ECONOMIC ADVANTAGE AND DISADVANTAGE AMONG OLDER AUSTRALIANS: PRODUCING NATIONAL AND SMALL AREA PROFILES

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ABSTRACT: Spatial and housing dimensions of economic and social inequalities have had increasing research and policy attention in Australia in recent years. Extensive research demonstrates the importance of the local environment especially for older people who may spend much of their time in their homes and neighbourhoods. While numerous studies have examined the locations of older people, few have systematically examined ways in which disparities of economic resources influence spatial heterogeneity among older Australians. This paper draws on national survey data and spatial microsimulation to examine locational inequalities in economic well-being among older Australians aged 55 years and over. The microsimulation approach makes it possible to analyse multiple dimensions of economic disadvantage (rather than income alone) for older people at a small area level. Significant disparities of income, home ownership and welfare dependence were found along with a strong clustering of elder disadvantage and advantage both within and outside the capital cities.

1. INTRODUCTION

Theories of 'cumulative advantage/disadvantage' suggest that inequalities across the life course underlie the increasing gulf between the well-off and the financially disadvantaged in later life (Dannefer, 2003). The social and economic resources that enable people to buy into housing and neighbourhoods and pay for transport reflect life-long inequalities (Dannefer and Kelly-Moore, 2009). Quality of life among older people is not only influenced by education, labour force participation and health during their early and working years, but also by the housing market and

processes of residential location and change (O'Rand, 2006; Phillipson, 2010; Kendig *et al*., 2012).

Among developed countries Australia is notable for having an older population with high levels of home ownership notwithstanding relative low incomes with most on a moderate government pension (Pynoos *et al*., 2007). The locations of older people, especially those who are home owners and some public tenants, typically reflect household incomes and housing markets applying many decades earlier. Mobility rates and housing outlays are generally low for older people, irrespective of local housing markets, while younger buyers and private tenants must have the resources to meet current market prices (Kendig *et al*., 2012; Warnes, 2010). These life span developments and housing market processes can result in major disjunctions in the economic resources of younger and older people within small areas.

Local environments are especially important for older people who spend most of their time at home and in their neighbourhood; many have low incomes and mobility limitations and do not drive (Marmot *et al*., 2010; Kendig *et al*., 2012; Kendig and Phillipson, in press). For example, Kendig *et al*. (2012) report that the home and neighbourhood are important for the independence, social participation, and well-being of older people in Australia and other developed countries. However, previous locational analyses of older Australians have not taken much account of the ways in which socio-economic resources are associated with spatial heterogeneity among older Australians (Miranti *et al*., 2010). Patterns of residential development and urban infrastructure are important policy concerns particularly for cohorts entering later life with rising car ownership levels and aspirations for continuing mobility in daily life (Berry, 2007).

In an earlier paper Gong *et al.* (2012) presented a spatial microsimulation model that created small area synthetic data to study advantage and disadvantage among older Australians. It mainly focused on the development of the model including procedures for data linking, benchmarking, reweighting and validation. The present paper applies this model in order to identify and interpret spatial concentrations and clusters of deep economic disadvantage and relative economic advantage among older Australians. The use of multiple dimensions of advantage and disadvantage, specific to older populations reveals spatial distributions that are not apparent in the overall socio-economic wellbeing of an area for the wider population as measured by the Socio-Economic Indexes for Areas (SEIFA) 2006 (ABS, 2008). The spatial microsimulation model draws on the national ABS Survey of Income and Housing (SIH) and the

Census. The spatial units of our analysis are based on the Statistical Local Areas (SLAs), with some of them being aggregated up to Local Council Electoral Wards for Brisbane and Statistical Subdivisions (SSD) for Canberra. Economic disadvantage and advantage are defined by drawing on the concept of social exclusion, with its emphasis on multiple sources of disadvantage, rather than any single measures such as income poverty (Hayes *et al.*, 2008). The methods and findings on locational patterns in economic well-being among older Australians can provide analytical tools to inform policy development and decision-making concerning housing and public and private service provision.

2. THE CONCEPT OF WELLBEING FOR OLDER PEOPLE

The extensive debate on the concept of social exclusion has tended to focus more on children and working aged people with less attention to those in later life. There are numerous studies of spatial differences in a range of socioeconomic indicators for the total population and for children (see, for example, ABS, 2008; Daly *et al.*, 2008; Lewis and Corliss, 2009; Abello *et al.*, 2012). Yet despite the substantial risks faced by many older Australians - in terms of cumulative material/financial disadvantage, losing partner or living alone, lack of access to services and community activities, and social isolation and age discrimination, little work has been done on socio-economic and spatial dimensions of differences in ageing experience (Davies, 2005; Tanton *et al.*, 2009; Miranti *et al.*, 2010; Gong *et al.*, 2012; Lui *et al.*, 2011).

Broad measures of economic well-being suggest that differences in incomes between older and younger Australians may be more marked than in many other affluent nations. OECD data show that Australia ranked as one of the lowest countries in terms of the ratio of average equivalised disposable income of people aged 65 and over to that of people aged 18 to 64 years. According to OECD Statistics, the income ratio of retirement age (65+) to working age (18-64) in Australia was 0.63 in 2000, ranking second lowest among 26 OECD countries (only higher than that of United Kingdom). Although this ratio slightly increased to 0.64 by the mid-2000s, Australia still ranked fourth lowest among 30 OECD countries (higher than Ireland, New Zealand and Korea). Similar findings are reported by the Global Age Watch Index 2013 for old populations aged 60 and over. Among 91 countries, Australia is rated at 57 for economic security (indicated by income alone)

while overall quality of life is rated at 14 after combining income, health, employment, education and environment.

The cross-national differences may be due in part to a less generous social security system for older people in Australia than in many other OECD countries. The consequences for standards of living in later life may be mitigated, however, by Australia's high rates of outright home ownership in later life and consequent low housing outlays (Kendig and Bridge, 2007; Kelly, 2009). While these international comparisons do not provide data about differences between particular groups of older adults, they do suggest the importance of developing further knowledge about the economic well-being of older Australians. Although Australia has experienced two decades of economic growth and rising average incomes, some people in some communities continue to be 'left behind'. Further older people in the most disadvantaged neighbourhoods are more likely to be socially excluded and hence have a very low quality of life (Scharf *et al*., 2005).

Research has identified social exclusion as a major issue for the ageing population (Barnes *et al*., 2006; Naughtin, 2008; Miranti and Yu, 2011; Lui *et al*. 2011). Naughtin (2008), drawing on national survey data from the English Longitudinal Study of Ageing (ELSA) and policy work done by the UK Social Exclusion Unit Office of the Deputy Prime Minister (2006) and Barnes *et al*. (2006), has adapted to an Australian context seven dimensions of social exclusion applicable to later life. These are social relationships, cultural activities, civic activities, access to basic services, financial products and material consumption. Naughtin (2008) also notes that the risk of social exclusion for older people increases with various factors - including age (with those 80 years and above being more prone to exclusion), living alone or having no children, poor mental or physical health, no access to a private car or lack of access to public transport, living in rental accommodation, having low income and/or being reliant on welfare and having no access to a telephone. In Australia, Miranti and Yu (2011) and Mclachlan *et al*. (2013) have examined the persistence of social exclusion for older people. They found higher risks of persistent social exclusion for older people with poor educational attainment, older people living in the most disadvantaged areas, older people who have less engagement in employment since finishing full-time education, and older people with caring responsibilities, or who have a disability themselves.

3. MEASUREMENT, DATA AND VALIDATION

There is no consensus on where older adulthood begins and, in many cases, the choice of age groups to represent later life is a contextual one. We define older people as those aged 55 years and above, including Australians who are already retired as well as substantial numbers who are moving towards retirement. Based on 2006 Census data, only 53 percent of Australians aged 55-64 are still in the labour force and, of those who are in paid work, 30.8 percent work part-time. As discussed above, older Australians have relatively low income but high home ownership. It is important to move our economic wellbeing analysis for older people beyond income alone by incorporating homeownership and other crucial variables, such as dependence on government benefits. We investigate multiple dimensions and disparities of economic advantage and disadvantage by contrasting two relatively extreme groups defined as follows (see also Gong *et al.*, 2012):

- Deep economic disadvantage (6.6 percent of the older population). These individuals are in the bottom quintile of the equivalised national household disposable income distribution, paying public or private rent, and relying mainly on government income benefits (more than half of their household income is from government benefits);

- Relative economic advantage (16.5 percent of the older population). These individuals are in the top two quintiles of the equivalised national household disposable income distribution, paying no rent or mortgage, and relying mainly on private household income (more than half of their household income is from private income, including superannuation).

We include people renting in both the public and private rental markets in our 'deep economic disadvantage' group. Neither group has the wealth in their residences that can be central to the economic well-being of older home owners. Although public housing tenants pay lower rents than those in the private market, they nevertheless generally have very low income, while older Australians renting in the private market are widely acknowledged as a group likely to experience substantial housing stress (Tanton and Phillips, 2013). In addition, their housing tenure may also be

associated with other disadvantages including poor housing quality and insecurity of occupancy (Kendig and Bridge, 2007).

It is important to note that our two groups purposefully contrast extremes of economic disadvantage and advantage to better understand spatial inequalities. In fact, the majority of older Australians fall into neither of our groups. The most common economic situation for older Australians (especially those past the usual retirement age of 65 years) is to have outright ownership of their home (thus excluding them from our deep economic disadvantage group) combined with low income (thus excluding them from our relative economic advantage group). In addition, our measure of disadvantage is a narrow one, and it is important to understand that many economically vulnerable older people (e.g. home owners reliant only on the age pension) are not included in our 'deep disadvantage' group.

We present results at both a national and small area level, drawing on a range of data sources and multiple measures of advantage and disadvantage. First, the Survey of Income and Housing (SIH) 2005/06 is used to draw a national picture. Second, synthetic small area estimates created from a spatial microsimulation model, by combining the information in SIH 2003/04, SIH 2005/06 and Census 2006, are used for small area analysis. The Census data 2006 has also been used to validate our synthetic estimates at a small area level. Both SIH and Census data are collected by the Australian Bureau of Statistics (ABS). This analytical approach yields detailed socio-economic information otherwise unavailable on a small area basis.

We use the Statistical Local Area (SLA) as our base spatial unit of analysis (see ABS, 2007 for a full description). To allow comparison of regional characteristics across Australia, SLAs in Brisbane and Canberra were aggregated into larger geographic units, so that they were more similar in population size to SLAs in other areas - Local Council Electoral Wards for Brisbane and Statistical Subdivisions (SSD) for Canberra. This aggregation methodology follows that developed by Baum *et al*. (2005) and used in Daly *et al*. (2008) and Gong *et al*. (2012). After aggregation, the population sizes of older people aged 55 years and over in the spatial units on which this study is based ranged from 100 to 31 235. The spatial units therefore vary from small neighbourhoods to relatively large communities.

Census enumerations could have been used to identify broad groups of economically vulnerable and relatively advantaged elders, using variables available in the Census such as gross income and tenure type However, this approach has significant limitations in terms of our research purpose.

First, the income collected in the Census is household gross income by income ranges, which cannot be used to measure the actual household living standard after paying income tax and adjusting for household size (Saunders and Bradbury, 2006). Second, income source information is not available in the Census, which makes it impossible for us to combine the multiple measures of income, housing cost and welfare dependence into one complex indicator.

The spatial microsimulation model used in this study provides the methodology to generate small area estimates otherwise unavailable for older Australians experiencing multiple economic disadvantage or advantage. The spatial microsimulation model uses reweighting technology to create a synthetic household data set by combining the superior detailed data available from a national survey (e.g. SIH) with Census data which covers almost all households in private dwellings, including retirement villages (Tanton *et al.*, 2011). The Census data 2006 was used to set up the benchmarks (same as in Gong *et al.*, 2012) for reweighting as well as to validate our synthetic estimates at a small area level. This approach yields synthetic household weights for each small area in Australia; it replicates, as closely as possible, the characteristics of the actual households within each small area in Australia (Chin *et al.*, 2005; Chin and Harding, 2007; Lymer *et al.*, 2008; Vidyattama and Tanton, 2010; Harding *et al.*, 2011). A full discussion on how to use this methodology to generate the small area estimates for this study is described in Gong *et al.* (2012).

Spatial microsimulation allows us to produce accurate synthetic estimates of household characteristics for the vast majority of small areas in Australia. However, the analysis excludes some small areas (166) for which sufficiently accurate weights could not be obtained. Most of these areas have very small populations and unusual characteristics (e.g. industrial areas). In the Northern Territory, these limitations required the exclusion of almost half of the Territory's population and thus the estimates for the Territory should be treated cautiously. We also excluded additional small areas with small sample sizes for the key variables. This leaves us with a final sample of 908 small areas, containing around 99 percent of the in-scope population aged 55 and above. In addition, because the SIH includes only records and the Census only collects income information for older people living in occupied private dwellings (including retirement villages), our synthetic estimates exclude people living in non- private dwellings (such as residential care centres). The inability to estimate the small area data of older people in non-private

dwellings and very remote areas may reflect the weakness of small area estimation by combining SIH with Census data as discussed by Vidyattama *et al*. (2013). Households with zero and negative incomes are also removed from our sample.

The validation of synthetic small area estimates created by a spatial microsimulation model is extremely important (Ballas and Clarke, 2001). Before the data was used for this study, Gong *et al*. (2012) had conducted some validation for the key variables: (1) household income and housing tenure type at small area level with similar variables from the Census (see Figures 4 and 5 in Gong *et al*, 2012); (2) dependence on income from government sources at a national and state level using a similar variable from ABS Survey of Income and Housing (SIH) (see Table 2 in Gong *et al*, 2012). It was found that the model estimates are robust for a large set of small areas and the ranks of the states are fairly closely aligned with SIH estimates, although, the synthetic estimates are slightly different from the SIH estimates.

Data from the model was further validated for this study against data of 2006 Census and 2008 welfare recipients. As the welfare dependence data is not available in Census 2006, the 2008 small area data of the number of welfare recipients aged 16 and over from the Social Health Atlas of Australia 2010 is used. Both the Standard Error about Identity (SEI) and Pearson's correlation are used to measure the accuracy of our small area synthetic estimates against the existing small area data which were found to be similar. The SEI measures the total difference between two estimates, while the Pearson's correlation measures whether two estimates have a similar ranking across areas.

Figure 1 compares our synthetic estimates of the number of people aged 55 years and over with main income from government benefits against the number of welfare recipients aged 16 plus at a small area level. The R-square (0.96) of the regression line in the middle indicates a very high correlation between these two estimates, which is further evidenced by the very high value of Pearson's correlation (0.98). It is expected that the SEI value here is relatively low (0.62) because the two data sets are measuring different populations though their rankings are comparable.
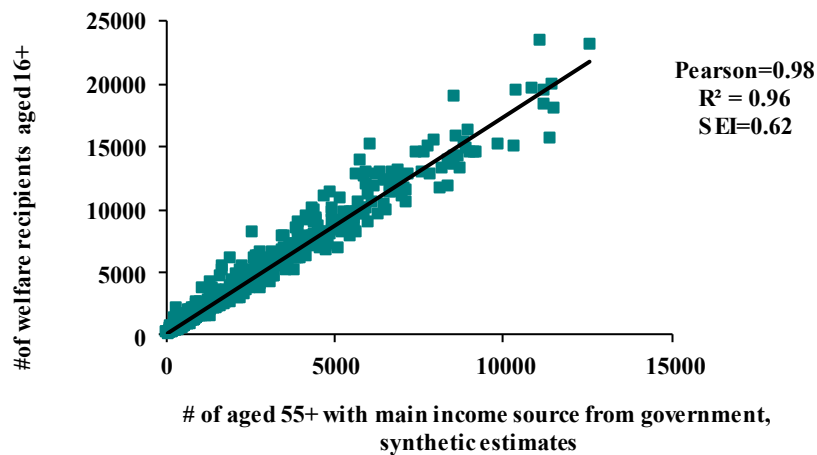
Figure 1. Synthetic Estimates of People Aged 55+ with Main Income from Government Benefits 2006 and Welfare Recipients Aged 16+ 2008 Australia. Data source: the synthetic estimates of the number of aged 55+ with main income from government benefits are from SPATIALMSM/09D. The number of welfare recipients aged 16+ is from Social Health Atlas of Australia 2010.

Table 1 presents further results of validations for our small area synthetic data for each of the variables for which comparable data is available in the Census and their combinations against similar estimates derived from Census data. The accuracy is very high for all the variables and combined measures. The SEI and Pearson's correlation of the proportion and number of older people aged 55+ in each of the disadvantaged and advantaged groups are higher than 0.90 except for a relatively low but still acceptable SEI value (0.84) for the group paying private rent. The SEI values in this table are higher than in figure 1 because the Census estimates and our estimates of household income and tenure type are much closer.

Table 1. Validation for Spatial Microsimulation Estimates against ABS Census Data.

	SEI for proportion	Pearson R for proportion	SEI for numbers	Pearson for numbers
(1) In bottom income quintile	0.99	0.98	0.99	1.00
(2) In top two income quintiles	0.97	0.99	0.99	1.00
(3) Public renters	0.95	0.98	0.98	0.99
(4) Private renters	0.84	0.90	0.98	0.99
(5) Paying no rent or mortgage	0.95	0.93	0.98	1.00
(6) Paying public/private rent and in bottom quintile	0.92	0.95	0.99	0.99
(7) Not paying rent/mortgage and in top two quintiles	0.97	0.98	1.00	1.00

Note: The income quintiles used in this table are national quintiles of household equivalised income. Data source: SPATIALMSM/09D; Census 2006.

4. RESEARCH FINDINGS

National Findings

We first present a national picture of economic disadvantage and advantage among older people in Australia using the Australian Bureau of Statistics (ABS) survey of Income and Housing (SIH) 2005/06. Table 2 shows the summary 'deep disadvantage' estimates as well as those for its components defined, as noted above, as being in the bottom quintile of the income distribution, paying rent, and relying mainly on government income. It shows that 36 percent of people aged 55 years and over are in the national bottom quintile of household equivalised income, 12.5 percent are still paying rent (of which 8.3 percent are private renters and 4.2 percent public renters), and 45.6 percent have their main household income (more than half) from government benefits. Only 6.6 percent of older adults fall into our definition of deep economic disadvantage,

largely due to the small proportion of older people who are still paying rent.

There is considerable variation on the distribution of disadvantage. Among those living alone, 15.7 percent fall into our 'deep disadvantage' group; they are more likely than other groups to be in the bottom income quintile, reliant on government benefits, and to be paying rent. In sharp contrast, only 0.8 percent of older people living in a household with at least one person employed fall into our deep disadvantage definition. There are some gender differences. On average, women are more likely than men to be in the bottom income quintile, reliant on government benefits or paying public rent. Some modest differences are evident in this set of variables between capital city and balance of state areas. The proportion of older adults reliant on government benefits and in the bottom income quintile is slightly higher in non-capital city areas. Capital city areas have a higher proportion of older people paying public rent, reflecting the historical location of these public investments.

Table 3 shows that the proportion of older adults falling into the advantaged group is 16.5 percent, somewhat larger than that falling into our multiple economic disadvantage group (6.6 percent). This group includes, as noted above, those in the top two quintiles of the income distribution (26.2 percent), paying no rent or mortgage (69.4 percent), and relying mainly on private household income (54.4 percent). Differences between capital cities and the balance of Australia are more evident for the advantaged group than for the deep disadvantage variable, with 18.5 percent of older people living in capital cities falling into this advantaged group, compared with only 12.8 percent of those living outside capital cities. Men are also more likely to fall into our relative advantage group than women, and the presence of at least one working person in the household is also strongly associated with relative economic advantage.

Table 2. Economic Disadvantage Variables for Persons Aged 55+, Distribution by Population Characteristics, Australia 2006.

Characteristics	Deep economic disadvantage	Bottom equivalised income quintile	Paying private rent	Paying public rent	Main income (government)
	%	%	%	%	%
(1)All persons 55+	6.6	36.0	8.3	4.2	45.6
(2)Female	7.5	40.2	8.0	4.7	50.9
(3)Males	5.7	31.5	8.7	3.6	39.9
(4)Living alone	15.7	67.3	11.2	7.8	77.8
(5)Living in household where anyone working	0.8	9.0	8.3	1.9	8.8
(6)Living in a capital city	7.0	33.8	8.4	4.7	41.0
(7)Not living in a capital city	6.0	40.2	8.4	3.1	53.8

Notes: (1) The 'deep economic disadvantage' variable refers to people aged 55 and over, in the national bottom quintile of equivalised disposable household income, with main income source from government benefits, and paying private/public rent. (2) As our definition of older people is person-based, some of the older people included in our analysis will be living in households with people younger than 55. Data source: ABS Survey of Income and Housing 2005/06.

Table 3. Economic Advantage Variables for Persons Aged 55+,
Distribution by Population Characteristics, Australia 2006.

Characteristics	Relative economic advantage %	Top two income quintiles %	Not paying rent or mortgage %	Main income (private) %
(1)All persons 55+	16.5	26.2	69.4	54.4
Females 55+	14.7	22.5	70.7	49.1
Males 55+	18.4	30.2	67.9	60.1
(2)55+ living alone	6.5	7.3	75.9	22.2
(3)55+ living in household where anyone working	28.8	49.7	57.5	92.0
(4)55+ living in a capital city	18.5	29.5	67.6	59.0
(5)55+ not living in a capital city	12.8	19.9	72.5	46.2

Note: The 'relative economic advantage' variable refers to people aged 55 and over, in the national
top two quintiles of equivalised disposable household income, with main income source from private
income, and not paying private/public rent or mortgage. Data source: ABS Survey of Income and
Housing 2005/06.

Small Area Analysis Using Spatial Microsimulation Data

We first calculate the proportions of older people aged 55 years and
over who fall into our deeply economically disadvantaged group as well
as the relatively economically advantaged group for each small area. Our
results show that the proportions of elder disadvantage at small area level
range from 0.40 percent to 36.80 percent and from 3.40 percent to 63.10
percent for the proportions of elder advantage. This demonstrates the
much larger spatial disparity within small areas in contrast to the national
averages of 6.6 percent for the disadvantaged group and 16.5 percent for
the advantaged group.

Using a natural breaks classification (a common statistical method used
to display geographic data into natural groups), we have divided all the
small areas into 5 groups based on their concentration rate of elder
disadvantage or advantage. It should be noted that all the small areas have
both   disadvantaged   and   advantaged   older   people.   The   most

disadvantaged (or advantaged) groups simply include areas where the proportion of disadvantaged (or advantaged) older people is highest.

Table 4 presents the numbers of small areas in each group divided by the range of the concentration rate of deep economic disadvantage using natural breaks classification. Groups 4 and 5 shown in the last results column have the highest concentration of elder disadvantage, ranging from 11.61 percent to 21.00 percent and 21.01 percent to 36.80 percent, with an average rate of 14.87 percent. 64 small areas in these two groups have been identified as our most disadvantaged areas which cover 7.05 percent of small areas, 6.11 percent of older people, 14.99 percent of disadvantaged older people and 4.46 percent of advantaged older people.

Table 4. Proportions of Small Areas and Older Population by the Concentration Rate of Disadvantaged People Aged 55+.

	The range of concentration rate of disadvantaged older people			
	0.40%-3.80%	3.81%-7.10%	7.11%-11.60%	11.61%-21.00% and 21.01%-36.80%
	Group 1	Group 2	Group 3	Groups 4 & 5 (Most disadvantaged)
(1) Average concentration rate of disadvantaged older people (%)	2.53	5.41	8.89	14.87
(2) #of SLAs	334	325	185	64

Note: "Disadvantaged older people" are defined as older people in the bottom income quintile, paying rent and mainly relying on government income. Data source: SPATIALMSM/09D.

The concentrations of disadvantaged older adults are present in both capital and non-capital city areas, but mainly appearing in the centre of capital cities (except for Hobart) and some remote areas along the western coast and in north western NSW. Among the 64 most disadvantaged small areas, 26 are outside of capital cities and 38 in capital cities (13 are in Adelaide, 8 in Sydney and 7 in Darwin). These findings are not unexpected. For example, the outer northern and outer

southern suburbs in Adelaide (such as Hackham and Elizabeth), the western suburban areas in Sydney (such as Blacktown and Parramatta), the outer northern and eastern suburbs in Darwin (such as Coconut Grove and Karama) are the areas with relatively low income.

Table 5 shows the corresponding numbers and proportions in Table 4 but in terms of elder advantage instead of disadvantage. The groups 4 and 5 in Table 5 have the highest concentration of elder advantage, ranging from 24.11 percent to 33.20 percent and 33.21 percent to 63.10 percent with an average rate of 27.88 percent. 149 small areas in these two groups have been identified as the most advantaged areas which cover 16.41 percent of small areas, 20.30 percent of older people, 13.03 percent of disadvantaged older people and 33.88 percent of advantaged older people.

Table 5. Proportion of Small Areas and Older Population by the Concentration Rate of Advantaged People Aged 55+.

	The range of concentration rate of advantaged older people			
	3.40%-13.30%	13.31%-18.00%	18.01%-24.10%	24.11%-33.20% & 33.21%-63.10%
	Group 1	Group 2	Group 3	Groups 4 & 5 (most advantaged)
(1)Average concentration rate of advantaged older people (%)	11.39	15.38	20.46	27.88
(2)# of SLAs	190	343	226	149

Note: "Advantaged older people" are defined as older people in the top two income quintiles, not paying rent or mortgage and mainly relying on private income. Data source: SPATIALMSM/09D.

The concentrations of advantage among older people are more likely to happen in the capital cities but less common outside the capital cities. Among the 149 most advantaged small areas, 98 are in capital cities and 51 are outside of capital cities. The advantage concentrations mainly reflect the overall socioeconomic status of these areas: for example,

Sydney and Melbourne have the largest number of advantaged small areas (25 in Sydney and 19 in Melbourne), in which the corridors of suburbs in Melbourne's east and Sydney's northern and eastern suburbs are areas of generally high income.

How do the concentrations of deep economic disadvantage and relative economic advantage among older people play out together at a small area level in Australia? In Table 6, the second and third columns present the numbers of small areas which fall into either the most disadvantaged or most advantaged groups, but not both. The fourth column provides the number of small areas with the highest concentration of both elder disadvantage and advantage. The fifth column gives the number of small areas which fall into neither the most disadvantaged nor the most advantaged groups. Though the concentrations of deep economic disadvantage and relative economic advantage are both spread across capital cities and the balance of state, elder disadvantage is more likely to concentrate in the balance of Australia while elder advantage is more likely in capital cities. The areas of concentrated elder advantage are generally different from those of concentrated elder disadvantage. There are a significant number of small areas falling into the groups of either the highest disadvantage only or the highest advantage only (except for Canberra and Hobart where there is no small area falling into the group with the highest concentration of disadvantage only). Only two small areas have both the highest concentrations of elder disadvantage and advantage. These two areas are North Canberra and Perth Remainder, where 41.2 and 46.8 percent of older people, respectively, have income in the top two quintiles and also 17 percent and 10.9 percent of older people, respectively, are living in public housing.

This finding has evidenced a strong clustering of elder disadvantage and advantage, in both the balance of states and the majority of capital cities. For example, in Sydney, there are 8 small areas with the highest concentration of disadvantage only, 25 small areas with the highest concentration of advantage only, 30 small areas with neither high concentration of disadvantage nor high concentration of advantage, and zero small areas with high concentration of both disadvantage and advantage.

Table 6. Number of Small Areas with the Highest Concentration of Disadvantage and Advantage among People 55+.

	Small areas with high disadvantage only	Small areas with high advantage only	Small areas with high disadvantage and advantage	Other small areas	Total small areas
Balance	26	51	0	535	612
Capital					
cities	36	96	2	162	296
Sydney	8	25	0	30	63
Melbourne	4	19	0	54	77
Brisbane	2	10	0	21	33
Adelaide	13	12	0	29	54
Perth	2	13	1	19	35
Hobart	0	1	0	5	6
Darwin	7	10	0	4	21
Canberra	0	6	1	0	7
All	62	147	2	697	908

Notes: (1) "High disadvantage" is defined as having the highest proportion of older people in the bottom income quintile, paying rent and mainly relying on government income, as shown in the last column in Table 4. (2) "High advantage" is defined as having the highest proportion of older people in the top two income quintiles, not paying rent or mortgage and mainly relying on private income, as shown in the last column in Table 5. Data source: SPATIALMSM/09D.

Further assessing the co-occurrence of elder disadvantage and advantage concentrations is critical for understanding the extent of homogeneity or diversity within an area, and for planning both public and private service provision. Figure 2 presents a national map with the eight capital cities as insets using the same four categories as in Table 6. On the maps, the dark blue indicates the areas with the highest concentration of disadvantage only, the yellow shows the areas with the highest concentration of advantage only, the light blue displays the areas with the highest concentration of both disadvantage and advantage, and the green is for other areas which fall into neither the most disadvantaged or the most advantaged groups.
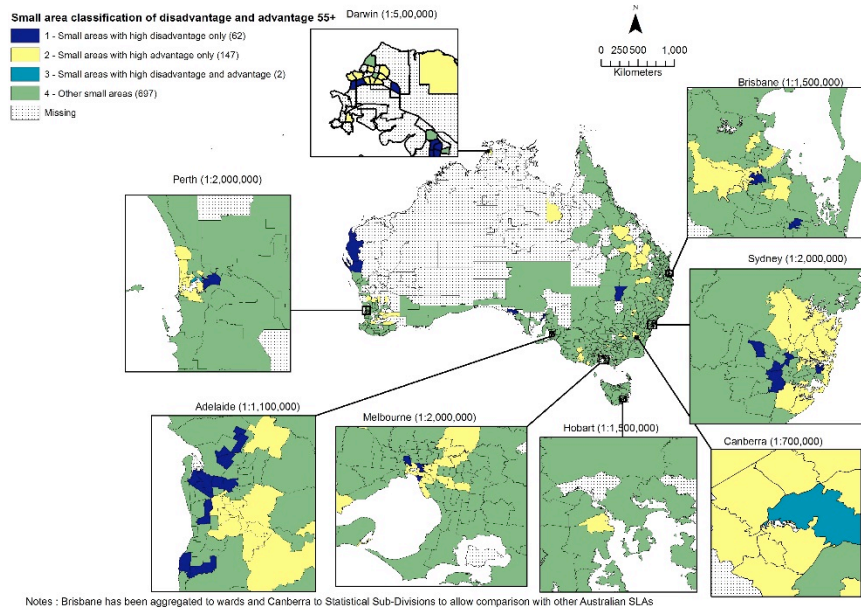
Figure 2. Small Area Clustering of Relative Economic Advantage and Deep Economic Disadvantage, People Aged 55+, Sydney, 2006. Data source: SPATIALMSM/09D.

This map provides further evidence of the observed clustering of elder disadvantage and advantage in Table 6. When looking at the map, the clustering of elder disadvantage and advantage is clear and present in both capital city and non-capital city areas, but it is more marked in Sydney and Adelaide. There are certain areas falling into the groups of high disadvantage only (dark blue) and high advantage only (yellow), with very few areas in the group with both high disadvantage and advantage (lighter blue). The majority of areas are in the groups with neither high disadvantage nor high advantage (green). The small areas with the highest concentration of deep economic disadvantage only, are mainly located in the inner western suburbs of Sydney and the western suburbs of Adelaide, as well as a few areas in the centre of Melbourne, Perth and Brisbane. The small areas with the highest concentration of relative economic advantage only, are pronounced in Canberra and Sydney, and are also evident in the east of Melbourne and Adelaide as well as the west of Brisbane and Perth. The only two areas with both the highest concentration of disadvantage and advantage are in Canberra and Perth, as mentioned above.

Contrasting Our Measures with a General Measure of Area-level Socio-economic Wellbeing

Spatial concentrations of disadvantage are generally different for children, working age people and older people (Tanton *et al*., 2012). In order to check whether the spatial distribution of deep economic disadvantage and relative economic advantage among older Australians that we estimated mirror the overall socio-economic wellbeing of an area for the wider population, we compare our measures with the Socio-Economic Indexes for Areas (SEIFA) 2006 (ABS 2008). The SEIFA index was derived by the ABS based on the characteristics of the residential areas of 2006 Census respondents, in which, the Index of Relative Socio-Economic Advantage/Disadvantage (IRSEAD) was chosen for this comparison as it includes measures of both relative advantage and disadvantage (Australian Bureau of Statistics 2008).

It is found that our deep disadvantage variable has a negative correlation (-0.23) while the advantage variable has a positive correlation (0.68) with the SEIFA IRSEAD index. The sign of the correlations indicates that more advantaged areas (with higher SEIFA scores) have lower proportions of deeply disadvantaged and higher proportions of relatively advantaged older people on average as would be expected. The moderately strong correlation between our relative advantage variable and the IRSEAD index shows that areas which fall into our most 'relatively advantaged' group are quite likely to also fall into the most advantaged small areas as measured by the SEIFA IRSEAD index. On the other hand, the weaker correlation coefficient between our relative disadvantage variable and the IRSEAD index shows that those areas which have the highest proportion of older people who are 'deeply economically disadvantaged' are more likely to be spread out across both advantaged and disadvantaged areas using the IRSEAD index. This is further evidenced by the transition matrix in Table 7 which shows how the percentage of deeply disadvantaged older people and the IRSEAD index match up at each quintile level. In total, there are only 31.5 percent of older people falling into the same area-level quintile shown by the IRSEAD index. The differences are spread right across the distribution of small areas - although, once again, the greatest agreement (9 percent) between the two measures occurs in the most advantaged/least disadvantaged quintile. However, there are 2.4 percent of older people living in 16 small areas which appear the most advantaged according to IRSEAD index while have the highest concentrations of deep economic

disadvantage as measured by our variable. Among these 16 areas, 4 are in Sydney, 6 in Melbourne, 2 in Adelaide, 3 in Perth and 1 in Queensland. These areas have relatively higher proportions of older people with income in the top two quintiles versus higher proportions of older people paying public or private rent. While our measures of advantage and disadvantage are constructed differently from the SEIFA index, the findings above indicate that the widely used SEIFA index may not always be able to provide an indication of the circumstances of older individuals or other specific subpopulations within small areas.

Table 7. Quintiles for Aged 55+ at SLAs by the Percent of Deeply Disadvantaged Older People and SEIFA IRSEAD Index.

Quintile for aged 55+ by SEIFA IRSEAD index	Quintile for aged 55+ at SLAs by percent of disadvantaged older people				
	5 (Most disadvantaged)	4	3	2	1 (Least disadvantaged)
1 (Disadvantage)	6.8	3.5	5.4	2.4	1.9
2	5.00	5.8	3.7	3.7	1.8
3	3.9	6.7	4.2	2.9	2.3
4	2.1	2.8	4.8	5.7	4.7
5 (Advantage)	2.4	1.2	1.9	5.5	9.0

Note: "Disadvantaged older people" are defined as older people in the bottom income quintile, paying rent and mainly relying on government income. Data source: SPATIALMSM/09D.

5. CONCLUSION AND FUTURE DIRECTIONS

The spatial microsimulation approach makes it possible to address spatial questions about variables that are not available in the Census but are available in their 'regionalised' sample survey data – with such questions often being of great interest to policy makers in terms of spatial inequalities and targeting services. In this article, the spatial microsimulation data allow us to more accurately estimate for small areas the populations of highly vulnerable older people as defined by multiple indicators of advantage and disadvantage in terms of income levels, income source and housing costs. This information is of crucial importance in identifying target groups for addressing spatial aspects of age, economic wellbeing, and social exclusion. The estimates on advantaged older populations can be used for a wide variety of purposes such as marketing strategies for retirement communities and later life

leisure and financial products. For example, the increasing number of economically advantaged baby boomers might drive higher demand and different expectations on retirement villages.

Our findings reveal substantial heterogeneity and strong clustering of multiple economic disadvantage and advantage nationally and even more so at a small area level. Although capital city areas were more likely to contain higher proportions of relatively economically advantaged older people, the picture of both elder disadvantage and advantage was mixed in both capital cities and the balance of states. The presence of substantial concentrations of older, low-income rent payers in some capital city areas is particularly concerning due to the high and increasing rents in many of Australia's urban areas. The disparities between the most and least affluent older Australians are expected to accelerate in the future as increasing proportions of baby boomers bring to later life more superannuation benefits, while conversely, those poorer baby boomers who do not own homes also are expected to increase (Yates *et al.*, 2008). The impact of the global financial crisis has raised further questions on older people's economic security (Kendig *et al.*, 2013) while health and aged care reforms now underway raise important matters concerning the regional organisation and delivery of care. These changes underscore the importance of understanding spatial heterogeneities and inequalities among older people across Australia.

More fundamentally, this small area analysis can shed light on how housing markets and urban development may underlie spatial dimensions to socio-economic disadvantage in later life. It would also be possible to examine how urban and rural changes are influencing opportunities for different aspects of social inclusion. The spatial disparities are especially important for vulnerable older people, who can be strongly affected by local environments and social exclusion yet have limited options for moving to better locations. The findings potentially can inform urban planning, service allocations, and social inclusion policies that could ameliorate the economic and social inequalities faced by vulnerable people across their life span (Mahjabeen *et al.*, 2009).

In this paper, we have been focusing on the geographic analysis of the proportions rather than the absolute numbers. Nevertheless, it should be noted that both metrics should be considered in terms of using these data to analyse needs or plan services as they might provide different pictures. For example, when proportions are used to examine the geographic distribution, the concentrations of disadvantage can be more clearly seen in areas outside the capital cities. In contrast the use of absolute numbers

shows that greater numbers of deeply disadvantaged older people are more likely to live in the capital cities rather than in the remainder of Australia.

In future work, we can include more domains into our definition of disadvantage and advantage for older people at small area level, such as health and health services, productive participation, social activities and connections and neighbourhood environment. We also could replicate the microsimulations for 2011 and later Census years in order to identify and monitor patterns and predictors of change. These developments would provide the opportunity to further develop an age-specific measure of small area advantage and disadvantage beyond economic well-being for older Australians.

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