreement uses a variety of socioeconomic status variables, including demographic indicators, and details about the dwelling and the residents in the household. Household variables are preferred, as issues concerned with housing tend to focus on the number of households and in particular, the number of households that may have special needs. For example, over recent decades, households have tended to become smaller as the number of families with relatively large numbers of children has fallen and the number of elderly couples and number of elderly people who live alone have both increased. These household compositional changes have generated far greater demand for housing than might be expected from population growth if average household sizes remained the same. They have also given rise to demand for different housing options. The housing variables under this Agreement are therefore analysed by other data items to determine the number of households with particular characteristics. These details, such as main source of household income, number of employed persons in the household, value of dwelling and household type, provide contextual information required to help interpret the comparative assessment of performance between jurisdictions.

Health is influenced by several broad socioeconomic concepts, such as education, occupation and income. People at risk of disadvantage tend to come from more disadvantaged families and more disadvantaged communities. For this reason, it is difficult to use one specific measure of socioeconomic status for health, as the inequalities are influenced by person level characteristics as well as family, household, community and area level factors. Due to the large number of variables that could be used to measure socioeconomic status in relation to health, a proxy is often chosen based on data availability. In the National Health Agreement, the SEIFA Index of Relative Socioeconomic Disadvantage is generally used as a measure of socioeconomic status. Some single variables are also used, such as age, sex, Indigenous status and major cause of death.

The National Disability Agreement focuses on individual level characteristics for measuring socioeconomic status. This is because disability status and care tend to relate to individual circumstances, rather than the area of usual residence. The specific variables include age, sex, country of birth and need for assistance. This Agreement is also about the care people are receiving and characteristics of the carer, such as their age, sex, country of birth, Indigenous status, whether they are the primary carer, and if they are a resident in the same household.

A number of different measures of socioeconomic status have been used for reporting for the Education Agreement. For this agreement it is important to analyse the performance indicators based on both individual measures of socioeconomic status and area measures, either for the location of the school or for the usual residence of the students. The National Education Agreement uses parental education and

parental occupation as variables for socioeconomic status. It also uses other variables from the Programme for International Student Assessment, such as home resources, cultural possessions and family wealth. The Agreement also reports performance indicators by the SEIFA Index of Relative Socioeconomic Disadvantage.

My Schools

The need for relevant socioeconomic status measures has been identified by the Australian Government in order to facilitate comparisons in performance across schools. The first version of the Index of Community Socio-Educational Advantage (ICSEA) was based on the socioeconomic status of the area in which the students lived (regardless of proximity to the school), rather than the characteristics of the individual students and their families.

Since then, the Australian Curriculum Assessment and Reporting Authority (ACARA) has developed a new method for calculating ICSEA for 71% of schools (ACARA, 2010). The new method includes students' individual and family level information where possible. From 2010, the index includes additional detail on the skill level of the parent's occupation, education level and language background, in addition to the area level information.

Murray-Darling Basin

Under the *Water Act 2007*, the Murray-Darling Basin Authority (MDBA) is responsible for developing a Basin Plan, while also considering the socioeconomic circumstances of people living in the Basin. In 2009, the ABS together with the Australian Bureau of Agricultural and Resource Economics (ABARE) and the Bureau of Rural Sciences (BRS) prepared a report on the socioeconomic circumstances of people and communities in the Murray Darling Basin area for this purpose (MDBA, 2009).

As the analysis was focussed on community wellbeing, an area based measure was most relevant and various aspects of economic, social and personal resources were covered to capture the areas ability to sustain community wellbeing. The SEIFA Index of Relative Socioeconomic Advantage and Disadvantage compiled from Census data was used to analyse disadvantage in the Murray Darling Basin area. This index was chosen based on data availability as well as the fact that many localities in the area have a large Aboriginal and Torres Strait Islander population. Due to previous evidence that the Aboriginal and Torres Strait Islander population tend to experience higher levels of disadvantage (MDBA, 2009, p. 112) and there are large Aboriginal and Torres Strait Islander population groups in the MDBA, the Index of Relative Socioeconomic Advantage and Disadvantage was chosen because Indigenous status is not an underlying component of the index. Using this index also meant that Indigenous status could be analysed separately, as it would not be doubling as both an analytical variable and a component in the index.

5. CONCLUSION

There are two main ways in which measures of socioeconomic status are used. Firstly to compare individuals, or groups of individuals, across time and space, and secondly as a way to summarise or control for variation across other variables (for example health or educational attainment).

One could also take the relationship between socioeconomic status and other variables as given, and use this as a motivation to focus on variation in socioeconomic status across population groups. For example, knowing that there is a relationship between socioeconomic status and income, one may focus on the relative income of the Aboriginal and Torres Strait Islander population compared to the non-Indigenous population as a way to explain the differences in socioeconomic outcomes between the two groups. Identifying changes in income, which can change quickly from policy interventions, may be a more useful way to monitor policy progress than tracking broader socioeconomic outcomes, which take longer to change. In this case the relationship between income and socioeconomic status is being assumed to be true and income is being used as a measure of socioeconomic status.

As has been discussed, there are four main questions that need to be asked before either undertaking any analysis by socioeconomic status or interpreting the results. The key point from the discussion presented in this paper is that the measure of socio-economic status that should be used depends heavily on the particular analysis being undertaken. Considering the four questions for each piece of analysis will assist in addressing the research question at hand in the best way possible.

Is socioeconomic status the most relevant concept?

A researcher or policy analyst should consider whether socioeconomic status is the most relevant concept to analyse, or whether a different focus is more appropriate for the piece of work (for example, poverty, wellbeing, social exclusion or human development).

What is the most relevant unit of interest?

Socioeconomic status can be measured for individuals, families, households or areas. It is important to distinguish which unit is the most appropriate for the purpose at hand, and to be explicit in the reporting of results to ensure no misinterpretation.

What aspects of socioeconomic status are most relevant for your intended use?

There is no single correct measure of socioeconomic status. Proxy measures are often used. The variables used for socioeconomic status must be relevant to the population group being examined. If comparisons are being made across groups then it is important to choose appropriate variables and decide whether a single variable or combination of variables, or an index, is best.

What data are available?

The decision regarding the best variables or index to use for socioeconomic status will also be influenced by the data items and sources that are available.

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APPENDIXES

A. SOCIOECONOMIC INDEXES FOR AREAS (SEIFA)

SEIFA is designed to allow users to make comparisons between different areas. Difficulty arises, though, when comparisons can only be made at a high level. The aggregation of small areas into larger areas often masks the inherent socioeconomic disadvantage of component areas. For example, CD1 in the table below could be a retirement village and be less advantaged than the other CD's within LGA1. By combining the CDs to a larger area, information is lost and different conclusions could be drawn from analysis.

Local Government Area (LGA)	Collection District (CD)	SEIFA score for CD *	SEIFA score for LGA *
LGA 1	CD 1	700	
	CD 2	1000	
	CD 3	1300	1000
LGA 2	CD 4	999	
	CD 5	1000	
	CD 6	1001	1000

*   Assuming each CD has the same population total, since the LGA score is a population-weighted average of the constituent CD's.

The index at the smaller level (CD) is more meaningful and the SEIFA score at the larger area level (LGA) gives no indication of the diversity of socioeconomic conditions within the area. If a user is only interested in the average socioeconomic conditions of an area, then the average score for a larger area is most likely suitable, but if a user is interested in the distribution of socioeconomic conditions within an area then it would be more appropriate to use additional information to improve the measure at the larger area level. For example, use the proportion of CDs within each LGA that are in the bottom quintile of CDs. This gives extra information about the LGA without doing analysis at the CD level.

The indexes are reviewed after each Census and the components do not necessarily remain the same. For example, there may be a need to reflect current technology and that information wasn't available or collected in the previous Census. These changes can restrict the comparability over time.

There are a range of variables included in each of these SEIFA indices, so it is important to be aware of what is already included if using SEIFA to measure socioeconomic status. Many variables that can be used to help measure socioeconomic status for a different unit of analysis (individual, family, household) could already be included in the SEIFA index being used, so they could be duplicated in the analysis. While this issue may not cause large problems in the analysis, it is

something to be aware of and a decision should be made regarding whether the variable would be best used on its own, with a combination of other variables, or indeed use the SEIFA index instead.

The Index of Relative Socioeconomic Disadvantage

The Index of Relative Socioeconomic Disadvantage focuses solely on disadvantage and summarises variables for relative disadvantage at the small area level.

The components of this index include internet connection, occupation, post-school qualifications, income, marital status, proficiency in English, Indigenous status, employment status, family composition, whether have a car, long-term health condition or disability and need assistance, renting from the Government or community, low rent payments and whether additional bedrooms are needed.

One consideration though, is what population group is being analysed. If it is a component of the index, such as the unemployed, divorced/separated or the Aboriginal and Torres Strait Islander population, it would be sensible to reconsider whether this index is the most appropriate for your purposes. For example, if focusing on the Aboriginal and Torres Strait Islander population it may be better to use the Index of Relative Socioeconomic Advantage and Disadvantage (IRSAD described below). This is because it does not include Indigenous status as a component and therefore the SEIFA measure can not bias the analysis. If analysing the unemployed population on the other hand, it is still a component of the IRSAD, so it may be better to choose individual variables to measure socioeconomic status.

The Index of Relative Socioeconomic Advantage and Disadvantage

The Index of Relative Socioeconomic Advantage and Disadvantage summarises variables for both advantage and disadvantage. The index can be used to measure socioeconomic wellbeing in a continuum, from the most disadvantaged areas to the most advantaged areas. This index is closely linked to the Index of Relative Disadvantage, but differs in that it also considers variables of advantage. An area that contains parts with relatively disadvantaged people and parts with relatively advantaged people might have a low score on the Index of Relative Disadvantage due to the pockets of disadvantage, but a higher score in the Index of Relative Advantage and Disadvantage, as the pockets of advantage may offset the pockets of disadvantage.

The components of this index differ to the Index of Socioeconomic Disadvantage by the inclusion of some extra variables for advantage. These include having high mortgage or rent payments, having four or more bedrooms in the house, being at university and having a diploma or advanced diploma qualification. The index also differs from the Index of Socioeconomic Disadvantage as it excludes proficiency in English, Indigenous status and marital status.

Social and health research most commonly use both IRSD and IRSAD as a proxy for socioeconomic status. If answering a research question that involves finding areas that are advantaged, the IRSAD would be the best measure. The IRSD can only say that some areas are more disadvantaged than others. As the variables included in the index only reflect disadvantage, it is possible for an area to get a low IRSD due to some very disadvantaged areas and a high IRSAD score, because the area also includes some advantaged areas. For this reason it is important to keep in mind the aim of the project when deciding which index better meets the overall goal.

The Index of Economic Resources

The Index of Economic Resources summarises variables relating to the financial aspects of relative socioeconomic advantage and disadvantage, including variables of high and low income as well as variables that capture high or low wealth. This index measures access to economic resources, where a high score means greater access to economic resources.

The components of this index differ to the Index of Socioeconomic Disadvantage by the inclusion of some extra variables of economic resources. These include whether own dwelling, owner of an unincorporated enterprise, have four or more bedrooms and a lone person household. The index also differs from the Index of Socioeconomic Disadvantage as it excludes whether have an internet connection, occupation, post-school qualifications, marital status, proficiency in English, Indigenous status, family composition and whether have a long-term health condition or disability and need assistance.

The Index of Education and Occupation

The Index of Education and Occupation focuses exclusively on education, employment and occupation and includes information on the skills of people in the area, formal qualifications and the skills required to perform different occupations. A low score for this index means the area has a high proportion of people without qualifications and/or with low skilled jobs.

The components of this index differ to the Index of Socioeconomic Disadvantage by the inclusion of some extra variables for education and occupation. These include having more details on the skill level of occupation, whether left school at Year 11, attainment of a certificate qualification, attending university and having a diploma or advanced diploma qualification. The index also differs from the Index of Socioeconomic Disadvantage as it excludes whether have an internet connection, marital status, income, proficiency in English, Indigenous status, family composition, whether have a car, need additional bedrooms, low rent payments, whether renting from the Government or Community and whether have a long-term health condition or disability and need assistance.

B. MODIFIABLE AREAL UNIT PROBLEM (MAUP)

The Modifiable Areal Unit Problem (MAUP) is perhaps best illustrated using a stylized example.

Consider a suburb with four small neighbourhoods A, B, C and D all with 200 usual residents. The suburb as a whole is separated from surrounding suburbs by a train line, highway and waterway whereas the neighbourhoods within the suburb are separated by minor roads.

Assume also that for the particular analysis being undertaken, an area of 400 usual residents was identified as being optimal based on the reliability of the underlying data and the aim of the analysis. It is clear, therefore, that this suburb should be split into two geographic areas. What is not clear, however, is which neighbourhoods should be grouped together for the analysis. The following diagram summarises the geographic location and characteristics of adults in the neighbourhoods.

Neighbourhood A	Neighbourhood B
Average income = $20,000 Per cent completed Year 12 = 90% Average cars per household = 0.5	Average income = $90,000 Per cent completed Year 12 = 80% Average cars per household = 2
Neighbourhood C Average income = $10,000 Per cent completed Year 12 = 30% Average cars per household = 2	**Neighbourhood D** Average income = $60,000 Per cent completed Year 12 = 40% Average cars per household = 0.5

If the aim of the analysis was to identify areas to be targeted for a particular policy because of low income (say under $25,000), then grouping A with B and C with D would mean that this suburb would be missed entirely. However, both A and C would classify by themselves and if grouped together, making them a good combination for the aim of introducing policies with a focus on low income. If the policy was based on low education though (under 50% Year 12 completion) then a Grouping of A with C and D with B would also lead to the suburb being ignored. In this instance, C and D should ideally be merged. A focus on access to transport though would result in a third grouping entirely, and an index comprising all three variables would be more complicated still. The decision on whether an index is the most appropriate indicator of socioeconomic status in this case is an important one. As can be seen through the example, there is the potential for different answers depending on the focus of analysis or relevant policy. While there is no correct answer, it is always best to consider what variables are available, at what level and whether 'area' is an influencing factor for what is being analysed. In the case above, the way neighbourhoods are best combined depends on which variable is the focus and this should influence the 'area' level variables used for analysis, if there is any choice available.

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