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ABSTRACT

Economic Liberalisation and the Mobility of Minority Groups: Evidence from Māori in New Zealand*

Between 1984 and 2003, New Zealand undertook comprehensive market-oriented economic reforms. In this paper, we use Census data to examine how the internal mobility of Māori compares to that of Europeans in New Zealand in the period after these reforms. It is often suggested that Māori are less mobile than other ethnic groups because of attachment to particular geographical locations. If this were the case, Māori may have been disadvantaged in the post-reform period because they were more likely to be living in adversely affected areas and less likely to move to pursue better employment opportunities. In contrast to the anecdotal evidence, we find that Māori are more mobile on average than similar Europeans. However, Māori who live in areas with strong networks of their iwi are slightly less mobile than Europeans. The difference between Māori who live locally to their iwi and those who do not is even more pronounced when we consider responsiveness to local labour market shocks. Non-local Māori are considerably more responsive to changes in economic opportunities than are Europeans, whereas local Māori are almost entirely unresponsive.

JEL Classification: J61, J15, R23

Keywords: mobility, migration, New Zealand, Māori, labour market areas

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1 Introduction

The 1980s marked a time of structural adjustment around the world. New Zealand began the decade as one of the most regulated economies in the OECD. By 1984, it was facing unsustainable fiscal and current account deficits, and high inflation and foreign debt. This triggered a period of comprehensive market-oriented economic reforms that lasted until 1993. Between 1984 and 1991, real per capita GDP growth averaged 0.4% and unemployment rose from 5% in 1984 to almost 11% in 1992. These reforms had particularly severe negative impacts on Māori and Pacific Islanders, who were disproportionately employed in low-skilled manufacturing jobs that largely disappeared with the end of industry support and import restrictions.

In this paper, we use Census data to examine how the internal mobility of Māori compares to that of Europeans in New Zealand in the period after these reforms. It is often suggested that Māori are less mobile than other ethnic groups because of attachment to particular geographical locations (Walker, 1990). If this were the case, Māori may have been disadvantaged in the post-reform period because they were more likely to be living in adversely affected areas and less likely to move to pursue better employment opportunities (Sin and Stillman, 2005). Furthermore, Māori had (and still have) lower average levels of educational attainment than Europeans, making transitioning to new careers particularly difficult. Previous research has found that the reforms of the 1980s had large persistent effects on local communities, suggesting that their impact on individuals could have also been long lasting (Stillman et al., 2010; Karagedikli et al., 2000; Dixon, 1998).

Our regression analysis compares the mobility between geographic labour markets of Māori and Europeans who initially live in the same area. We also examine heterogeneity in outcomes within the Māori population, distinguishing Māori who report only one ethnicity from those with multiple ethnicities, and those who report a tribal (iwi) affiliation. Further,

for Māori with an iwi affiliation, we stratify by whether they live in an area where their iwi has a strong network. Research has shown that each of these dimensions of ethnic identity can have important effects on both labour market outcomes and mobility decisions (Palloni et al. 2001; Carrington et al. 1996; Kritz and Nogle 1994; Chapple 1999; Nikora et al. 2004). Finally, our analysis directly examines how individuals from different groups respond to changes in local labour market opportunities during the post-reform period.

In contrast to the anecdotal evidence, we find that Māori are more mobile on average than similar Europeans. However, Māori who live in areas with strong networks of their iwi (whom we refer to as 'local' Māori) are slightly less mobile than Europeans. The difference between Māori who live locally to their iwi and those who do not is even more pronounced when we consider responsiveness to local labour market shocks. Non-local Māori are considerably more responsive to changes in economic opportunities than are Europeans, whereas local Māori are almost entirely unresponsive.

Although this means that the migration responses to labour market shocks of Māori are, on average, roughly comparable to those of Europeans, it highlights the fact that there exists a large subpopulation of Māori whose location choices are almost entirely unaffected by labour market considerations. While 17% of local Māori change labour market areas over a five year period, our analysis suggests that these moves are primarily driven by non-labour market considerations. This suggests that, for certain Māori, culture- or socially-based ties to particular areas could be an important impediment to moving to labour market opportunities. These Māori are likely to have faced considerable difficulty adjusting to the reforms of the late 1980s and early 1990s.

The mobility of minority groups has been the focus of a small international literature, though often in the context of residential segregation. South and Deane (1993) and Ross (1998) find that African Americans in the United States are less likely to move house than are

other groups, even controlling for individual and area characteristics. They suggest that housing segregation could be a contributing factor, and raise the concern that this limited mobility harms black opportunities. In Australia, Biddle and Yap (2010) find that Indigenous Australians are less mobile than comparable non-Indigenous people, while Kinfu (2005) finds that young adult Indigenous Australians, who are in the key years for their career development, are less mobile than the Australian population as a whole.

Limited prior research has rigorously examined mobility among Māori.[1] Most relevant to our study is Vaithianathan (1995), which uses data from the 1991 census to examine the impact of local labour market opportunities on the mobility of Māori between 1986 and 1991 compared with that of non-Māori. She finds that while non-Māori migration is highly responsive to local labour market opportunities, Māori migration is much less responsive, particularly for Māori living in their traditional iwi area. While her results are consistent with our finding that local Māori are almost entirely unresponsive to changes in economic opportunities, our results suggest that mobility in response to economic opportunities has increased substantially for non-local Māori since the reform period. Given the general uncertainty associated with the reforms, especially for low skilled individuals, it is perhaps unsurprising that mobility was initially lower for this group.

The rest of the paper is organized as follows: Section 2, briefly discusses Māori socioeconomic structure and history; Section 3 describes the data used in the analysis and provides some sample characteristics; Section 4 presents results from our econometric estimation; and Section 5 concludes.

[1] A number of papers, including Kerr et al (2001), Maré and Timmins (2004), and Maré and Choy (2001) examine internal mobility in New Zealand using aggregate data, but are unable to analyse differences between population groups. Renkow and Scrimgeour (2005) use grouped data from the 1996 and 2001 censuses to study the relative mobility of Māori between 1991 and 2001. Inconsistent with the previous literature and our work, they find no evidence of a link between worker mobility and local labour market conditions for either Māori or non-Māori. We suspect this occurs because they are examining mobility at a quite aggregated geographical level (between 16 regional councils) using a gravity model and hence have little variation in their measures of local labour market conditions, as well as limited controls for other important regional differences.

2 Background[2]

'Māori' are defined in this paper, and generally in New Zealand research, as individuals who identify themselves with the Māori ethnicity, which is a measure of cultural affiliation, as opposed to race, ancestry, nationality, or citizenship. Ethnicity is self-perceived and people can belong to more than one ethnic group. The vast majority of Māori belong to an iwi, which can loosely be translated as tribe.[3] The iwi is traditionally the largest socio-political organisation in Māori society, and is generally a territorial entity. Iwi members today retain strong ties to the rohe, or traditional region, of their iwi. As can be seen in Sin and Stillman (2005), this attachment to traditional lands has led to a large amount of geographic clustering among Māori. Hence, migration decisions are likely to be complicated by the issue of iwi affiliation, which is why we focus on this as an important source of heterogeneity.

At the time of initial European settlement in the early 19th century, the Māori economy was mainly agrarian. Introduced crops, such as potatoes, and metal implements were gradually incorporated into the economy and over time Māori increased their economic production and integration into the cash economy. By the late 1850s, a long-lasting economic decline for Māori had begun. Māori were strongly represented in the flour milling and shipping industries and when these markets collapsed, the impact on Māori was significant. During this time, settlers and the Crown confiscated eighteen million acres of land from Māori, which dramatically reduced their autonomy and their economic output.

The next period of large change came in the post-war period. In 1965, nearly two-thirds of Māori lived in rural areas, but by 2006 nearly 85 percent lived in urban areas (and hence many had moved away from their rohe). This urban migration often meant better opportunities for good housing, full-time employment and education. As Māori were

[2] The material in this section comes from Consedine (2007) and Statistics New Zealand (2014).
[3] There are 111 iwi recognised by Te Puni Kōkiri (Ministry of Māori Affairs). Statistics New Zealand (2014) reports that 89 percent of Māori adults know their iwi.

significantly under-represented in the higher levels of education, they became predominantly represented in low-skill occupations, such as factory work, forestry, and meat processing. These were exactly the areas that were most affected by the economic reforms of the 1980s.

3 Data

This paper uses unit record data for the New Zealand population from the 1996, 2001, and 2006 censuses. We restrict our analysis to the New Zealand-born European and Māori population aged 30–59. As discussed later in this section, our mobility measure refers retrospectively to the previous five years, so these individuals are as young as 25 at the beginning of the observation period. We focus on this age group because students and individuals nearing retirement tend to migrate for quite different reasons from working-aged people. We exclude individuals born outside New Zealand and individuals of non-Māori, non-European ethnicity from our analysis because we suspect that these people may also have different mobility patterns than the majority group of New Zealand-born Europeans.

Individuals can record up to three self-defined ethnicities on a census form. Our main comparison groups are Europeans, sole Māori, and mixed Māori. We define Europeans as all individuals who state that they are of European ethnicity, but are not of Māori ethnicity; sole Māori as all individuals who report Māori as their only ethnicity; and mixed Māori as all individuals who report Māori ethnicity and at least one other ethnicity. Europeans, as defined in this paper, may also report other non-Māori ethnicities. Out of the 2.1 million individuals in our pooled sample, 85% are European, 10% sole Māori and 5% mixed Māori.

Information is collected in each census about the current usual residential locations of individuals and their usual residential locations (including overseas) five years before the census date (i.e. at the time of the previous census).[4] The nature of these data means we are unable to track forward the movements of all people living in any one area at an earlier time,

[4] A negligible number of individuals are dropped because their usual residential address is unavailable.

but instead must look backwards and examine the location five years ago of all individuals currently in a particular location.[5] The location information is coded to the relatively fine census "area unit" level which in urban areas more or less corresponds to particular suburbs.[6] Because a high proportion of moves between area units are short-distance residential moves that do not relate to changes in labour market opportunities, our analysis focuses instead on moves between larger local labour market areas (LMAs). These 140 LMAs are commuting zones constructed by Newell and Papps (2001) using travel-to-work data from the 1991 census.[7]

The census asks individuals with Māori ancestry to list up to five iwi affiliations.[8] As discussed above, migration decisions are likely to be complicated by the issue of iwi affiliation. Hence, we further classify Māori based on whether they specify any iwi affiliations, and if specified, whether or not they live in an LMA that is a "local area" of any iwi with which they are affiliated.[9] A LMA is defined as local for an individual if the proportion of the total population of their iwi living there is 1.5 times larger than the

[5] It is not possible to calculate the precise probability that a person living in a certain location moved, as some of the people previously living in that location will not have filled out a census form five years later for various reasons. For example, they may have died, moved overseas, or failed to fill out their census forms in enough detail for their previous addresses to be ascertained. The probabilities that we do calculate (of people moving when we know both their current and previous addresses) are likely to be understated relative to the true probabilities of moves, because the most mobile people are the most likely to be missed or to have an incomplete address record from five years ago. We are also not able to identify multiple moves over the five-year period.

[6] There are nearly 2,000 area units in New Zealand, with an average of 2,000 individuals living in each.

[7] Newell and Papps (2001) construct LMAs using an algorithm that ensures that most people who live in one LMA work in it, and most people who work in one LMA live in it. Their algorithm requires LMAs to have a minimum employed population of 2,000 and 75% containment of workers. LMAs have been used as the geographical units of interests in a wide range of papers on mobility in New Zealand, such as Maré and Timmins (2004) and Maré and Stillman (2010).

[8] Iwi do not have to conform to any particular specifications in terms of size or other characteristics and are an evolving set. For example, SNZ periodically reviews its list of iwi, considering new possibilities for iwi in terms of a number of guidelines. At the time of the 2001 census, it recognised approximately 95 individual iwi. Of these, 13 had more than ten thousand members, 14 had between five and ten thousand, 32 had between one and five thousand and 36 had fewer than one thousand members.

[9] Māori without an iwi affiliation are a heterogenous group including individuals reporting Māori ethnicity but not Māori ancestry, Māori who report an iwi affiliation that cannot be classified by SNZ, Māori who do not answer the iwi affiliation question and Māori who truly do not have an iwi affiliation.

proportion of the total European population living there as measured in a pooled sample of the 1996, 2001 and 2006 censuses.[10]

4 Empirical Strategy and Results

4.1 Māori Mobility between 1996 and 2006

We start by examining descriptively the mobility of the Māori population between 1996 and 2001 and between 2001 and 2006 compared with the mobility of the European population. We categorise each individual's mobility status by comparing her current residence with her residence five years ago. Mobility status can take the values: i) same area unit (AU); ii) same LMA but different AU; iii) different LMA; and iv) moved from overseas. Moves within the same AU and within the same LMA but different AU are likely to be residential moves, as opposed to labour market moves. We initially present results broken down in this manner, but beyond these focus our analysis on moves that involve a change in LMA.

Panel A of Table 1 summarises the average mobility of our three main comparison population groups. Europeans exhibit similar local residential mobility to Māori, but Māori appear to be, on average, slightly more likely to move to a new LMA than Europeans in both sample periods. For example, between 1996 and 2001, 21% of both sole and mixed Māori moved to a new LMA compared with 17% of Europeans. Similar figures for between 2001 and 2006 are 22% for sole and mixed Māori and 19% for Europeans, respectively. Moves from overseas, considered a change in LMA, are a small part of overall mobility; Māori are slightly less likely to have moved from overseas.

Panel B compares mobility rates across subgroups of the Māori population defined by whether they specify any iwi affiliations, and, if specified, whether or not at the beginning of the sample period they live in a local LMA as defined above. Sole and mixed Māori are

[10] We experimented with other cut-offs; more broadly defined local areas lessened the mobility differences between local and non-local Māori.

combined for this analysis. In 1996, 44% of Māori live in local iwi areas, 32% live in non-local areas, and the remainder have no iwi affiliation. In 2001, 45% live in local areas and 36% live in non-local areas. In both periods, Māori living in a local iwi area are 8–10 percentage points less likely to move to a different LMA than Māori living in a non-local iwi area. Māori with no iwi affiliation fall somewhere in between. In general, Māori not living in a local iwi area appear quite a bit more mobile than Europeans (as measured by the percentage changing LMA).

Panel B also examines whether Māori who change LMAs move to local or non-local destination LMAs. Among Māori who live in a local LMA at the beginning of the sample period, 57-58% of those who move between LMAs move to another local LMA, compared with 45-46% of Māori movers who initially live in non-local LMAs. This suggests that Māori who live in local LMAs have a natural propensity to live in local iwi areas, as well as possibly having attachment to a particular local area. It is also possible that Māori who live in local LMAs are affiliated with iwi that are local to more LMAs, in general, than other Māori.

The finding that Māori are more mobile than Europeans on average appears at odds with the suggestion that the attachment of Māori to particular geographical locations renders them less mobile. However, these comparisons do not control for differences in the sociodemographic characteristics of the three ethnic groups. The Māori working-age population is younger than the European population and younger people are typically more mobile than older ones. Other salient differences exist between the ethnic groups, for example, in educational levels and employment rates, which may also be correlated with mobility.

These raw comparisons also do not control for differences in where individuals are located. The likelihood that an individual leaves an area may partly be driven by characteristics of the area, such as amenities. Consequently, if people with a certain innate

likelihood of being mobile tend to settle in particular areas, failing to account for the geographical clustering of ethnic groups could result in misleading conclusions about ethnic differences in mobility.

4.2 Regression Analysis of Ethnic Mobility Differences

For these reasons, we turn next to regression analysis so we can control for other important correlates with migration decisions and directly examine the impact of local economic shocks. Our main regression is a linear probability regression that takes the form:[11]

$$Y_{it} = \alpha_t + \beta X_{it} + \delta Z_{it} + e_{it} \quad (1)$$

where *i* indexes the individual and *t* indexes the survey year. Y_{it} equals 1 if individual *i* at time *t* lives in a different LMA to where he lived five years ago and equals 0 otherwise, X_{it} is a vector of indicator variables that identify the ethnic group to which the individual belongs, and Z_{it} is a vector of sociodemographic control variables the varies in different specifications. In all cases, we pool data from the 2001 and 2006 censuses and control for the survey year (α_t). The coefficients on the X_{it} variables indicate the average underlying differences in mobility between individuals in different comparison groups and are the main focus of our analysis.

Our main regression analysis splits the Māori and European population into seven ethnic comparison groups: Europeans, sole Māori who live in a local LMA at the beginning of the sample period, sole Māori who live in a non-local LMA at the beginning of the sample period, sole Māori who do not report an iwi affiliation, and three analogous groups for mixed Māori.

[11] This model is a reduced-form specification of the general internal migration model introduced in Greenwood (1975). We estimate an OLS model even though we have a binary dependent variable because, as discussed in Angrist and Pischke (2009), if one's goal is to estimate marginal effects then this model is robust to misspecification of the conditional distribution of the error term, whereas discrete choice models are not. Interpretation of the results is also more straightforward, particularly when there are two-way interactions as in some of our specifications. We also estimate models where our outcome variable is distance moved and have similar qualitative findings.

Table 2 presents summary statistics for all variables used in the regression analyses for each comparison group. Europeans make up 85% of the analysis population. Sole Māori in local LMAs are the largest Māori group (32% of the Māori population) followed by sole Māori in non-local LMAs (19%), mixed Māori in non-local LMAs (14%), mixed Māori in local LMAs (13%), sole Māori with no iwi affiliation (12%) and mixed Māori with no iwi affiliation (9%). Sociodemographic characteristics vary considerably across comparison groups. On average, Māori are younger, less qualified, less likely to be married, less likely to be in full-time employment, more likely to have low levels of income, and more likely to be single parents. In general, mixed Māori are more similar to Europeans than are sole Māori, and non-local Māori are more similar to Europeans than are local Māori.

Table 3 presents the results from estimating three versions of equation (1). Europeans are the omitted comparison group in each specification, thus the coefficient on each other group is interpreted as the relative difference in mobility between that group and Europeans. In the first specification, we control for fixed or predetermined characteristics only, namely age (as a quadratic), gender, education and survey year, in addition to the comparison group indicator variables.[12]

Controlling for these basic characteristics, we find that all non-local Māori and those without an iwi affiliation are more mobile than Europeans while local Māori are less or similarly mobile. Local Māori are 0-2 percentage points less mobile, Māori with no iwi affiliation about 2 percentage points more mobile, non-local mixed Māori 6 percentage points more mobile, and non-local sole Māori 10 percentage points more mobile than comparable Europeans. Given our large sample size, all of these differences are strongly significant.

Figure 1 graphs the age–mobility relationship derived from the regression estimates (normalised to 0 for age 40). The solid line ("no LMA FE") shows the results from the first

[12] Although education is not, strictly speaking, fixed or predetermined, the 30 to 59-year-olds who make up our sample had largely completed their formal education more than five years earlier.

specification. As expected, mobility decreases at a decreasing rate throughout the prime-age range, levelling off around age 52. The age–mobility gradient is quite steep early on, with 30-year-olds nearly 14 percentage points more likely to change LMAs than 40-year-olds. We also find a large education-mobility gradient. Relative to those with no qualifications, individuals with school qualifications are 0.3 percentage points more likely, those with vocational qualifications 2 percentage points more likely, and those with university degrees 7 percentage points more likely to change LMAs. Gender is essentially unrelated to mobility, with the difference between men and women economically zero (though statistically significant).

In the second specification, we control for an individual's location five year's previously (using LMA fixed effects measured at the beginning of the sample period) in addition to the control variables from the first specification. As previously discussed, these fixed effects capture the unobserved contributions of individual locations to outward mobility. Our results are here inferred by comparing the mobility of Māori in particular locations to the mobility of similar Europeans in those same locations. This approach reduces the concern that any differences we might find are related to earlier locational decisions of Māori and non-Māori and not to underlying mobility propensities.

The comparisons between Europeans and the various Māori groups are qualitatively robust to the inclusion of LMA fixed effects. However, the coefficients on Māori groups decrease with LMA fixed effects, indicating that Māori tend to cluster in higher mobility LMAs. Non-local Māori are still much more mobile than Europeans, with mixed Māori in this group 4 percentage points more mobile, and sole Māori 8 percentage points more mobile. Māori with no iwi affiliation are now 1 percentage point more mobile, and local Māori 1–2 percentage points less mobile than Europeans. The age–mobility (the dashed lines in Figure 1, labelled "LMA FE") and education–mobility gradients are both flatter with the addition of

LMA fixed effects. This indicates that younger individuals and those with more education choose to live in locations that people are more likely to leave (and vice versa for older individuals and those with less education).

In the third specification, we include control variables for an individual's marital and employment status, family type, and pre-tax income in the previous year in addition to those variables included in the second specification. The backwards-looking nature of our data means we are only able to measure these individual time-varying characteristics at the end of the period, after the individual has or has not moved. Because these variables are likely to be endogenously determined with mobility, their inclusion in the regression model may bias the results, and so our preferred specification excludes them. In fact, the inclusion of these additional control variables has little impact on our main findings.

4.3 Heterogeneity by Ethnic Group

The regression specifications estimated above assume that sociodemographic characteristics have the same effect on mobility for all comparison groups. Here we re-estimate the second specification from Table 3, allowing the relationships between age, gender, and education and mobility to vary for each ethnic group. Table 4 presents the coefficients from one regression that includes all these interactions. The first column, labelled 'Europeans', shows the relationship between these variables and the mobility of Europeans. The remaining columns present interaction effects for each Māori group, i.e. these coefficients show the effect of each characteristic on the mobility of a particular Māori subgroup over and above its effect on Europeans.

Figure 2 graphs the age–mobility profiles of Māori relative to Europeans. This figure shows that most types of Māori are most mobile relative to Europeans at mid-working ages of 40 to 45, and have lower relative mobility both at young and old working ages. We also find that the relationship between education and mobility differs across ethnic groups. The

interaction effects show consistent evidence that mobility is higher for more qualified individuals, and that this difference is more pronounced for most Māori groups than for Europeans.

The qualification-mobility gradient is particularly steep for local Māori. For example, local Māori with university degrees are 8.6 percentage points more mobile than local Māori with no qualifications, whereas this difference for Europeans is just 4 percentage points. Combining these figures with the average differences between local Māori and Europeans discussed above, local Māori with university degrees are clearly more mobile in absolute terms than comparable Europeans. This may reflect that Māori with higher qualifications are a more select group of the population than equivalently qualified Europeans, which is quite likely given the lower average qualification levels of Māori.

4.4 Impact of Labour Market Shocks

In this section, we extend our basic regression model, equation (1), to include controls for local economic conditions. Specifically, we control for the labour force participation rate (LFP), the unemployment rate, and the interaction between the two among people of the same age and education level as the individual, and who lived in the individual's origin LMA. Labour market conditions are all measured five years previously, at the beginning of the migration period.[13] Since we include origin LMA fixed effects, we are effectively asking how mobility responds to changes in local economic opportunities. We control for both local LFP and unemployment rates, as well as their interaction, to allow people in and out of the labour force to have different average migration responses to local labour market shocks. A range of factors could cause such heterogeneity. For example, a strong labour market might make a region attractive to a worker, but more expensive for a non-worker. More broadly, those who

[13] We experimented with different measures of demographic characteristics. Because some LMAs are quite small, we settled on a version based on 10-year age groups and 3 qualification categories (grouping degree with post-school). Our regression also includes fixed effects for these 30 groups.

are in the labour force might have their location decisions driven by different factors to those who are not. For example, those outside the labour force may not be able to afford the monetary cost or risk of migration.

Table 5 presents the results of this regression. To aid interpretation of the interactions, in Figure 3 we graph the impact of changes in the unemployment rate on the mobility of different ethnic groups at different levels of local LFP. These results show that higher unemployment rates for a demographic group in a region lead to higher out migration by Europeans in that demographic group when local LFP for that group is over 50 percent. The magnitude of this effect is increasing in the group's LFP, with a 10 percentage point increase in unemployment leading to a 0.3 percentage point increase in migration when LFP is 50% compared with a 2.9 percentage point increase in migration when LFP is 100%. The difference between these effects has the expected sign: individuals in the labour force are more likely to leave an area when it suffers a negative labour demand shock, whereas individuals not in the labour force are less likely to be induced to leave by such a shock.

Both groups of non-local Māori are highly responsive to labour market conditions. This could be because these individuals are disproportionately likely to have moved in the past to pursue employment away from their home areas, and as such are self-selected to be more mobile for non-family reasons. Like Europeans, non-local mixed Māori are more responsive at higher levels of LFP, but have relatively higher out-mobility at every LFP level. Non-local sole Māori are more responsive to labour market shocks than Europeans at low levels of LFP, but their responsiveness is insignificantly different to that of Europeans at high levels of LFP.

In contrast, both groups of local Māori are both very unresponsive to labour market conditions, and this unresponsiveness does not vary significantly with LFP. This could occur because this group has chosen to live "locally" for non-economic reasons, and hence will likely move only if these reasons change (for example, if family circumstances change).

Alternatively, their local support networks might be strong enough to help them weather temporary adverse shocks to economic opportunities, alleviating their need to move.

We cannot reject the hypothesis that mixed Māori without iwi affiliations are equally responsive to local economic shocks as Europeans, which makes sense since this group is likely to be the most 'European' of the Māori groups. Our results for sole Māori without iwi affiliations are difficult to interpret. They show counterintuitively that these Māori are less likely to leave a labour market area that faces a negative economic shock, especially if local LFP is high. One possibility is that the quality of data for these individuals is lower than for other groups, potentially including higher mis-recall of location five years earlier.[14]

5 Conclusions

In this paper, we use Census data to examine how the internal mobility of Māori compares to that of Europeans in New Zealand from 1996 to 2006. Our regression analysis compares the mobility between geographic labour markets of Māori and Europeans who initially live in the same area. We also examine heterogeneity in outcomes within the Māori population, distinguishing Māori who report only one ethnicity from those with multiple ethnicities, and those who report a tribal (iwi) affiliation. For Māori with an iwi affiliation, we also stratify by whether they live in an area where their iwi has a strong network. Finally, our analysis directly examines how individuals from different groups responded to changes in local labour market opportunities during the post-reform period.

In contrast to most anecdotal evidence, we find that Māori are more mobile on average than similar Europeans. However, Māori who live in areas with strong networks of their iwi are slightly less mobile than Europeans, suggesting that social ties could be an important impediment to moving to labour market opportunities. Our findings on migration responses

[14] This would be consistent with not listing any iwi indicating, in some cases, a lack of effort in filling out the census form rather than a genuine lack of affiliation.

to local labour market shocks provide additional evidence along these lines: Māori living in their iwi network areas are almost entirely unresponsive to changes in local economic opportunities. In contrast, non-local Māori are more responsive than Europeans.

Although self-selection is likely to play a role in these differences, they do imply that there exists a large sub-population of Māori who are likely to have had trouble adjusting to the reforms of the 1980s liberalisation period. This also suggests there may be an important role for location-based policies in closing the gap between Māori and European labor market outcomes.

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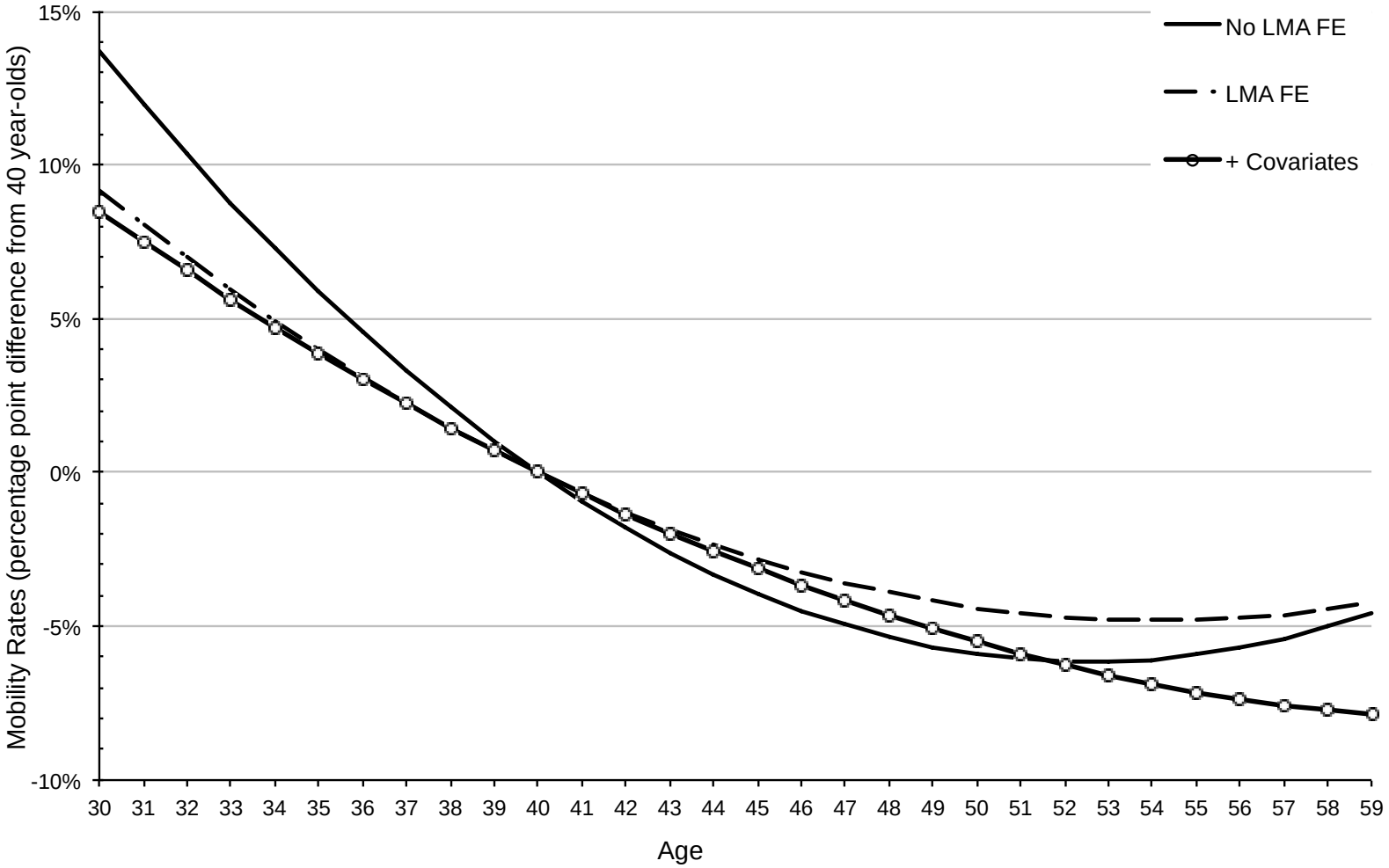
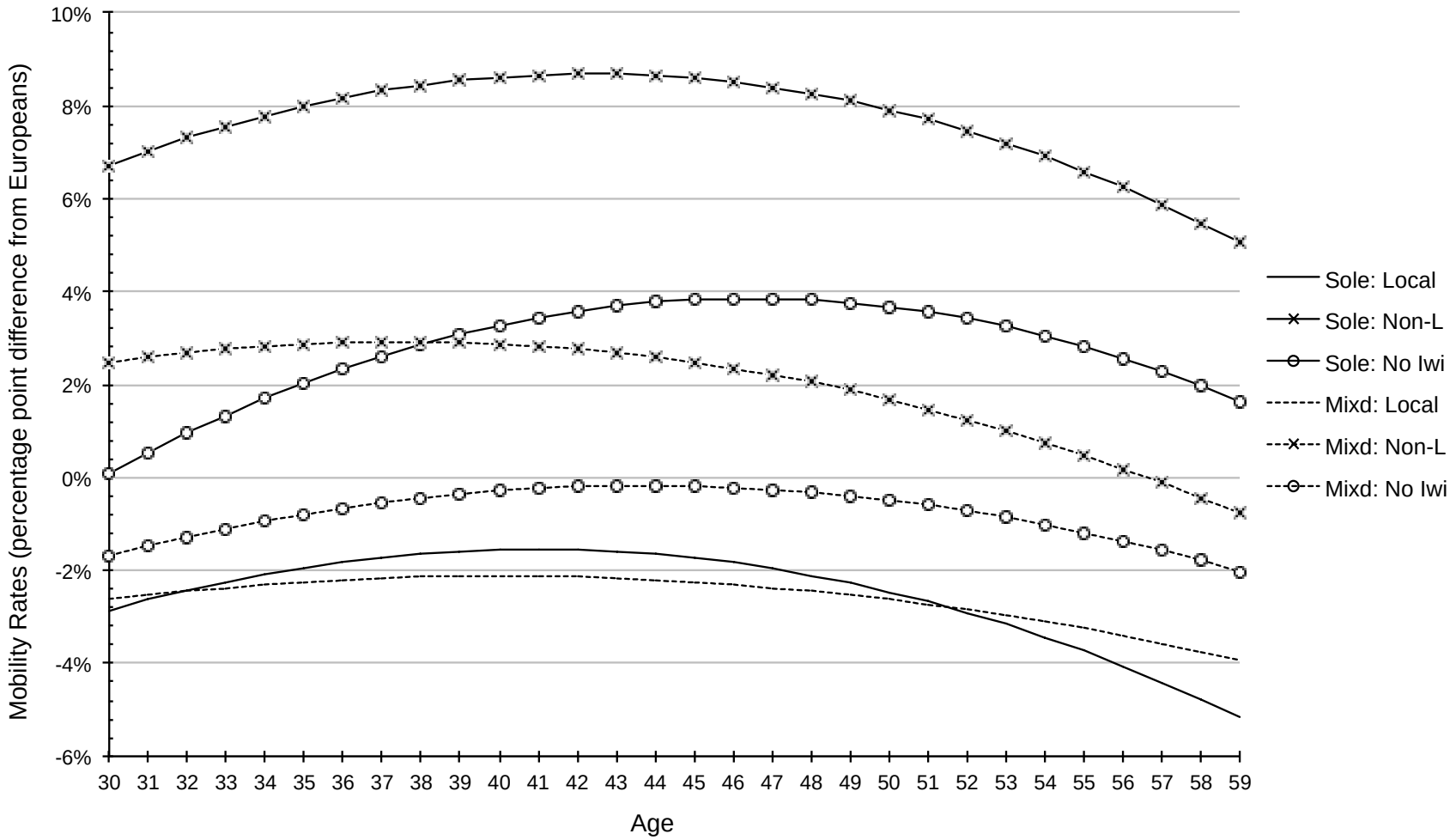
Figure 1: Estimated Age-Mobility Patterns



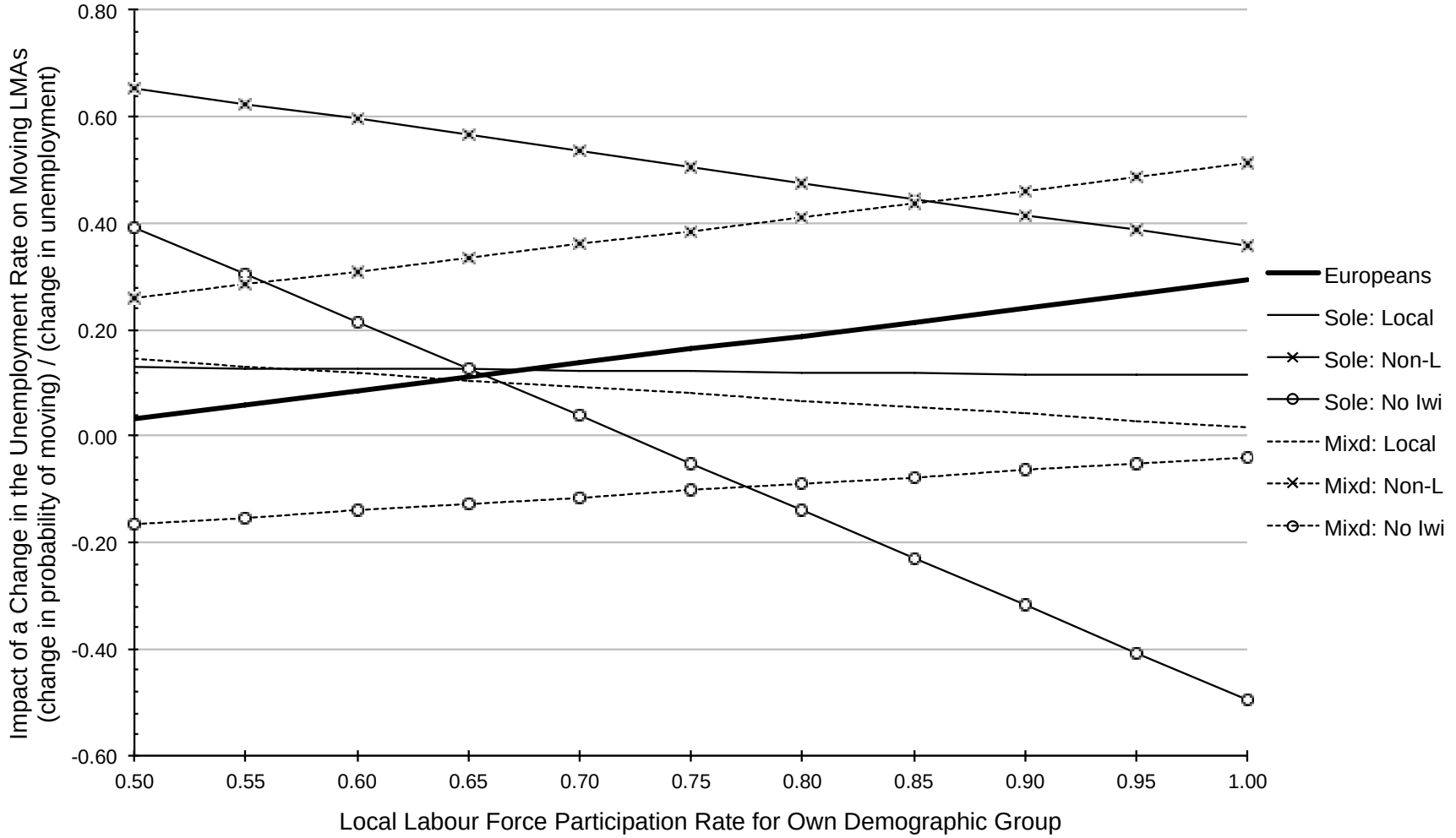
Note: This figure shows the age–mobility relationships (normalised to 0 at age 40) in the regressions presented in Table 3.

Figure 2: Estimated Age-Mobility Patterns by Ethnicity



Note: This figure shows the age–mobility profiles of different groups of Māori relative to Europeans in the regression presented in Table 4. Refer to the notes to Table 1 for an explanation of how local and non-local Māori are defined.

Figure 3: Estimated Impact of Local Unemployment Rates on Mobility by Ethnicity



Note: This figure shows the impact of changes in the unemployment rate on the mobility of different ethnic groups at different levels of local labour force participation, from the regression presented in Table 5. Refer to the notes to Table 1 for an explanation of how local and non-local Māori are defined.

Table 1: Mobility Status by Ethnicity, Location and Year

	Between 1996 and 2001			Between 2001 and 2006		
Panel A	Sole Māori	Mixed Māori	European	Sole Māori	Mixed Māori	European
Same area unit	56.7%	53.5%	59.5%	53.8%	49.9%	55.1%
Changed area unit, Same LMA	22.8%	25.7%	24.0%	24.6%	27.9%	25.7%
Changed LMA	18.6%	18.2%	13.7%	18.9%	18.3%	14.8%
Moved from Overseas	1.9%	2.6%	2.8%	2.6%	3.9%	4.3%
Moved from Outside LMA	20.5%	20.8%	16.5%	21.5%	22.2%	19.2%
Population	98,739	50,571	885,081	102,621	64,503	905,307
	Between 1996 and 2001			Between 2001 and 2006		
Panel B	Māori: Local Iwi	Māori: Non-Local Iwi	Māori: No Iwi Affiliation	Māori: Local Iwi	Māori: Non-Local Iwi	Māori: No Iwi Affiliation
Same LMA	82.6%	74.3%	80.2%	82.8%	72.1%	78.6%
Changed LMA	17.4%	25.7%	19.7%	17.2%	27.8%	21.4%
Changed to Local LMA	9.9%	11.9%	0.0%	9.9%	12.6%	0.0%
Changed to Non-Local LMA	7.5%	13.8%	0.0%	7.3%	15.3%	0.0%
Population	65,946	47,490	35,871	75,744	59,658	31,719

Note: Newell and Papps (2001) define 140 labour market areas (LMAs) using an algorithm that ensures that most people who live in one LMA work in it, and most people who work in one LMA live in it. We calculate for each LMA–iwi combination the proportion of the total iwi population living in that LMA relative to the proportion of the total European population living in it, based on aggregating the 1996, 2001 and 2006 censuses, and if this proportion exceeds 1.5, the LMA is considered a local LMA for the iwi. Classifications of Maori as living locally or non-locally to their iwi refer to the start of the 5-year period. All individual counts in the tables have been randomly rounded to base 3 for confidentiality reasons.

Table 2: Population Characteristics by Ethnicity and Location

	Sole Māori			Mixed Māori			European
	Local Iwi	Non-Local Iwi	No Iwi Affiliation	Local Iwi	Non-Local Iwi	No Iwi Affiliation	
Moved from Outside LMA	17%	28%	20%	17%	26%	21%	18%
Mean Age	42.9	42.8	42.2	41.5	41.1	40.8	44.2
Female	55%	50%	47%	60%	59%	51%	52%
Has No Qualifications	44%	39%	51%	29%	22%	33%	22%
Has School Qualification	22%	25%	18%	32%	32%	30%	33%
Post-School Qualification	18%	19%	11%	25%	26%	20%	27%
University Degree	5%	7%	2%	8%	14%	7%	14%
Missing Qualifications	12%	10%	18%	7%	5%	9%	4%
Single, Never Married	24%	22%	26%	18%	17%	19%	12%
Legally/De Facto Married	61%	63%	56%	68%	69%	66%	76%
Divorced/Separated/Widowed	14%	15%	14%	13%	13%	14%	12%
Missing Marital Status	1%	1%	3%	0%	0%	1%	0%
Employed Full-Time	53%	59%	52%	60%	62%	60%	68%
Employed Part-Time	13%	12%	12%	15%	15%	14%	16%
Unemployed	9%	7%	9%	6%	5%	5%	2%
Not in the Labour Force	25%	21%	28%	19%	18%	21%	14%
Mean Real Income	$25,228	$28,920	$24,094	$30,184	$34,357	$31,096	$38,615
Income Missing	8%	7%	16%	4%	4%	8%	4%
Non-Family Member	23%	26%	30%	18%	19%	22%	19%
Couple, No Chilldren	14%	17%	15%	16%	17%	17%	26%
Couple, Children	42%	40%	36%	49%	48%	46%	47%
Single Parent	21%	17%	19%	18%	16%	16%	8%
Year = 2001	48%	47%	55%	43%	41%	50%	49%
Year = 2006	52%	53%	45%	57%	59%	50%	51%
Percent of Overall Population	5%	3%	2%	2%	2%	1%	85%
Percent of Māori Population	32%	19%	12%	13%	14%	9%	
Population	101,595	61,551	38,214	40,095	45,597	29,376	1,790,388

Note: See the notes to Table 1 for a description of how local LMAs for each iwi are defined. Real incomes are in 2006 Dollars.

Table 3: OLS Regression of Whether Moved LMA from 5 Years Ago

	Baseline	LMA Fixed Effects	Extended Covariates
Ethnic group: Omitted category European			
Sole Māori: Local Iwi	-0.005***	-0.015***	-0.021***
	(0.001)	(0.001)	(0.001)
Sole Māori: Non-Local Iwi	0.096***	0.077***	0.070***
	(0.002)	(0.001)	(0.001)
Sole Māori: No Affiliation	0.021***	0.008***	-0.003
	(0.002)	(0.002)	(0.002)
Mixed Māori: Local Iwi	-0.023***	-0.013***	-0.015***
	(0.002)	(0.002)	(0.002)
Mixed Māori: Non-Local Iwi	0.055***	0.040***	0.038***
	(0.002)	(0.002)	(0.002)
Mixed Māori: No Affiliation	0.015***	0.010***	0.006***
	(0.002)	(0.002)	(0.002)
Age	-0.041***	-0.026***	-0.019***
	(0.000)	(0.000)	(0.000)
Age^2 / 100	0.039***	0.024***	0.015***
	(0.000)	(0.000)	(0.000)
Female	-0.002***	0.001***	-0.008***
	(0.001)	(0.000)	(0.001)
Qualifications: Omitted category no qualifications			
Has School Qualification	0.003***	0.001	0.010***
	(0.001)	(0.001)	(0.001)
Post-School Qualification	0.019***	0.013***	0.024***
	(0.001)	(0.001)	(0.001)
University Degree	0.069***	0.043***	0.060***
	(0.001)	(0.001)	(0.001)
Year: Omitted category 2001			
2006	0.025***	0.015***	0.019***
	(0.001)	(0.000)	(0.000)
Origin LMA fixed effects		Yes	Yes
Additional controls			Yes
R-Squared	0.034	0.193	0.203
Observations	2,106,819	2,106,819	2,106,819

Note: This table presents the results of three linear probability regressions in which the dependent variable is a dummy for living in a different LMA to five years earlier. All regressions pool data from 2001 and 2006. The sample is all New Zealand-born European and Māori aged 30–59. See the notes to Table 1 for a description of how local LMAs for each iwi are defined. Each regression also includes an indicator variable for missing qualifications. *Additional controls* are: marital status (indicator variables for never married, married, de facto married, divorced or separated, widowed, or missing marital status), employment status (indicator variables for employed full-time as a wage/salary earner, employed full-time as a non-wage/salary earner, employed part-time as a wage/salary earner, employed part-time as a non-wage/salary earner, unemployed, not in the labour force, or missing employment status), income the previous year (indicator variables for 9 numerical categories or missing), and household composition (indicator variables for a couple with dependent/adult children, a couple without dependent/adult children, a single parent of dependent/adult children, or a non-family). Asterisks denote: *** significant at 1%, ** significant at 5%, * significant at 10%. Standard errors are in parentheses.

Table 4: OLS Regressions of Whether Individuals Moved LMA from Five Years Ago with Ethnicity Interaction Effects

		Ethnicity interaction effects					
	European	Sole Māori: Local Iwi	Sole Māori: Non-Local Iwi	Sole Māori: No Iwi Affiliation	Mixed Māori: Local Iwi	Mixed Māori: Non-Local Iwi	Mixed Māori: No Iwi Affiliation
Ethnic group main effect		-0.204***	-0.148***	-0.272***	-0.111**	-0.078	-0.163***
		(0.033)	(0.042)	(0.053)	(0.052)	(0.049)	(0.060)
Age	-0.028***	0.009***	0.011***	0.013***	0.004*	0.006***	0.007***
	(0.000)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)
Age^2 / 100	0.026***	-0.011***	-0.013***	-0.014***	-0.005	-0.008***	-0.008**
	(0.000)	(0.002)	(0.002)	(0.003)	(0.003)	(0.003)	(0.003)
Female	0.001*	0.000	0.003	-0.002	0.009**	-0.002	0.004
	(0.001)	(0.002)	(0.003)	(0.004)	(0.004)	(0.003)	(0.004)
Qualifications: Omitted category no qualifications							
Has School Qualification	0.000	0.001	-0.004	0.003	0.008*	-0.005	0.004
	(0.001)	(0.003)	(0.004)	(0.005)	(0.005)	(0.005)	(0.005)
Post-School Qualification	0.011***	0.023***	0.007	0.019***	0.024***	0.010**	0.010*
	(0.001)	(0.003)	(0.004)	(0.006)	(0.005)	(0.005)	(0.006)
University Degree	0.040***	0.046***	0.019***	0.034***	0.046***	0.002	0.026***
	(0.001)	(0.005)	(0.006)	(0.013)	(0.007)	(0.006)	(0.009)
Year: Omitted category 2001							
2006	0.016***	-0.016***	-0.006**	-0.002	-0.020***	-0.013***	-0.003
	(0.001)	(0.002)	(0.003)	(0.004)	(0.004)	(0.003)	(0.004)
Origin LMA fixed effects	Yes						

Note: This table presents results from a single regression where the dependent variable is a dummy for living in a different LMA to five years earlier. It replicates the regression in column 2 of Table 3, but allows the effects of the covariates to vary with ethnic group. Origin LMA fixed effects are included, but not allowed to differ by ethnic group. See the notes to Table 1 for a description of how local LMAs for each iwi are defined. Asterisks denote: *** significant at 1%, ** significant at 5%, * significant at 10%. Standard errors are in parentheses. The sample size is 2,106,819 and the R-squared is 0.193

Table 5: OLS Regressions of Whether Individuals Moved LMA from Five Years Ago: Impact of Labour Market Shocks

		Ethnicity interaction effects					
	European	Sole Māori: Local Iwi	Sole Māori: Non-Local Iwi	Sole Māori: No Iwi Affiliation	Mixed Māori: Local Iwi	Mixed Māori: Non-Local Iwi	Mixed Māori: No Iwi Affiliation
Labour Force Participation Rate	0.090***	0.118***	0.206***	0.140***	0.102***	0.096**	-0.026
	(0.014)	(0.020)	(0.034)	(0.036)	(0.034)	(0.044)	(0.043)
Unemployment Rate	-0.227**	0.373**	1.180**	1.508***	0.500*	0.232	-0.065
	(0.110)	(0.168)	(0.479)	(0.292)	(0.293)	(0.648)	(0.421)
LFP Rate * Unemployment Rate	0.520***	-0.552**	-1.116*	-2.296***	-0.777*	-0.012	-0.267
	(0.150)	(0.237)	(0.649)	(0.414)	(0.414)	(0.870)	(0.590)

Note: This table presents the results of a single regression where the dependent variable is a dummy for living in a different LMA to five years earlier. It replictes the specification in column 2 of Table 3, but controls for labour market conditions and interacts these with ethnic group. Labour market conditions are defined for the LMA lived in five years earlier by 10-year age group and 3-category qualifications (grouping degree with post-school). The labour force participation rate and unemployment rate are expressed as fractions. Fixed effects are also included in the regression for each of these 30 groups. See the notes to Table 1 for a description of how local LMAs for each iwi are defined. The sample size is 2,034,177 observations. Asterisks denote: *** significant at 1%, ** significant at 5%, * significant at 10%. Standard errors are in parentheses.