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# The Relationship between Social Capital and Migrant Integration, Ethnic Diversity, and Spatial Sorting

Matthew Roskruge & Jacques Poot

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# The Relationship between Social Capital and Migrant Integration, Ethnic Diversity, and Spatial Sorting

Matthew Roskruga<sup>a</sup> & Jacques Poot<sup>b</sup> \*

## Abstract

In this paper, we present evidence from quantitative research over the last decade on how the social capital of individuals in Aotearoa New Zealand is associated with birthplace and, for migrants, years since migration. We also consider the effects of spatial sorting and ethnic diversity on social capital formation. Aotearoa New Zealand has one of the highest rates of immigration in the OECD and, consequently, one of the highest shares of foreign-born individuals in the population. Additionally, the population is characterized by high ethnic diversity and a large indigenous population, with Māori representing 17 percent of the population. Using several data sources, we measure social capital by focusing on participation and volunteering in a range of community activities, perceptions of safety and inclusion, and voting in elections. Regression modelling shows that, as expected, migrants have little local social capital upon arrival. However, differences between their social capital and that of native-born individuals reduce considerably as the duration of residence in Aotearoa New Zealand increases. When the migrant share in a region is larger than the national average, migrants invest less in bridging social capital. Migrant clustering within a region increases their investment in bonding social capital. Bridging activities are associated with better employment outcomes. Less than one in five respondents in the utilized survey data report discrimination, and for migrants, discrimination declines with years of residence. However, the trend in discrimination has been upward over time and particularly affects non-European migrants and persons identifying with Māori and Pacific Peoples ethnicities. Residential location matters. Greater ethnic diversity is associated with the perception of a less safe neighbourhood, but individuals in ethnically diverse regions experience relatively less discrimination. Additionally, there is more involvement in elections in such regions. In contrast, greater ethnic polarisation in regions is associated with less civic engagement and more discrimination.

**JEL classification codes :** F22, R11, Z13

**Keywords:** social capital, ethnic diversity, bonding, bridging, linking, immigrant integration, spatial sorting

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## 1. Introduction

The total number of international migrants in the world has quadrupled since 1960 (Batalova, 2022).<sup>1</sup> The many – and wide ranging – consequences of this global phenomenon for countries of origin, countries of destination, and the migrants themselves have triggered a huge literature that can be collectively referred to as ‘migration impact assessment’ (MIA; Nijkamp et al., 2012). A relatively recent focus of this research has been on the social capital of migrants and their communities, particularly in terms of the interrelationship between migrants’ social capital and their socio-economic outcomes. A broad consensus has emerged during the last decade that social capital refers to the networks of relationships among people embedded in communities – with a specific focus on how these networks enable the community to function effectively in terms of resources, trust, support, reciprocity, and opportunities.<sup>2</sup> In the case of international migrants, such networks can be within the migrant community (i.e. co-ethnic networks), link to other persons in the country the migrants live in, or refer to ongoing relationships with those they left behind in their country of origin.<sup>3</sup>

In this paper we focus on hitherto largely unpublished evidence from research during the last decade on the role that social capital plays in migrant integration in Aotearoa New Zealand (NZ).<sup>4</sup> The case of NZ is of particular interest given that this nation state has – among OECD countries – one of the highest rates of immigration. In 2023, net international migration (i.e. immigration minus emigration, including the net migration of NZ citizens, which is usually negative) is estimated to be about 2.6 percent of the population.<sup>5</sup> Consequently, the share of foreign born in the NZ population is also one of highest in the OECD (about 27 percent at the time of the 2018 population census), while the share of foreign born in the largest city (Auckland, population 1.7 million) is about 40 percent. Additionally, NZ has a large indigenous population – with Māori representing 17 percent of the population. Overall, cultural diversity is very high (Stone et al., 2021) and attitudes toward migration and migrants are generally among the most positive in the world (Sliver et al., 2021).

In this context, migrants have ample opportunities to build co-ethnic networks, while also engaging with other groups in the community. Following Chetty et al. (2022a) and others, we distinguish between three types of social capital. The first is a cross-type connectedness, whereby the people who are interacting are of different types. This is also commonly referred to as ‘bridging’ social capital. The second type of social capital can be thought of as the cohesiveness of a network, whereby people sort into clusters of relative homogeneity, often driven by ‘homophily’, a tendency for people to be attracted to those who are similar to themselves. This type of social capital is commonly referred to as ‘bonding’. The third type of social capital is concerned with ‘civic engagement’, which can be measured by participation and volunteering in civic organisations, voting in general and local elections (‘actions’), or by feelings of trust in others, and safety in the neighbourhood (‘perceptions’). This can be referred to as ‘linking’ social capital. While bonding and bridging are by definition mutually exclusive, linking activities can overlap with either. For example,

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<sup>1</sup> World Bank (2023) estimates that about 184 million people (2.3 percent of the world’s population) live outside of their country of nationality, including 37 million refugees. Additionally, there are 61 million people who live in a country in which they were not born but who acquired that country’s citizenship, i.e., they are foreign-born naturalized citizens.

<sup>2</sup> For broad introductory surveys, see Cook (2022) and Field (2017).

<sup>3</sup> See McCann et al. (2010) on the ‘relationship capital’ of migrants with respect to their family and friends in their country of origin.

<sup>4</sup> Aotearoa, meaning ‘land of the long white cloud’ in the language of the indigenous Māori population, is being increasingly used as a substitute or conjugate when referring to the nation of New Zealand.

<sup>5</sup> Source: <https://infoshare.stats.govt.nz/>

the networks that are established by volunteering in a community may lead to both bonding and bridging.

The structure of social capital is displayed in Figure 1. The networks that are established through bonding and bridging types of relationship building can be directly, or indirectly, observed from data. Such data are nowadays mostly obtained from digital media, such as emails, mobile phone calls, and social media. However, traditional analogue media (such as landline phone calls, printed newsletters, and postal mail) may still play a small role as well. Despite the growth in online interactions, in-person interactions remain important for bridging, bonding and the development of trust (Misra et al., 2016). Bridging, bonding, plus participation and volunteering in social activities, are actions that yield tangible social capital. In contrast, perceptions of others and of the community are subjective and can be referred to as intangible social capital. Nonetheless, they form an important part of linking social capital.

Figure 1 about here

Participation and volunteering in social activities partially overlap since some participants do not volunteer, while some volunteers may not participate themselves in the activity (e.g., a running event to raise funds for a community organisation). Clearly, actions that lead to the formation of tangible social capital may trigger intangible social capital in the form of perceptions, and vice versa. Reciprocity may be an important driver of actions (Plickert et al., 2007). The causal linkages between actions and perceptions on the one hand and 'impact' (private and public benefits and costs) on the other, are also two-way. This creates a challenge for empirical research that aims to identify causal effects (Mouw, 2006; Chen, 2011). Nonetheless, some empirical evidence has been derived from natural experiments (Algan et al., 2016; Gërkhani and Kosyakova, 2022), from randomised assignment of individuals to observe social capital formation (see Enos, 2014, on observing commuters in Boston public transport), or from 'gaming' laboratory experiments (El-Bialy et al., 2023).

A range of types of impact of social capital formation that benefit the individual are shown in Figure 1. Similarly, there are private costs (monetary costs, effort, etc.) involved in the formation of tangible social capital. Additionally, the impact can be measured at the community level and at more aggregated levels. As in the case of the private costs and benefits, various types of public costs and benefits can be discerned. Several are listed in Figure 1. The present paper is predominantly concerned with the upper half of Figure 1.

Social capital formation was first examined in NZ in a series of publications by Robinson (1997; 1999; 2002). These papers, along with quantitative work by Spellerberg (2001), laid the groundwork for exploring social capital in the NZ context. The early research highlighted the importance of considering ethnicity of migrants and of the native born, particularly indigenous Māori and Pacific Island groups, when attempting to measure the social capital of individuals. Socio-economic status has also been shown to be an important determinant of social capital. Data for empirical research on social capital have been predominantly sourced from surveys that were introduced at the start of the 21<sup>st</sup> century, such as the NZ General Social Survey (Statistics New Zealand, 2010), which is similar to the European Social Survey (Davidov et al., 2008).<sup>6</sup>

As noted above, and shown in Figure 1, bonding and bridging activities can take place via various media or through meeting in person. Digital media are currently the dominant instrument for

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<sup>6</sup> International comparisons are facilitated by replication of some survey instruments across countries, such as through the International Social Survey Programme (ISSP; see Haller et al., 2009).

forming and maintaining networks. Ahmad et al. (2023) suggest that particularly bridging social capital benefits from social media activity. Researchers of social capital are increasingly using data generated from online networks provided by social media companies, such as Facebook, Twitter/X, LinkedIn, WhatsApp and Instagram. These datasets are potentially huge. For example, Chetty et al. (2022a, 2022b) analyse the social network of 70.3 million Facebook users aged 25-44 in the US, while Obradovich et al. (2022) measure cultural distances between groups by scraping Facebook data from two billion people globally. While such datasets provide a vast resource for research on social capital associated with relationships between individuals, they do have several limitations. Firstly, biases may be introduced by selective public versus private posting, selective participation in social media, and the dominant focus of research on English-language networks (Wang et al., 2019). Secondly, access to anonymised social network data may be difficult to obtain or very costly to researchers, particularly when the data are commercially valuable. Thirdly, access to data may be restricted by a country's privacy regulations and ethical standards, which can also change over time.

While there has been some research on social capital by means of social media data in NZ, this has used only small samples of individuals (Lee and Hallak, 2020), and no research on social capital has yet been conducted in this country that has scraped social media 'big data' to derive statistically representative estimates of social capital. The empirical findings reported in this paper are all derived from large sample surveys that are considered representative of the population of NZ generally, and migrants specifically. Hence the reported results do not suffer from the biases of social media data that were noted above, but it should be acknowledged that the available survey data provide only limited information on the actual networks of the surveyed individuals, including their social media involvement.

We measure social capital by focusing on participation and volunteering in community activities, perceptions of safety and social inclusion; and voting in elections. The evidence shows that, as would be expected, migrants have little local social capital upon arrival in NZ. However, differences between their social capital and that of native born reduce considerably with increasing years of residence. Residential location matters. When the share of migrants in a region's population is larger than the national average, we find that migrants invest less in bridging social capital. Migrant clustering within a region increases their investment in bonding social capital. We find that less than one in five respondents in NZ survey data report discrimination and, for migrants, discrimination declines with years of residence. However, the trend in discrimination has been upward and particularly affects non-European migrants, but also those with Māori and Pacific ethnicities. Greater ethnic diversity is associated with a perception of less safe neighbourhoods, but individuals in ethnically diverse regions experience relatively less discrimination. Additionally, there is more involvement in elections in such regions. In contrast, greater ethnic polarisation in regions is associated with less civic engagement and more discrimination.

The remainder of the paper is organised as follows: the next section discuss the theoretical considerations that drive our empirical work on the relationship between migrant integration and social capital formation. We focus on both the personal and the spatial dimension of this relationship. With respect to the latter, we consider the implications of intra-regional and inter-regional differences in ethnic diversity on social capital formation in communities. Section 3 provides evidence of the effect of migrant integration on their social capital by means of data obtained from several large surveys. Section 4 assesses empirically to what extent survey data on social activities can be interpreted as being associated with bridging, bonding or linking. We show that spatially selective patterns of migrant settlement contribute to large differences in ethnic diversity between regions. Evidence is then provided on how the intensity of bridging and bonding activities of

migrants is related to their geographic clustering within and between regions. Section 5 reports on regression modelling of the association between ethnic diversity at the regional level and various quantitative measures of social capital of individuals living in these regions. The final section evaluates the empirical results and offers potentially promising avenues for further research on social capital of migrants and non-migrants in ethnically diverse communities.

## **2. Theoretical considerations**

During the last two decades a rapidly growing literature has emerged that links social capital and migrant integration in destination countries. To some extent this is due to the huge growth in cross-border migration globally since the 1980s. Li (2004) suggests that this interest is also due to policy concerns around improving outcomes for migrants. Migrant networks, and hence their social capital, can be important for facilitating migration but also for settlement into the destination country (Mouw, 2006). Massey and Aysa-Lastra (2011) argue that social capital may act as a substitute for human capital: migrants with low human capital may rely on informal networks obtained through social capital formation to gain access to resources and improve their outcomes.

While migrants form social linkages in their new country of residence, they may also continue to maintain social capital in their country of origin. This is particularly true in recent decades, as modern global travel and communication networks allow for a mobile and integrated world, which has radically reduced the cost of maintaining social networks over long distances (McCann et al., 2010). Contact via online media has particularly benefitted refugees and other displaced persons (Moran, 2023), for whom social capital is an important contributor to wellbeing (Elliott and Yusuf, 2014). Eckstein (2010) suggests that, additionally, remittances sent by migrants to the home country can be considered as investments in transnational social capital.

The act of migration has a large impact on a person or family's social network. Temporary migrants may rely particularly on bonding social capital, i.e., the support of the co-ethnic group in the destination country. They will also continue to have strong ties with families and friends left behind. Those who have the intention to migrate long-term or permanently will benefit from initial ties with co-ethnics in the destination country, but their investment in bridging social capital in the years following migration may have considerable economic returns in the labour market (Lancee, 2010), particularly among white-collar workers (Piracha et al., 2016). More generally, migrant social capital formation can be associated with enhanced quality of life (Adedeji, 2021).

We would expect a migrant's social capital to increase with years lived in the destination country due to the building of relationships in their community and in the workplace. However, due to discrimination and social exclusion, some migrants may have persistently lower levels of community participation and group membership compared to similar native-born individuals (Pendakur and Mata, 2012; Tegegne and Glanville, 2019). This means that while immigrants may wish to invest in social capital to improve their outcomes, social barriers to participation may need to be overcome for them to benefit from bridging social capital formation.

Quantitatively, one can consider a migrant's accumulation of social capital over time in a way that is analogous to the way in which migrant earnings may, or may not, 'catch up' over the years to those of the native born. This was first investigated with regression methods and US data by Chiswick

(1978).<sup>7</sup> Hence, as in the case of the earnings function, we express the outcome – here a measure of social capital of individual  $i$ ,  $K_i^S$  – as a function of years lived in the migrant destination country,  $YSM_i$ . When comparing social capital between groups,  $YSM_i$  is only defined for those born abroad. This is taken into account in regression analysis by interacting  $YSM_i$  with a dummy variable  $FB_i$  that is one when individual  $i$  is born abroad and zero otherwise.

Much of the variation in social capital across individuals can be associated with observable characteristics. Important ones such as gender, education, and ethnicity, can also impact on the socio-economic status of the groups (Lin, 2000). In the present context, we focus specifically on ethnicity, defined for migrants by country of birth and for the native born by self-reported ethnicity. Thus, ethnicity can be represented in regressions by a set of dummy variables  $ETH_i^p$ , which are equal to one when individual  $i$  belong to ethnic group  $p$  ( $p = 1, 2, \dots, P$ ) and zero otherwise. It is clear that when the first  $F$  of these ethnic groups represent foreign birthplaces,  $\sum_{p=1}^F ETH_i^p = FB_i$ .<sup>8</sup> Other characteristics of individuals that are likely to be associated with an individual's social capital can be assembled in a vector  $\mathbf{X}_i = (X_i^1, X_i^2, \dots, X_i^Q)$ .

Given data on individuals at time  $t$ , this framework leads to the following regression equation to identify the determinants of the social capital of migrants and the native born:

$$K_{it}^S = \beta_0 + \beta_1 (YSM_{it} \times FB_i) + \sum_{p=1}^P \beta_{p+1} ETH_{it}^p + \sum_{q=1}^Q \beta_{q+P+1} X_{it}^q + \varepsilon_{it} \quad (1)$$

in which  $\varepsilon_{it}$  represents the regression error term. Heterogeneity can be investigated by testing whether specific coefficients that are defined for both the native-born and migrants differ between these two groups. The hypothesis that social capital of migrants increases with years in the destination country is tested by considering whether the estimate of  $\beta_1$  is greater than zero.

When data on years since migration are only available in intervals, such as 0-4 years, 5-9 years, etc. coefficients can be estimated for each interval. This has the added advantage that nonlinearity in the relationship between  $YSM_{it}$  and  $K_{it}^S$  can be detected. Also note that the migrant identifier  $FB_i$ , which signals a foreign birthplace, is time invariant. In summary, we report coefficient estimates of regressions of the following form:

$$K_{it}^S = \beta_0 + \sum_{y=1}^Y \beta_y (YSM_{it}^y \times FB_i) + \sum_{p=1}^P \beta_{p+y} ETH_{it}^p + \sum_{q=1}^Q \beta_{q+Y+P} X_{it}^q + \varepsilon_{it} \quad (2)$$

in which  $YSM_{it}^y$  refers to a dummy variable for the  $y^{th}$  time interval.

Despite the ease with which digital media enable a person to form relationships at any physical distance, the location and features of a person's neighbourhood, city, or region, are likely to impact on a person's social capital. Face to face relationships continue to matter. Indeed, the 'death of distance' hypothesis is easily refuted by noting that the majority of a person's friends on social media live in the person's vicinity (Backstrom et al., 2010; Poot, 2024).

Physical proximity to others in a personal network will be particularly important to migrants, as it will affect their opportunities for bridging and bonding in their community. While bonding social capital will be important for maintaining cultural identity and traditions, bridging may be important

<sup>7</sup> For a survey of this literature, see Duleep (2015). Winkelmann and Winkelmann (1998) provide typical examples with NZ census data.

<sup>8</sup> Note that country of birth is in this set up equivalent to a single ethnicity. The available data do not allow us to distinguish migrants with different ethnicities who originated from the same country of birth. In NZ this is not a problem because most migrants from a source country identify with that country's majority ethnicity.



for labour market outcomes and socio-economic advancement. Lancee (2010) finds, for a sample of migrants in the Netherlands, a significant and positive relationship between bridging social capital and both employment and income, while no corresponding relationship was found for bonding social capital. Results similar to Lancee (2010) were found earlier by Aguilera (2002, 2005) for Mexican and Puerto Rican immigrants in the United States. However, Li (2004) suggests that, while it is important to encourage and facilitate bridging social capital to assist in integration, at the same time bonding social capital is needed to encourage local social support and community development.

Friessen (2003) argues that dense intra-migrant group interactions (i.e., bonding social capital) could increase segregation, reducing the positive spillovers (externalities) of migrant social capital to society as a whole. Instead, dense relations beyond the immigrant community through bridging social capital allows spillovers of migrant social capital to be captured by society generally. Nonetheless, bonding social capital may provide beneficial spillovers to wider society, namely through facilitating the maintenance and intergenerational communication of cultural and traditional practices and identities which may otherwise be lost. However, high levels of bonding social capital may be responsible for excessive claims on an individual's resources by other members of a social network. As shown in Figure 1 under the 'public costs' header, high levels of bonding with low levels of bridging, present for example in groups engaged in organised crime, or due to discriminatory practices, may lead to segregation and exclusion of outsider groups, which can have negative effects in communities in terms of economic outcomes, health and wellbeing (Villalonga-Olives and Kawachi, 2017).

Discrimination is expected to have a negative effect on social capital formation (Bloemraad and Ramakrishnan, 2008). NZ studies reveal that New Zealanders have generally a positive attitude toward immigrants and that they endorse multiculturalism (Ward and Masgoret, 2008; New Zealand Productivity Commission, 2021). However, discrimination issues that are experienced in other countries are also present in NZ, especially for those migrant groups that are culturally different from the European and Māori populations. Positive sentiments towards migrants are generally highest amongst people of Asian ethnicity, residents of the capital Wellington and people born overseas, and are lowest amongst New Zealanders who had no friends born outside NZ (New Zealand Productivity Commission, 2021). Racism, including of an institutional nature, is quite prevalent in NZ and has led to negative impacts on health and wellbeing in communities (Talamaivao et al., 2020).

Daldy et al. (2013) examine the causative factors of self-reported discrimination among migrants in workplaces in NZ. They find that migrants are significantly more likely than NZ-born workers to report that they experience discrimination in the workplace. However, the likelihood that migrants report discrimination decreases with the number of years a migrant has lived in NZ and reaches parity with the NZ born after approximately 20 years, with the highest likelihood of discrimination being found amongst migrants from Asian and Pacific regions.

Given that proximity continues to matter in the building of social relationships, the type and level of social capital a migrant chooses to invest in will depend on the geographic distribution of their co-ethnic group. To quantify this distribution we can use measures of spatial clustering across regions and measures of local spatial sorting (also referred to as segregation). Many such measures have been proposed in the literature (Nijkamp and Poot, 2015). Here we will restrict ourselves to the most popular ones.

Keeping notation to a minimum, we denote  $N_{pra}$  to represent the population of group  $p$  (with  $p = 1, 2, \dots, F$  referring to foreign birthplaces, and  $p = F+1, F+2, \dots, P$  to the native born ethnic groups) in region  $r$  (with  $r = 1, 2, \dots, R$ ) and local area unit  $a$  (with  $a = 1, 2, \dots, A$ ). Summing populations over indices is denoted by  $*$ . Hence  $N_{p**}$  refers to the national population of ethnic group  $p$ ,  $N_{*r*}$  refers to the total population of region  $r$  and  $N_{***}$  refers to the total population nationally. The relative spatial concentration of migrant group  $p$  in region  $r$ , i.e. the spatial clustering of migrants across the nation, can then be measured by a location quotient:

$$LQ_{pr} = \left( \frac{N_{pr*}/N_{p**}}{N_{*r*}/N_{***}} \right) \quad (3)$$

It is clear that when the proportion of migrants from a particular birthplace group in a particular region is exactly equal to national proportion of migrants from that group in NZ, the corresponding  $LQ_{pr}$  for that region will equal 1. When the proportion in the region is greater than the national proportion,  $LQ_{pr} > 1$ , and if there are less than the 'expected' number of migrants from that group within the region, given the region's share of the national population,  $LQ_{pr} < 1$ . The higher the value of  $LQ_{pr}$ , the greater the clustering of migrants in that region compared to other regions.

To measure the sorting, or segregation, of migrants of a particular group within a region, we use the conventional segregation index ( $SI$ ) introduced by Duncan and Duncan (1955). In the present context,  $SI_{pr}$  is given by

$$SI_{pr} = 0.5 \sum_a \left| \frac{N_{pra}}{N_{pr*}} - \frac{(N_{*ra} - N_{pra})}{(N_{*r*} - N_{pr*})} \right| \quad (4)$$

which examines how clustered migrants from ethnic group  $p$  are across area units  $a$  within a region  $r$ . This index has a simple interpretation, namely the fraction of migrants of group  $p$  that would have to move from their current residential location to make the spatial distribution of group  $p$  across the area units of region  $r$  the same as the distribution of the total population of region  $r$  across its area units. When  $SI_{pr} = 0$ , the migrants of group  $p$  are distributed across the region's area units proportionally to the total population of the area units. The larger the value of  $SI_{pr}$ , the greater the segregation of group  $p$  in the region. When  $SI_{pr} = 1$ , the migrants of group  $p$  are residing only in area units in which there are no other ethnic groups.

Neither of the two measures of the spatial distribution of migrants of a particular origin informs on the diversity they experience locally. This local diversity may have an impact on their relationship building, given that many relationships are formed in close physical proximity, as we noted above. We therefore also consider several popular measures of diversity (Nijkamp and Poot, 2015). The first of these is  $FI_{ra}$ , the fractionalisation index of area unit  $a$  of region  $r$ :

$$FI_{ra} = 1 - \sum_{p=1}^P \left( \frac{N_{pra}}{N_{*ra}} \right)^2 \quad (5)$$

This diversity index has been extensively applied internationally, and in NZ as well (Maré and Poot, 2023), and has a very simple interpretation. It measures the probability that two randomly selected individuals in area unit  $a$  of region  $r$  belong to different groups.  $FI_{ra}$  varies between a minimum of 0 (when there is only one ethnic/birthplace group present) and a maximum of  $1 - \frac{1}{P}$  (when all groups represent equal shares of the population).

It has been generally acknowledged in the literature that the fractionalisation index tends to be strongly correlated with the share of the foreign born in areas in which the foreign born are jointly a minority of the population or, in other words, in which the share of the native born is greater than

one half (Ozgen et al., 2012). This is clearly a very common situation. To differentiate between the cases in which the foreign born either consist of only one group or, alternatively, consist of many groups, we calculate an index of fractionalisation of migrants,  $FM_{ra}$  (recall that there are  $F$  of these among the  $P$  ethnic groups):

$$FM_{ra} = 1 - \sum_{p=1}^F \left( \frac{N_{pra}}{\sum_{j=1}^F N_{jra}} \right)^2 \quad (6)$$

Hence it is common for researchers to replace  $FI_{ra}$  in regressions with two variables, the share of foreign born in the population,  $SF_{ra}$ :

$$SF_{ra} = \frac{\sum_{j=1}^F N_{jra}}{N_{*ra}} \quad (7)$$

and the index of fractionalisation of the foreign born as defined by Equation (6). This is useful because  $FM_{ra}$  and  $SF_{ra}$  convey different information about the ethnic diversity of the population.

The final diversity index that we consider is the polarisation index,  $PI_{ra}$ :

$$PI_{ra} = \sum_{p=1}^P \left( \frac{N_{pra}}{N_{*ra}} \right)^2 \left( 1 - \frac{N_{pra}}{N_{*ra}} \right) \quad (8)$$

Like  $FI_{ra}$ , this index has a minimum of 0 when there is only one ethnic/birthplace group present, but takes the value  $\frac{1}{P} - \frac{1}{P^2}$  when all groups represent equal shares of the population. Hence, for a large number of small groups,  $PI_{ra}$  approaches zero. The index reaches a maximum of 0.25 when there are only two groups that each represent half the population, which explains why it is called a polarisation index. Because the spatial clustering measures ( $LQ_{pr}$ ,  $SI_{pr}$ ) are the same for all persons of group  $p$  in region  $r$ , and the diversity measures ( $FM_{ra}$ ,  $SF_{ra}$ ,  $PI_{ra}$ ) are the same for all persons in region  $r$  and area unit  $a$ , corresponding clustering of the errors  $\varepsilon_{it}$  in Equations (1) and (2) must be assumed in regressions that include these variables.

The theoretical framework discussed above provides the basis for the selection of variables and the specification of the regressions. To investigate robustness of the results, measures of social capital and regression specifications have been, where possible, replicated across data sets.

### 3. Social capital and migrant integration: data and regressions

The main source to investigate self-reported social relationships is the General Social Survey (GSS), which commenced in 2008 and has been conducted biennially since then (with the 2020 survey having been delayed until 2021, due to the COVID-19 pandemic). Table 1 combines descriptive statistics from the three most recently conducted GSSs to gauge key differences in social capital between migrants and the NZ born, as well as recent trends.

Table 1 about here

Migrants represent an increasing proportion of the NZ population. The percentage of NZ born has been declining from 69.6% in 2016-17 to 68.1% in 2021. The share of recent migrants (residing less than five years in NZ) has been increasing from 5.2% in 2016-17 to 6.3% in 2018-19 but then declined, due to the COVID-19-related border closure, to 4.1% in 2021. In terms of feelings of safety, there are consistent and remarkable patterns: recent migrants feel safer than long-term migrants, who – in turn – feel safer than those born in NZ. This applies to walking alone in a neighbourhood after dark, but also to using the internet for online transactions. These differences are likely to be

driven by recent migrants considering safety in their country of origin to be less than in NZ. In 2021, 71.7% of recent migrants felt very safe or safe when walking in their neighbourhood alone after dark, as compared with 57.1% of those born in NZ. Feeling safe when using the internet is always greater than feeling safe in the neighbourhood, but there is a notable downward trend in the latter for all groups. Migrants report experiencing more discrimination than the NZ born (except long-term migrants in 2016-17). Recent migrants report more discrimination than long-term migrants, 22.5% and 21.1% in 2021 respectively. However, while reported discrimination among the NZ born and long-term migrants increased between 2016-17 and 2021, this trend is not observed among recent migrants.

Non-face-to-face contact with family and with friends, presumably mostly through social media, email and phone calls, exceeds face-to-face contact for all groups and years. Obviously, migrants have less face-to-face contact with family than the NZ born. For most migrants, face-to-face contact with family and friends left behind is either not possible on a weekly basis, or restricted to video calls. The percentage of recent migrants who had face-to-face contact with family at least once a week was 36.7% in 2016-17 but increased to 46.5% in 2021, possibly due to the increasing use of face-to-face videocalls through, for example, WhatsApp. In contrast, 60.4% of long-term migrants had face-to-face contact with family in 2016-17, declining to 54.4% in 2021. The difference between the corresponding percentages signals that migrants have initially limited social networks in the destination country but destination country networks grows over time. As they do, the interaction switches from non-face-to-face contact to face-to-face contact, although this is less consistent for the interaction with friends than with family. Family reunification in the years following migration may be an important mechanism here. A notable percentage of recent migrants felt lonely: 30.7% in 2016-17, but the percentage declined to 27.1% in 2021. Feelings of loneliness decline sharply with migrant integration in NZ. This will be reconfirmed by the regression models discussed below. Still, loneliness is always more prevalent among migrants than among the NZ born.

In contrast, migrants report higher levels of trust than the NZ born. The level of trust of NZ people is greater among recent migrants than among those who have been in NZ for longer than five years. In 2018-19, 82.7% of recent migrants stated high levels of trust (7 to 10 on a scale of 0 to 10), compared with 62.1% of the NZ born. Acceptance of ethnic diversity is remarkably similar between NZ born and migrants. In 2016-17, 88% of the NZ born felt comfortable, or very comfortable, about a new neighbour who was of a different ethnicity. This percentage increased further to 90.5% in 2021. However, migrants feel less able to express their identity than the NZ born, although the gap declines with years lived in NZ. 89.4% of the NZ born found it easy or very easy to express their identity in 2016-17, compared with 73.9% of recent migrants. Interestingly, the ability to express identity has been declining for all groups between 2016-17 and 2021.

The descriptive patterns reported in Table 1 may not remain robust to multivariate regression analyses. To conduct such a regression analysis, we use two data sets: the Adult Literacy and Life Skills Survey (ALL) 2006-2007 and GSS 2008, which corresponds most closely to the ALL survey period. While these two dataset are not recent, the advantage of using both is that some ALL information is not collected in the GSS but informs explicitly on a range of social activities that assist us in explicitly considering bonding, bridging and linking activities in the next section. Additionally, by using both surveys, we can check for robustness of results across the datasets. We find that the results are consistent with the more recent descriptive findings in Table 1, with other information from recent GSS surveys, and with analyses with alternative data sources.<sup>9</sup>

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<sup>9</sup> See also Roskrug (2021).

The ALL survey was conducted between May 2006 and March 2007 and collected data from a representative sample of 7,131 respondents aged between 16 and 65, of whom 25% were foreign born (the same share of population as in the 2006 census).<sup>10</sup> The ALL survey contains geographic data which we exploit to test the effect of spatial clustering of migrant populations on migrant social capital. In contrast, the Confidentialised Unit Record File (CURF) of the GSS 2008 GSS does not contain detailed geographic data, and therefore could not be used to test for effects of spatial clustering. GSS 2008 was based on interviews between April 2008 and March 2009 of 8,721 individuals aged 15 and over, of whom 23% were foreign born (Crothers, 2023; Statistics New Zealand, 2010).

To improve comparability between the two surveys, data extracted from both samples were restricted to persons aged between 20 and 65. More than half of the respondents were female (ALL: 57%; GSS: 54%). In both surveys about 40% of respondents had dependent children living in the household. Years of schooling were somewhat higher in ALL than in GSS (ALL: 13.5; GSS: 12.7) and, relatedly, the employment rate was also higher in ALL than in GSS (ALL: 87%; GSS: 80%). Those who had resided less than 10 years in NZ accounted in both surveys for 41% of the foreign born. Birthplaces of the foreign born were allocated across four regions of birth (with the share of the sample population in parentheses): Western (ALL: 13%; GSS 11%), Asia (ALL: 7%; GSS 6%), the Pacific (ALL: 5%; GSS: 3%) and Middle Eastern, Latin American and African (MELAA) (ALL: 1%; GSS: 3%). Self-reported ethnic identity among the NZ born was allocated to four ethnic groups: European (ALL: 61%; GSS: 68%), Māori (ALL: 16%; GSS: 12%), Pacific (ALL: 5%; GSS: 2%) and Other (ALL: 2%; GSS: 1%).<sup>11</sup>

70% of the ALL respondents indicated that they participated in at least one community activity and 57% did at least one type of volunteering in the twelve months before the survey. In the GSS, these percentages were notably lower: 40% and 32% respectively, but referred to only the last three months rather than 12 months. Comparing the foreign born with the NZ born, participation in community activities was slightly higher among the foreign born (ALL: 72% vs. 70%; GSS: 41% vs. 40%) while volunteering was less common among the foreign born (ALL: 52% vs. 59%, GSS: 31% vs. 32%).

GSS 2008 provides three indicators of social interaction that are not available in ALL. The GSS 2008 data show that 94% of the NZ born felt they had sufficient interpersonal contact, compared with 93% of the foreign born. 82% of the NZ born felt that they were not isolated from others, compared with 77% of the foreign born. 66% of the NZ born felt safe in their neighbourhood after dark, compared with 70% of the foreign born. From this we conclude that migrants and the NZ born had similar levels of interpersonal contact. Migrants did feel more isolated from others, but also safer.<sup>12</sup> These findings are consistent with the more recent data from Table 1.

Table 2 reports regressions of the determinants of social capital as specified by Equation (2) of the previous section, using both ALL and GSS data. Information on participation and volunteering, which can involve bridging, bonding and linking activities, is available from both surveys. Information on interpersonal contact, feelings of safety, and of inclusion, is only available from GSS. Given that the dependent variable is binary, coefficients are estimated by logit regressions.

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<sup>10</sup> Sampling weights were applied when calculating means, but not in the multivariate regression analysis (see Winship and Radbill, 1994).

<sup>11</sup> Survey respondents could identify with multiple ethnicities. Hence the sum of the percentages exceeds the share of the New Zealand born in the population.

<sup>12</sup> These differences are statistically significant at the 5% level.

## Table 2 about here

With respect to participation in community activities, there appears to be no difference between the two genders. Males are less likely to do any volunteering than females, but this is only statistically significant in the ALL sample. Males are more likely to feel safe in their neighbourhood after dark. The presence of dependent children appears to have no effect on participation in community activities in the ALL sample, but has a marginally significant positive effect in the GSS sample. Additionally, those having dependent children feel that they have sufficient interpersonal contact.

With respect to volunteering, the effect of having children is positive and statistically significant at the 1 percent level in both cases. With respect to age and education, the two surveys also show consistent and robust results, which are in line with the existing literature and theoretical predictions (Glaeser et al., 2002). Among those who are pre-retirement (the samples cover ages 20-65), participation in community activities and volunteering are more common at older ages, and are associated with greater feelings of inclusion (McDonald and Mair, 2010). Participation and volunteering also increase with years of schooling (Huang et al., 2009). Higher education leads to notably stronger feelings of adequate interpersonal contact, safety and inclusion. Using data from their own NZ survey (n=1,358), Ma et al. (2022) find that trust in others and in the political processes, not feeling exploited, and being committed to family, all protect against loneliness.

Similar effects are found with respect to employment: being employed is associated with greater participation in social activities, more volunteering, and stronger perceptions of adequate contact, safety and inclusion (the exception is the volunteering variable in the GSS data). However, causal mechanisms may exist in both directions. To identify a causal link between social capital and employment is difficult. For example, Gërkhani and Kosyakova (2022) use a natural experiment that resulted from German agencies assigning refugees in Germany to specific locations. They find little evidence of a direct causal effect of the refugees' social networks on their employment. The effects of social capital on employment may in fact be of a non-monetary nature. Franzen and Hangartner (2006) find, using ISSP 2001 data and a survey of Swiss graduates, that while using social ties is a common job-search strategy, social networks may not translate directly into higher pay. Instead, social contacts may help to lower search costs and yield better job matches. Using data on migrants in Spain, Park et al. (2022) show that migrant community social capital is more important than the measurable networks of individuals when entering the destination country labour market.

Turning now to region of birth and ethnicity, we see from Table 2 that migrants from western countries feel safer after dark in Aotearoa than the reference group (NZ born Europeans). This is also true for Māori. Besides the perception of safety, Māori social capital is in these regressions also greater than that of the NZ born Europeans in participation and volunteering regressions (with the exception of participation in the GSS). The same is the case for respondent who are NZ born but of Pacific Island ethnicity. Māori perceive to be less socially included. Those from Pacific Island ethnicity are less likely to state that they have sufficient interpersonal contact.<sup>13</sup>

Migrants originating from Asian source countries feel much less safe. Additionally, migrants from Asian countries report lower levels of participation and volunteering (the latter are not statistically

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<sup>13</sup> These regressions have been replicated with data from more recent GSSs, as well as the Quality of Life (QoL) Survey (<https://www.qualityoflifeproject.govt.nz/about-the-survey/>) and the World Values Survey (WVS) (<https://www.worldvaluessurvey.org/>). These, as yet unpublished, results show considerable consistency in differences between Māori social capital, social capital of persons born in Pacific Islands, or having Pacific ethnicities, and the New Zealand born European reference group. These findings jointly reconfirm the results shown in Table 2. See Roskrue (2021).

significant in the GSS data), while they also have notably lower perceptions of contact and inclusion. Migrants from MELAA countries are also feeling more isolated from others.

Comparing the regressions, only those born in Asia reported lower stocks of social capital than NZ-born Europeans across all measures, suggesting that migrants from Asia may face the greatest barriers to social capital formation into NZ, potentially due to these migrants being 'salient' or identifiable, making them victims of discrimination. There may also be additional cultural, religious or linguistic barriers that these migrants face which are not present for other migrant groups.

With respect to duration of residence in NZ, the sequence of coefficients shows that migrant social capital is increasing with years lived in NZ, consistent with theory and with what shown in Table 1. We also see again that migrants feel initially safer in NZ than in later years (although the coefficient is only statistically significant at the 10 percent level). This may well be due to a perception of NZ being safer than their country of birth, with this perception becoming weaker as their experiences in NZ start to dominate.

However, many of the 'years since migration' coefficients are not statistically significant, suggesting considerable heterogeneity in migrant social integration with increasing years of residence. Years in the destination country may be a less important determinant of social outcomes than it is of economic outcomes (with the latter reviewed by Duleep, 2015). In a systematic review, Zhang et al. (2023) argue that migrant participation in their community may not necessarily lead to their social integration in this community. The nature of this participation (bridging, bonding or linking) is likely to matter a lot. This is investigated empirically in the next section.

#### **4. Bridging, bonding, and linking**

The ALL survey data provide information about which kind of social activities respondents have participated in and/or have volunteered for. As can be seen in Figure 1, participation in these activities may, or may not, trigger bridging, bonding or linking social capital formation. For example, the type of social capital that is formed may depend on the nature of the interaction: face to face or online. In a recent systematic literature review, Ahmad et al. (2023) find that social media have had a positive and statistically significant impact on particularly bridging social capital. This relationship is stronger in Western than in Eastern countries. Ahmad et al. conclude that social media may offer a platform to strengthen weak ties, first argued to be important by Granovetter (1973).

However, without direct network data from social media such as analysed by Chetty (2022a, 2022b) to distinguish between bonding activities of people who are similar in some measurable way and bridging activities between those who are different in terms of the same measure, we develop a classification of networking through social activities in terms of *potential* rather than *actual* bonding, bridging and linking. The key assumption is that this potential is related to the spatial distribution of the migrant population across and within regions. Clearly, bonding activities are more likely where even random encounters among migrants are likely to be with other migrants. Conversely, bridging activities are more common where migrants are likely to be a small minority. The extent of linking will depend on the nature of the activity.

Table 3 lists the 10 types of social activities that we distinguish, based on ALL data that comprise 1,656 foreign born adults. The first column of Table 3 reports the percentage of migrants participating in the activity. One third or more of the migrants participates in religious activities, fundraising and organised sports. Less than 10 percent participates in community services and

political organisations. The latter is consistent with Carey (2019), who notes that migrants in NZ report relatively low participation rates in elections relative to those of the native-born (pp. 22-23).

Table 3 about here

We now proceed to consider in which spatial context these activities take place. Figure 2 provides maps of fractionalisation (as defined in section 2) of NZ Territorial Authorities (TAs) in terms of birthplace (Figure 2a) and ethnicity (Figure 2b). The maps are quite different because the concentration of migrants in the metropolitan areas Auckland, Wellington and Christchurch, and in Queenstown (a major tourist destination), leads to high birthplace fractionalisation in those TAs, whereas the relative concentration of Māori in Northland, Auckland, plus the central area and east coast of the North Island, contributes to high ethnic fractionalisation in those TAs.

Figure 2 about here

The TA of residence is known for each person in the ALL data. Using data on the spatial distribution of migrants and the corresponding distribution of the native born, we calculated the correlation of migrant social activities with the Location Quotient  $LQ_{pr}$  and the Segregation Index  $SI_{pr}$ , using Eq. (3) and Eq. (4) respectively. Both of these indices were created using the 2006 census administered by Stats NZ with population data coded to the TA and area unit level for each of the four overseas birth regions (listed in Table 2). At the time these data were collected, there were 74 TAs within NZ, representing administrative boundaries which are broadly similar to counties in the US and UK geographical hierarchies.<sup>14</sup> Each TA is comprised of area units, which represent between 3,000 and 5,000 individuals.<sup>15</sup>

The results are shown in the second and third columns of Table 3. The ten social activities are ranked by the values of their correlations with  $LQ_{pr}$ . The correlations with  $SI_{pr}$  are very similar. Hence, if migrants are demographically overrepresented in specific TAs, they also tend to be spatially clustered within these TAs. Both of these correlations, together with knowledge of the nature of the activity, lead to a subjective assessment of the likelihood of a personal interaction in each of these activities being bonding, bridging or linking. For example, migrant participation in religious activities is likely to lead to bonding, but offers less opportunities for bridging, given that homophily is an important driver of sorting across religious denominations (Emerson et al., 2015). However, religious activities are also likely to lead to a sense of civic responsibility and perceptions of trust and safety, at least within the church communities, i.e. linking social capital. In contrast, participating in organised sports is likely to lead to bridging social capital, since sports clubs are predominantly organised by the majority population, not by the migrant group themselves. Linking social capital is likely to be the strongest in civic activities such as volunteering for a charity, participation in political organisations and volunteering to be a member of a community or board.

The hypothesised differences between social activities in terms of the relative strength of bonding and bridging shown in Table 3 do not suggest that an individual's bonding with others in each of these activities is inversely related to their bridging with others. Instead, there are several individual characteristics that may be associated with greater levels of both. Tuominen et al. (2023) show,

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<sup>14</sup> Chatham Islands Territory, a small island with a population of 650, was not sampled in ALL and has therefore been excluded. Due to amalgamation of several TAs, the remaining 74 TAs in 2006 have been subsequently reduced to 66.

<sup>15</sup> The geographic hierarchy in official statistics has been subsequently changed. See <https://www.stats.govt.nz/methods/geographic-hierarchy/>. There were about 1900 defined area units in 2006 census data.



using Finnish data, that highly educated persons have high levels of both bonding and bridging social capital. Income plays an important role. In Table 5 below we show similar evidence, plus the positive association between age and both bridging and bonding social capital.

While we focus in this paper primarily on determinants of social capital rather than impact, Table 3 tests in a simple way whether there is a relationship between participation in these activities and employment outcomes. The hypothesis proposed and tested by Lancee (2010) in The Netherlands, and subsequently also confirmed with data from various other countries, is that bridging social capital is for migrants more effective than bonding social capital to achieve better employment outcomes.<sup>16</sup> To test this hypothesis, we compare in Table 3 for each of the ten social activities the employment rate of those participating in the activity with the employment rate of those not participating. This reveals some evidence that in typical bonding activities – religious activities and volunteering for a charity – employment rates are lower among those participating, while in typical bridging activities – organised sports – employment rates are greater among those participating. To give such correlations a causal interpretation remains difficult (Gërkhani and Kosyakova, 2022).

Roskruge et al. (2016) find that higher levels of linking social capital, such as volunteering for a charity, participation in political organisations, and volunteering to be a member of a committee or board (see Table 3), are associated with higher levels of entrepreneurship (measured by self-employment). Again, this relationship may not be causal because personal traits that lead to volunteering may also be a trigger for entrepreneurship. Roskruge et al. (2016) also find heterogeneity in their results, with MELAA, Asian and Pacific birthplaces having worse outcomes in terms of both entrepreneurship and standard of living, which again suggests possible discrimination of non-Europeans migrants in the labour market. However, self-employment and the living standard increase with more years in NZ for all groups.

Hence, similar to the evidence presented in Tables 1 and 2, we would again expect that social capital of migrants increases with duration of residence. This is formally tested by logit regressions for each of the ten activities listed in Table 3. The predicted change in participation rates when comparing those in NZ 0-4 years with those resident 5-9 years are shown in Figure 3. This indicates that there are notable increases in participation in religious activities, fundraising and school activities with increasing residence in NZ, while there is virtually no change over time in participation in sport and in volunteering as a coach, or in civic activities such as community services and participation in politics.

Figure 3 about here

Table 4 reports the coefficients of the demographic variables in the logit regressions for each of the ten types of activities listed in Table 3. Note that these regressions were estimated with the ALL sample of 1,656 foreign born only. Table 4 shows firstly that there are clear gender effects: male migrants are less likely to participate in almost all of the ten social activities than female migrants, except that they are more likely to volunteer as a sports coach. The coefficients of having dependent children are, as expected, mostly positive.

Table 4 about here

With respect to the human capital variables age and years of schooling, the results are as theoretically predicted and as empirically confirmed in the literature: more human capital implies

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<sup>16</sup> Also using data from the Netherlands, Kanas et al. (2009) find that bridging social capital increases the likelihood of a migrant being self-employed.

more social capital. The coefficients for age and years of schooling are mostly statistically significant and similar to those for the corresponding regressions with ALL data in Table 2. There are also notable differences between region-of-birth groups. The relatively highest participation is in these regressions signalled by the least negative region-of-birth group intercept. In all but one of the ten types of social activities this least negative intercept (coefficient) can be found for migrants who were born in the Pacific Islands. The only exception is volunteering as a sports coach, where being born in Western countries is the most common. The relatively lowest level of participation (with controls for other demographics) is found among those born in MELAA countries for most social activities. The exceptions are participation in religious activities, volunteering for a charity and participation in hobby clubs (with Western region of birth having the relatively lowest participation), while the relatively lowest participation for volunteering as a sports coach is found for those who were born in Asia.

To test for the effect of within-region and between-region clustering of migrants on social capital formation, we rerun the regressions in which bridging and bonding activities are aggregated along the lines of Table 3. Because there is some ambiguity with respect to which activities may be considered as predominantly bonding or bridging, a robustness check has been conducted in which bonding activities are one-by-one reassigned to bridging, and vice versa. The results are largely robust to such reassignment (Roskrue, 2013).

The dependent variables in the bridging regressions are coded as integer variables that vary between zero (in which case the individual does not participate in any of the social activities are considered as predominantly bridging) and five (the individual participates in all activities that are considered bridging). The dependent variable in the bonding regressions is defined similarly. We use tobit regressions (Verbeek, 2013) to account for fact that the dependent variable is bounded from above (zero) and from below (five).<sup>17</sup>

The results from two of these regression are reported in Table 5. The mean value of the dependent variable in the bridging regression is 1.088, compared with 1.208 in the bonding regression. Coefficients of age and schooling are significant and positive in both regressions. Those of gender, and dependent children are insignificant in the bridging regression. Migrant females and those with dependent children engage in more bonding activities. Those who live in rural regions are more likely to engage in bonding activities than those in urban areas. Using data from a Danish survey, Sørensen (2016) finds similar evidence that bonding social capital was found to be significantly higher in rural areas, whereas bridging social capital was found to be only marginally higher in urban areas.

Relative to the reference group of those born in Western countries, migrants born in the Pacific reported the highest overall levels of bridging and bonding social capital investment (albeit only statistically significant at the 10% level in the bridging regression). The relatively high level of social capital of migrants born in the Pacific reconfirms what we found in Table 4 in terms of the least negative group intercept. As we see for many of the individual activities in Figure 3, and in Table 5 by means of the coefficients for years since migration, bridging social investment is lowest for those who had been less than five years in NZ. In this regression, and in the corresponding bonding regression, the positive relationship with years of residence is very clear, with statistically significant and positive results for those who arrived between 15 and 19 years prior to responding to the ALL survey.

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<sup>17</sup> Ordered probit regressions and ordinary least squares regressions generated qualitatively similar results.

Table 5 about here

Turning to the effect of spatial clustering of migrants, Table 5 shows that the Location Quotient  $LQ_{pr}$  has a negative and statistically significant effect on bridging activities of migrants. This indicates that when migrants are overrepresented in certain TAs, investment in bridging social capital will be lower. A similar effect was found by Fajth and Bilgili (2020), using data from the Netherlands. An explanation may be found in labour market behaviour. Where a comparatively large number of migrants from the same birth region are in the same local labour market, migrants could use ethnic-specific networks to increase employment opportunities, and may also face lower discrimination by native-born or other migrant employers. This in turn would reduce the need for bridging social capital to enhance employment opportunities.

Migrants who live in regions where migrants from the same birth region are clustered together within that region, as measured by the Segregation Index  $SI_{pr}$ , are significantly more likely to invest in bonding social capital. A potential explanation for this finding is that migrants who locate closer together are able to form within-group networks with lower transactions costs than dispersed groups. There may also be a selection effect where migrants who prefer bonding social capital locate closer together. Using German data, recent research by Battisti et al. (2022) shows that, after controlling for their endogenous initial location, migrants in districts with larger co-ethnic networks (i.e. greater values of  $SI_{pr}$  in our context) are more likely to be employed soon after arrival. This advantage fades after four years, due to post-arrival investments in human and social capital.

## 5. Linking social capital and ethnic diversity

It is clear from the results shown in the previous section that spatial clustering of migrant groups influences both the nature, and the level, of their social engagement. However, this association between the spatial distribution of groups and their social capital may also matter for residential sorting. Additionally, there can be spillovers effects of clustering of some groups on clustering of others. We saw in Figure 2 that the spatial distribution of the foreign born is distinctly different from the spatial distribution of ethnic groups. In this section we therefore investigate the implications of the resulting birthplace and ethnic diversity of localities on social capital formation.

Ethnic diversity has been increasing greatly in NZ due to immigration, as in most other developed countries (Maré and Poot, 2023; Stone et al., 2021). Putnam (2007) argued that ethnic diversity tends to reduce social solidarity and social capital in the short run. He also argued that some immigrant societies have in the long run overcome such fragmentation by creating new forms of social solidarity and more encompassing identities. However, this positive long-run effect is more likely to be found in Anglo-Saxon migrant destination countries than in, for example, Europe (Gesthuizen et al., 2009). Countries such as NZ and Canada tend to show the most positive attitudes toward migrants in international surveys, and Southern European and East Asian countries the least.<sup>18</sup> These differences are often linked to the level of social capital: more positive attitudes are associated with more social capital (Economidou et al., 2020). More specifically, where bridging social capital is considerable, more positive attitudes toward migration and cultural diversity are found (Chu and Yang, 2019). However, there may be no universal link between immigration-generated diversity and community social capital. Using data from 19 countries, Kesler and

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<sup>18</sup> See <https://www.migrationdataportal.org/themes/public-opinion-migration>

Bloemraad (2010) show that the direction and strength of the relationship depends on institutional arrangements and policies.

To test the effects of diversity on social capital formation we merged unit record data of the GSS 2008, 2010 and 2012, accessed through the secure environment of the Stats NZ Datalab. A pooled sample of 25,731 observations resulted, with approximately 8,500 observations from each survey. Regional diversity indexes were calculated as described in Section 2. Eight types of social activities and perceptions were identified, with prevalence rates reported in Table 6. In terms of the structure of social capital described in Figure 1, these all fall under the broad concept of linking social capital.

Table 6 about here

The eight types of linking social capital have been grouped into three categories (with prevalence rates in the pooled data given in parentheses). The first group is networking, which includes volunteering (31.2%), participation in social activities (40.7%), and giving of unpaid help (63.4%). The second group is social cohesion and inclusion, which is observed by perceptions of feeling safe at night (51.2%), feeling included (83.0%), and by not experiencing discrimination (89.9%). Safety and discrimination can be directly compared with the more recent data shown in Table 1. This shows a social cost of sharply increasing net immigration during the last decade. Reported discrimination increased from one in ten to one in five in the population over the decade. Comparing Table 6 and Table 1, the sense of feeling safe at night in the neighbourhood has somewhat increased (around 50% in Table 6 and around 60-70% in Table 1). The third group of social capital in Table 6 is civic engagement, which is measured by voting in general elections (78.8%) and local elections (63.3%).

The regional diversity measures were calculated at the TA level by means of unit record data from the 2006 NZ Census. The mean value of the fractionalisation index of ethnicity  $FI_{ra}$  (as defined in Eq. (5)) is 0.501. This implies that in a random encounter of two individuals, the likelihood that they belong to two different ethnicities was in 2006 about 50%. As expected, fractionalisation by birthplace is much less, given that more than three quarters of the 2006 population was born in New Zealand (compare also Figures 2a and 2b). The mean value is 0.255. However, fractionalisation among the foreign born ( $FM_{ra}$ , defined in Eq. (6)) is much greater, with a mean of 0.726. Finally, ethnic polarisation as defined by  $PI_{ra}$  (see Eq. (7)) has a mean value in the 2006 census of 0.729.

Table 7 reports the results of logit regressions of the eight types of linking social capital that were distinguished in Table 6. Due to the pooling of data from three consecutive GSS surveys, a much larger sample is generated that permits the consideration of a wider range of determinants of social capital than in the earlier regressions reported in this paper. We find that the variables that were considered previously in this paper, behave similarly in these regressions.

Table 7 about here

Greater ethnic diversity, as measured by the fractionalisation index  $FI_{ra}$ , lowers all three types of networking social capital: volunteering, participation in social activities, and giving unpaid help. This NZ evidence reconfirms what is concluded in the literature by, among others, Putnam (2007), Gesthuizen et al. (2009), Laurence (2011), and Abascal and Baldassarri (2015). Fractionalisation is also negatively associated with feeling safe at night, but reduces perceptions of discrimination. However, fractionalisation does trigger more civic engagement in terms of voting in general and local elections. In contrast, ethnic polarisation  $PI_{ra}$  leads to more discrimination and less voting in general elections. These findings are mostly consistent with what Mavrides (2015) concluded with data from Indonesia: greater ethnic diversity and polarisation lead to lower social capital outcomes, but polarisation has an even larger negative effect. In terms of measuring fractionalisation, the

distinction between the foreign born and the native born appears to matter more than local ethnic diversity among the foreign born.  $FM_{ra}$  is statistically insignificant in all regressions.

Males do less networking, are less likely to vote in elections, and do feel safer at night. Age enters as a quadratic, but with a positive derivative: older persons participate and volunteer more in social activities, and they are more likely to vote. Their perceptions of social cohesion and inclusion are also more positive. Family ties (being partnered, living with children, household size) has generally positive effects on social capital.<sup>19</sup>

Being born overseas is associated with lower levels of networking, social cohesion and inclusion, and civic engagement, than is the case for the NZ born. The exception is, as also shown in earlier regressions, that migrants feel safer at night. The consistently lowest levels of networking social capital are found for those of Asian ethnicity and the highest for those of Māori and Pacific ethnicity. Those with Asian (Pacific) ethnicity are also less (more) likely to vote than those of European ethnicity. Perceptions of discrimination are greater among all non-European ethnic groups than among Europeans.

The economic variables also behave as expected. Persons with educational qualifications have greater levels of networking and are more likely to vote in elections than those without qualifications. However, they are less likely to feel socially included and more likely to have perceived to have experienced discrimination, as was shown earlier in NZ by Daldy et al. (2013). Those in the lower (upper) quartile of the income distribution have relatively less or similar (more or similar) social capital than those in the interquartile range. Those in a relatively more prosperous areas (i.e., with a higher Economic Living Standard Index) have also greater levels of social capital, with the exception that those living in such areas are less likely to give unpaid help, presumably due to the greater opportunity cost of time when receiving higher hourly earnings. The opportunity cost of time is also reflected in that, relative to those working fulltime, those working part-time, being unemployed, or not in the labour force, do more networking. Owning a home without a mortgage, or living in a home owned by a (family) trust increases all types of social capital – consistent with earlier NZ evidence reported by Roskrug et al. (2013).

There are strong positive partial correlations between social capital of any type and health (both physical and mental) and a measure of satisfaction with life. However, these relationships are clearly two-way, as already emphasised in Figure 1. Using European data, Rocco et al. (2014) show that being healthy triggers greater social capital engagement, while individual social capital is shown to be a strong determinant of health.

## 6. Final reflections

Using ALL 2006 and GSS survey data from 2006 to 2021, we report in this paper evidence from NZ on the determinants of social capital of migrants, and the effect of migration-driven greater cultural diversity and spatial sorting on social capital formation. The results are highly consistent across surveys and time periods. We measure bridging, bonding and linking social capital by focusing on participation and volunteering in a range of community activities, perceptions of safety and inclusion, and voting in elections. We find that migrants have little local social capital upon arrival but, like differences in economic outcomes (Winkelmann and Winkelmann, 1998), differences

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<sup>19</sup> The exception is a negative coefficient of 'partnered' on 'feeling safe at night'. Additionally, adults in larger households are less likely to vote in general elections.

between their social capital and that of native born reduce considerably when duration of residence increases.

Migrant and non-migrant networks are affected by homophily (the tendency of individuals to associate and bond with similar others) and spatial sorting (the tendency to want to live near those with similar backgrounds). We find that when the migrant share in a region is larger than the national average, migrants invest less in bridging social capital, even though bridging activities tend to be associated with better employment outcomes. Migrant clustering within a region increases their investment in bonding social capital.

By international standards, attitudes toward migrants in NZ are generally positive and reported levels of discrimination are low. Less than one in five respondents in the utilised survey data report discrimination and, for migrants, discrimination declines with years of residence. However, the trend in discrimination has been upward and affects particularly non-European migrants, but also those with Māori and Pacific Island ethnicity. Again, residential location matters: greater ethnic diversity is associated with a perception of less safe neighbourhoods, but individuals in ethnically diverse regions experience relatively less discrimination. Additionally, there is more involvement in elections in such regions. In contrast, greater ethnic polarisation in regions is associated with less civic engagement and more discrimination.

Much research remains to be done, in terms of measurement of social capital, establishing causal direction, and identifying and testing interventions that enhance economic growth and wellbeing through social capital. As was made clear by means of Figure 1, social capital is a complex phenomenon due the two-way relationships between actions, perceptions and impact. The concept of social capital is too broad to expect that a single interpretation will ever emerge, although the growth of social media over the last two decades is likely to lead to a gradual moving away from the use of 'stated preference' data, obtained by means of general social surveys, to 'revealed preference' data, obtained through online social media.

Spillovers of the social capital formation of individuals also need more attention. These spillovers can be positive and/or negative (see Figure 1), and are likely to be important for wellbeing and economic growth. Social capital of a community is not a simple average of social capital of its individuals. Additionally, group averages hide intra-group heterogeneity and power dynamics within social networks. In this context it is difficult to develop social-capital-oriented policies that may enhance social cohesion and wellbeing. For example, while the migrants from Asia are shown to have the lowest level of social capital in the available NZ survey data, their lower levels of bridging social capital may be due to challenges in language proficiency rather than an explicit preference for bonding activities. This issue could not be directly tested with our data. On the other hand, we find high levels of social capital of Māori and Pacific Island ethnic groups, but these have yet to be mobilised to improve economic outcomes of these groups.

Generally, the available evidence to date on social capital impacts provides limited guidance for policymakers on how to leverage social capital for positive outcomes. It is clear that networks are important: encouraging and facilitating (though information and resources) 'connectivity' in both employment and residential spheres is expected to have individual and community benefits. In any case, the distinction between bonding, bridging, and linking, will matter for policy development, not only for employment outcomes but also for wellbeing and economic growth (Muringani et al., 2021). Outcomes data are available in NZ data in terms of indicators of economic living standards, health, and life satisfaction, that have yet to be fully utilised in this context.

Establishing causality in social capital research remains challenging. We have carefully avoided inferring causal direction in the empirical associations / partial correlations that we have identified in this paper because there are often plausible mechanisms for causality to be bidirectional. For example, bridging social capital may assist a migrant in finding employment in young and innovative firms, while at the same time such firms may actively recruit migrants because cultural diversity increases their innovativeness (Ozgen et al., 2014). It is often difficult to find instruments to address endogeneity issues. Some natural experiments have been cited earlier in the paper, but these may apply only to very specific situations and lack external validity. Some experimental research, for example through game play of relationship building in a laboratory setting, is also emerging as an alternative means of identifying causal linkages (e.g., for the case of Syrian refugees in Germany, see El-Bialy et al., 2023). The growing availability of rich longitudinal microdata on an individual's social capital activities and perceptions may be a promising avenue to establish causal direction in a panel data setting.

The dynamics of social capital development and impact also needs much more attention. The impact of social capital may change over time, and the dynamics of social relationships may be influenced by historical and temporal factors. Some effects may be very long lasting. For example, Zhang (2023) finds that social networks of African American veterans formed during the American Civil War (1861-1865), had a large impact on their subsequent location and incomes.

Finally, it can be argued that a general model of social capital, such as depicted in Figure 1, has been developed with mainstream western research in mind and lacks contextual cultural specificity. Roskrug (2021) constructs and observes measures of social capital that are specific to Māori by means of the Te Kupenga social survey of the Māori population, thereby revisiting social capital in a kaupapa Māori theoretical framework. Similarly, migrant social capital should also be considered both quantitatively and qualitatively within appropriate cultural settings.

## **Acknowledgements**

This paper brings together findings of a decade of econometric research on immigrant integration and social capital formation in Aotearoa New Zealand. Various parts of this work were presented at several scientific gatherings throughout the world: International Workshop on Economic Impacts of Immigration and Population Diversity, University of Waikato, NZ, 2012; Pathways to Metropolis in the 21st Century Conference, Massey University, NZ, 2012; 4th Norface Migration Network Conference, University College London, UK, 2013; 60th Annual North American Meeting of the Regional Science Association International (NARSC), Atlanta GA, USA, 2013; 61th NARSC, Washington DC, USA, 2014; 16th Labour, Employment and Work Conference, Victoria University of Wellington, NZ, 2014; International Migration Institute, University of Oxford, UK, 2015; New Zealand Immigration Settlement Summit, Te Papa, Wellington, NZ, 2016; National Refugee Resettlement Forum, Te Papa, Wellington, NZ, 2016; Pacific Regional Science Conference Organization (PRSCO) Summer Institute, Bangkok, Thailand, 2016; Pathways, Circuits and Crossroads Conference, Wellington, NZ, 2016; 65<sup>th</sup> NARSC conference, San Antonio, USA, 2018; Massey University Economics Workshop, Palmerston North, NZ, 2019; and 61<sup>st</sup> Annual Conference of the New Zealand Association of Economists, 2021. We thank Syed Hassan, Arthur Grimes, Philip McCann, Bridget Daldy, Laura King, Philip Morrison, Hans Westlund and many conference and workshop participants for valuable inputs, comments, and suggestions. We thank June Lincoln for her excellent graphic design of Figure 1. Finally, we made use of some information on social capital research extracted from scholar.google.co.nz; chatgpt.com; elicitor.com; and consensus.app.

## Data availability

Access to the data used in this study was provided by Stats NZ under conditions designed to keep individual information secure and confidential in accordance with requirements of the Statistics Act 1975. The results presented in this study are the work of the authors, not Stats NZ.

## Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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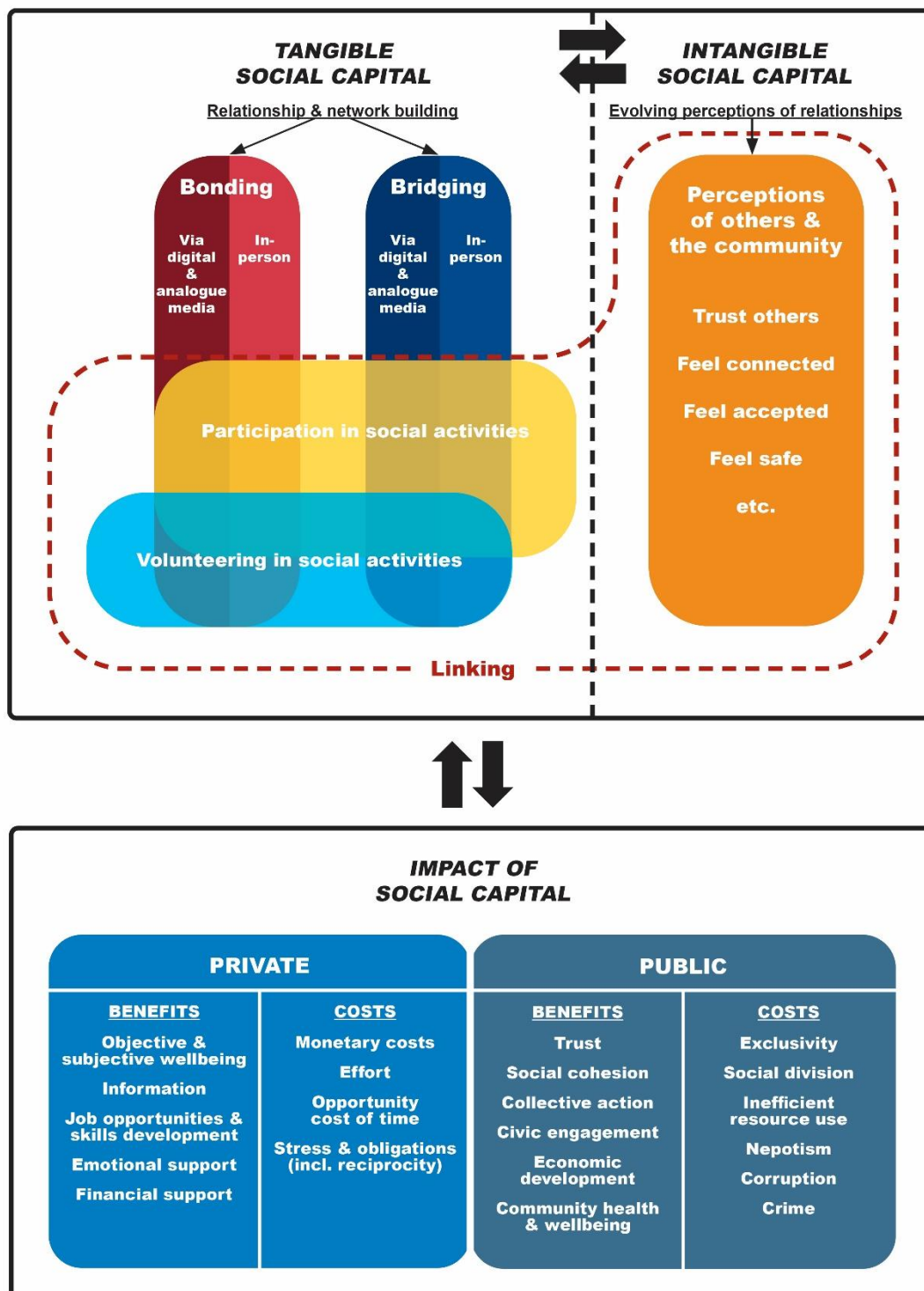
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FIGURES AND TABLES

Figure 1: The structure of social capital

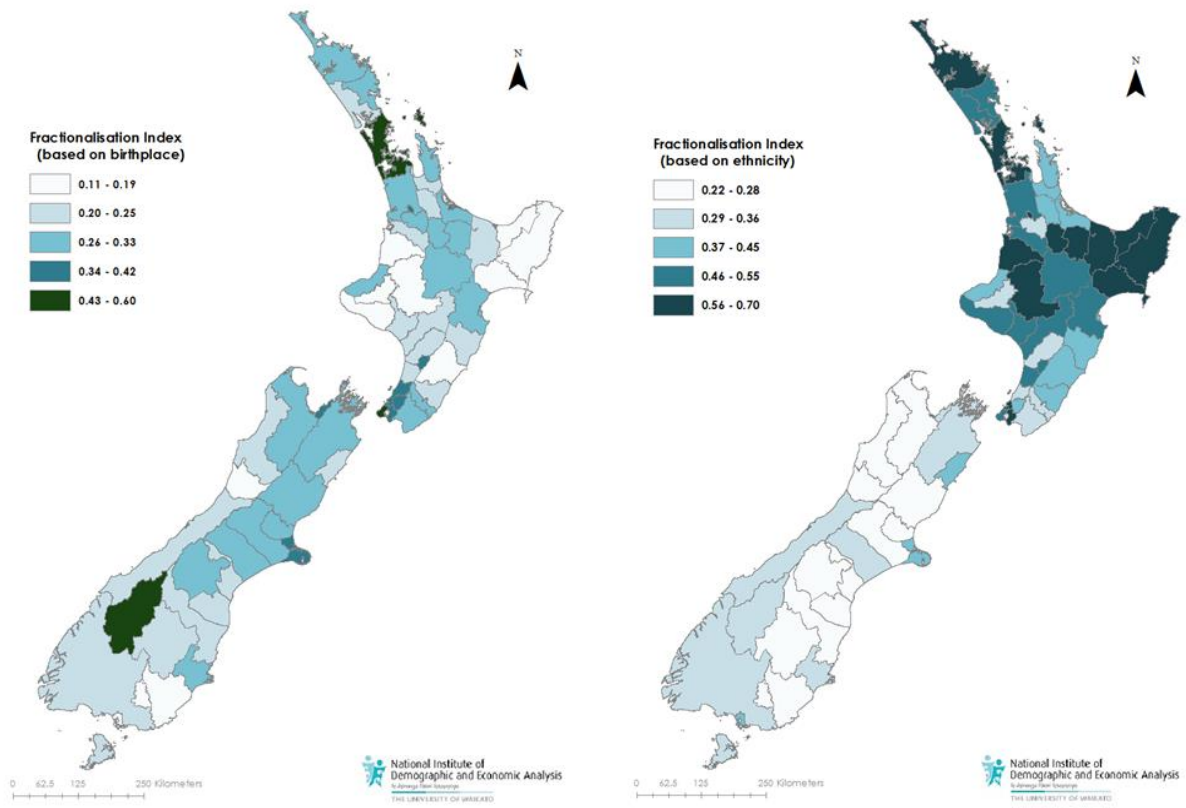


Source: the authors.

**Figure 2: Birthplace and ethnic diversity of New Zealand Territorial Authorities**

(a) Birthplace diversity

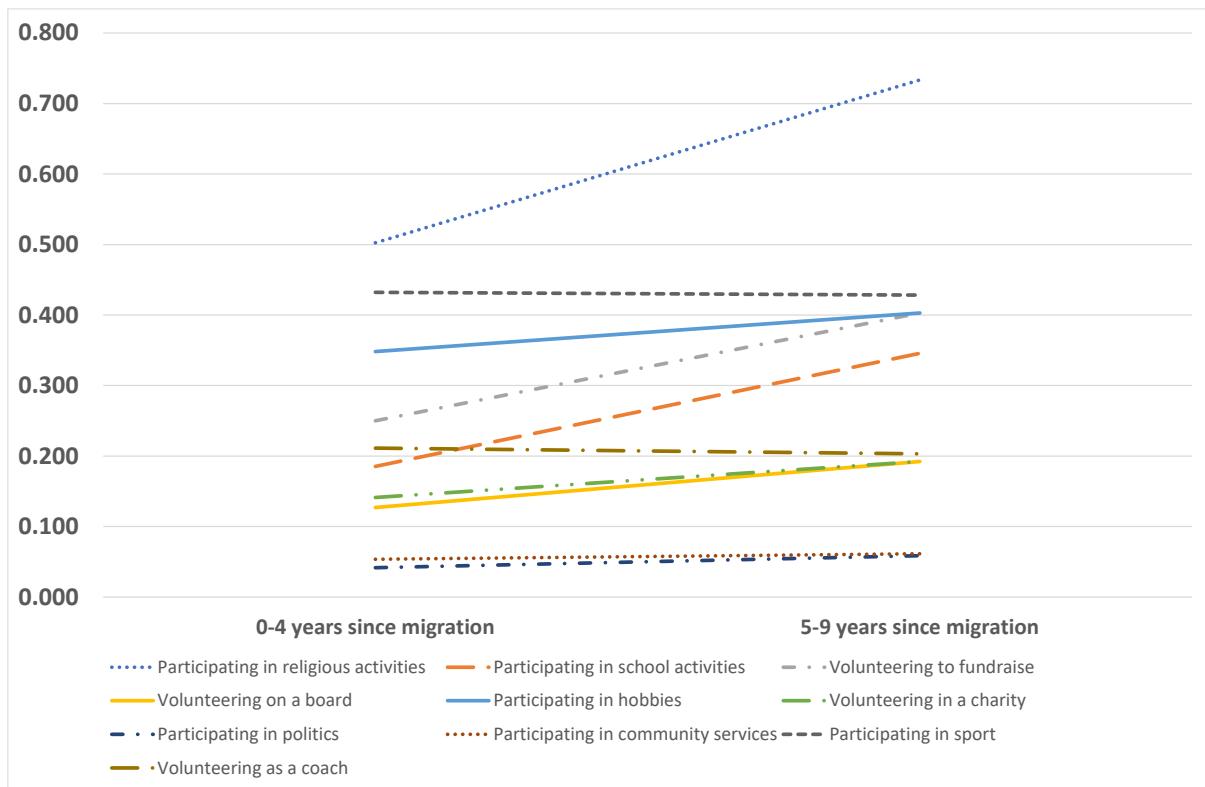
(b) Ethnic diversity



Source: Poot (2016).



**Figure 3:** Change in migrant social activities with increasing years of residence



Note: Based on coefficients of logit regressions with ALL data.

Source: the authors.

**Table 1: Recent trends in selected indicators of social capital in Aotearoa New Zealand: migrants and New Zealand born**

Measure	April 2016–April 2017			April 2018–March 2019			April 2021–August 2021		
	Migrant status			Migrant status			Migrant status		
	Born in NZ	Long-term migrant	Recent migrant <sup>(1)</sup>	Born in NZ	Long-term migrant	Recent migrant <sup>(1)</sup>	Born in NZ	Long-term migrant	Recent migrant <sup>(1)</sup>
<b>Population distribution</b>	69.6	25.2	5.2	68.7	25.0	6.3	68.1	27.8	4.1
<b>Safety and discrimination</b>									
Feeling of safety when walking alone in the neighbourhood after dark <sup>(2)</sup>									
Very safe/safe	58.2	65.4	72.4	60.2	62.8	76.8	57.1	63.5	71.7
Feeling of safety when using the internet for online transactions <sup>(2)</sup>									
Very safe/safe	71.7	79.5	88.7	70.8	72.1	81.2	68.2	70.6	74.1
Experience of discrimination in last 12 months									
Experienced discrimination	16.6	16.3	25.8	16.5	18.8	21.2	20.8	21.1	22.5
<b>Social contact and loneliness</b>									
Contact with family and friends <sup>(3)</sup>									
Had face-to-face contact with family at least once a week	68.4	60.4	36.7	64.3	54.9	38.1	67.3	54.4	46.5
Had non-face-to-face contact with family at least once a week	81.1	79.6	87.9	79.8	78.5	86.6	82.0	83.7	89.1
Had face-to-face contact with friends at least once a week	76.5	78.1	75.0	74.0	73.1	75.3	69.7	70.7	64.0
Had non-face-to-face contact with friends at least once a week	81.2	77.0	85.7	78.5	77.5	83.0	79.0	79.7	78.8
Felt lonely in last four weeks									
Some, most, or all of the time	16.0	16.8	30.7	15.6	16.4	28.0	17.5	17.7	27.1
<b>Generalised trust<sup>(4)</sup></b>									
Trust held for people in New Zealand									
7 to 10	64.6	73.1	81.1	62.1	72.1	82.7	60.1	73.5	77.2
<b>Culture and identity</b>									
Acceptance of diversity									
Feeling about a new neighbour who was a different ethnicity to you									
Very comfortable/comfortable	88.0	90.5	88.8	88.4	89.0	88.4	90.5	90.2	84.9
Ability to express identity									
Very easy/easy	89.4	82.9	73.9	87.4	78.1	67.7	83.2	74.5	62.1
1.	Recent migrant refers to people who arrived in New Zealand in the last five years.								
2.	Percentage excludes responses of 'not applicable'.								
3.	Contact in the last four weeks with family/friends living in another household.								
4.	Based on a scale where 0 is not trusted at all and 10 is trusted completely.								

Source: Stats New Zealand, General Social Surveys, 2016, 2018 and 2021. The sample size is approximately 12,000 individuals in each survey.

**Table 2: Determinants of social capital in Aotearoa New Zealand: migrants and New Zealand born**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Participation (ALL)	Participation (GSS)	Volunteering (ALL)	Volunteering (GSS)	Contact (GSS)	Safe (GSS)	Inclusion (GSS)
male	-0.030 (0.056)	-0.062 (0.054)	-0.306*** (0.052)	0.047 (0.057)	-0.032 (0.110)	1.615*** (0.065)	0.097 (0.067)
dependent children	0.081 (0.058)	0.109* (0.057)	0.459*** (0.054)	0.471*** (0.061)	0.228** (0.113)	-0.002 (0.064)	0.028 (0.069)
age	0.019*** (0.002)	0.010*** (0.002)	0.017*** (0.002)	0.026*** (0.003)	-0.003 (0.004)	0.000 (0.003)	0.013*** (0.003)
years of schooling	0.152*** (0.011)	0.166*** (0.012)	0.133*** (0.010)	0.153*** (0.012)	0.137*** (0.029)	0.071*** (0.014)	0.037** (0.015)
employed	0.164** (0.083)	0.142** (0.068)	0.152* (0.078)	0.035 (0.073)	0.669*** (0.118)	0.302*** (0.077)	0.576*** (0.077)
region of birth: western	-0.196* (0.109)	-0.017 (0.104)	-0.159 (0.100)	-0.154 (0.110)	-0.192 (0.212)	0.336*** (0.124)	-0.154 (0.131)
region of birth: asia	-0.282* (0.162)	-0.336** (0.151)	-0.608*** (0.152)	-0.214 (0.164)	-0.697*** (0.265)	-0.573*** (0.181)	-0.367** (0.177)
region of birth: pacific	0.785*** (0.158)	0.259 (0.158)	-0.052 (0.133)	0.320* (0.165)	-0.438 (0.269)	-0.042 (0.201)	-0.144 (0.192)
region of birth: melaa	-0.039 (0.417)	-0.081 (0.182)	-0.519 (0.363)	-0.183 (0.199)	-0.275 (0.366)	0.008 (0.229)	-0.433** (0.208)
nz born - other ethnicity	0.535** (0.216)	-0.226 (0.465)	0.427** (0.187)	-0.053 (0.499)	-2.016*** (0.521)	0.685 (0.761)	-0.539 (0.521)
nz born - pacific ethnicity	0.695*** (0.145)	0.413** (0.177)	0.408*** (0.127)	0.476*** (0.184)	-0.686** (0.291)	0.228 (0.204)	-0.075 (0.211)
nz born - maori ethnicity	0.192** (0.078)	0.053 (0.084)	0.326*** (0.074)	0.194** (0.088)	-0.254 (0.158)	0.215** (0.097)	-0.220** (0.099)
0-4 years since migration	-0.011 (0.177)	-0.175 (0.161)	-0.368** (0.165)	-0.299* (0.177)	-0.728*** (0.269)	0.353* (0.205)	-0.407** (0.181)
5-9 years since migration	0.062 (0.162)	-0.083 (0.154)	-0.129 (0.151)	-0.247 (0.171)	0.199 (0.310)	0.235 (0.186)	0.035 (0.184)
10-14 years since migration	0.154 (0.202)	-0.118 (0.189)	0.312* (0.182)	-0.038 (0.198)	0.129 (0.358)	0.157 (0.228)	-0.226 (0.210)
15-19 years since migration	0.465** (0.224)	0.076 (0.220)	0.335* (0.192)	0.237 (0.233)	0.531 (0.484)	0.438 (0.278)	0.116 (0.278)
Constant	-2.110*** (0.199)	-3.062*** (0.209)	-2.022*** (0.183)	-4.098*** (0.229)	0.738* (0.443)	-1.150*** (0.239)	0.016 (0.254)
Observations	6,605	6,257	6,605	6,254	6,257	5,844	6,250
$R_p^2$	0.04	0.029	0.048	0.037	0.038	0.112	0.023

*Notes:* Logit regressions. Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1  
New Zealand born of European ethnicity is the omitted category of the birthplace/ethnicity classification.  
20 or more years since migration is the omitted category of the years since migration classification (only defined for foreign born).  
*Source:* Roskrue (2013), merger of Table 5-4 and Table 5-5.

**Table 3:** Migrant social capital by type of social activity

Type of social activity	Fraction participating	Correlation with LQ	Correlation with SI	Bonding	Bridging	Linking	Employment rate of those participating in this activity	Employment rate of those not participating in this activity	Difference
Participating in religious activities	0.378	0.253	0.312	+++	+	++	0.829	0.859	-0.030 *
Volunteering for a charity	0.175	0.038	0.083	+++	+	+++	0.810	0.856	-0.046 **
Participating in political organisations	0.055	0.005	0.014	+++	+	+++	0.824	0.849	-0.025
Volunteering to fundraise for an organisation	0.339	-0.023	-0.006	++	++	++	0.851	0.846	0.005
Participating in hobby clubs	0.296	-0.025	0.013	++	++	+	0.845	0.849	-0.004
Participating in school activities	0.237	-0.026	0.038	++	++	++	0.839	0.850	-0.011
Participating in community services	0.066	-0.044	-0.034	+	+++	++	0.873	0.846	0.027
Volunteering to be a member of a committee or board	0.199	-0.087	-0.074	+	+++	+++	0.836	0.851	-0.015
Volunteering as a sports coach	0.221	-0.109	-0.074	+	+++	++	0.852	0.847	0.005
Participating in organised sports	0.330	-0.119	-0.117	+	+++	+	0.894	0.825	0.069 ***

Notes: n = 1,656 foreign born adults. + refers to low likelihood; ++ refers to medium likelihood; +++ refers to high likelihood;

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1; LQ: Location Quotient (see Eq. (3)); SI: Segregation Index (see Eq. (4)).

Source: calculated by the authors by means of the Adult Literacy and Life Skills Survey 2006

**Table 4:** Demographic determinants of migrant social activity: participation and volunteering

	Participating in religious activities	Volunteering for a charity	Participating in political organisations	Volunteering to fundraise for an organisation	Participating in hobby clubs	Participating in school activities	Participating in community services	Volunteering to be a member of a committee or board	Volunteering as a sports coach	Participating in organised sports
male	-0.282** (0.111)	-0.441*** (0.136)	0.419* (0.218)	-0.400*** (0.108)	-0.352*** (0.112)	-0.286** (0.121)	0.213 (0.201)	-0.106 (0.128)	0.625*** (0.108)	0.126 (0.123)
dependent children	0.224* (0.115)	0.270* (0.142)	-0.386 (0.222)	0.535*** (0.114)	0.00832 (0.115)	0.596*** (0.130)	-0.111 (0.209)	0.179 (0.135)	-0.0693 (0.111)	0.321** (0.131)
age	0.0243*** (0.005)	0.0290*** (0.006)	0.0138 (0.009)	0.0105** (0.005)	0.0175*** (0.005)	0.0158*** (0.006)	0.0459*** (0.009)	0.0350*** (0.006)	-0.0078 (0.005)	0.0155*** (0.006)
years of schooling	0.0524*** (0.016)	0.0342* (0.019)	0.0672** (0.032)	0.0564*** (0.016)	0.111*** (0.017)	0.106*** (0.018)	0.123*** (0.028)	0.110*** (0.019)	0.0525*** (0.016)	0.135*** (0.019)
region of birth: western	-2.805*** (0.370)	-3.327*** (0.446)	-4.882*** (0.717)	-1.470*** (0.349)	-3.193*** (0.370)	-3.184*** (0.397)	-6.661*** (0.689)	-4.258*** (0.430)	-1.171*** (0.347)	-3.687*** (0.408)
region of birth: asia	-1.813*** (0.346)	-2.747*** (0.420)	-5.061*** (0.697)	-1.936*** (0.341)	-3.069*** (0.357)	-3.082*** (0.382)	-6.691*** (0.662)	-4.713*** (0.424)	-2.026*** (0.343)	-4.402*** (0.409)
region of birth: pacific	-0.668** (0.319)	-2.571*** (0.389)	-4.187*** (0.625)	-1.152*** (0.311)	-2.698*** (0.328)	-2.640*** (0.349)	-6.359*** (0.622)	-4.216*** (0.388)	-1.498*** (0.313)	-3.425*** (0.363)
regional of birth: melaa	-2.572*** (0.491)	-3.272*** (0.615)	-5.064*** (0.998)	-2.805*** (0.560)	-2.838*** (0.476)	-3.511*** (0.556)	-7.129*** (0.996)	-5.409*** (0.684)	-1.659*** (0.465)	-4.606*** (0.606)

Notes: Logit regressions without a constant term (dummy variables are included for each of the four regions of birth). Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1  
Source: 2006 Adult Literacy and Life Skills Survey, n = 1,656.

**Table 5:** The effect of migrant clustering between and within regions on migrant bridging and bonding activities

	(1)	(2)
	Bridging	Bonding
male	0.051 (0.080)	-0.307*** (0.081)
dependent children	0.034 (0.102)	0.327*** (0.126)
age	0.013*** (0.004)	0.025*** (0.003)
years of schooling	0.114*** (0.017)	0.091*** (0.013)
employed	0.050 (0.099)	0.028 (0.069)
region of birth: asia	-0.182 (0.153)	-0.040 (0.146)
region of birth: pacific	0.408* (0.214)	0.888*** (0.188)
region of birth: melaa	-0.107 (0.236)	-0.580 (0.362)
0-4 years since migration	-0.312** (0.153)	-0.217** (0.106)
5-9 years since migration	-0.179 (0.118)	0.247* (0.136)
10-14 years since migration	0.024 (0.148)	0.383** (0.157)
15-19 years since migration	0.219* (0.131)	0.566*** (0.145)
rural	0.109 (0.204)	0.400** (0.165)
LQ	-2.385*** (0.480)	-0.788 (0.544)
SI	0.266 (0.777)	1.182** (0.571)
Sigma	1.737*** (0.051)	1.674*** (0.036)
Constant	-1.530*** (0.406)	-1.855*** (0.321)
Observations	1,656	1,656
$R_p^2$	0.022	0.036

*Notes:* Tobit regressions. Robust standard errors, clustered by area, in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . LQ: Location Quotient (see Eq. (3)); SI: Segregation Index (see Eq. (4)). Region of birth: Europe is the omitted category of the birthplace classification. 20 or more years since migration is the omitted category of the years since migration. Bridging activities in column (1) include: participation in organised sports, volunteering as a sports coach, participation in community services, participation in hobby clubs and volunteering for a charity. Bonding activities in column (2) include: Participation in religious activities, participation in political organisations, volunteering to fundraise, participation in school activities, volunteering to be a member of committee or board. The results are robust to reassignment of activities along the lines of Table 3, as discussed in the text. *Source:* Roskruege (2013), Table 5.7.

**Table 6:** Prevalence of social activities and perceptions in the General Social Survey, 2008, 2010 and 2012

		<b>Pooled</b>	<b>GSS 2008</b>	<b>GSS 2010</b>	<b>GSS 2012</b>
<b>OBSERVATIONS</b>		25,731	8,721	8,550	8,460
<b>Type of activity or perception</b>	<b>Social capital group</b>				
Activity: volunteering	Networking	31.2%	32.1%	31.6%	29.8%
Activity: participation	Networking	40.7%	42.3%	42.5%	37.2%
Activity: has given unpaid help	Networking	63.4%	63.5%	64.7%	61.9%
Perception: feel safe at night	Social cohesion and inclusion	51.2%	43.4%	54.9%	55.3%
Perception: feeling included	Social cohesion and inclusion	83.0%	82.2%	83.5%	83.5%
Perception: not experiencing discrimination	Social cohesion and inclusion	89.9%	90.2%	89.6%	89.9%
Activity: voted in General Election	Civic engagement	78.8%	78.6%	79.3%	78.5%
Activity: voted in Local Election	Civic engagement	63.3%	62.9%	62.6%	64.3%

*Source:* calculated by the authors

**Table 7:** Determinants of linking social capital

Social capital group	Networking			Social cohesion and inclusion			Civic engagement	
	Volunteering	Participation	Has given unpaid help	Feel safe at night	Included	No discrimination	Voted in General Election	Voted in Local Election
Type of activity or perception								
Fractionalisation Index FI	-1.095*** (0.266)	-1.583*** (0.300)	-0.496** (0.216)	-2.709*** (0.405)	0.390 (0.444)	0.883*** (0.291)	2.132*** (0.439)	1.021*** (0.303)
Polarisation Index PI	0.004 (0.522)	0.460 (0.522)	0.942* (0.534)	0.279 (0.772)	-0.914 (0.557)	-1.864*** (0.529)	-2.198*** (0.526)	-0.317 (0.678)
Index of fractionalisation among migrants FM	0.155 (0.555)	0.634 (0.477)	-0.265 (0.633)	0.079 (1.219)	0.140 (0.524)	-0.113 (0.514)	0.199 (0.702)	-0.968 (0.630)
Male	-0.050* (0.028)	-0.211*** (0.035)	-0.112*** (0.027)	1.482*** (0.033)	0.045 (0.041)	-0.050 (0.047)	-0.183*** (0.043)	-0.160*** (0.031)
Age	0.053*** (0.005)	-0.009** (0.004)	0.031*** (0.004)	0.061*** (0.005)	0.023*** (0.005)	-0.028*** (0.008)	0.058*** (0.008)	0.059*** (0.007)
Age-squared	-0.000*** (0.000)	0.000*** (0.000)	-0.000*** (0.000)	-0.001*** (0.000)	-0.000*** (0.000)	0.000*** (0.000)	0.000 (0.000)	-0.000** (0.000)
Partnered	-0.040 (0.041)	-0.025 (0.031)	-0.005 (0.036)	-0.112*** (0.036)	0.166*** (0.039)	0.204*** (0.056)	0.191*** (0.040)	0.217*** (0.042)
Lives with Children	0.107** (0.050)	0.025 (0.054)	-0.059 (0.046)	-0.025 (0.043)	-0.120* (0.069)	0.146** (0.072)	0.229*** (0.059)	0.111** (0.056)
Born overseas	-0.071* (0.043)	0.035 (0.035)	-0.197*** (0.038)	0.330*** (0.032)	-0.353*** (0.053)	-0.155* (0.084)	-0.898*** (0.052)	-0.379*** (0.045)
Household size	0.127*** (0.022)	0.059*** (0.017)	-0.014 (0.016)	0.010 (0.015)	0.076*** (0.021)	0.005 (0.027)	-0.056*** (0.021)	-0.025 (0.018)
Educ.: Degree level education or higher	0.690*** (0.035)	0.657*** (0.040)	0.170*** (0.037)	0.276*** (0.063)	-0.194*** (0.059)	-0.455*** (0.064)	0.665*** (0.067)	0.294*** (0.041)
Educ.: Vocational or diploma level education	0.357*** (0.029)	0.314*** (0.029)	0.277*** (0.032)	0.102*** (0.032)	-0.074* (0.042)	-0.254*** (0.038)	0.292*** (0.043)	0.132*** (0.032)



**Table 7:** Determinants of linking social capital – *continued*

Social capital group	Networking			Social cohesion and inclusion			Civic engagement	
	Volunteering	Participation	Has given unpaid help	Feel safe at night	Included	No discrimination	Voted in General Election	Voted in Local Election
Type of activity or perception								
Personal income distribution: Lower 25%	-0.062 (0.041)	-0.202*** (0.043)	-0.137*** (0.049)	0.113** (0.046)	-0.053 (0.059)	0.083 (0.056)	-0.021 (0.048)	-0.061 (0.047)
Personal income distribution: Upper 25%	0.048 (0.044)	0.100** (0.051)	0.047 (0.044)	0.049 (0.037)	-0.004 (0.054)	-0.086 (0.086)	0.170*** (0.062)	-0.014 (0.053)
Household income distribution: Lower 25%	0.012 (0.057)	-0.020 (0.039)	-0.054 (0.039)	-0.060 (0.054)	0.079 (0.054)	0.051 (0.075)	-0.048 (0.065)	0.047 (0.051)
Household income distribution: Upper 25%	-0.024 (0.032)	-0.014 (0.033)	-0.053 (0.040)	0.236*** (0.050)	0.020 (0.057)	-0.021 (0.061)	0.201*** (0.067)	0.041 (0.051)
Labour force status: Employed part-time	0.365*** (0.052)	0.316*** (0.060)	0.326*** (0.048)	-0.117*** (0.045)	0.106 (0.068)	0.002 (0.067)	0.299*** (0.063)	0.086* (0.049)
Labour force status: Unemployed	0.482*** (0.069)	0.201** (0.082)	0.164** (0.074)	0.082 (0.099)	-0.024 (0.093)	-0.074 (0.099)	0.005 (0.084)	0.086 (0.085)
Labour force status: Not in labour force	0.231*** (0.053)	0.295*** (0.048)	-0.045 (0.040)	-0.061 (0.055)	0.092 (0.067)	0.172*** (0.058)	-0.022 (0.050)	0.050 (0.049)
Tenure: Homeowner with mortgage	-0.120*** (0.038)	0.009 (0.043)	-0.033 (0.044)	-0.131*** (0.038)	0.085 (0.056)	0.033 (0.077)	-0.052 (0.080)	-0.162*** (0.054)
Tenure: Renter	-0.235*** (0.049)	-0.177*** (0.053)	-0.178*** (0.047)	-0.040 (0.042)	-0.075 (0.061)	-0.071 (0.078)	-0.600*** (0.075)	-0.570*** (0.056)
Tenure: Home owned by trust	0.143*** (0.041)	0.178*** (0.042)	0.136*** (0.045)	0.075* (0.045)	0.014 (0.065)	0.052 (0.099)	0.240** (0.094)	-0.012 (0.056)
Ethnicity: Asian	-0.258*** (0.077)	-0.238*** (0.057)	-0.452*** (0.063)	-0.467*** (0.074)	-0.272*** (0.091)	-0.808*** (0.114)	-0.224** (0.100)	-0.044 (0.052)
Ethnicity: Maori	0.322*** (0.043)	0.183*** (0.054)	0.195*** (0.050)	0.402*** (0.059)	0.033 (0.059)	-0.453*** (0.074)	-0.075 (0.069)	0.075 (0.053)
Ethnicity: MELAA	-0.035 (0.139)	-0.108 (0.157)	-0.345** (0.153)	-0.392** (0.172)	-0.249 (0.198)	-0.620*** (0.171)	-0.157 (0.210)	-0.251* (0.141)

**Table 7:** Determinants of linking social capital – *continued*

Social capital group	Networking			Social cohesion and inclusion			Civic engagement	
	Volunteering	Participation	Has given unpaid help	Feel safe at night	Included	No discrimination	Voted in General Election	Voted in Local Election
Type of activity or perception								
Ethnicity: Not stated	-0.008 (0.489)	0.675 (0.534)	0.740 (0.616)	0.692 (0.621)	-0.009 (0.622)	-0.675 (0.810)	-0.120 (0.547)	-0.107 (0.486)
Ethnicity: Other	0.268*** (0.079)	0.258*** (0.088)	0.031 (0.106)	0.201* (0.122)	-0.103 (0.104)	-0.215 (0.142)	0.176 (0.138)	0.145 (0.103)
Ethnicity: Pacifica	0.651*** (0.050)	0.637*** (0.077)	0.242*** (0.054)	0.139** (0.067)	-0.002 (0.079)	-0.322*** (0.105)	0.759*** (0.073)	0.777*** (0.102)
Economic Living Standard Index	0.007** (0.003)	0.016*** (0.002)	-0.010*** (0.004)	0.030*** (0.003)	0.051*** (0.003)	0.053*** (0.004)	0.014*** (0.004)	0.016*** (0.003)
Mental Health Index	0.007*** (0.002)	0.006*** (0.002)	0.005*** (0.002)	0.013*** (0.002)	0.058*** (0.002)	0.025*** (0.002)	0.000 (0.002)	0.007*** (0.002)
Physical Health Index	0.010*** (0.001)	0.010*** (0.001)	0.013*** (0.001)	0.014*** (0.002)	0.012*** (0.002)	0.015*** (0.002)	0.003 (0.002)	0.003 (0.002)
Satisfied with Life	0.296*** (0.050)	0.214*** (0.049)	0.154*** (0.041)	0.022 (0.041)	0.422*** (0.044)	0.300*** (0.082)	0.312*** (0.046)	0.190*** (0.045)
Dummy: 2010	-0.025 (0.035)	0.028 (0.044)	0.100** (0.039)	0.484*** (0.044)	0.345*** (0.050)	0.026 (0.057)	-0.006 (0.059)	-0.046 (0.065)
Dummy: 2012	-0.127*** (0.038)	-0.218*** (0.058)	-0.040 (0.046)	0.509*** (0.056)	0.358*** (0.052)	0.083 (0.057)	-0.122** (0.049)	0.067 (0.047)
Constant	-3.687*** (0.400)	-1.955*** (0.431)	-0.623 (0.594)	-2.692*** (0.746)	-3.993*** (0.492)	0.168 (0.550)	-0.793* (0.476)	-2.077*** (0.575)
Observations	24,540	24,534	24,534	23,547	24,513	24,510	23,649	23,286
Pseudo R-squared	0.042	0.038	0.043	0.152	0.148	0.103	0.160	0.129

*Notes:* Logit regressions. Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. FI: See Eq. (5). PI: See Eq. (8). FM: See Eq. (6). Omitted categories of categorical variables are as follows: education: no educational qualifications; personal income distribution: interquartile range; household income distribution: interquartile range; labour force status: employed fulltime; tenure: owned without a mortgage; ethnicity: European. *Source:* calculated by the authors, using GSS 2008, 2010 and 2012