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Old, Single and Poor: Using Microsimulation and Microdata to Analyse Poverty and the Impact of Policy Change Among Older Australians

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About NATSEM

The National Centre for Social and Economic Modelling was established on 1 January 1993, and supports its activities through research grants, commissioned research and longer term contracts for model maintenance and development with a wide range of Federal and State government departments.

NATSEM aims to be a key contributor to social and economic policy debate and analysis by developing models of the highest quality, undertaking independent and impartial research, and supplying valued consultancy services.

Policy changes often have to be made without sufficient information about either the current environment or the consequences of change. NATSEM specialises in analysing data and producing models so that decision makers have the best possible quantitative information on which to base their decisions.

NATSEM has an international reputation as a centre of excellence for analysing microdata and constructing microsimulation models. Such data and models commence with the records of real (but unidentifiable) Australians. Analysis typically begins by looking at either the characteristics or the impact of a policy change on an individual household, building up to the bigger picture by looking at many individual cases through the use of large datasets.

It must be emphasised that NATSEM does not have views on policy. All opinions are the authors' own and are not necessarily shared by NATSEM.

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Abstract

In recent months in Australia there has been extended debate about whether the age pension is sufficiently high to allow older Australians to attain an acceptable standard of living. This paper uses microdata and NATSEM's microsimulation models to examine the spatial distribution of poverty among older single people and to test the likely impact upon national and small area poverty rates of an increase in the single age pension rate.

The paper provides an illustration of the usefulness of microsimulation models to policy makers. Changes in a country's tax and transfer systems can have a large effect on incomes, and can be targeted towards increasing incomes for the poor, thus reducing poverty rates. However, governments need an estimate of the extent to which a proposed policy change is likely to affect poverty rates, in order to be able to compare different proposals. Microsimulation models allow this comparison of proposed policies and can provide governments with an appreciation of how much a new policy is likely to cost; how many and what types of low income people will benefit; and the extent of any consequent reduction in the poverty rate.

Until recently, microsimulation models have been able to estimate the effects of such changes only at a national or very broad regional level. The National Centre for Social and Economic Modelling (NATSEM) at the University of Canberra in Australia has now linked its tax/transfer microsimulation model (STINMOD) to spatially disaggregated census data, producing a spatial microsimulation model which can be used to identify the neighbourhood effects of policy changes for small areas.

Author note

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General caveat

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

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

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

1 Introduction

Like many Western industrialised countries, Australia is facing structural population ageing. The post World War II baby boom, combined with a subsequent fall in fertility rates and an increase in life expectancy as a result of improvements in health technology, has meant that Australia's population distribution is changing. There are proportionally more older people today than in the past, and this is expected to increase further, from 14 per cent today to 25 per cent by 2047 (Treasury, 2007a).

This population change has meant that the Australian government is increasingly concerned about how to fund age pensions. In 2003-04, total government outlays on age and service pensions were \$23.3 billion, representing 2.9 per cent of GDP. By 2044-45, despite increasing numbers of older people receiving private superannuation, these outlays are expected to increase substantially, rising to an estimated 4.6 per cent of GDP (Productivity Commission 2005).

A main objective of the Australian age pension, along with other income support payments, is to provide support for a basic standard of living (Abelson 2008; FAHCSIA 2008). At present, however, a substantial proportion of older Australians are living in poverty (around 23.9 per cent, according to recent analysis from the Social Policy Research Centre) - and, of all Australians living in poverty, 27 per cent are people over the age of 65 (Saunders et al 2008). Projected increases in the number of age pension recipients in the future, as well as concerns about the current well-being of age pensioners, particularly in light of increasing costs of living, has prompted debate about the adequacy of the current level of payments. In particular, concerns have centred around the situation of people receiving the single (rather than the couple) rate of age pension.

Previous research has shown that single older people have the highest incidence of poverty of any demographic group, with 46.9 per cent of single older people living in poverty in 2005-06 (Saunders et al 2008). At present, single age pensioners receive a payment of \$273.40 per week, which is around 60 per cent of the couple basic pension rate of \$456.80 per week (FAHCSIA 2008). The ratio of the single person to couple rate is lower than the average ratio of 63 per cent across all OECD countries (FAHCSIA 2008). If the Australian single pension rate were increased to 63 per cent of the couple rate, this would mean an increase of about \$15 per week in payments. However, advocacy groups have called for an increase of the single pension rate to 66 per cent of the couple rate, which would represent a total payment increase of around \$30 per week (Nolan 2008). The Australian government is currently undertaking a review of the pension system (including age pensions), examining

various options for addressing the financial hardship faced by many income support recipients (FAHCSIA 2008; Karvelas 2008).

In this paper, we analyse the effects of two hypothetical policy changes on poverty rates for older persons living in lone households, using microsimulation modelling. Microsimulation techniques allow us to examine the effects of various policy change scenarios (in this case, an increase of the ratio of single age pension to couple age pension to 63 per cent and 66 per cent) as well as estimating the total cost of these possible changes to the Australian government.

One of the major advances this paper makes is to show how spatial microsimulation can then be used to assess the impact of the policy change at a small area level. Generally, microsimulation models can only be used to examine the effects of policy changes at a national or very broad regional level (for example, differences across states). However, recent research on well-being and disadvantage has increasingly emphasised the need to understand locational disadvantage, and the extent to which poverty and disadvantage (and policies targeted at their alleviation) differ across small areas (for recent Australian examples, see Daly et al 2008; Harding et al 2008; McNamara et al 2008; Vinson 2004, 2007; Vu et al 2008). Spatial microsimulation is described below, and essentially allows us to estimate data for small areas by combining information from more than one data source, and then to examine the impacts of policy changes on particular demographic groups (in this case lone older persons) at a small area or local level.

In this paper, we present both national and small area results, so that the effects of hypothetical policy changes can be seen overall, as well as from a regional perspective.

2 Data and Methods

2.1 Calculating poverty

Poverty measurement methodology is a highly contested area of social research in Australia, with vigorous debates about the utility of income poverty as a proxy for deprivation - and about the validity of the data and methodology which underlie income poverty lines (McNamara et al 2006; Saunders 2005).

In this project, we are interested in comparing poverty rates under different policy scenarios and across different regions - and, for this type of analysis, an easily understood headline measure, such as that provided by an income poverty line, is an

appropriate proxy for economic well-being. However, it is important to be aware of the conceptual and practical limitations of income poverty. While it is beyond the scope of this paper to deal in detail with these issues here, some key points need to be noted.

Conceptually, income clearly captures only one aspect of disadvantage, and does not address the underlying causes of poverty, or wider aspects of deprivation and social exclusion (Saunders 2005). However, it is widely acknowledged that, despite the limitations of simple headcount measures of income poverty, such measures remain an important aspect of measuring and describing the incidence and distribution of disadvantage, and a number of recent Australian studies focus on income poverty (see, for example, Saunders and Bradbury 2006; Saunders et al 2008). In addition, studies which adopt broader approaches to disadvantage nevertheless almost always incorporate a measure of income poverty (Headey 2005).

A number of debates exist within poverty literature around measurement issues such as the choice of income measure, the exclusion of some households from poverty analysis due to very low reported incomes, and where the poverty line should be set. Within an Australian context, however, some agreement has been reached about a number of measurement issues. Marks (2007) notes that disposable income (that is, income after taxes and cash transfers) is viewed as the best measure of income to use for the calculation of poverty, and that this should be adjusted in some way for household size (Marks 2007, p. 2).

In relation to the income data on which standard poverty estimates are based, researchers have noted deficiencies in the available income data which make it difficult to accurately measure incomes at the bottom end of the income distribution. Research has suggested that many households that report very low, zero or negative incomes in fact have standards of living that do not reflect these figures (ABS 2005; Bradbury 1996; Johnson & Scutella 2003; Siminski et al. 2003). The ABS excludes the bottom decile of the income distribution from their recent analyses of low income households (for example, ABS 2004, 2005). Such an approach, however, may exclude analysis of those people in the bottom decile who are truly disadvantaged (Gabriel et al 2005; Saunders and Bradbury 2006). Recent work suggests that removing from analysis households with zero and negative incomes, self-employed households and households whose expenditure is substantially greater than their apparent income tends to slightly lower poverty rates, but not dramatically (Saunders et al 2008). In this paper, we have excluded from our analysis those households which report zero or negative income.

Debates about where to draw the poverty line have also been common, as small shifts in drawing the poverty line can result in substantial apparent movements into or out of poverty. Some analyses include data using more than one poverty line,

including absolute as well as relative poverty lines, so that differences in overall poverty rates generated by the use of different poverty lines can be observed (Harding, Lloyd & Greenwell 2001; Harding & Szukalska 2000a, 2000b; Saunders et al 2008). However, in Australia, a relative poverty line based on 50 per cent of median equivalised disposable household income is the most commonly used poverty line, and it is the one we have used here.

In this study, current disposable household income is used as the basis for measuring poverty. The use of household rather than individual income assumes income-sharing within households. Recent Australian poverty studies consistently use the household as the basic income-sharing unit (Marks 2007; Saunders and Bradbury 2008; Saunders et al 2008). The modified OECD equivalence scale (first proposed by Buhmann et al (1988) and widely recognised internationally) is used to adjust these household incomes for household size and composition. In this study, this scale has been used to give a value of 1 to the first adult in the household, 0.5 to any second and subsequent adults, and 0.3 to dependent children. Dependent children are defined here, in common with other recent Australian studies, as children aged 0 to 14 years (see, for example, Saunders et al 2008).

Persons are then ranked by their household incomes, and the poverty line is set at 50 per cent of the median equivalised household income, so that all persons with household income falling below this figure are deemed to be in poverty. Further details about the technical issues involved in the choice of income measure, equivalence scale and poverty line can be found in Greenwell, Lloyd and Harding (2001), Saunders (2005) and Saunders et al (2008).

2.2 Defining lone older Australians

In this paper, we present most of our poverty-related results for a sub-sample of older Australians who live in lone person households. We select this sample by first identifying survey respondents aged 65 and older, and then by selecting only those people 65 and older who are living in lone person households. We thus focus our sample on respondents' living arrangements, not their marital status. Older Australians who live with family members or others are not included in our poverty results, at either a national or small area level. Our reason for this approach is that we would expect single older persons living with others to generally be able to take advantage of some income sharing, or economies of scale in terms of expenditure, with such benefits not available to those in lone person households. Our poverty rates are for all older people living in lone person households, not just for those in receipt of an age pension. It should be noted that some women will be receiving the age pension before the age of 65 (as noted in the next section) but, in order to focus

on a sample in which all members have reached the age threshold for the pension, we have used 65 years as our cut-off.

For our analysis of the costs to government of an increase in the rate of the single age pension, however, we include *all* single age pension recipients, not just those living alone. These differences in sample definition are noted where they occur.

Finally, it should be noted that older people living in non-private dwellings (eg nursing homes) have been imputed onto NATSEM's STINMOD/07 model, and are thus included in the calculation of regional weights. This imputation process treats all older adults living in non-private dwellings as lone person households, and thus our estimates of poverty rates for lone older adults includes those living in non-private dwellings.

2.3 National results data and method

The national simulations shown in this paper are undertaken using NATSEM's static microsimulation model, STINMOD. This model has been kept up to date by the National Centre for Social and Economic Modelling since it was first developed in 1994. STINMOD is used by Commonwealth departments for their analysis of the impact of policy reforms (Bremner, 2005; Treasury, 2007b). NATSEM is regularly commissioned by government agencies and other policy actors to undertake research using STINMOD (Beer, 2003; Harding et al, 2005, 2006; Lloyd, 2007).

The model is used to calculate the simulated impact of major Australian federal government cash transfers, income tax and the Medicare levy. The model estimates the aggregate fiscal impact of a change in tax and/or transfer policy on revenue or government expenditure. The model also estimates the distributional impacts of policy change at the household level, for groups of people and individuals – that is, who wins, who loses and by how much.

STINMOD works by applying the current and possible alternative settings of the tax and transfer system, which have been coded and regularly updated to reflect major changes in tax/transfer policies every year, to a sample population (basefile) which is constructed from the latest ABS Surveys of Income and Housing Costs. (For this study, the basefile was based on combined data from the 2002/03 and 2003/04 ABS Surveys of Income and Housing). In addition, various demographic and administrative benchmarks are used to increase the accuracy of the modelling, and economic indicators are used to inflate the earnings and other monetary values reported by those Australians captured in the ABS surveys to current values (as the surveys are always some years out of date). The rates and payments settings of the tax and transfer system (parameters), which are also regularly updated, are used to

determine and calculate different tax and income variables for each of the individuals and families in the sampled population.

For this analysis, a modified version of STINMOD/07 was used. The modifications adjusted the STINMOD/07 model to take into account key changes made in the May 2008 budget, and these comprise:

- Changes to personal income tax rates and thresholds;
- Changes to Medicare thresholds;
- Changes to the FTB part B income test; and
- Changes to the dependent spouse rebate.

In this paper, the year under study is the 2008-09 financial year. The basefile used in the study represented the Australian population and economic settings as at December 2008, or the middle of the financial year. The tax and social security parameters used are those averaged over the 2008-09 financial year.

The base scenario simulation starts with the calculation of various tax/transfer/income variables for each member of the household, using the modified version of STINMOD/07. Starting with the private income of an individual, which includes income from wages and salaries, businesses and investments, the model applies the tax and social security settings of the 2008-09 financial year. Then, using the average tax and transfer payment parameters of that year, various tax/transfer/income variables for that individual are calculated. These tax/transfer/income variables for the individual are then aggregated to a STINMOD income unit (which is like a nuclear family).¹ Although our unit of analysis is the household, we focus our poverty analysis on those older people living in households which contain only one income unit and, thus, for these households 'income unit' characteristics and 'household' characteristics are identical.

The criteria for receiving an age pension in Australia are shown in Centrelink (2008). To receive an age pension in Australia, a person needs to satisfy all these criteria:

- They must be age 65 or over for men or aged between 60 and 65 for women (there is a sliding scale that means the retirement age for women is slowly increasing to 65);

¹ An 'income unit' refers to either a couple with dependent children; a couple with no dependent children; a sole parent with dependent children; or a single person.

- They must be an Australian resident and in Australia on the day the claim is lodged; and
- They must have been an Australian resident for at least 10 years, and at least 5 of these in one continuous period (there are some qualifications and exemptions to this rule).

Once they have satisfied these criteria, the amount of the pension is reduced according to how much income the pensioner receives from other sources, how much wealth they have in the family home and other assets². Further, there is no income or assets test applied to pensioners who are permanently blind.

In the next step, the policy options were incorporated into the model. Two policy options were simulated for this paper - one was to increase the single age pension to 63 per cent of the couple pension and the other was to increase it to 66 per cent. Both options were tested because they had been identified in the literature as possible reforms - with the 63 per cent being the average of OECD ratios and 66 per cent being recently suggested by a key Australian seniors advocacy group (FAHCSIA, 2008; Nolan, 2008). Using these new rates, the same set of variables as those in the base simulation were created by STNMOD. Based on this simulation, comparisons can be made between the base scenario and the new scenarios for national and small area analysis.

One of the issues involved in undertaking such a policy reform analysis is whether a fixed or moving poverty line is used to calculate the pre and post-change poverty rates. In calculating poverty rates for the new scenarios, a poverty line set at half the median will change (because it is a relative poverty line and the incomes within the distribution it is based on are changing). In any policy change analysis, this complicates interpretation of policy effects (because it is difficult to tell whether movements of individuals into or out of poverty are due to impact of the policy change or the rising half median poverty line). This problem can be compounded if there is a particular income point at which a large group of individuals (such as people on fixed pension incomes) may fall. In such cases, a slight change in the poverty line can mean a large change in the poverty rate.

These issues are likely to be present when analysing movements into and out of poverty for lone older persons. Because the single age pension rate falls relatively close to the poverty line, we may expect some sensitivity in the poverty estimates for this group related to where the poverty line lies. In order to address this issue, we have looked at changes to poverty rates using both a changing and a fixed poverty line. We have also looked at the distribution of incomes for single age pensioners and

² Note that STINMOD does not simulate the pensions assets test due to lack of data.

compared this distribution to the poverty line. However, possibly because single age pension recipients are a relatively small proportion of the total Australian population, changes in their incomes did not in fact make a very large difference to the moving poverty line - and thus changes to poverty rates differed little irrespective of whether we used a fixed or moving line. This is explored further in Section 3.

2.4 Small area results data and method

In recent years NATSEM has been attempting to move beyond the national and state level results produced using STINMOD, by using spatial microsimulation to show the effect of policy change at the *small area* (or neighbourhood) level (Chin et al 2005, 2006a, 2006b, 2007; Harding et al 2008; McNamara et al 2007; Tanton et al 2007). When the ABS issues the microdata files from its national sample surveys, it attaches a 'weight' to the record of every household within the sample. For example, the weight attached to the first household within this sample file represents the number of comparable households within Australia that the ABS believes are similar to that particular household. These weights are the mechanism used to 'gross up' from the sample survey results to estimates for the whole of Australia. In a series of research projects funded by the Australian Research Council and our research partners, NATSEM has been refining the technology to instead weight the ABS sample survey files to small area targets derived from the census. This then creates a synthetic household microdata file for each Statistical Local Area in Australia. In essence, the technique creates a set of synthetic households who replicate, as closely as possible, the characteristics of the real households living within each small area in Australia.

This paper utilises SpatialMSM/08B. This version of the modelling has derived results for each of the 1,422 Statistical Local Areas (SLA) across Australia by reweighting the microdata from the 2002-03 and 2003-04 Surveys of Income and Housing to Statistical Local Area benchmarks from the 2006 Australian Census of Population and Housing. These two ABS income surveys are also the two surveys used as the basefiles for versions of STINMOD, so the weights from our spatial microsimulation model can be fused to simulations from our STINMOD model to derive small area effects of changes to social security and tax policies. The results show what proportion of households gain from the policy change, and by how much, on average, each SLA would gain in terms of incomes from the two policy options. SpatialMSM/08B thus blends together the 2002-03 and 2003-04 ABS Survey of Income and Housing Costs unit record files, the 2006 Census and a specially modified version of STINMOD/07 (which, as discussed earlier, incorporates key changes announced in the May 2008 budget).

Because the STINMOD file was adjusted to a 2008-09 tax/transfer world, we also inflated the spatial microsimulation weights (which reflect a 2006 demographic profile from the 2006 Census) to 2008 populations. This is done by applying person level population projections available from the Australian Bureau of Statistics by Statistical Local Area. These population projections were originally available for 2001 SLAs, and we have adjusted these to reflect 2006 SLAs using a concordance of 2001 to 2006 SLAs from the ABS.

The current version of this technology utilises a standard Australian Bureau of Statistics spatial unit called a 'Statistical Local Area' (SLA). In the capital cities of Canberra and Brisbane, a statistical local area is often a suburb but, in other cities, it can be larger than this and may embrace a few suburbs. In outback Australia, a single statistical local area can cover a very large geographic area but contain very few people. So the geography of areas in Australia is quite different to what would normally be seen in countries in Europe, where geographic areas are small and highly populated.

Using SLAs in Australia means that Canberra and Brisbane tend to have less populous SLAs than other capital cities. Because of this, if SLAs in Canberra and Brisbane were to be compared to SLAs in other capital cities, we may find more extreme values in Canberra and Brisbane because of the homogeneity in smaller areas. For example, in more populous areas, we may find higher average incomes because small pockets of low income are being masked by the general high incomes apparent in the larger area. If the SLAs were smaller and had fewer people (as they do in Canberra and Brisbane), any such pockets of low income may not be masked as much, and we would see more low income areas simply because the areas are smaller, less populous and more homogenous. To take this into account, in this study we have aggregated SLAs to Statistical Sub-Divisions in Canberra and Local Council Electoral Wards in Brisbane (see McNamara et al 2008 for a description of this). Some testing found that these areas are comparable in terms of population size and diversity with other SLAs in Australia. All the maps in this paper use aggregated SLAs in Canberra and Brisbane.

Earlier validation of the results of our spatial microsimulation techniques has suggested sufficient reliability for the results to be used in policy analysis (Chin et al 2005, 2006a, 2006c). However, we have also undertaken additional validation procedures with this version of the spatial microsimulation model. First, it should be noted that, because the procedure used to calculate the weights in SpatialMSM is iterative, for some areas the procedure will not find a solution. For these areas, the procedure has not converged, and we take these areas out of our analysis. (Generally, these are highly unusual SLAs, such as military bases or industrial areas.) Across Australia, we had 1302 SLAs where the procedure converged.

However, having the reweighting procedure converge is only the first step in ensuring that the small area results we produce from spatial microsimulation are accurate estimates of small area characteristics. In addition, we conducted validation procedures which resulted in the exclusion from the analysis of some additional SLAs. First, we excluded 103 additional SLAs where the estimated number of lone older person households was less than 30, since these population sizes may be too small to produce reliable estimates of small area poverty rates. Second, another 8 SLAs were excluded when we found some major differences between our simulated outcomes and external Census estimates of the proportion of households within each SLA with gross incomes below \$500 a week. In total we excluded 230 SLAs from our analysis due to non-convergence, low population size or poor estimation. However, because many of the areas we excluded were sparsely populated, remote areas, our total exclusions covered only 1.1 per cent of the Australian population. Once all non-converging, small population and/or inaccurately estimated SLAs were removed from our analysis, the correlation between modelled poverty rates and poverty rates calculated from the 2006 Census was 95.65 per cent. Thus we have some confidence that the weights we use are giving reasonable results for the vast majority of small areas in Australia. Table 1 summarises the number of SLAs and population excluded after the validation of the SpatialMSM/08B weights.

Table 1 Analysis of convergence and validation results, SpatialMSM/08B

Description	Number of SLAs	Population	Per cent of population
Australia	1422	19,233,540	100.0
SLAs not converged (a)	120	98,601	0.51
Areas with less than 30 lone older people (b)	103	99,668	0.52
Areas failing validation			
- all	15	22,110	0.11
- with more than 30 lone older people (c)	7	17,359	0.09
Total excluded (a + b + c)	230	215,628	1.12
Total included	1192	19,017,912	98.88

Source: SpatialMSM/08B

It should be noted that, in both the national and small area results, the simulations only show the *first round* effects of the policy change, before any Australians change their behaviour in response to the policy change. Thus, the simulations show the ‘morning-after’ impact of the new policy, without taking into account any possible behavioural changes that might occur as the result of a policy change. Further, the change can conceivably be measured as the effect of the policy change on age pensions only or the effect of the policy change on all income support allowances. This is because other allowances could also be affected by this policy change, because under the Australian cash transfer system, many other allowances also use the age

pension rates. The allowances that use the age pension rates include the Disability Support Pension (DSP), Wife Pension, Widow B Pension, and Carer Payment. The tables in this paper show only the effect of the policy change on the single age pension.

3 National Level Analysis

Before presenting our national level results, we provide some summary data about the characteristics of lone older person households in Australia, particularly in relation to their location of residence. This data comes from the STINMOD/07 model, which is largely based on the 2002-03 and 2003-04 Surveys of Income and Housing (although, as noted earlier, people in non-private dwellings are added to the survey files). These people are not normally covered in surveys by the Australian Bureau of Statistics, but are an important part of the lone older person population.

Table 2 Characteristics of lone older person households,

	Number	Per Cent
Tenure		
Own house	415,914	56.74
Buying	11,962	1.63
Public Rental	55,614	7.59
Private Rental	54,920	7.49
Other Tenure (including in Non private dwelling, eg, nursing home)	194,595	26.55
Location		
Capital City	437,121	59.63
Balance of State	286,445	39.08
Unknown (data not available)	9,439	1.29
Age		
65 – 69 years	131,337	17.92
70 – 74 years	133,093	18.16
75 and over	468,575	63.93
Source of Income		
Mainly Private	199,291	27.19
Mainly Government benefits	533,713	72.81

Note: People in Non-Private dwellings are included in this table. While these people are not normally on the ABS surveys used, they are added into the STINMOD model.

Source: STINMOD/07

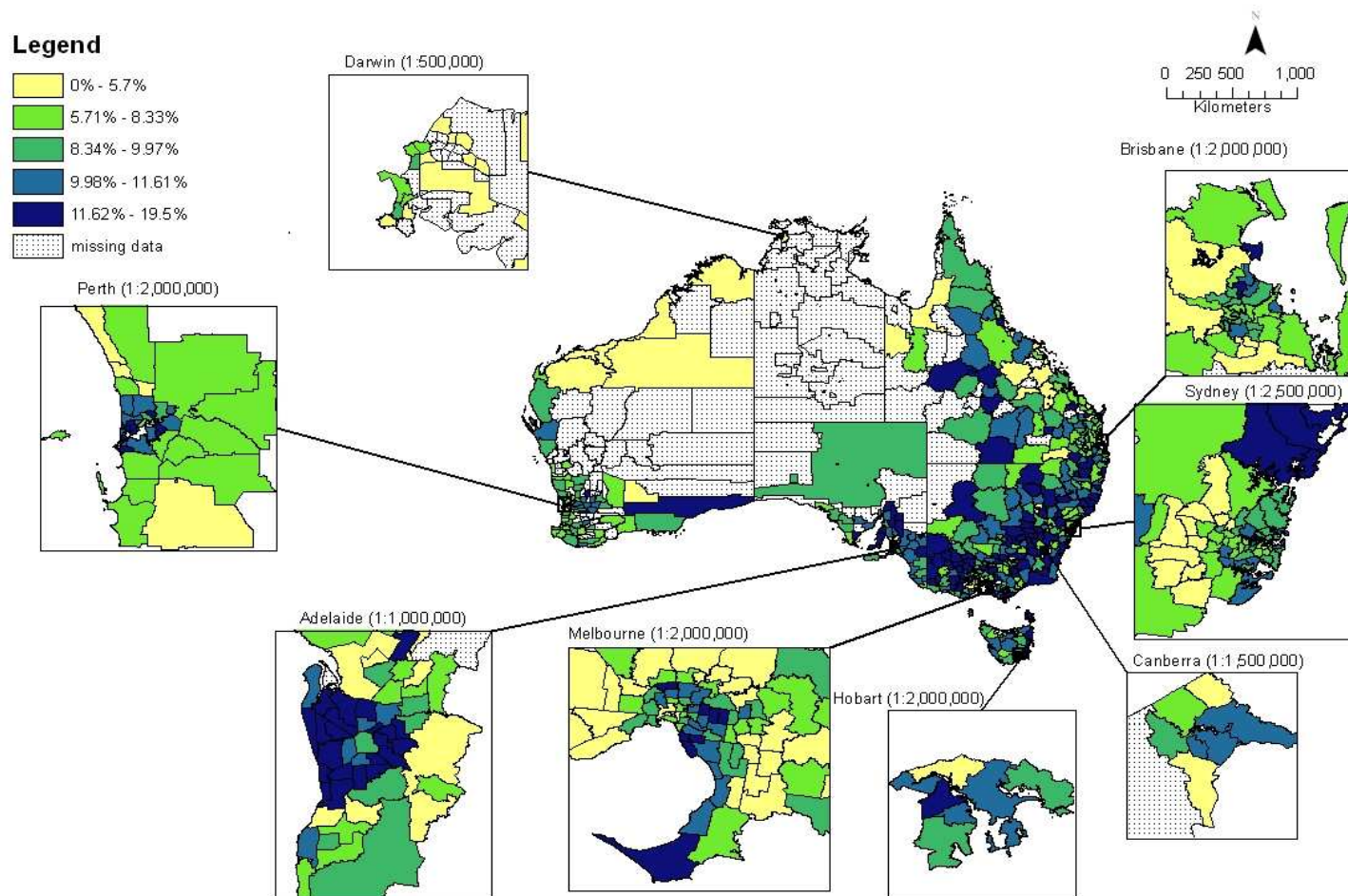
Table 2 shows that most lone older persons live in their own house or in a non-private dwelling (usually a nursing home or hospital). However, nearly 17 per cent are renting or still paying a mortgage. These are the people who are more likely to be struggling financially. Public renters in Australia generally pay around 25 per cent of

their incomes on public rent and, in Australia, there is some rent assistance paid to those on low incomes who are renting privately (e.g. through a real estate agent), so this partially offsets some of the costs of renting. Those single older people still paying a mortgage may be struggling, particularly given recent interest rate rises in Australia. In regard to other characteristics of lone older person households, Table 2 shows that most lone older people live in Australia's capital cities (reflecting the general population distribution), and many are 75 and over. For most of the single aged, the main source of income is government benefits (73 per cent). This is an important point for this paper, as our focus is on the impact of a change to government benefits.

Figure 1 shows where people aged 65 and over living in lone person households are located in Australia. This is calculated from our spatial microsimulation model. Areas where we do not have reliable small area data are shown as stippled. Unfortunately, due to either non-convergence or small numbers of single aged people, we have no estimates for most remote areas in the Northern Territory and south-west Australia. These areas in Australia have very low populations and very few single older people, so having no estimates for these areas will not substantially affect the overall estimates in this paper.

It can be seen that the largest geographical concentrations of older people in lone person households are in the capital cities of Australia, in the south-east corner of Australia in New South Wales and Victoria, outside the city of Adelaide, and along the northern New South Wales and southern Queensland coastline. Western Australia, Darwin and Canberra generally have lower concentrations of lone older people. The northern beaches of Sydney have many areas with a high proportion of lone older people - and Adelaide's central areas also seem to have many SLAs with a high proportion of this group.

Figure 1 Estimated proportion of people aged 65 and over living in lone person households, by SLA, 2006



Notes : Brisbane has been aggregated to wards and Canberra to Statistical Sub-Divisions to allow comparison with other Australia SLAs

Data source: SpatialMSM/08B applied to the Australian Bureau of Statistics Survey of Income and Housing 2002/03 and 2003/04

The national first round impact of the two proposed policy options is shown in Table 3. This table shows the costs of both options to the Government compared to the costs for the base scenario (which is the continuation of the current policy world). It should be noted that this table refers to payments made to all recipients of the single age pension, not just those 65 and over living in lone person households.

Under option 1, an additional outlay of \$650 million would be needed for the single age pension, on top of the current cost of the system at \$25 billion – an increase of 2.6 per cent. Under option 2, the additional costs are now \$1.3 billion, or an additional 5.1 per cent. The second option adds an additional \$617 million to Government outlays compared to option 1.

As noted in the methodology section, changes to the single age pension rate would also affect other income support payments which are currently tied to the age pension rate. In theory, it would be possible for the government to ‘quarantine’ increases in the single age pension rate to age pensioners. In practice, such an option might be more difficult. However, we have not taken account of the possible additional extension of a higher single pension rate to other groups on income support in the analysis below. Another important point is that the costing only looks at the financial impact for government in 2008-09. Because of the ageing of the population, any increase in the single age pension rate could add substantially to government outlays in future years.

Table 3 Estimated costs of single age pension policy options, Australia, 2008-09

Costs	Current System (Base scenario)	Option 1 63% of couple rate	Option 2 66% of couple rate	Option 1 Additional Cost	Option 2 Additional Cost
	\$bn	\$bn	\$bn	\$bn	\$bn
Single age pension	25	26	26	0.65	1.3

Note: These figures are based on estimated payments made to all recipients of the single age pension, not just to those 65 and over living in lone person households.

Note: All numbers rounded to nearest \$bn

Source: STINMOD/07

Table 4 shows the number of single age pensioners by gender, and by how much they would gain on average from the proposed policy changes. Single age pensioners are much more likely to be female than male. Data from our modelling shown in Table 4 shows that 73 per cent of single age pensioners are female and 27 per cent are male. Because of this, any policy that provides more funding to single age pensioners will benefit women more than men, simply because more recipients are women. Due to the nature of the policy changes simulated, all single age pensioners (over 800,000

people) gained from the proposed policies. In terms of the amount gained, the average amount gained per single age pensioner under option 1 was about \$15 per week and under option 2 was about \$30 per week (which, as expected, is the same for men and women).

Table 4 Estimated number of gaining single age pensioners and average gains by gender, Australia, 2008-09

Gender	Number of single age pensioners	As % of all gaining pensioners	Average gains Option 1	Average gains Option 2
			\$ per week	\$ per week
Male	222,000	26.9	14.80	28.80
Female	602,000	73.1	14.80	28.90
Total	824,000	100.0	14.80	28.90

Note: These figures refer to all recipients of the single age pension, not just to those 65 and over living in lone person households.

Notes: Numbers rounded to nearest thousand

Source: STINMOD/07

Table 5 shows the poverty rates under both policy options by gender. We examine these rates by gender as, although males and females are treated in exactly the same way in the social security system, we may find different poverty rates among women than men due to factors such as women's longer lifespan and generally lower retirement incomes. Note that these poverty rates in Table 5 refer *only* to persons aged 65 and over and living in lone person households, and are not restricted to pension recipients.

The poverty line on which the rates in Table 5 are based was set at half the median equivalised disposable household income of all individuals in households in Australia, and is recalculated for each of the options (that is, the poverty line moves with the changes in income distribution caused by the policy changes). As noted in the methodology section, we have removed negative and zero incomes before calculating all poverty lines.

It can be seen from Table 5 that the poverty rate under option 1 is lower than the base scenario. There is also a slight difference between the male and female poverty rates, with female poverty rates being slightly higher than male in both the base case and under option 1. The decrease in poverty rates under option 1 is about 4 percentage points, from 46.5 per cent to 42.3 per cent, with changes of a similar magnitude for both men and women.

Under option 2, the poverty rates decrease another 6 percentage points, from a rate of 42.3 per cent under option 1 to 36.5 per cent. The overall decrease in poverty rates

from the base scenario is 10 percentage points, or from 46.5 per cent of all lone older persons (about 341,000) to 36.5 per cent (about 267,000). Thus, option 2 would put about an extra 74,000 lone older persons above the poverty line.

Table 5 Estimated poverty rates for people aged 65 and over living in lone person households, Australia, 2008-09

	Base			Option 1 63% of couple rate			Option 2 66% of couple rate		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
	% poor	% poor	% poor	% poor	% poor	% poor	% poor	% poor	% poor
Changes to single age pension only modelled	45.3	47.0	46.5	41.0	42.9	42.3	37.1	36.2	36.5

Source: STINMOD/07

Table 6 shows why this relatively slight change in policy has such a large effect on poverty rates. This table shows the estimated poverty line and then the estimated benefit paid to single age pensioners under each of the options. This benefit paid is the estimated annual benefit that will be paid in 2008-09, so it is the benefit paid in September 2008 (\$273.40 per week) indexed by average weekly earnings. It can be seen from this table that the benefit paid under the current system is below the poverty line. Option 2 increases the base rate until it is very close to the poverty line (about 96 per cent of the poverty line).

Table 6 Estimated poverty lines and benefits paid, 2008-09

	Base	Option 1	Option 2
	63% of couple rate	66% of couple rate	
	\$ per week	\$ per week	\$ per week
Poverty line	322.74	322.86	323.15
Benefit paid ^(a)	281.70	296.57	310.70
Benefit paid as % of poverty line	87.3	91.9	96.1

Notes: (a) In Australia, the single age pension is taxable; but Government rebates and allowances mean that effectively there is no tax paid, so for a single age pensioner, this amount is disposable income, which matches the poverty line calculated from disposable income.

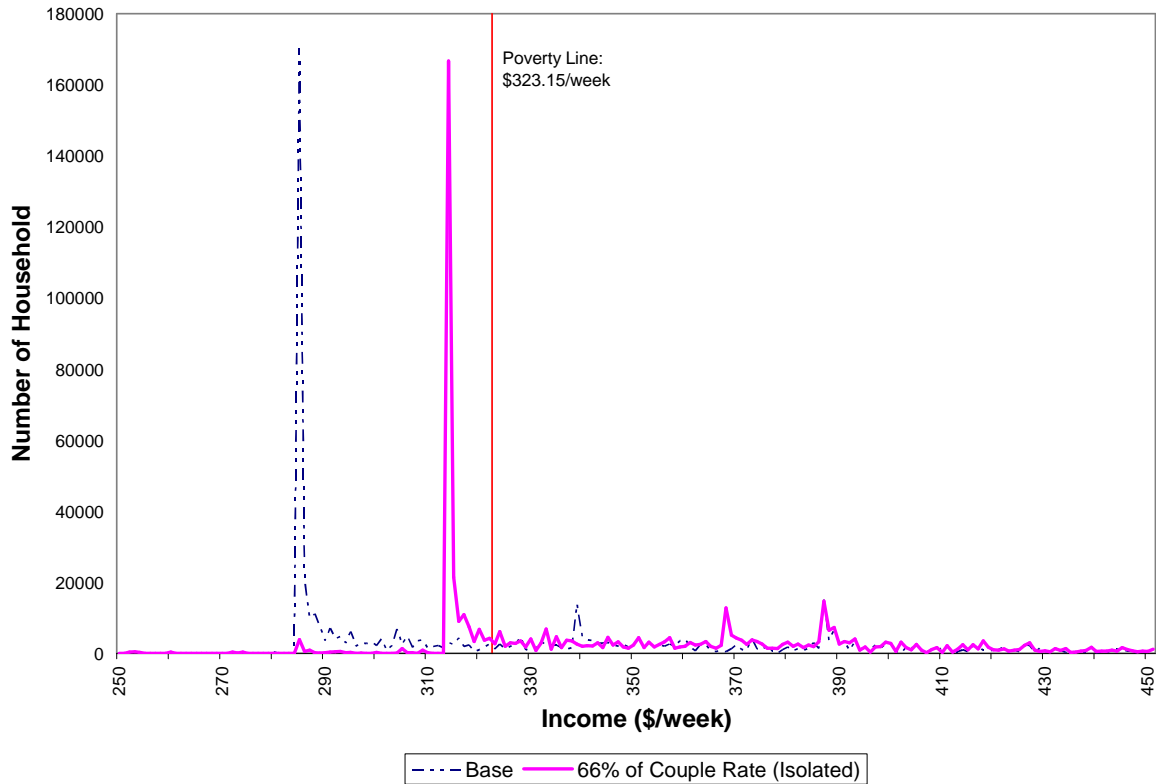
Source: STINMOD/07 and Centrelink

As discussed in the methodology section, changes to benefit payments affect the income distribution, and thus the level at which poverty based on median income is set. An alternative to using a moving poverty line is to fix the poverty rate prior to modelling policy changes. Table 6 shows the way the moving poverty line changed in our analysis, with the half median income (the poverty line) for the base scenario being \$322.74, the poverty line under option 1 being \$322.86 and the poverty line under option 2 being \$323.15, indicating only very small changes in the poverty lines. However, even these small changes can potentially have an effect on poverty rates if there is a group of people around this line and the movement in the line pushes them just out of (or into) poverty. In order to examine the possible effects of moving poverty lines on our results we undertook sensitivity analysis with a fixed poverty line, fixing it at \$322.74 per week, and found little difference in the poverty rates. As a result, for this analysis, we have left the poverty line as a movable line.

One issue that Table 6 highlights is how close the benefit paid is to the poverty line under Option 2. This can be seen graphically in Figure 2, which shows a frequency distribution of single aged pensioner incomes. So this graph shows how many single aged pensioners (shown on the y axis) are earning a set amount (shown on the x axis). The amounts on the x axis are in \$1 increments, which gives a high degree of detail. The blue line shows the frequency distribution under the base scenario (so the current benefit paid); and the pink line shows the frequency distribution under Option 2 (single age pension at 66 per cent of couple).

One issue with using a poverty line when analysing people where many of them receive Government benefits is that there is a large number of people earning one income (the benefit amount). This can be seen in Figure 2. This means that if the single age benefit was increased to be just over the poverty line, about 234,000 households would suddenly be out of poverty, so the poverty rate would drop dramatically. This is one of the issues of using a poverty line, rather than some measure of the depth of poverty.

Figure 2 Frequency distribution of single age pensioner incomes, 2008-09



Data source: STINMOD/07

4 Small area analysis

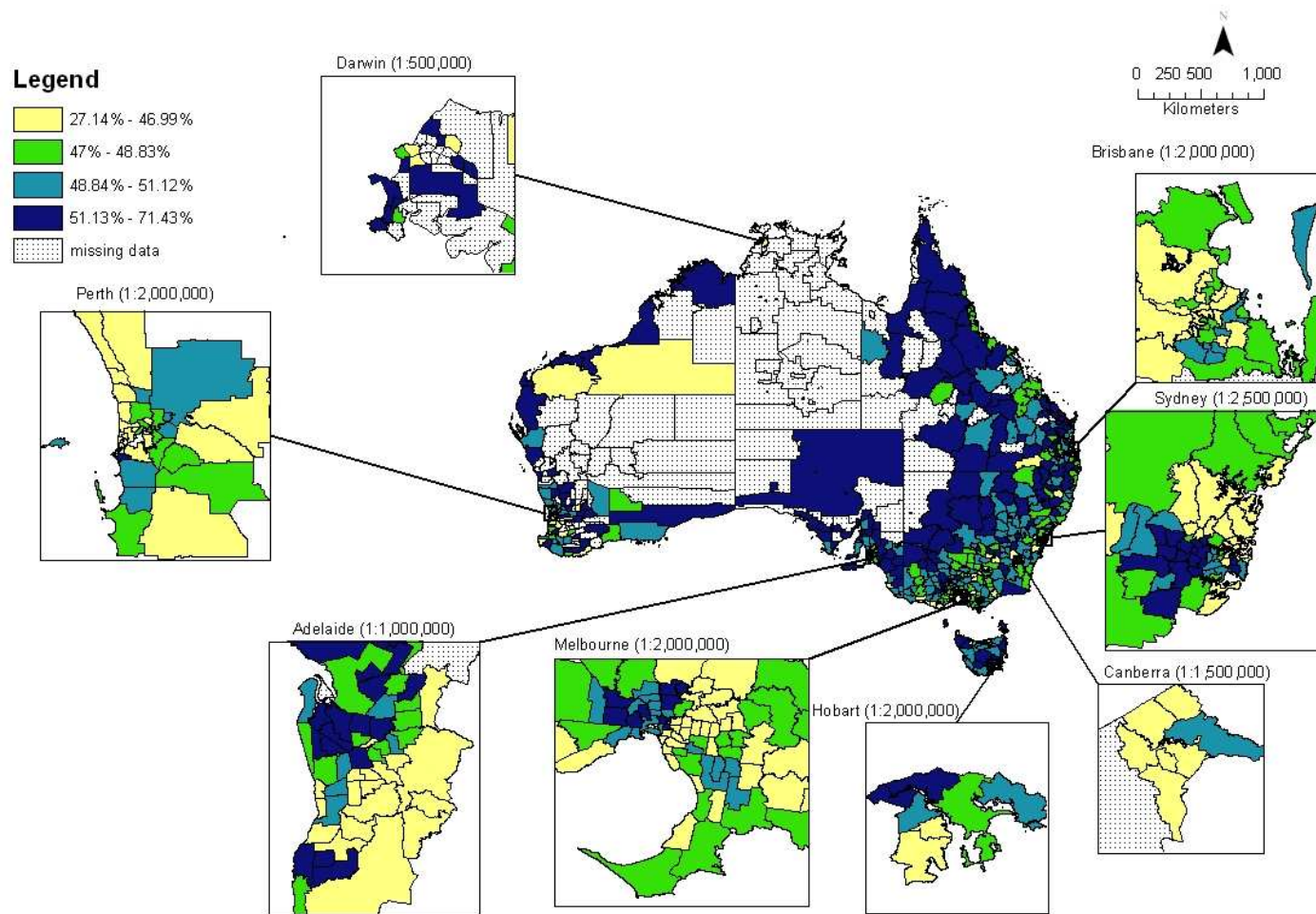
The national averages of gains under our hypothetical policy changes presented above mask very pronounced differences in the characteristics of those living in different suburbs of Australia. As noted earlier, in recent years NATSEM has been developing the technology to allow policy makers to assess the small area as well as the national impact of reforms that they are considering. This is of significant help to policy analysts, where the spatial implications of a policy change is very important. It also highlights areas where the policy will provide the most assistance, and identify those areas where there may need to be additional assistance.

Figure 3 shows the poverty rates for older people in lone person households under the base case (i.e. the existing system). As noted earlier, in these maps we have also

removed areas which did not converge using our regional modelling techniques, or where the number of lone older people is less than 30, or where validation suggested that the poverty estimates could be unreliable. The darkest areas on the maps represent the highest within-area poverty rates for lone older people.

It can be seen that the areas with the highest poverty rates for lone older people are clustered in remote New South Wales and Queensland. The capital cities tended to have lower concentrations of lone older people in poverty, although there were pockets of high poverty rates in capital cities, such as the western suburbs of Sydney and north-west Melbourne.

Figure 3 Estimated poverty rates for people aged 65 and over living in lone person households, by SLA, 2008/09



Notes: Brisbane has been aggregated to wards and Canberra to Statistical Sub-Divisions to allow comparison with other Australia SLAs

Data source: SpatialMSM/08B applied to STINMOD/07

Figure 4 shows the changes created by option 1, which involves increasing the single age pension to 63 per cent of the couple age pension. Rather than show poverty rates on this map, we have shown areas divided into the following four categories:

- where there are high poverty rates but below average decreases in poverty;
- where there are high poverty rates and above average decreases in poverty;
- where there are low poverty rates and below average decreases in poverty; and
- where there are low poverty rates and above average decreases.

‘Low poverty rate’ areas are defined as areas where the poverty rate for lone older persons was in the bottom two quintiles of poverty (as shown in Figure 3) and ‘high poverty rate areas’ were defined as those in the top three quintiles shown in Figure 3. The average decrease in poverty under option 1 (Figure 4) was 4.2 percentage points compared with around 10 percentage points for option 2 (Figure 5). It should be noted that in both Figure 4 and Figure 5 the poverty line against which the impact is measured is the line set for the base case scenario shown in Figure 3.

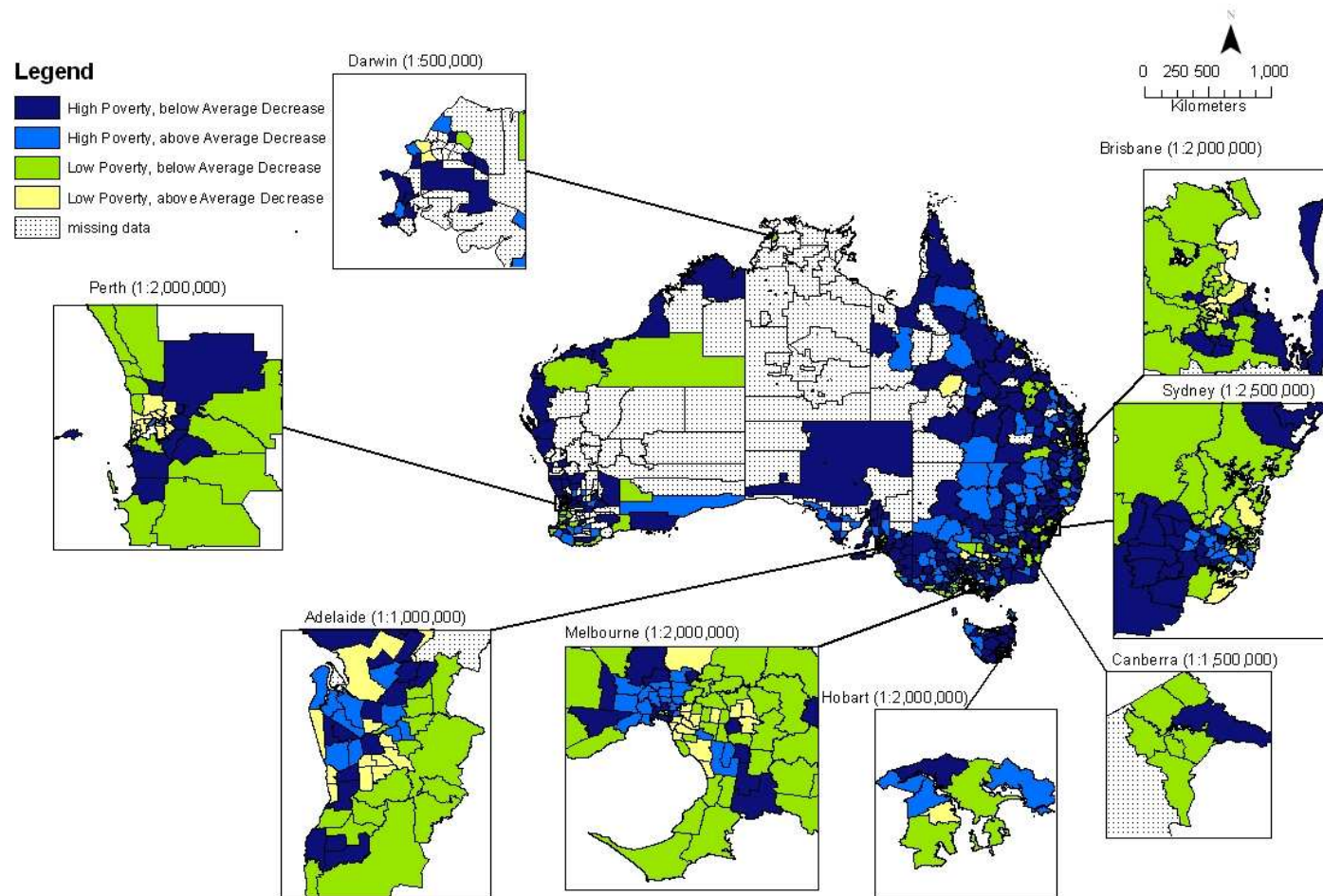
The darkest areas on this map are areas that have the highest poverty and *have not benefited as much* from policy option 1 compared to the national average. Thus, these can be seen as Australia’s most disadvantaged areas for lone older persons. The mid-dark areas on the map are high poverty areas, but are neighbourhoods where the reduction in poverty has been above average: thus, lone older people in these areas, while more likely to be in poverty, have benefited more substantially than average from this policy option. The mid-light areas are those where proportions of lone older persons in poverty were relatively low, and where the effect of the policy change was not great. The lightest areas are arguably those which represent the most advantaged concentrations of lone older persons, where poverty rates for lone older persons are relatively low and there have been above average decreases in poverty as a result of the policy change. In essence, our analysis in Table 6 suggests that these are areas where older lone persons are most likely to have some private resources of their own, to supplement their age pension. It should be noted when viewing this map that poverty rates overall for older people living in lone person households are very high (as shown in the legend on Figure 3), so that the “lower poverty” areas on this map still contain relatively large proportions of impoverished older people.

Looking at this map, it can be seen that numerous rural areas in Australia fall into the high poverty rate/below average decrease group (the darkest areas), although clusters of capital city SLAs also show this pattern, most notably in the far south-west of Sydney. Low poverty rate/above average decrease areas fall overwhelmingly into the capital cities, with only a handful of rural SLAs falling into this category. There is a particularly strong band of high poverty rates and above

average decreases through New South Wales, and a number of urban SLAs also show this pattern.

Many areas on the outskirts of capital cities seem to have relatively low poverty rates and below average decreases in poverty rates, suggesting these areas are where somewhat higher income lone older people may live, and that some may be self-funded retirees, thus perhaps not receiving the pension, or only receiving a part pension.

Figure 4 Estimated change in poverty rates from base case to option 1, lone older persons, by SLA, 2008-09

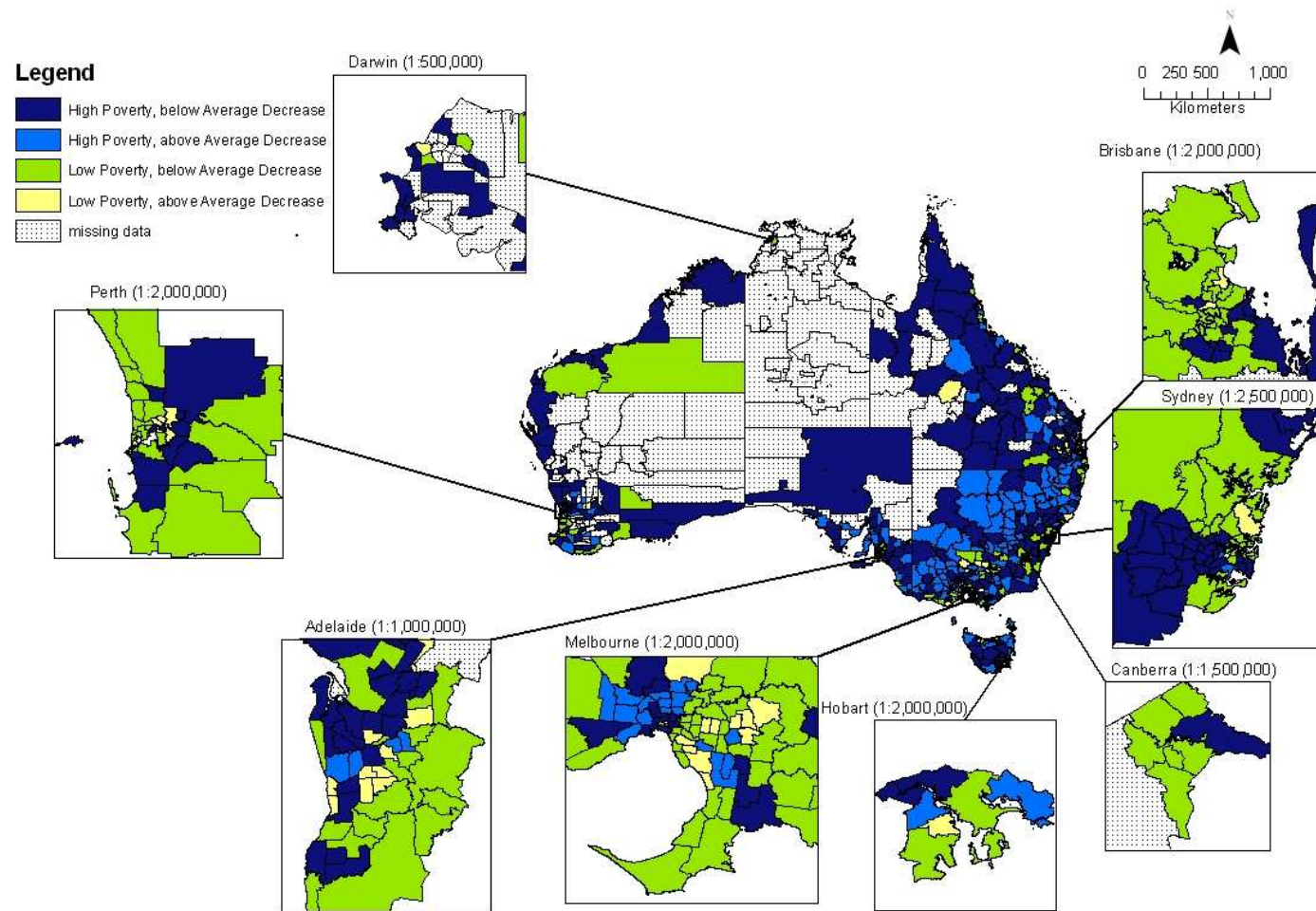


Data source: SpatialMSM/08B applied to STINMOD/07

Figure 5 shows the small area impact of option 2, which involves increasing the single age pension to 66 per cent of the couple age pension rate. It can be seen that the results are very similar to those for option 1. Some of the areas that were low poverty/above average increase in option 1 are now low poverty/ below average decrease, possibly because the average decrease is higher under option 2 and these areas may have been marginal under option 1. As noted above, the poverty line for these maps is set to the poverty line for the base scenario: it does not change for either of these policy options, so areas can only change in relation to the impact of the policy change. Thus, an area cannot change from low poverty to high poverty.

An example of a cluster of high poverty neighbourhoods that changed status under option 2 compared with option 1 is a group of SLAs in Sydney's western suburbs (including areas such as Fairfield, Parramatta and Bankstown) which are shown as dark blue in Figure 3 so are high poverty areas. The switch to below average decreases in poverty may be because they were marginal above average decreases under Option 1, which then became marginal below average decreases under Option 2.

Figure 5 Estimated change in poverty rates from base case to option 2, lone older persons, by SLA, 2008-09



Notes: Brisbane has been aggregated to wards and Canberra to Statistical Sub-Divisions to allow comparison with other Australia SLAs

Data source: SpatialMSM/08B applied to STINMOD/07

5 Conclusions

The adequacy of pension rates for Australia's older single people has received extensive attention in Australia over the last few months. This paper shows that the cost of increasing the single age pension to 66 per cent of the couple age pension rate would be about \$A1.3 billion and would benefit about 824,000 single age pensioners. Further, it would reduce the poverty rates for lone older persons from 46.5 per cent to 36.5 per cent, a 10 percentage point reduction.

Under current legislation the single aged pension is the rate set for a range of other government benefits. If these other payment rates were increased, the total cost to government would be higher and there would be flow-on effects on poverty rates for those on these other income support payments. These flow-on effects and costs have not been considered in this study.

Looking at the spatial distribution of such benefits, the effect of the policy change on those areas in Australia in which the highest proportion of impoverished lone older people live seems to be generally stronger in capital cities, and in bands of rural areas in New South Wales and Victoria (possibly farming districts suffering from the drought). Many of the areas that experienced below average decreases in poverty rates fall just outside Australia's capital cities, and many remote areas in Australia have high poverty rates among lone older people allied with below average decreases in poverty rates following the policy change. This suggests that those single aged persons living in such areas are more likely to be wholly dependent upon the age pension, with no or few private resources of their own to supplement their government pension.

This paper has demonstrated two significant developments in poverty analysis in Australia. The first is the use of static microsimulation models to assess the effect of a proposed policy change on poverty rates for a population sub-group at a national level, a type of analysis which has been done in Australia by NATSEM for a significant period of time. The second, more recent, innovation is the linking of this policy change to a spatial microsimulation model that allows the small area effect of the policy change to be estimated. This small area effect provides substantial extra information to policy makers, allowing them to see what effect the policy will have on capital cities, remote areas, and disadvantaged suburbs surrounding cities.

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