

# Moving In and Out of Areas of Deprivation: Evidence from the New Zealand Census

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## Abstract

One of the important intersections between social policy and demography is the role migration plays in the social mobility of people on one hand and the socio-economic ranking of places on the other. The essential message of this paper is that the socio-economic context people start from when they move has a major influence on where they move to. We use the New Zealand Index of Deprivation to rank neighbourhoods at two census dates 2001 and 2006 and show that the socio-economic rank of the neighbourhood of origin is closely related to the rank of the destination. Among prime age adults for example, the probability of ending a move in a low decile neighbourhood is inversely related to the level of deprivation prevailing at their neighbourhood of origin. Similarly, those who live in relatively deprived areas of the country are more likely to move to areas with either the same or very similar levels of deprivation. The dynamics of internal mobility and migration therefore tend to perpetuate rather than counter the pre-existing geography of social deprivation. These empirical patterns we present by age and ethnicity have potentially important consequences for social mobility and the ability of people to improve the social and economic contexts in which they live.

## Introduction

The New Zealand population is highly mobile by international standards and population specialists have paid considerable attention to the geographic patterns of such mobility (Bedford, 1999; Didham, 2003, 2007). The study of residential mobility in New

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Zealand, as elsewhere, tends to fall into two camps: moves within cities (Clark & Cadwallader, 1973; Poot, 1981) and moves between cities or local labour markets (Maré & Timmins, 2003). Most moves take place within cities and are driven by housing adjustment needs (Clark & Dieleman, 1984), while a much smaller set involve longer moves which are driven mainly by social and employment reasons (Morrison et al., 2009; Morrison & Clark, 2011).

We have learned in the course of these studies that the propensity to move varies markedly by age and also by ethnicity. What we know far less about is the role residential mobility plays in either reflecting or precipitating change in socio-economic status of people - the relationship between residential mobility and social mobility. Social mobility is typically described as the movement of individuals between different positions within the system of social stratification and is of interest as a measure of the openness of a society. Internationally there is an extensive body of research testing this central proposition, mainly by comparing the ranked occupations of fathers and sons (Solon, 1992). By comparison, research on patterns of inter-generational social mobility within New Zealand society has been extremely limited with the work of early pioneers (Robb & Cloud, 1970) and (Davis, 1979) having only just been updated as part of the Treasury's work programme (Gibbons, 2010).

Geographers in particular have long been concerned with the possible role that spatial context plays in constraining or facilitating social mobility. Considerable attention has been paid to the possible role living in relatively poor areas might have on individual development specifically and social mobility more generally. Unlike the study of inter-generational mobility which addresses inter-generational change using a socio-economic index of occupation, the study of geographic mobility involves people's change of neighbourhood over much shorter periods of time. The focus of the latter is not on changing occupations but on changing neighbours.<sup>1</sup>

The inferences one can draw from the study of occupational change and neighbourhood change are quite different even though they both address distributional issues in the degree of social advancement. The focus on changing neighbours stems from a strongly policy oriented literature that addresses the possible existence of negative spill-over effects that accompany the spatial clustering of low income households: in the United

Kingdom (Glennerster et al., 1999; Townsend, 1999; Power & Wilson, 2000), in the United States (Wilson, 1987), in Australia (Baum, 1997; Gregory & Hunter, 2001), and in Canada (Myles & Picot, 2002; Hulchanski, 2007). So far there is little comparable New Zealand research on this important question.

Students of neighbourhood effects tend to focus on the consequences of living in relatively deprived areas. They ask how negative effects of residing in certain social environments in particular are transmitted and differentially absorbed within the neighbourhood and how this might affect the subsequent social mobility chances of affected residents (Lupton, 2003). The literature linking deprived neighbourhoods and outcomes is voluminous but in the end there is little that successfully measures the actual effect of living in deprived neighbourhoods after controlling for the effects of residential sorting (Friedrichs et al., 2003). The research to date establishes strong correlations between deprivation and a variety of outcomes but without necessarily being able to separate the effect of choosing the neighbourhood from the effect of actually living in the neighbourhood. The fundamental methodological difficulty has to do with the presence of selection effects: neighbourhoods may appear to affect behaviour simply because they attract people whose attributes primarily govern such behaviour including their ability to move to alternative neighbourhoods. According to this argument it is the origins of settlement rather than the consequences of living in a particular neighbourhood which may explain any subsequent mobility experience.

The second rationale for the study of social mobility from a neighbourhood perspective stems from an interest in particular places. How areas of high deprivation develop, are sustained and possibly change can be addressed by tracking who moves in and who moves out of such areas (South & Crowder, 1997; South et al., 2005).<sup>2</sup> In each of these studies net migration flows are observed to have reinforced existing levels of deprivation regardless of the macro-economic context. As UK researchers have observed, “net migration flows act to maintain the gap between deprived areas and the average and, as a result, work to undermine efforts to regenerate deprived neighbourhoods” (Bailey & Livingston, 2008, p. 948).

On the other side of the Atlantic, Nord has also shown how net flows reinforce spatial segregation and how the net flows of both poor and non-

poor contribute to these outcomes: poor people move away from affluent areas to other areas including poor areas, while non-poor move in the opposite direction (Nord, 1998, see also Nord et al., 1995).

### *The Geography of Deprivation in New Zealand*

Readers will be well aware that there is a distinct geography to advantage and disadvantage in New Zealand, both through their personal experience, and more abstractly, through the Atlas of Socio-Economic Deprivation (White et al., 2008).<sup>3</sup> Students of health and social welfare as well as practitioners also tell us that the spatial divisions apparent in these maps are long standing and that such areal inequalities have been increasing since the 1980s (Pearce & Dorling, 2006).

Notwithstanding the usefulness of the Atlas and the index of deprivation used to create the maps, our linking of the social geography to public health and social policy to date has usually taken place on the basis of cross-sectional evidence, that is by analysing data collected based mainly on census data at one point in time (Barnett, 2000; Witten et al., 2008). By contrast, we have little understanding of the spatial dynamics underlying the maps of socio-economic deprivation.<sup>4</sup>

In this paper we confront the dynamics by describing the degree to which people upgrade their neighbourhoods when they move (change usual residential address). In doing so, we illustrate the value of linking the index of deprivation at the neighbourhood of origin to the same index applied to their neighbourhood of destination. This linking process helps us better understand the relationship between geographic and social mobility.

Section 1 explains the estimation of the 2006 New Zealand Deprivation Index (NZDep06) on 2001 Census returns thus allowing a consistent set of area units to be compared from one census to the next. Section 2 presents the inter-decile mobility matrix covering the five year period 2001 to 2006. Section 3 considers the extent to which the structure of these mobility patterns vary across four different age groups and four ethnic groups. In Section 4 we reflect on the strengths and limitations of the inter-NZDep mobility matrix for understanding social mobility.

## Comparing Indices of Deprivation across Censuses

The NZDep2006 Index is the fourth iteration of the original developed for the 1991 Census (Salmond & Crampton, 2001). It is constructed from nine variables covering eight domains over which deprivation can vary: income, housing tenure, single-parenthood, unemployment, lack of educational qualifications, crowding, lack of access to a telephone and/or a car (Ibid). The continuous form of the index, the scores, are obtained from the first principal component extracted from the inter-correlation of nine measures, which is then scaled to have a mean of 1000 index points and standard deviation of 100 index points. In geographic terms, the scores are the weighted sums of the variables that account for most of the variation in socio-economic deprivation across the NZDep2006 areas. These scores are rank ordered into deciles from low to high, so that each contains ten percent of the area units. Those assigned to decile 10 fall among the most deprived ten percent of small areas in New Zealand and those assigned to decile 1 are the ten percent of least deprived area units.<sup>5</sup>

There is a further adjustment made to these area based deprivation measures - their standardisation by age. As the authors of the Atlas point out:

... a small area with a higher proportion of young families is likely to have a low number living in their own home simply because the parents are young, whereas another area with a high proportion of older adults is likely to have a greater proportion living on their own. Socio-economic distinctions between the areas therefore are partly attributable to their different age structures. (White et al., 2008).

Age-standardisation equalises small areas so that some areas cannot be considered more deprived than others simply because their populations have different age structures.

Our use of the New Zealand Deprivation Index in this paper differs from its use in the Atlas. Firstly, unlike the Atlas which maps five quintiles of deprivation, we use the full ten deciles in constructing the mobility matrices below. Secondly, we do not use the aggregations of meshblocks that the Atlas uses to create 'small areas', but instead we use the 2006 Census area units together with their rebased equivalents in 2001.<sup>6</sup> Thirdly, and most importantly, the Atlas and other published uses of the Deprivation Index have been based on only one census at a time where as our study applies the

index to area units five years apart. It is this last step which allows us to trace the inter-NZDep decile mobility of those changing residence between census dates.<sup>7</sup>

In order to link the deciles of movers' two neighbourhoods we have had to address two preliminary further issues: area instability and index instability. These are discussed below.

### ***Area Instability***

While area units may share the same geographic boundaries at two successive census years they may not remain assigned to the same NZDep decile. An imbalance in the socio-economic mix of out-movers and in-movers over the five years can shift the area unit's NZDep score into another decile. In order to assess the extent to which area units are assigned to different NZDep deciles in the two censuses we have constructed Table 1. This comparison shows that over half of the area units in 2001 and 2006 were given the same NZDep classification in the two census years and, as such, maintained their relative position in the deprivation ranking of all neighbourhoods. It is also apparent from Table 1 that one fifth, or 20.5 percent of area units (345/1679), experienced a reduction in their deprivation score over the five years while nearly a quarter or 25.4 percent became relatively more deprived (427/1679).

**Table 1. The distribution of NZDep2006 differences for area units in New Zealand with consistent classification coding at the 2001 and 2006 censuses**

Difference NZ Dep 2006 – NZ Dep 2001	Number of area units	Percent distribution
-10	-	-
-7	1	0.1
-6	-	-
-5	1	0.1
-4	1	0.1
-3	11	0.7
-2	52	3.1
-1	279	16.6
0	907	54.0
1	375	22.3
2	41	2.4
3	9	0.5
4	2	0.1
6	-	-
7	-	-
10	-	-
<b>Total</b>	<b>1679</b>	<b>100.0</b>

Source: Statistics New Zealand, customised tabulations

Table 1 shows that shifts up or down by more than one decile were relatively rare. Shifts in the socio-economic composition of area over five year periods are therefore rather gradual. The large shifts that do occur are characteristics of area unit with relatively few people. Whereas the average number of people living in area units experiencing either no change (0) or simply a shift into a neighbouring decile (-1 or 1) was well over 2000, those experiencing a decile change of two or more typically had under a 1000 people, and those area units experiencing an even more extreme change usually had very few inhabitants. As a consequence the proportion of people affected by ‘area mobility’ was much smaller than the proportion of area units.

### *Index Instability*

The second issue we had to deal with is index instability. We have assumed for convenience that the analysis of flows of people between deciles can be conducted when 2006 decile ratings are applied to area units of origin and destination. The alternative would have been to compute flows of migrants between 2001 area units rebased to 2006 boundaries using 2001 decile ratings. The underlying assumption made in using just 2006 deciles was

that the two indices are highly correlated. Such an assumption is justified by the fact that over 62 percent of the statistical variation in one can be accounted for by knowing the other. As the last column in Table 2 shows, in all but two cases deciles of origin vary by less than ten percent.

**Table 2. Distribution of movers by NZDep decile of origin**

<b>NZ Dep of origin 2001</b>	<b>NZDep2001</b>	<b>NZDep2006</b>	<b>Percent difference</b>
1	8.5	7.7	-9.6
2	9.2	9.2	-0.9
3	9.1	9.0	-0.2
4	10.3	9.0	-12.1
5	9.7	11.3	17.0
6	10.6	9.9	-7.4
7	10.6	10.9	2.6
8	11.7	12.4	5.3
9	11.3	11.0	-2.3
10	9.0	9.6	7.4
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>-</b>

Source: Statistics New Zealand, customised tabulations

Notes Area units in New Zealand with consistent classification codes at the 2001 and 2006 Censuses

In summary, most previous analyses of the New Zealand deprivation index have used the index cross sectionally and, as far as we know, there have been no attempts to estimate mobility in NZDep terms from one census to the next. We have begun by showing that most area units are sufficiently stable in NZDep decile terms over the five year inter-censal period to enable us to focus on the movements of individuals between what in effect are a fairly fixed hierarchy of neighbourhoods. On that basis we now turn to the flows of people that took place between area units ranked by NZDep06 deciles over the inter-censal period 2001 to 2006.

## Mobility between Deprivation Areas

Our aim is to present a count of the moves that people made over the last inter-censal period between area units ordered according to their relative level of socio-economic deprivation. Unlike studies of geographic mobility which focus on moves between areas, we focus on moves between deciles - that is, neighbourhoods at different steps in the socio-economic ranking of all neighbourhoods.<sup>8</sup> Our decile of origin by destination matrix is presented in Table 3 which captures those 1.28 million adults enumerated at the 2006 census who were also usually resident in New Zealand five years earlier and who have changed their address.

**Table 3. NZDep2006 classification of residents aged 15+ at the 2006 Census who lived elsewhere in New Zealand five years earlier**

NZDep2006 at origin 2001	NZDep2006 index at destination 2006										Total
	1	2	3	4	5	6	7	8	9	10	
1	27,840	14,076	9,726	8,823	9,342	7,641	6,939	6,174	5,478	3,153	99,192
2	14,196	30,636	12,693	11,571	11,700	9,687	8,235	8,103	7,251	4,104	118,176
3	11,253	13,476	26,022	11,181	11,724	10,980	9,939	10,176	7,353	4,080	116,184
4	10,281	12,291	10,821	27,150	12,108	10,206	9,672	11,136	8,976	5,043	117,684
5	10,812	13,176	12,486	12,756	32,742	13,278	12,687	13,230	11,088	6,195	138,450
6	7,845	9,747	11,268	10,689	12,996	31,716	12,420	13,377	10,758	7,095	127,911
7	8,451	9,090	10,398	10,137	13,269	12,936	37,071	17,811	12,393	8,169	139,725
8	7,035	9,789	10,335	11,976	14,151	13,635	17,892	40,647	18,321	11,610	155,391
9	5,532	8,334	7,140	9,741	12,141	10,887	13,077	18,615	39,063	16,812	141,342
10	2,958	5,076	4,263	5,463	7,422	8,418	8,997	13,587	20,286	47,700	124,170
Total	106,203	125,691	115,152	119,487	137,595	129,384	136,929	152,856	140,967	113,961	1,278,225

Source: Statistics New Zealand, customised tabulations from the 2006 Census

Notes: Figures in this table represent those who moved between 2001 and 2006 and where NZDep2006 was identified for each of the two specified addresses.

By way of illustration, one can see from Table 3 that a total of 47,700 people living in decile 10 area units were living at a different address in 2001 but still in a decile 10 neighbourhood (bottom right cell of Table 3). By contrast, 20,286 had moved from a decile 10 to a decile 9 neighbourhood and 16, 812 from a decile 9 to a decile 10 (the neighbouring two cells). And so forth for the other cells in Table 3.

The counts in Table 3 can be used to estimate the empirical probability that those moving from a previous residential address in New Zealand to the one in which they were enumerated in 2006 will have moved upward or downwards in the deprivation ranking of all neighbourhoods. By subscripting the area unit of origin as  $i$  and the area unit of destination as  $j$ , each cell in Table 3 contains counts  $f_{ij}$ .

We have computed the unconditional cell probabilities using  $p_{ij} = f_{ij}/f_{.}$  to produce Table 4. For example, if we divide the number of people who moved between neighbourhoods in decile 1 and decile 2 over the five year period (14,076) by the total of all people who changed address (1,278, 225) we get the unconditional cell probability  $p_{12} = 0.011$ ; and so on for each of the cells in Table 4.

**Table 4. Unconditional probabilities of residents moving within and between NZDep2006 deciles in New Zealand between 2001 and 2006**

NZDep2006 at origin (2001)	NZDep2006 index at destination (2006)										Total
	1	2	3	4	5	6	7	8	9	10	
1	0.0218	0.0110	0.0076	0.0069	0.0073	0.0060	0.0054	0.0048	0.0043	0.0025	0.0776
2	0.0111	0.0240	0.0099	0.0091	0.0092	0.0076	0.0064	0.0063	0.0057	0.0032	0.0925
3	0.0088	0.0105	0.0204	0.0087	0.0092	0.0086	0.0078	0.0080	0.0058	0.0032	0.0909
4	0.0080	0.0096	0.0085	0.0212	0.0095	0.0080	0.0076	0.0087	0.0070	0.0039	0.0921
5	0.0085	0.0103	0.0098	0.0100	0.0256	0.0104	0.0099	0.0104	0.0087	0.0048	0.1083
6	0.0061	0.0076	0.0088	0.0084	0.0102	0.0248	0.0097	0.0105	0.0084	0.0056	0.1001
7	0.0066	0.0071	0.0081	0.0079	0.0104	0.0101	0.0290	0.0139	0.0097	0.0064	0.1093
8	0.0055	0.0077	0.0081	0.0094	0.0111	0.0107	0.0140	0.0318	0.0143	0.0091	0.1216
9	0.0043	0.0065	0.0056	0.0076	0.0095	0.0085	0.0102	0.0146	0.0306	0.0132	0.1106
10	0.0023	0.0040	0.0033	0.0043	0.0058	0.0066	0.0070	0.0106	0.0159	0.0373	0.0971
Total	0.0831	0.0983	0.0901	0.0935	0.1076	0.1012	0.1071	0.1196	0.1103	0.0892	1.0000

Source: Calculated from the entries in Table 3.

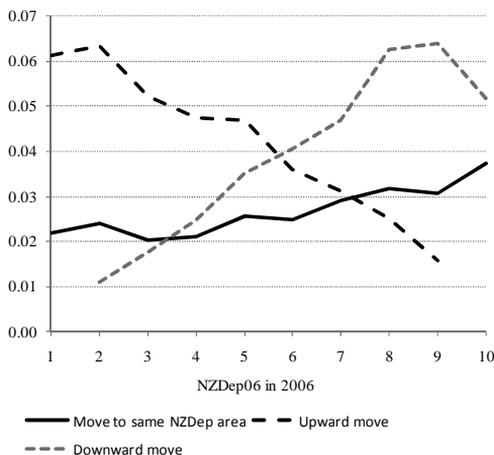
The inter-decile mobility matrix that is Table 4 allows us to identify the direction of mobility in decile terms. Upward residential mobility involves moving to areas with a lower NZDep06 classification - the probabilities in cells below the diagonal ( $i > j$ ). Inter-decile stability refers to moving within

the same category of the deprivation index, as identified by entries in the diagonal ( $i=j$ ). Downward mobility involves moving to a higher index category as indicated by probabilities in the cells above the diagonal,  $i < j$ .

The sum of the probabilities in the diagonal (i.e.  $0.0218 + 0.0240 + \dots + 0.0306 + 0.0373$ ) suggests that about one quarter of all those changing address within New Zealand between 2001 and 2006 remained in the same deprivation category. Nearly three quarters of movers therefore changed their relative position in neighbourhood terms over the five year period.<sup>9</sup>

We have used the entries in Table 4 to construct Figure 1 which depicts three relationships of interest. The first is the solid line showing the probability of moving to another neighbourhood with the same deprivation decile between 2001 and 2006. As the upward slope of the line indicates, the more deprived the neighbourhood of origin the more likely the mover will have remained in their decile of origin when they move. So those moving from within the most deprived area units (decile 10) exhibit the highest chance of moving to a dwelling in a neighbourhood of the same decile.<sup>10</sup>

**Figure 1. The (unconditional) probability of moving to neighbourhoods with the same, higher or lower levels of deprivation (NZDep2006) within New Zealand between 2001 and 2006.**



Source: Statistics New Zealand. Based on customised tabulations from the 2006 Census of Population and Dwellings.

The second point of interest in Figure 1 is the way the level of deprivation of the destination neighbourhood relates to whether people have moved up or down in deprivation terms. What the two dashed lines show is that when people do change deciles they are most likely to move to a neighbourhood which is very similar to the one they left. Those leaving areas where deprivation is very low move mainly to other neighbourhoods like theirs, or with slightly higher or lower levels of deprivation. This is why we see probabilities of upward moves (the black dashed line) start off being high in decile 1, rise slightly in moves to decile 2, then diminish rapidly in the case of moves to neighbourhoods with successively higher deprivation levels (0.00613, 0.0.0634, ..., 0.0252, 0.0159).<sup>11</sup>

The grey dashed line in Figure 1 traces those moving from more deprived neighbourhoods. Unlike the previous case of those moving from less deprived areas, those moving from the most deprived neighbourhoods are less likely to move to another neighbourhood in decile 10 than they are to move to adjacent (less deprived) neighbourhoods, i.e. decile 9 or 8. Those moving to decile 7 through to 2 show lower and lower probabilities of coming from neighbourhoods with lower levels of deprivation.

In summary, what Figure 1 tells us is that while there is a degree of upward and downward mobility in decile terms residential mobility in general tends to reinforce or perpetuate a pre-existing distribution of residents over neighbourhoods ordered by the deprivation index. The exceptions are those moving out of decile 10 upward into neighbouring deciles 9 and 8, and to a much lesser extent, those moving from decile 1 down into decile 2. On net there is a slight upward movement as a result of boundary effects i.e. decile 10 based movers can only stay put or move down in decile terms (to less deprived neighbourhoods). For movers as a whole the probability of staying in the same NZDep areas was 27 percent, the probability of moving up over the period was 38 percent and having moved down, 35 percent.<sup>12</sup>

### ***Implications***

A central question in the debate over the geographic correlates of social mobility and residential socio-economic polarisation more generally is the degree to which movement out of areas of relatively high deprivation is constrained by characteristics of the neighbourhood of origin. For example,

do people living in the most deprived areas find it harder to move up to the next most deprived areas than those living further down the deprivation scale? We know from Figure 1 that people who live in the most deprived areas are the least likely to leave them (for locations elsewhere in New Zealand), however, we have also learned that when people from decile 10 do move out of their decile, they are more likely to move into decile 9, and even more likely to move into decile 8 but after that the chances of further upward mobility fall noticeably.

We observe therefore an inverse relationship between the decile of the neighbourhood and upward mobility and ask whether this occurs simply because residents of these areas select them (residential sorting) or because living in their neighbourhood has affected their willingness and/or ability to move (neighbourhood effects). For example, to what extent, if any, do those who remain in the most deprived areas do so as a result of the presence of negative externalities generated by living in such areas? By the same argument, do the chances of moving to areas with very low levels of deprivation increase as deprivation decreases because of the increasing presence of positive neighbourhood effects i.e. does the presence of better facilities, more parent funded education facilities and programmes and assistance from neighbours with higher levels of human capital actually increase peoples chances of maintaining or raising their social advantage?

These are not easy questions to answer despite there being a huge international literature on neighbourhood effects. Contrary to the interest shown in these questions overseas, New Zealand appears to have paid them very little attention. One way of gaining greater contemporary insight into the relative importance of residential sorting, conditioned as this is by the attributes of movers, is to examine how different categories of people actually behaved. We introduce this question by looking at two such attributes: age and ethnicity.<sup>13</sup>

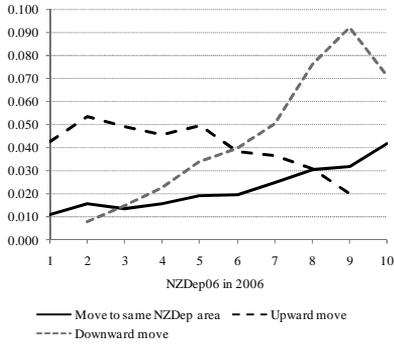
## **Transitions by Age and Ethnicity**

The aggregate picture in Figure 1 raises the question as to how the inter-decile mobility matrix might vary by sub-group. Two of the most important dimensions are age and ethnicity. We begin therefore by constructing the same relationships depicted in Figure 1 for each of the four age groups separately as shown in Figure 2. What we discover is that there is a striking

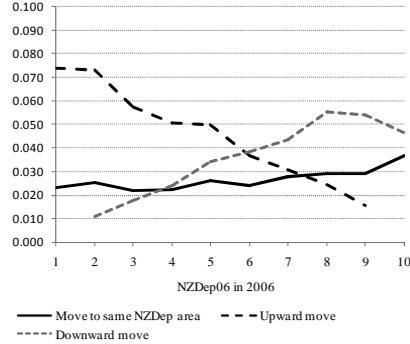
similarity in these graphs between the young and old on one hand and the middle age groups on the other. The chances of movers remaining in their decile of origin rise with the deprivation level of the origin but at a decreasing rate with age, to the point where among those 65 years and over stability (the continuous line) actually falls for those in deciles 9 and 10. By contrast, those in the working age group (34–64 years) are much more likely to retain their residence in deciles 1 and 2 than is the case for the young and the old whose ability to sustain residence in these privileged locations appears much weaker.

**Figure 2: The proportion of movers in each of four age groups in New Zealand who moved to area units of same, higher or lower NZDep2006 deciles between 2001 and 2006**

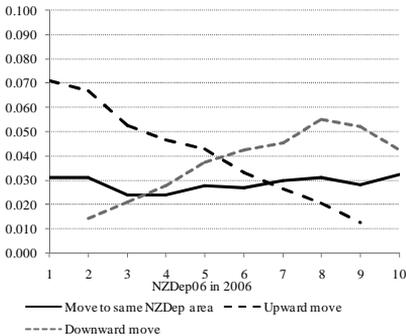
**Aged 18-29 years**



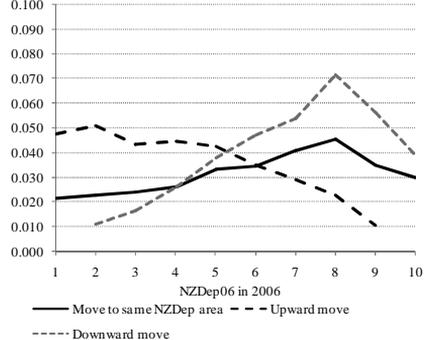
**Aged 30-44 years**



**Aged 45-64 years**



**Aged 65+ years**



Source: Statistics New Zealand. Based on customised tabulations from the 2006 Census of Population and Dwellings.

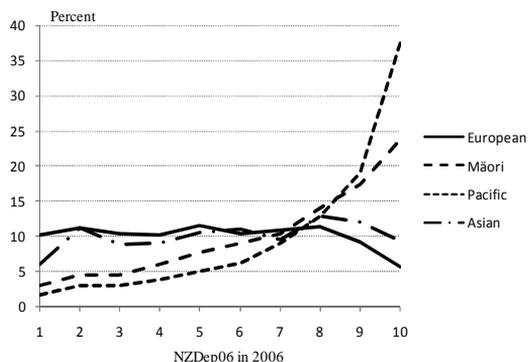
Many of the movements of the 18-29 year age group are motivated by leaving home and going on to further study or relatively low wage employment which means moving from an owner occupied family home in a lower decile area to rental accommodation in more deprived areas. Such a scenario would account for the high peak of downward moves by this age group. The fact that mobility rates are disproportionately high among this age group means that the young have a disproportionate influence on the aggregate pattern of stability depicted in Figure 1.<sup>14</sup>

In summary, each of the four age groups depicted in Figure 2 retain their higher propensity shown in the aggregate case to move to neighbourhoods which are similar in decile terms to those they leave. The young are the most mobile and are also the most likely to move downwards (41 percent) and their behaviour in terms of inter-decile mobility is very closely replicated by those over 65 years. This trend is reversed for people in their prime working ages who are more likely to remain in low decile areas when they move and are less likely to enter areas experiencing high levels of deprivation.

## **Ethnicity**

It is helpful to introduce the discussion of mobility by ethnic group by recalling their relative share of the population. European make up almost three quarters (65 percent) of the country's population and, as Figure 3 shows, were fairly evenly distributed across the deciles with the exception being their under representation in decile 10 areas. The Asian population who make up nine percent of the 2006 population were also fairly evenly distributed although are underrepresented relative to European in the least deprived decile and are over represented in the most deprived deciles. In stark contrast are Maori and Pacific who make up 14 and 7 percent of the 2006 population respectively. They were under represented in lower to medium decile neighbourhoods and quite over represented in neighbourhoods with relatively high levels of deprivation, a feature particularly characteristic of the Pacific population.

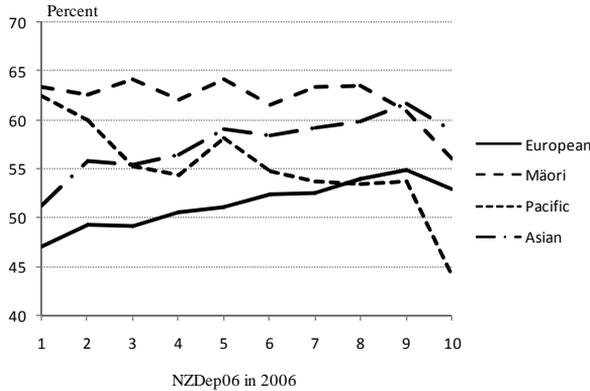
**Figure 3: Distribution of ethnic groups in New Zealand by decile of the NZDep2006 index**



Source: Statistics New Zealand. Based on customised tabulations from the 2006 Census of Population and Dwellings.

Mobility rates are far more even across the ethnic groups than they are across the age groups. While European, Pacific and Other ethnicity display relatively low rates (approximately half having changed residence at least once over the five year to 2006), Maori and Asian display higher rates (at 60 and 57 percent respectively).<sup>15</sup> Figure 4 depicts the proportion of movers in each of the four ethnic groups by area deprivation decile over the five years to 2006. Of note here is the contrasting way in which European and Asian mobility rates rise with neighbourhood deprivation (slowing only in decile 10), while mobility rates for Maori are the reverse, being the highest in low to medium deprivation areas and lowest among those in decile 10 in 2006. Pacific show lower levels of mobility in general even though they are similar to Maori in decile 1. By decile 10 however, mobility rates of Pacific are extremely low.

**Figure 4. The proportion of individuals by ethnic group who moved within New Zealand 2001-2006 by NZDep2006 of residence**

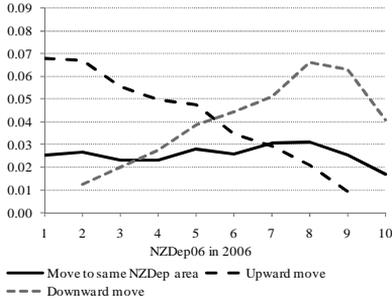


Source: Statistics New Zealand. Based on customised tabulations from the 2006 Census of Population and Dwellings.

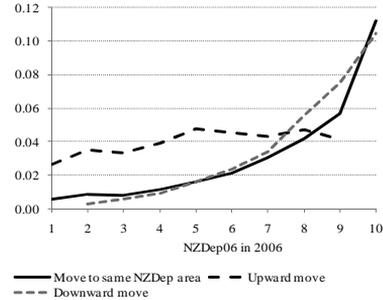
Figure 5 replicates Figure 1 for each of the four ethnic groups. Of particular interest is the stark contrast between Europeans whose profile replicates the aggregate picture of Figure 1 and those of the other smaller ethnic groups. The lack of inter-decile mobility rises at an increasing rate with neighbourhood deprivation but there is a major contrast between Maori and Pacific on one hand and European and Asian on the other. The solid line indicating movement within and between neighbourhoods of the same decile highlights the comparative lack of inter-decile mobility among Maori and Pacific especially among those living in the higher decile neighbourhoods.

**Figure 5. The proportion of movers in each ethnic group who moved to area units of same, higher or lower NZDep2006 decile within New Zealand between 2001 and 2006**

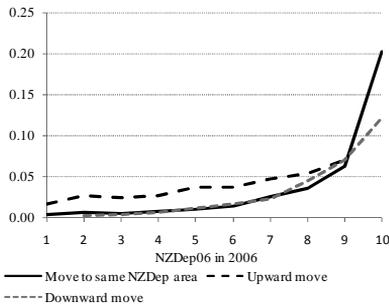
### European



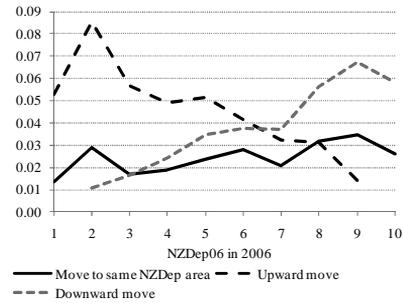
### Maori



### Pacific



### Asian



Source: Statistics New Zealand. Based on customised tabulations from the 2006 Census of Population and Dwellings.

In the case of the Asian population we note a slightly higher upward migration rate to most decile areas compared to European, and higher levels of stability in the low decile areas. In contrast, we observe higher downward mobility rates among Europeans in most deciles except for those living in most deprived areas, decile 9 and 10 areas.

When it comes to upward mobility, that is moves into the lower deciles in 2006 (the black dashed lines), Pacific and Maori exhibit very similar trends (once scale differences are noted). Not only are relatively few members of Maori and Pacific ethnicity actually resident in the lower NZDep neighbourhoods (recall Figure 3) but also exhibit very low probabilities of staying there (the reverse of the European experience).

Unlike European and to only a slightly lesser extent Asian, the propensity of Maori or Pacific to move downwards to areas of higher

deprivation does not decline in the most deprived areas (as opposed to what one may have inferred from Figure 1). On the contrary, the more deprived the neighbourhood the greater the likelihood both Maori and Pacific will move to areas with higher levels of deprivation. That this is not the case for European and Asian, who are more likely to move out of the most deprived areas, accounts for the aggregate behaviour we see exhibited in Figure 1 (the grey dashed line).

In summary, there is a strong connection between ethnicity and likelihood of moving in and out of areas of high deprivation. The markedly different dynamics exhibited by European and Asian not only reflects socio-economic points of differences but may actually exacerbate them resulting in an increasing separation by decile.

## Conclusions

Understanding the way migration is associated with social mobility is an important point of connection between social policy and demography. By tracking five yearly changes in address that are linked to a consistent classification of socio-economic status we have been able to describe the prevailing patterns of mobility in the aggregate and for key subgroups within the society. The central question we have posed is whether residence in neighbourhoods with relatively high rates of deprivation is associated with the direction of mobility as judged by the relative socio-economic position of the neighbourhood.

New Zealand has yet to grapple with the relationship between social mobility and residential deprivation and its implications. One of the reasons neither the patterns nor the underlying processes themselves are well understood is that we have confined our understanding of our social geography to cross sectional evidence. Therefore, in contrast to the snapshot representations of the geography of deprivation depicted in the Atlas of Socio-economic Deprivation for example, we have focussed in this paper on the movement of people between deciles of deprivation.

While levels of residential mobility *per se* remain similar across deciles when people do move, the relative deprivation score of the neighbourhood of origin appears negatively related to the degree of upward movement in deprivation index terms. The young (and the old) have a much higher

propensity to move to areas with higher deprivation but those of prime working age are more likely to move to areas of lower deprivation.

When it comes to ethnicity, those who leave deprived neighbourhoods are more likely to be of European and Asian ethnicity and those who enter are more likely to be Maori and Pacific. The net result is a reinforcing of the correlation between ethnicity and levels of neighbourhood deprivation.<sup>16</sup>

## Limitations

This paper is the first attempt that we know of to trace the pattern of movement individuals living in New Zealand make between neighbourhoods ranked according to the country's deprivation index and to argue for a link between geographic and social mobility. It is important therefore that we also draw attention to some of the limitations of our analysis.

The first is our confining of entry to and exit from high deprivation areas to those changing address only within New Zealand. We have not included those settling from overseas nor have we addressed the geography of emigration and the neighbourhoods people leave behind. When it comes to ethnicity in particular, this wider perspective on the relationship between geographic and social mobility may well be tempered by the evidence on diaspora. The former step is possible given existing data but the latter requires access to results from overseas censuses as well as a consistent deprivation index.

A second feature of the internal migration process and its relationship to the differential deprivation of areas not addressed here is the difference between circulation, temporary migration and more permanent migration. We don't know for example, whether the movements between the different neighbourhoods reflect permanent or temporary moves, whether such moves are structural or circulatory in nature. This is important if we are going to argue for the possible presence of neighbourhood effects where the timing of exposure is of obvious importance. Answering such questions will require instruments other than the census notwithstanding the possibilities opened up by using rebased area unit measures as we have done here.

A third limitation addresses the degree of socio-economic heterogeneity within New Zealand neighbourhoods, a point raised by the referee, who points out that, "even at the meshblock level the heterogeneity of the socio-economic status of households is high". The point is well taken even though

we are using individuals rather than households in our analysis. The more heterogeneous the neighbourhood the less likely residents will be subject to interaction with any one particular socio-economic group. At the same time, there is evidence that this heterogeneity which has been characteristic of New Zealand suburbs may be diminishing in favour of greater homogeneity (Pearce & Dorling, 2006) and this is a trend we need to learn more about.

Fourthly, and a related point, there are many instances of personal and community growth within neighbourhoods over considerable periods that can and do occur in spite of the residential sorting process. In other words geographical mobility is neither a necessary nor sufficient condition for social mobility. From a public policy point of view, as has been learned from the UK experience, rather than viewing progress simply as the geographical redistribution of upwardly mobile individuals, it is important to jointly invest in both people and places, that is in all individuals in places that can provide employment, security and supportive social environments (Cheshire et al., 2003). There is a need therefore to define and document 'social mobility' in an inclusive, broader way which involves in situ development and not just upward mobility by migration (Blakely & Pearce, 2002).

Finally, one cannot tell from our evidence whether it is primarily residential sorting which drives individuals to move between neighbourhoods with different deprivation deciles or whether neighbourhood effects do actually play a role and how. The distinction is important because the first largely reflects income and wealth inequality and the second reflects presence of externalities within neighbourhoods. It is the presence of negative externalities in particular which the literature addresses as likely to exacerbate the different potential for social mobility already inherent in the selection effects which govern residential sorting. This paper has reminded us that deprivation rankings of neighbourhoods are maintained through a highly regularised dynamic of reciprocal physical movement of a heterogeneous population and that our understanding of the possible role of the neighbourhood in the development of individuals in New Zealand remains at a very early stage.

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## Notes

1. The recently released study of residential location patterns in Auckland underscores the attention people pay to the characteristics of their neighbours in their location decisions. See Maré et al. (2011).
2. For an earlier study refer to Shefer and Primo (1985).
3. These maps may be also be viewed on the Ministry of Health website: <http://www.moh.govt.nz/moh.nsf/indexmh/dhb-maps-and-background-information-atlas-of-socioeconomic-deprivation-in-nz-nzdep2006>
4. An exception is the study of mortality rates at area unit level over five census periods within District Health Boards (Pearce & Dorling, 2006).
5. This study confines itself to the use of deciles. An analysis of mobility based on scores themselves (with comparisons to deciles) is reported in Clark & Morrison (2011).
6. In terms of their average geographic and population size, mesh blocks are smaller than area units, which, in turn, are smaller than small areas.
7. While this linkage is possible for the vast majority of area units, it is not possible for all. The 2006 census counted 1919 area units and of these 93.4 percent (1792) could be assigned an NZDep06 score. There were 1859 area units assigned in the 2001 census and 1723 or 92.7 percent were able to have deprivation score assigned. In 2006 a total of 1792 area units had a deprivation score compared to a total of 1723 in 2001. A total of 1679 area units (with no boundary changes) had a defined NZDep score assigned in both 2001 and 2006.
8. Geographic and socio-economic mobility are not entirely separate of course and there is a case here for formally recognising the spatial clustering of neighbourhoods sharing similar NZDep deciles. We do not pursue this link here however.
9. The degree of actual movement is much higher than this because we are only counting people who change decile categories as movers, and not those who

change position within the deciles - a point elaborated in greater detail elsewhere (see Morrison, 2011).

10. Any two neighbourhoods could be the same or a different physical neighbourhood, down the road or at the other end of the country. This conclusion is partly a function of decile 10 being an end state. While those originating in decile 10 can move to a lower decile they cannot move any further 'downwards' in socio-economic terms. It is important in evaluating Figure 1 however, to recognise that the range of scores within decile 10 is actually wider than the range over all the other deciles combined, and therefore there is considerable scope for movement within decile 10 (see Clark & Morrison, 2011).
11. The probabilities plotted in Figure 1 were calculated from Table 4, as the row sum of the unconditional probabilities in the cells of the corresponding row to the right of the diagonal; 0.0613, in the case of row one for example. The second value in the black dashed line, 0.0634, is the sum of the unconditional probabilities in the cells of the second to top row of Table 4, and so on.
12. These are the sums of the cells to the right and left of the diagonal in Table 4.
13. We explore a wider set in a multivariate framework elsewhere, one using the Survey of Motivation and Dynamics of Migration, in Clark & Morrison (2011) and the other further Morrison & Nissen (2011).
14. Almost three-quarters (73 percent) were living at a different address in 2006 than in 2001 compared to 63 percent for those 30-44, 40 percent for those 45-64 and only a third for those 65 years and over (33 percent).
15. The highest mobility rates among the five categories identified are recorded for the relatively small Middle Eastern/Latin American/African group at 68 percent.
16. These conclusions, drawn from the descriptive evidence in this paper, are confirmed in multivariate analysis of the Survey of Dynamics of Motivation and Migration reported elsewhere (Clark & Morrison, 2011).

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