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Non-Technical Abstract

Many immigrants are overqualified in their first job after arrival in the host country. Education-occupation mismatch can affect the economic integration of immigrants and the returns to education and experience. The extent of this problem has been measured in recent years by means of micro level data in Australia, North America and Europe. However, these papers have typically ignored the importance of allowing for heterogeneity, in particular by qualification level and years in the destination country. In this paper, we use micro data from the 1996, 2001 and 2006 New Zealand censuses to examine differences between each migrant's actual years of education and the estimated typical years of education in the narrowly defined occupation in which they work. We find that migrants living in New Zealand for less than 5 years are on average overeducated, while earlier migrants are on average undereducated. However, once accounting for heterogeneity, we find that both overeducated and undereducated migrants become, with increasing years of residence in New Zealand, more similar to comparable native born. Convergence from overeducation is stronger than from undereducation.

Keywords: immigration, occupation, skill transferability, job - worker mismatch, discrimination, New Zealand

JEL Classification: F22, J21, J61.

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1. Introduction

It is commonly observed that the average level of education of immigrants in many occupations is greater than the average level of education of native-born workers in the same occupations. The gap may be particularly large during the first few years after arrival in the host country labour market. Occupation-education mismatch can affect the economic integration of immigrants in the host country and the returns to education and experience (Chiswick and Miller, 2008). It can also lead to efficiency losses, or even lower economic growth (Ramos et al., 2009). The basic idea is that for each occupation, there is a required level of education at which job performance will be optimal, given technology. If workers do not have the required level of education, there is a mismatch in the worker to job assignment. Previous research has shown that both overeducation and undereducation are costly to workers. For example, Hartog (2000) found that returns to overeducation are half to two-thirds of the returns to required education while returns to undereducation are negative (i.e., workers who are undereducated earn less on average than those who have the required education).[1]

The extent of this problem has been measured in recent years by means of micro level data in Australia, North America and Europe. However, these papers have typically ignored the importance of allowing for heterogeneity, in particular by qualification level and years in the destination country.[2] In this paper, we use data from the 1996, 2001 and 2006 New Zealand censuses to examine differences between each migrant's actual years of education and the estimated average years of education in the narrowly defined occupation in which they work. This is done separately by gender and we examine how this gap varies with migrant-specific characteristics such as time spent in New Zealand, age at arrival, and country of origin. We also control for factors that may influence the mismatch between workers and jobs generally, such as age, family situation, location and, most importantly, level of education.

There are various ways to measure occupation-specific job/worker mismatch. The first is job analysis, in which personnel experts specify the level and type of education required for each job title. The second method is worker self-assessment in which workers state the typical schooling required, or simply whether their education is higher/lower/the same as expected for the job. The third measure is to calculate the number of realized matches. This

[1] Hartog (2000) referred to this as the ORU (Over-, Required and Undereducation) model of earnings.

[2] Recent studies include, for Australia: Green et al. (2008); Canada: Wald and Fang (2008); Ireland: Barrett and Duffy (2008); Italy: Dell'Aringa and Pagani (2010); Spain: Fernandez and Ortega (2008); UK: Lindley (2009); and USA: Chiswick and Miller (2009a).

compares the individual to the mean or modal level of education for that occupation. In practice, the findings are typically insensitive to the choice of the measure (see Chiswick and Miller, 2009b).

In this paper, we use the third approach. In the next section, we discuss the various causes of a migrant-job skills mismatch. We also review the available international literature. While this issue has not been previously addressed formally in New Zealand, there is some indirect evidence that we will briefly summarise that suggests that the issue is important in New Zealand. In section 3, we outline how we constructed our census dataset and provide some descriptive statistics. Section 4 reports on a multivariate regression approach to identify the immigrant characteristics that are primarily responsible for the mismatch between required skills and actual skills among migrants. The final section sums up and suggests avenues for further work in this area.

We find that migrants living in New Zealand for less than 5 years are on average overeducated, while earlier migrants are on average undereducated. However, once accounting for heterogeneity, we find that both overeducated and undereducated migrants become more similar to comparable native born with increasing years of residence in New Zealand, with convergence from overeducation being stronger than from undereducation.

2. Theoretical considerations and international evidence

There are a large number of phenomena that can lead to an education-occupation mismatch among migrants. Some of these phenomena apply equally to immigrants and native-born workers. Others are specific to migrants. A number of previous papers have extensively reviewed the literature on education-occupation mismatch, so we will remain brief here.[3]

The starting point is that for any given job, productivity is maximised when the worker possesses a level of skills that is required for that job, but neither more nor less. Such skills are a combination of formal education and training, natural ability and practical experience. In what follows, we focus exclusively on observed education when measuring mismatch, while realising that ability and experience can substitute for a lack of education. Indeed, some of our results are directly the consequence of such substitutions taking place.

The first reason for potential mismatch is that firms and workers face imperfect information. Both parties engage in search until the benefits of further search no longer outweigh the costs. In the resulting equilibrium of realised matches some workers will be overeducated for the job they have accepted, while others may be undereducated. For each occupation, one can then define a “typical” or “required” skill level, given by the mode or the mean of the, possibly skewed, distribution of schooling of workers in that occupation. The more

[3] For the general literature on over- and undereducation, see Hartog (2000), Kiker et al. (2000) and McGuinness (2006). For the specific case of immigrants, see Chiswick and Miller (2009a).

efficient the matching process, the narrower the distribution is likely to be. Given that migrants are less well-informed about the host labour market than the native born, we expect there to be more mismatch among the former. Additionally, across migrant groups the mismatch would be greater the greater the difference in economic and cultural terms between the host and home countries. However, better information, job mobility and post-arrival human capital investments will enable migrants to gradually improve the match between their human capital (in terms of abilities, experience, interest and qualifications) and the available jobs. Consequently, education-occupation mismatch among migrants is likely to decrease over time. Both the greater extent of mismatch among migrants than among the native born and the decreasing mismatch over time are confirmed by our data.

Besides the impact of imperfect information and job search, several other phenomena can explain education-occupation mismatch. They include human capital accumulation, technological change and globalisation, various forms of screening and barriers in the labour market, and the consequences of worker and job heterogeneity. We'll discuss each briefly in turn.

Formal on the job training and practical experience are clearly means by which workers can increase their skill levels. Most workers aspire to a career progression and will aim to obtain towards the end of their career a position for which the typical level of formal education is higher than what they acquired, i.e. they become increasingly undereducated. Such upward mobility requires on-the-job human capital investment. For immigrants these investments are even more important than for the native born, because their home country human capital is likely to be imperfectly transferable to the host country. Consequently they often start out being overeducated, but this declines with duration of residence. At the same time, positive selection in terms of ability and motivation may permit immigrants to obtain jobs for which they do not have the formal skills, and such undereducation is likely to persist.

Technological change and globalisation are generating an increasing demand for skilled workers in developed countries, leading to lower pay and status for semi-skilled blue-collar employment. This has greatly increased the demand for enrolment in post-compulsory education, particularly in white collar professional qualifications. Market forces and governments have responded with an expansion of the higher education system. Thus, older cohorts have less formal education than the young, which makes the former more likely to be undereducated and less likely to be overeducated. This applies to both migrants and the native born, but among the former the mismatch is amplified for those from developing countries where educational attainment is generally lower.

The screening hypothesis suggests that formal education is simply a signal of innate ability rather than of skills specific to the job. If so, mismatch could increase over time if among recruits with the same entry education level when those who are unsuccessful are demoted to lower level jobs, while those with high productivity are promoted. What matters for

migrants is how host country employers interpret foreign qualifications. Those who have been educated in countries very dissimilar to the host country may be considerably overeducated in their first job, as employers cannot ascertain the value of the qualification. The subsequent employment record in the host country will signal true ability and will diminish overeducation, unless non-recognition of foreign qualifications creates permanent barriers. Such non-recognition may be due to 'gatekeeping' by monopolistic suppliers of professional labour or due to a genuine concern about the maintaining of professional standards and quality of service. Additionally, statistical discrimination ('stereotyping' of foreign workers), preferences-based discrimination or adverse attitudes could lead to foreign workers being pushed into jobs below their level (e.g., Altonji and Black, 1999; Zegers de Beijl, 2000; Mayda, 2006).

A final phenomenon is that could lead to mismatch is the presence of worker and job heterogeneity. This has led to a theory of assignment in which heterogeneous jobs and heterogeneous workers are matched, for example in terms of worker skills and job complexity (e.g. Sattinger, 1993). Both Hartog (2000) and Chiswick and Miller (2009a) suggest that the relevance of assignment for the education-occupation mismatch is not easy to determine. However, we argue that worker heterogeneity in terms of job (dis) utility and riskiness could easily lead to undereducation or overeducation. For example, if jobs with a high level of required education become increasingly risky or stressful (e.g. professionals in justice, medicine or education), workers in such jobs may move down the job ladder to less risky and stressful jobs.

In this broad interpretation, the assignment theory also has direct relevance for immigration. Quality of life is commonly cited as a key motivator for migration to New Zealand for migrants from high income countries (e.g. Bedford and Poot, 2010). We would therefore expect migrants from such countries more likely to be overeducated, as they may accept positions below their professional status in order to maximise the benefits of lifestyle. In this case, such overeducation could persist over time. For migrants from developing countries the compensating differential aspect is likely to be less important than the limited transferability of foreign human capital. For them, overeducation may decline with duration of residence.

A final form of heterogeneity that may impact on observed occupation-education mismatch is the presence of casual, part-time and other non-standard jobs. These are often taken by workers in the peripheral work force such as students, married women with young children and semi-retired persons. Such workers are likely to have a higher than average incidence of overeducation. This can be also relevant in the context of immigration, since foreign students and young people on working holiday visas often have temporary jobs at a level below their formal qualifications. To separate this issue from the analysis in this paper, we focus on workers aged 25 to 64.

This review of the various phenomena that may lead to occupation-education mismatch provides various predictions of the incidence and persistence of such mismatch. Together, they may leave the sign of the impact of various determinants theoretically indeterminate. However, the results of several recent studies are broadly consistent in terms of the net effect of such influences. Green et al. (2007) study two cohorts of the Longitudinal Survey of Immigrants in Australia (LSIA) 1993-2000. They find that recent immigrants are more likely to be overeducated than natives even if they enter on skill assessed visas. Overeducation is greater for immigrants from non-English Speaking Background (NESB) countries. Another country that has a points system for admission that gives much weight to formal education is Canada. Wald and Fang (2008) find, using data from the 1999 Canadian Workplace and Employee Survey, that recent immigrants to Canada also have a relatively high incidence of overeducation. This general pattern is also confirmed by Barrett and Duffy (2008) who find by means of the Ireland 2005 Quarterly Household Survey that overqualification declines over time, but that there may be a cohort effect. Lindley (2009) used the UK Quarterly Labour Force Survey 1993-2003 and found that non-European migrants are more likely to be overeducated. Again, overeducation decreases with years of residence. Chiswick & Miller (2009a) also conclude, using US 2000 Census data, that recent migrants are more likely to be overeducated than the native born. More years in the US lowers the probability of overeducation and increases the probability of undereducation. Greater pre-immigration experience (usually implying an older age of arrival) leads to more overeducation.

However, there is evidence from southern European countries that overeducation among some migrant groups may be persistent. Dell'Aringa and Pagani (2010) use 2005-2007 Italian Labour Force Survey data and show that foreigners are upon their arrival in Italy much more likely to be overeducated than natives. They also find that pre-migration experience is not valued in Italian jobs and that post–migration experience does not permit a catch-up. This negative conclusion is reinforced by Fernandez and Ortega (2008) for Spain. They find, as elsewhere, that migrant workers in Spain have a higher incidence of overeducation and temporary contracts, but that – unlike the case of English-language speaking host countries where overeducation declines over time – the incidence of overeducation does not appear to decrease after 5 years in Spain.

Until this paper, this kind of analysis had not yet been conducted in New Zealand. However, there is some New Zealand indirect evidence on overeducation or mismatch. Pernice et al. (2009) used the relatively small sample Longitudinal New Settlers Survey 1998-2002 of 36 principal applicants from China, 36 from India and 35 from South Africa. They found that overeducation was common and persistent. Statistics New Zealand (2004) found that among immigrants with university degrees in New Zealand at the 2001 census, the percentage of sales workers declined while the percentage of legislators, administrators and managers increased with duration of residence in New Zealand. However, OECD (2007) argues that overeducation in New Zealand affects native workers more than immigrant workers and that New Zealand is therefore an exception among OECD countries. Using data

from the LisNZ, Masgoret et al. (2009) find that of the skilled principal applicants, 70.7% were managers or professionals in their previous country, but only 62.4% had such an occupation at the time of the Wave 1 interview.

Immigration to New Zealand is skewed toward skilled migrants. The skilled/business migrants accounted for 62 percent of the 2008/09 approvals for permanent residence (Department of Labour, 2009). The number of immigrants has also grown strongly in recent decades, from 196,702 over the period 1979-1988 to 363,143 over the 1989-1998 decade and 545,478 over the 1999-2008 decade (Bedford and Poot, 2010). Consequently many migrants have been in the country for a relatively short number of years: more than forty percent arrived less than ten years ago. Given that overeducation is more likely among the highly qualified, the incidence of overeducation in New Zealand has increased. Using data and methods we describe in the next section, we find that overeducation among recent male migrants increased from 47.9% in 1996 to 53.4% in 2006, and from 33.1% to 42.0% for earlier migrants. The trends for females are the same. We argue that the extent to which this is a cause for concern depends on both the qualification levels of the immigrants and the change in mismatch with increasing years in New Zealand. We therefore proceed with assuming heterogeneity in the migrant adjustment process by level of qualification.

This short literature review suggests several hypotheses. Firstly, the extent of mismatch is greater among immigrants than among the native born. Secondly, mismatch reduces with increasing duration of residence, although the extent of this will be host country and migrant group specific. Thirdly, recent migrants are much more likely to be overeducated than undereducated. Fourthly, female migrants are somewhat more likely to be overeducated than male migrants. Fifthly, the gaining of host country qualifications opens up job opportunities previously unavailable and thereby lowers overeducation among migrants. Finally, such findings are likely to vary quantitatively across the different levels of qualifications. The descriptive and regressions results in the next two sections confirm these hypotheses.

3. Data and descriptive results

3.1. Data and variable definitions

This paper uses unit record data on the entire usually resident New Zealand population from the 1996, 2001 and 2006 Census.[4] The Census collects information on each individual's country of birth and their year of first arrival in New Zealand. We restrict our analysis throughout to individuals aged 25-64 with non-missing year of first arrival, if foreign-born. We focus on this age group to exclude most students and individuals who are retired. For

[4] We also have access to the 1986 and 1991 Census data, but we do not use these data for two reasons: first, New Zealand underwent a period of comprehensive market-oriented economic reform from 1984-93 which complicates interpretation of any results from the early time-period (Evans et al., 1996); second, the 1991 Census did not ask foreign-born individuals their year of first arrival in New Zealand.

obvious reasons, our sample is restricted to individuals who are employed and report a valid occupation.[5] We further restrict our sample to individuals who are wage/salary employees in their main occupation since 'required' education is an ill-defined concept for the self-employed.

We gauge occupational mismatch by comparing each individual's actual education to the 'typical' education for a New Zealand-born individual in the occupation in which they are employed. This is done separately by gender and census, and for narrowly defined occupations at the five-digit level of classification. There are 561 five-digit occupations in 1996 and 565 in 2001 and 2006.[6] Over 200 of these occupations have more than 1,000 individuals working in them. Another 200 have between 200 and 1,000 individuals working in them. Only around 60 occupations have less than 100 individuals employed in them. In order for us to be able to calculate the 'typical' education for a New Zealand-born individual in each occupation, we have aggregated a small number of occupations (around ten in each year) that have less than 30 individuals working in them or do not have both New Zealand-born and immigrants in the occupation.

We use two definitions of the 'typical' education for a New Zealand-born individual employed in each occupation; the first definition uses the modal qualification, while the second calculates the mean years of education. Our census data record the highest qualification obtained by each individual using the following classification: i) No Qualification; ii) Level 1 School Qualification (e.g., school certificate); iii) Level 2 School Qualification (e.g., sixth-form certificate); iv) Level 3 or 4 School Qualification (e.g., university entrance, higher school certificate, bursary or scholarship); v) Overseas School Qualification; vi) Level 1, 2 or 3 Post-School Certificate; vii) Level 4 Post-School Certificate; viii) Level 5 Post-School Diploma; ix) Level 6 Post-School Diploma; x) Bachelor Degree; xi) Higher Degree (e.g., Honours, Masters or PhD); and xii) Not Elsewhere Included.

When calculating the modal qualification in each occupation, we use the following more aggregate classification: i) No Qualification; ii) School Qualification; iii) Post-School Certificate; iv) Post-School Diploma; v) Bachelor Degree; and vi) Higher Degree. Everyone with an overseas school qualification is included in the School Qualification group. We assign 'Not Elsewhere Included' to the Post-School Certificate category because informal discussion with staff at Statistics New Zealand revealed that the majority of the people in this category have earned post-school qualifications that do not fit into the New Zealand classification scheme. In some cases, the qualifications data are truly missing and hence people are potentially misclassified using this approach. Among the New Zealand-born in

[5] Occupation is missing for less than 4% of the employed and the characteristics of these individuals appear generally similar to those of our analysis sample.

[6] Examples of five-digit occupations include Quarry Manager, Water Resources Engineer, Broadcasting Transmitting and Studio Equipment Operator, Human Resources Clerk, Usher and Cloakroom Attendant, Wool Classer, Aircraft Engine Mechanic, Clay Product Plant Operator and Railway Shunter.

the analysis sample, 5.4% have qualifications that are 'Not Elsewhere Included', while this is the case for 6.3% of immigrants.

In order to calculate the mean years of education for individuals, we convert the above information on highest qualification to estimate the total number of years spent by each individual in education. Specifically, individuals who have 'No Qualifications' are assumed to have spent 10 years in education if they are NZ-born and between 3 and 11 years in education if they are foreign-born depending on their gender and country of birth,[7] those whose highest qualification is 'Level 1 School' 11 years, those whose is 'Level 2 School' 12 years, and those is 'Level 3 or 4 School' 13 years. Individuals whose highest qualification is 'Overseas School' are assumed to have spent 6 to 12 years in education depending on their gender and country of birth.[8] Individuals whose highest qualification is 'Level 1, 2 or 3 Post-School Certificate' are assumed to have spend 12 years in education, those with a 'Level 4 Post-School Certificate' 13 years, those with a 'Level 5 Post-School Diploma' 13.5 years, those with a 'Level 6 Post-School Diploma' 14 years, those with a Bachelor Degree 16 years and those with a 'Higher Degree' 17.5 years. Individuals whose highest qualification is 'Not Elsewhere Included' are assumed to have spent 7 to 13 years in education depending on their gender and country of birth.[9]

While this approach is somewhat ad-hoc, it is consistent with the way in which the New Zealand education system operates, even though the nature of assessment has changed over time (e.g. the shift to a National Certificate of Educational Achievement (NCEA) in Years 11, 12 and 13 at secondary schools). The advantage of using this approach as opposed to focusing on a comparison between qualifications is that a "completed years of education" measure permits a straightforward quantification of the extent of under- or overeducation for individuals with different characteristics.

We also use the data on highest qualification along with those on age at arrival to create an indicator variable for whether a foreign-born individual is likely to have gained any qualifications in New Zealand. For example, if an individual arrived before age 16 and has any qualifications, we assume that some were earned in New Zealand. If they arrived between age 16 and 18 and have any qualifications other than overseas school qualifications, then we assume that some were earned in New Zealand. If they arrived between age 19 and 21 and their highest qualification is a post-school diploma or higher, then we assume that some were earned in New Zealand. Finally, if they arrived between 22 and 25, then they are only coded as having New Zealand qualification if they have a higher

[7] We use the data collected by Barro and Lee (2001) on worldwide educational attainment to estimate the average years of education for individuals of a particular gender and country of birth that have not completed secondary school. The mean estimate across all countries is 7.5 years.

[8] The Barro-Lee data are now used to calculate the average number of years to complete secondary school for individuals of a particular gender and country of birth. The mean estimate across all countries is 10 years.

[9] Again, this is done using the Barro-Lee data, but now assuming that individuals have the average number of years of tertiary education in a particular country on top of completed secondary school. The mean estimate across all countries is 10.5 years.

university degree. Immigrants who first arrived after age 25 are assumed to have earned all their qualifications outside New Zealand.[10]

While we control for whether immigrants earned qualifications in New Zealand in our regression modelling, we do not adjust our measures of years of education to control for potential differences in the quality of education in particular countries. Hence, if the effective years of education are lower than the nominal years, the extent of overeducation (undereducation) could be overestimated (underestimated). We control in our multivariate modelling for region-of-origin fixed effects which will account for quality differences between different immigrant groups, but not for differences between immigrants and the NZ-born. Recent work by Stillman and Velamuri (2010) finds that returns to years of education are higher for immigrants than for the NZ-born in New Zealand. This is consistent with immigrant qualifications being viewed as being a similar quality as those for NZ-born, but could also occur, even if foreign qualifications are undervalued, if immigrants are strongly positive selected on unobserved ability. Self-selection among immigrants in general makes it difficult to calculate how actual years of education should be converted to effective years and hence we do not currently attempt to do this.

3.2. Sample Characteristics

Table 1 presents the sociodemographic characteristics of NZ-born and immigrants in the 1996, 2001 and 2006 censuses separately by whether they are i) non-employed, ii) self-employed or missing occupational status, iii) employed in a wage/salary job with a valid occupation. The latter represents our analysis sample and the former are included to check for differences between those included and those excluded. Our analysis population consists of 2.37 million NZ-born and 0.65 million immigrants. Hence, immigrants account for 21.5% of the analysis sample.

Individuals in the analysis sample generally have similar characteristics as those excluded although they do have more education and higher incomes. For the NZ-born, the excluded population is split roughly evenly between those not employed, who are predominately female and, on average, less educated than the analysis sample, and those self-employed or missing occupational status, who are predominately men with similar qualifications to those in wage/salary employment. Among immigrants, roughly 60% of the excluded population are non-employed reflecting lower employment rates among immigrants than among the NZ-born, especially in 1996 and 2001. Non-employed immigrants are also predominately female and, on average, less educated than both the self-employed and those in the analysis sample. Overall, the difference in years of education between the analysis sample and those excluded from our remaining analysis is larger for immigrants (1.0 versus 0.5 years of education) suggesting that higher skilled immigrants leaving wage/salary

[10] A longitudinal survey of immigrants in New Zealand, LisNZ, shows that 1 in 10 migrants had engaged in formal study or training in New Zealand. However, these are likely to be predominantly in the 16-24 age group, which make up 14.5% of the LisNZ sample (Masgoret et al., 2009).

employment because of a lack of job opportunities at their skill level is not more common than the same occurring for the NZ-born.

Focusing on just the analysis sample, immigrants and the NZ-born have very similar characteristics other than that immigrants are much more qualified than the NZ-born, with 27.5% of migrants having university degrees versus 14.5% of the NZ-born. This is reflected throughout the qualification distribution, with few migrants having no qualifications compared to the NZ-born. This occurs because, as noted in the previous section, New Zealand operates a structured immigration system that focuses mainly on higher-skilled migrants. However, overall, immigrants have on average only about 0.4 years more education than the NZ-born. As illustrated in Figure 1, which presents a histogram and kernel density of imputed years of education for immigrants and the NZ-born in the analysis sample,[11] this occurs because the NZ-born are much more likely to have upper level school qualifications (13 years of education) and non-university post-school qualifications (12-14 years of education) than migrants who have a much more bimodal distribution with either foreign school qualifications (9-12 years of education) or university qualifications (16-17.5 years of education).

Table 2 presents the aggregated qualification distribution for immigrants and the NZ-born separately for each census year. The upskilling of both the NZ-born and recent immigrant cohorts is very clear from this table. It is also noticeable that the qualification gap between immigrants and the NZ-born has been growing over time. For example, in 1996, the share of immigrants with university degrees was 9% greater than the share of NZ-born with degrees. By 2001, this gap had increased to 12% and then to 15% by 2006. Just looking at mean years of education reveals that immigrants had only slightly more education, on average, than the NZ-born in 1996, while by 2006 they had 0.6 more years of education.

Differences in the distribution of qualifications among immigrants and the NZ-born can have an important impact on differences in the propensity of individuals in these groups to be under- or overqualified. This occurs because, in the extremes of the distribution, high skilled individuals can only be perfectly qualified or overqualified, while low skilled individuals can only be perfectly qualified or underqualified. Even away from the extremes, highly skilled individuals are more likely to be overqualified and since immigrants in New Zealand are generally more skilled, this will potentially lead to a finding of greater overqualification among immigrants.

Hence, our main focus is on regression results that stratify by qualification, thus comparing immigrants and NZ-born with similar mechanical propensities to be under- or overqualified. However, first we present descriptive results on the propensity of under- and overqualification and simple regression models that pool all individuals regardless to their level of qualifications.

[11] Immigrants with 9 or less years of education are grouped together in this figure.

3.3. Descriptive Evidence on Under-/Overeducation

Table 3 presents basic evidence on the degree of under- and overeducation among immigrants and the NZ-born. To examine whether occupation-education matching improves with time spent in New Zealand, we classify individuals as being either NZ-born, a recent migrant or an earlier migrant, where recent migrants are all individuals who first arrived less than 5 years ago. We measure mismatch in three ways. In the first panel, we define individuals as being underqualified, perfectly qualified and overqualified by comparing their qualification level to the modal qualification held by a NZ-born individual of the same gender employed in the same occupation in the year of observation. In the second panel, we instead compare an individual's imputed years of education to the mean years of education for NZ-born of the same gender employed in the same occupation in the year of observation. Individuals are then defined as under(over)-qualified when their actual years of education is more than 0.5 years less (more) than the comparison years of education. All remaining individuals are perfectly qualified. Finally, in the third panel, we use the same information as in the second panel but present the mean and median in the difference between actual years of education and the mean years of education for the reference group.

These results show that both male and female recent migrants are more likely to be overqualified than the NZ-born. On average, male recent migrants have 0.7 more years of education than male NZ-born in the same occupation, while the equivalent gap is 0.8 years for female recent migrants. However, while earlier migrants are less likely to be perfectly qualified than the NZ-born, they otherwise look like the NZ-born in terms of average levels of over/under-education. In other words, worker-job skill matches are improving over time.

As discussed above, these results at least partially reflect that each successive cohort of NZ-born are better educated on average than earlier ones, while recent migrants are younger and, on average, better educated than the average NZ-born and earlier migrants are older and worse educated than the average NZ-born. To illustrate this point further, we next present, in Table 4, the mean years of overeducation for individuals with different characteristics, focusing on the variation across age and qualification level.

Over- and undereducation by age simply reflects a long-term trend of increasing participation in post-compulsory education (and an increase in the legal school leaving age). As the average level of education of young workers who enter the labour market is always more than of older workers who retire, the young are likely to be overeducated and the older workers undereducated. The same applies to migrants: actual education minus required education decreases with age. The difference between those aged 24-29 and 60-64 is fairly similar for recent migrants (1.0 years) as for the NZ born (0.8 years).[12]

[12] Recent migrants in the oldest age-groups are likely to have been admitted to NZ under family reunification criteria (parents of migrants).

The next panel in Table 4 demonstrates that the incidence of over or undereducation is closely linked to the level of education itself. It is impossible to be underqualified with a PhD or overqualified if you have no qualification. Thus, those with no qualifications are the most undereducated, while those with a higher degree are the most overeducated. This is equally true for recent and earlier migrants as for the NZ-born. In fact, the extent of overeducation among those with a higher degree is roughly the same across all three groups. However, migrants with no qualification are much less educated than the typical level of education for their jobs (3.6 years for recent migrants and 2.8 years for earlier migrants) than the NZ-born with no qualification (1.6 years). It is likely that a greater substitution of experience for education among migrants and positive self-selection in the decision to migrate contribute to this difference.

Finally, we provide some examples of how under- and overeducation varies across occupations for immigrants. Table 5 presents the average years of education for NZ-born men and women in the 10 most common occupations for the NZ-born of each gender (top sub-panels) and the 10 most common occupations for recent migrants (bottom sub-panels) when pooling the 1996, 2001 and 2006 data. This table also shows how the average years of education for recent and earlier migrants differs from the NZ-born in the same occupations.

Recent migrants are generally overskilled compared to the NZ-born in these occupations, but the extent of this overskilling varies quite substantially. For example, male recent migrants who are heavy truck or tanker drivers, the most common occupation for the NZ-born, have 0.6 years more education on average than NZ-born in this occupation, while the difference for sales assistants, the most common occupation for recent migrants and also low-skilled, is 1.2 years. This type of variation exists at the upper-end of the skill distribution as well, with male recent migrant working as computer applications engineers having 0.6 years more education than NZ-born men in that occupation, while the difference for male university lecturers is 1.0 years. On the other hand, male earlier migrants have generally similar years of education compared with NZ-born men in the same occupations. These patterns are fairly similar for women, but the most common occupations are different due to gender segregation across occupations.[13]

[13] As noted in Statistics New Zealand (2004), there is a common perception in New Zealand that there are many foreign-born university graduates employed as motor vehicle drivers, particularly as taxi drivers. Our census data show that indeed 38% of male recent migrant taxi drivers have a university degree, as compared with only 3% of NZ-born taxi drivers. However, the total number of male recent migrant taxi drivers is very small (87) compared with 1,917 male NZ-born taxi drivers so that the chance that a university educated male taxi driver is an immigrant is much less than that he is NZ-born. Moreover, among earlier migrant taxi drivers the proportion with a university degree is similar to that for the NZ-born. A similar issue prevails in the case of female cashiers, tellers and related clerks. Here, among recent female immigrants in these occupations, 38% have a university degree, compared with just 1% of the New Zealand born. For earlier migrants, the extent of overeducation is much reduced to only 8% having university degree. Nonetheless, a clerk with a university degree is more likely to be an immigrant than to be NZ-born. It is important to note that these are very specific professions, which are quite possibly attractive to recent migrants as temporary jobs to be held while looking for employment that is a better match to one's skills.

These differences between immigrants and the NZ-born in terms of education-occupation mismatch may be related to factors that apply to both migrants and non-migrants (such as that the incidence of mismatch is likely to be to greater in more peripheral labour markets with less job mobility or that there is a trend of increasing average education levels generally), potential segmentation of the labour market in immigrant-type and native-born type jobs, and factors that could be specific to migrants (such as non-transferability of skills or discrimination). Such effects are impossible to disentangle without multivariate analysis, to which we now turn in the next section.

4. Multivariate regression analysis

We start by estimating a simple OLS regression model which examines the relationship between the number of years of over-/undereducation for each individual and a variety of socioeconomic control variables.[14] Specifically, we estimate four specifications of the following regression model separately for men and women:

$$YearsEd_{it} - MeanYearsEdNZ_{occ(t)} = \sum_{j=1}^{50} \delta^j (YrsNZ_{it} = j) + X_{it}\gamma + \alpha_t + e_{it}\,, \qquad (1)$$

where *i* indexes individuals and *t* indexes time. The dependent variable is the difference between $YearEd_{it}$, an individual's actual years of education and $MeanYearEdNZ_{occ(t)}$, the mean years of education for the NZ-born in the same occupation, gender and census year. Our regression analysis focuses on this continuous measure of under-/overeducation as it permits a straightforward quantification of the extent of under- or overeducation for individuals with different characteristics.

The main independent variables are $YrsNZ_{it} = j$, which are indicator variables for whether the number of years that an individual has lived in NZ = *j*, with *j*=50 also including immigrants residing in NZ for more than 50 years. Hence, the coefficients on these variables, δ^j, are semi-parametric estimates of the difference in under-/overeducation for immigrants residing in NZ for a particular amount of time compared to that for the NZ-born. We also include time fixed effects, α_t, in all specifications and e_{it} is a mean zero idiosyncratic error term. X_{it} is a row vector of other control variables, with coefficient vector γ, that varies in the different specifications discussed below.

In our first specification, we only include the years in NZ indicator variables and the two census year indicators (versus the default of the 1996 census). Figures 2 (men) and 3 (women) plot out the δ^j coefficients from this specification for the first twenty years in NZ

[14] We also estimated models that include occupation FEs hence allowing different occupations to have different degrees of job matching on average. This had no qualitative impact on our results so we do not present these findings.

(labelled 'no controls').[15] These results show that male migrants in New Zealand for less than four years are 0.6-0.8 years more educated than male NZ-born in the same occupations, but that the degree of overeducation declines sharply for most years between four and fourteen years in NZ, with male migrants in NZ for nine years having similar education levels as NZ-born men in the same occupation, and those in NZ for fourteen years or more having 0.2 less years of education than NZ-born men in the same occupations. Similar results are found for women, although the initial degree of overeducation for immigrants is larger at 0.8-0.9 years, catch-up with the NZ-born does not occur until thirteen years in NZ, and the degree of undereducation for long resident female migrants is 0.1-0.2 years.

As discussed above, other characteristics besides immigration status are also likely related to job matching and also likely to differ for immigrants versus the NZ-born. Hence, in our second specification, we also control for characteristics that might impact job matching for both immigrants and the NZ-born. These include a quadratic in potential experience (measured as age minus years of education minus five), marital status (currently married/de-facto, previously married, never married, missing), family type (couple with no children, couple with children, single with children, non-family), the number of hours worked in their main job, whether they work multiple jobs, an indicator for whether hours worked in missing, an indicator variable for whether they live in an urban area, and a series of indicator variables for geographic location (140 labour market areas - LMAs - as defined by Papps and Newell, 2002).

The δ^j coefficients from this specification are also presented in Figures 2 and 3 (labelled 'controlling for demographics').[16] Controlling for these characteristics leads to a one-third to two-thirds reduction in the degree of overeducation experienced by migrants in their first ten years in New Zealand and has no impact on the results for longer resident migrants. This is true for both men and women, with the absolute reduction greater for women due to the higher initial estimate of the degree of overeducation among recent migrants. These findings indicate the recent migrants generally have characteristics that are associated with being overeducated, such as being young, compared to the NZ-born, and this explains some of the observed overeducation among these migrants.

We next add control variables which are only relevant for migrants to the previous specification. As the composition of migrants has changed over time, allowing for heterogeneity across immigrants may be important for examining overeducation. Specifically, we add controls for: i) the arrival cohort with indicators for arrived before 1957,

[15] For clarity of presentation, we do not also graph confidence intervals. However, as will be seen when we present the coefficients on other regressors in Tables 6 and 7, due to our use of a 100% census sample, our estimates are extremely precise.

[16] We do not present the coefficient estimates for the other control variables in any of our initial regression specifications because, as we discuss below, we believe that the proper regression model should be fully stratified by education. We present the coefficients from this model in Tables 6 and 7.

in 57-66, in 67-76, in 77-86, in 87-96, and in 97-06, ii) an indicator for having any New Zealand qualifications and iii) indicators for region of birth (15 regions, see Tables 6 and 7 for details). These indicator variables are all defined so that the coefficients can be interpreted as the difference between an immigrant with that particular characteristic and the average immigrant.[17] Using this approach, the coefficients on the years in New Zealand indicator variables can still be interpreted as the over-/undereducation of the average immigrant.

The δ^j coefficients from this specification are also presented in Figures 2 and 3 (labelled 'controlling for immigrant chars'). Adding these controls, further reduced the observed overeducation of recent migrants, but increases it for long resident migrants. Once we adjust for differences in immigrant characteristics, we find that 'average' male recent migrants are 0.2 years more educated than equivalent NZ-born, with no differences in overeducation for male migrants that have been resident in NZ for at least seven years. On the other hand, the difference for 'average' female migrants in NZ less than nine years and equivalent NZ-born has become close to zero.

In our final specification, we add controls variables for whether individuals have school qualifications or post-school qualifications versus having no qualifications to the previous specification. As discussed above, educational levels are mechanically correlated with the likelihood of being under-/overqualified and since immigrants are generally more qualified than the NZ-born, it is likely important to control for education levels when comparing education-occupational matching by immigrant status. The δ^j coefficients from this specification are also presented in Figures 2 and 3 (labelled 'controlling for broad quals').

These results confirm the importance of controlling for education levels when examining under-/overeducation. We now find that the 'average' recent male immigrant has 0.4 years *less* education than a comparable NZ-born male in the same occupation, with this declining to 0.3 years *less* education for male migrants in NZ for more than ten years. Results are practically identical for women.

Examining Figures 2 and 3 highlights that controlling for heterogeneity among immigrants as well as broad educational levels has large impacts on the estimated degree of over-/undereducation among immigrants to New Zealand. Given the crucial importance of education in determining over-/undereducation, we next extend regression model (1) to be fully stratified by qualifications. In particular, we estimate separate regression models, by gender, for individuals whose highest qualification is: i) no qualification, ii) a school qualification, iii) a post-school certificate, iv) a post-school diploma, v) a bachelor degree, or vi) a higher university degree. We do this using the third specification above which controls

[17] This is implemented by transforming each indicator variable using the following formula: $D_i^* = (D_i - D_z \times p_i/p_z)$, where D_i is the standard 0/1 indicator variable for category *i* for a particular individual, D_z is the standard 0/1 indicator variable for the omitted category, and p_i/p_z is the population share of category *i* relative to that for the omitted population group.

for a full set of immigrant specific and general control variables. Hence, we are now asking the question: "does the average immigrant work in a more or less skilled occupation than the average NZ-born individual with the same characteristics and the same qualifications?". We focus our remaining discussion on the results from this model, as we believe it best represents the question that is relevant to understanding whether job matching differs for immigrants versus natives.

Figures 4 (men) and 5 (women) present the δ^j coefficients from this model for each qualification group. First, examining the results for men, we see that the relative degree of under-/overeducation varies a great deal across qualification groups. Immigrant men with bachelor degrees are 0.4-0.6 years overeducated when in NZ for less than five years, but are no longer overeducated after ten years of residence. Immigrant men with post-school diplomas and higher degrees are also initially overeducated, although only by around 0.2 years. For both these education groups, by eight years in NZ, migrants essentially have the same years of education as the NZ-born in their occupations.

Male immigrants in the remaining qualification groups are all *undereducated* compared to equally qualified NZ-born men. For each group, the degree of undereducation is largest when they first arrive in New Zealand, 0.9 years for individuals with school qualifications, 1.3 years for individuals with post-school certificates, and 1.7 years for individuals with no qualifications. While these slowly converge towards the years of education among the comparable NZ-born, immigrant men with school qualifications or post-school certificates who have been in NZ for twenty years work in occupations where the comparable NZ-born have 0.4 more years of education. Similarly, for those with no qualification, migrant undereducation is still 1.2 years after spending twenty years living in NZ.

Next, examining the results from women, we also find that migrants with higher degrees, bachelor degrees, and post-school diplomas are initially more overeducated, by 0.6 years for those with bachelor degrees and 0.2-0.4 years for those with higher degrees and post-school diplomas, than comparable NZ-born. For bachelor degrees, this declines by about half over time and such immigrant women in NZ for twenty years are still 0.3 years more overeducated than comparable NZ-born. For post-school diplomas, there is little convergence over time and the gap remains around 0.2 years for long residences. On the other hand, women with higher degrees are no longer comparably overeducation by twelve years in NZ. As for men, women with no qualifications, school qualifications and post-school certificates are relatively undereducated compared with NZ-born women and while the degree of this declines over time, it remains large. In terms of overall scale, the figures for women with these qualifications are very similar to those for men.

Finally, we present in Tables 6 (men) and 7 (women) the coefficients on the other control variables in these models. Location fixed effects and the coefficients for the controls variables that account for missing marriage status and hours of work are not reported. Given the large number of significant coefficients, as expected given the very large number

of observations, we only discuss ones that have a general pattern across the qualification groups or are particularly important (such as potential experience). Looking at the coefficients for men, we see that overeducation declines with potential experience for all qualification groups except post-school certificates (where potential experience is only weakly related to overeducation) across most of the relevant range. Calculating the marginal effect of moving from potential experience 17.5 years (the mean) to 18.5 years, reveals that this one year increase reduces overeducation by 0.01 years for individuals with no qualifications, a bachelor degree or a higher degree, 0.02 years for individuals with a post-school diploma and 0.03 years for individuals with school qualifications. Married men are generally less overeducated than those that are not currently married. This is also true for men living in urban areas and for those that work multiple jobs.

Examining immigrant-specific characteristics, only a few clear patterns emerge. First, low-skilled Australian immigrants have more years of education than comparable NZ-born. This is also true of low-skilled immigrants from Northern Europe (mainly Scandinavia), North America and to some extent from other parts of Europe. All migrants from South-Eastern (former Yugoslavia, Bulgaria, Romania and Greece) and Eastern Europe are more likely to be overeducated, which might reflect a poor transferability of Soviet-era qualifications. Migrants from South-East Asia and North-East Asia, with post-school diplomas and higher, are also more likely to be overqualified (but more likely to be underqualified at low education levels). Interestingly, migrants from Sub-Saharan Africa (predominantly South African) are more likely to be undereducated than the NZ-born at most qualification levels. Migrants from Southern and Central Asia (primarily India and Sri Lanka) are also generally more likely to be undereducated.

Interestingly, low-skilled immigrants with NZ qualifications are more likely to be overeducated than those without them, while having NZ qualifications has a limited impact on overeducation among the higher skilled. There are no clear patterns among the cohort effects and these generally do not have a strong relationship with overeducation although there are a few notable exceptions (for example, recent cohorts with post-school certificates are much more likely to be overeducated relative to previous cohorts with this qualification).

Turning to the results for women, most of the key findings are remarkably similar. For example, the impact of potential experience and marital status on overeducation is almost identical. We also find that women who work multiple jobs are generally less likely to be overeducated. One small difference is that living in an urban location has little impact on overeducation among women. Turning to immigrant characteristics, the same patterns emerge for immigrants from different countries of birth, with low-skilled Australians and Northern Europeans, and all Eastern European more likely to be overeducated. One slightly different results, is that for women there is a clear pattern of low-skilled migrants from Asian countries being, on average, undereducated, while high-skilled migrants from these

countries are overeducated. Cohort effects are similar for women, with no clear patterns, except for post-school certificates where, like for men, overeducation has become more common among recent cohorts.

5. Conclusion

In this paper, we used data from the 1996, 2001 and 2006 population censuses in New Zealand to examine differences between a migrant's actual years of education and the estimated average years of education in the occupation in which they work. Our focus is on examining the important of heterogeneity in educational attainment when estimating whether overskilling is more prevalent among migrants. This has been generally ignored in previous work on this subject even though almost by definition, mismatch among the highly educated means overeducation and among those without qualifications undereducation.

In general, recent migrants in New Zealand are much more likely to be overeducated than undereducated, but once accounting for broad education levels in a multivariate analysis of migrant occupation-education mismatch, we find that most groups of migrants are, in fact, more likely to be undereducated than similarly qualified natives and that both overeducated and undereducated migrants become more similar to comparable native-born with increasing years of residence in New Zealand. This is in contrast to the results when we estimate standard regression models that do not allow for heterogeneity in educational attainment; in this case we find that migrants are undereducated relative to New Zealanders of the same education level (presumably because they are positively self-selected in terms of unobserved ability) and that undereducation does not appear to change with increasing years in the country.

As we are examining narrowly defined occupations, the degree of educational mismatch is a good measure of how efficient job-skills matching is in this specific labour market. For migrants we see that the efficiency is less than for the locally born, but matching improves with years in the host labour market. This suggests that further education, training and experience gained with increasing duration of residence lead to a more efficient allocation of migrant human capital over time.

With this interpretation, several of our findings can be seen in new light. For example, we find that being in an urban area lowers overeducation among those with a high level of qualifications. This is plausible in the light of the increasing importance of agglomerations, which draw in highly skilled labour and generate positive spillover benefits of such labour pooling (e.g. Glaeser and Gottlieb, 2009).

Much of the recent international literature has been concerned with incorporating the overeducation-undereducation framework into estimating the consequences for earnings by means of Mincer-type earnings regression equations. The ORU model (e.g. Chiswick and Miller, 2008; 2009b) permits the calculation of the private cost of overeducation and

undereducation of immigrants. The heterogeneity discussed above clearly has implications for estimating such earnings equations. It suggests that one cannot estimate the (low) returns to overeducation correctly unless the data are split into broad qualifications groups. For example, if there are diminishing returns to additional education, the returns to overeducation in a sample of highly qualified workers are expected to even less than if the data are pooled. A quantification of this effect would be a fruitful avenue for further research.

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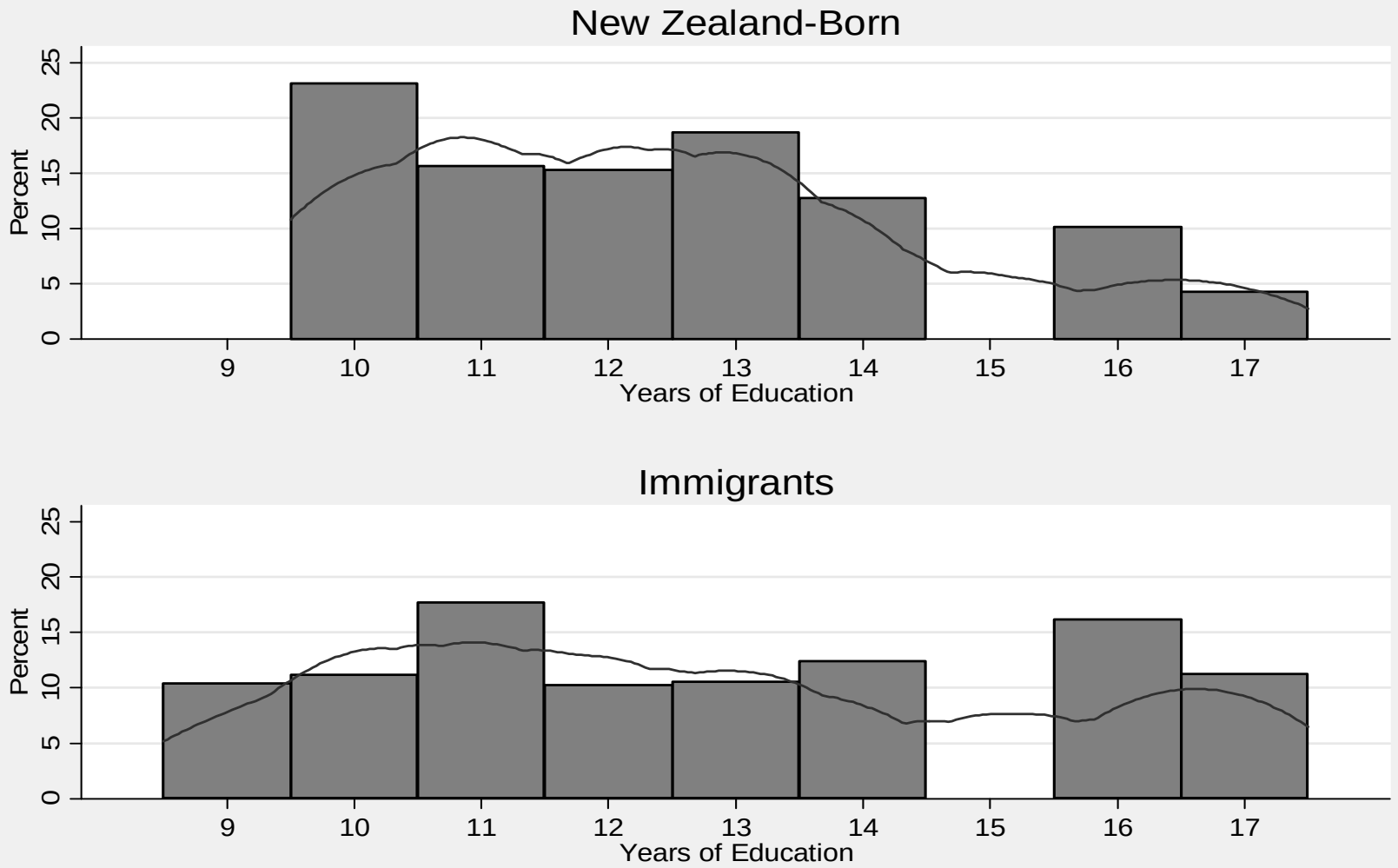

Figure 1: Distribution of Years of Education by Migrant Status

Table 1: Summary Statistics

	New Zealand-born				Immigrants			
	Not Employed	Self-Employed or Missing Occupation	Drop from Analysis (first two columns)	Analysis Sample	Not Employed	Self-Employed or Missing Occupation	Drop from Analysis (first two columns)	Analysis Sample
Female	67.0%	36.2%	51.9%	51.0%	65.4%	39.8%	55.1%	48.8%
Mean Age	43.9	44.8	44.3	41.1	44.7	44.9	44.8	42.0
Mean Years in New Zealand	NA	NA	NA	NA	15.9	19.6	17.4	17.8
No Qualification	41.9%	22.9%	32.6%	23.1%	24.2%	13.7%	20.0%	12.8%
School Certificate	14.2%	15.8%	15.0%	15.6%	4.0%	4.4%	4.2%	5.2%
6th Form/UB/Higher School	11.1%	13.8%	12.4%	14.8%	4.4%	5.5%	4.8%	6.1%
Overseas School Qual	0.2%	0.2%	0.2%	0.2%	24.5%	21.3%	23.2%	17.8%
Post-School Certificate	9.0%	15.8%	12.3%	13.7%	7.3%	11.8%	9.1%	12.0%
Post-School Diploma	7.0%	11.0%	9.0%	12.8%	7.3%	9.7%	8.3%	12.5%
Bachelor Degree	4.3%	8.3%	6.3%	10.2%	10.7%	13.0%	11.6%	16.2%
Higher Degree	1.4%	3.2%	2.3%	4.3%	5.4%	8.2%	6.6%	11.3%
Not Elsewhere Included	10.9%	8.9%	9.9%	5.4%	12.2%	12.3%	12.2%	6.3%
Mean Years of Education	11.58	12.34	11.95	12.44	11.47	12.33	11.81	12.81
Non-Family	26.4%	16.2%	21.4%	21.5%	19.5%	14.7%	17.6%	18.2%
Couple without Children	21.3%	29.4%	25.3%	27.4%	23.0%	26.1%	24.3%	27.2%
Couple with Children	33.9%	49.2%	41.4%	43.1%	45.8%	54.3%	49.2%	48.6%
Single with Children	18.4%	5.3%	11.9%	8.0%	11.7%	4.9%	9.0%	6.0%
Employed			49.1%	100%			40.1%	100%
Self-Employed in Main Job		79.9%	39.2%	0%		74.6%	29.9%	0%
Mean Weekly Work Hours		42.36		38.42		40.51		38.32
Multiple Jobs		12.5%	6.1%	8.7%		10.1%	4.0%	6.8%
Mean Individual Income	13,224	42,942	27,814	39,022	11,519	35,926	21,314	40,608
Year = 1996	36.5%	32.0%	34.3%	30.4%	31.2%	27.5%	29.7%	26.1%
Year = 2001	33.8%	33.3%	33.6%	33.5%	33.4%	32.1%	32.9%	30.9%
Year = 2006	29.7%	34.7%	32.1%	36.1%	35.4%	40.4%	37.4%	43.0%
Percentage of Population	22.7%	21.8%	44.5%	55.5%	29.2%	19.6%	48.7%	51.3%
Number of Individuals	967,416	932,952	1,900,368	2,370,054	368,916	247,317	616,233	648,408

Notes: Income is in 2006 dollars. All counts underlying the figures in this table are randomly rounded to base 3.

Table 2: The Distribution of Qualifications for Employed Immigrants and New Zealand-born

	1996		2001		2006		Pooled	
Country of Birth	NZ-born	Immigrants	NZ-born	Immigrants	NZ-born	Immigrants	NZ-born	Immigrants
No Qualifications	27.6%	19.8%	22.2%	11.6%	20.2%	9.5%	23.1%	12.8%
School Qualifications	27.4%	21.5%	33.7%	36.2%	30.4%	28.4%	30.6%	29.0%
Post-School Certificate	20.3%	25.5%	17.1%	14.1%	19.8%	16.8%	19.1%	18.2%
Post-School Diploma	13.6%	13.0%	13.5%	13.0%	11.5%	11.8%	12.8%	12.5%
Bachelors Degree	7.5%	11.0%	9.4%	14.4%	13.1%	20.6%	10.2%	16.2%
Higher Degree	3.6%	9.1%	4.1%	10.8%	5.0%	12.9%	4.3%	11.3%
Years of Education	12.25	12.30	12.40	12.69	12.64	13.21	12.44	12.81
Any Qualification Gained in NZ	NA	27.9%	NA	28.2%	NA	24.5%	NA	26.5%
Number of Individuals	720,567	169,155	793,071	200,436	856,413	278,820	2,370,051	648,411

Notes: All figures are rounded to base 3. See the paper for the conversion from qualifications to years of education.

Table 3: Under/Overeducation by Immigrant Status and Gender

	Male			Female		
	NZ-born	Recent Migrant	Earlier Migrant	NZ-born	Recent Migrant	Earlier Migrant
a) Measured Compared to Modal Qualification in Same Occupation						
Under Qualified	19.5%	14.7%	18.7%	17.9%	8.6%	13.7%
Perfectly Qualified	44.2%	33.6%	40.3%	48.0%	33.2%	43.4%
Over Qualified	36.3%	51.7%	41.0%	34.1%	58.1%	42.9%
b) Measured Compared to Average Years of Education +/- 0.5 in Same Occupation						
Under Qualified	42.2%	33.4%	43.5%	43.4%	35.2%	45.7%
Perfectly Qualified	20.9%	15.0%	18.8%	25.0%	13.4%	20.0%
Over Qualified	36.9%	51.7%	37.6%	31.7%	51.3%	34.2%
c) Actual Years of Education Minus Average Years of Education in Same Occupation						
Mean	0.00	0.67	-0.11	-0.01	0.81	-0.08
Median	-0.10	0.70	-0.20	-0.20	0.70	-0.30
Number of Individuals	1,161,186	83,451	248,487	1,208,868	70,860	245,610

Note: Pooling 1996, 2001, and 2006 data. All figures are rounded to base 3. Recent migrants have lived in New Zealand for less than five years.

Table 4: Years of Overeducation for Individuals with Different Characteristics

	Overall	NZ-born	Recent Migrants	Earlier Migrants
Male	0.02	0.00	0.67	-0.11
Female	0.01	-0.01	0.81	-0.08
Aged 24-29	0.45	0.41	0.80	0.50
Aged 30-39	0.17	0.11	0.84	0.12
Aged 40-49	-0.08	-0.11	0.61	-0.11
Aged 50-59	-0.32	-0.31	0.33	-0.40
Aged 60-64	-0.46	-0.41	-0.21	-0.64
No Qualifications	-1.79	-1.63	-3.60	-2.76
School Qualifications	-0.66	-0.52	-1.68	-1.03
Post-School Certificate	0.44	0.59	-0.24	-0.12
Post-School Diploma	0.58	0.57	0.78	0.58
Bachelors Degree	2.17	2.06	2.72	2.25
Higher Degree	3.16	3.10	3.50	3.06

Note: Pooling 1996, 2001, and 2006 data. Recent migrants have lived in New Zealand for less than five years.

Table 5: Years of Overeducation for Individuals in Different Occupations

	% Total Pop in Occupation			Mean Years of Education		
Occupation	NZ	RM	EM	NZ	RM-NZ	EM-NZ
			Male			
Heavy Truck or Tanker Driver	4.2%	0.6%	1.1%	10.92	0.55	-0.18
Sales Assistant	3.2%	3.3%	2.9%	11.81	1.22	0.01
General Manager	2.8%	2.3%	2.9%	13.20	1.14	0.31
General Labourer	2.8%	1.8%	2.6%	11.08	0.56	-0.69
Administration Manager	2.4%	2.0%	2.4%	13.18	1.26	0.45
Sales and/or Marketing Manager	2.0%	1.9%	2.0%	12.87	1.19	0.13
Slaughterer	2.0%	0.4%	0.7%	10.99	-0.03	-0.72
Sales Representative	1.7%	0.9%	1.2%	12.14	1.31	0.12
Carpenter and/or Joiner	1.6%	1.2%	1.1%	12.02	-0.17	-0.53
Motor Mechanic	1.5%	1.5%	1.0%	12.22	0.08	-0.24
Sales Assistant	3.2%	3.3%	2.9%	11.81	1.22	0.01
Computer Applications Engineer	0.8%	2.6%	1.4%	14.20	0.62	0.57
Chef	0.5%	2.5%	1.3%	12.21	-0.78	-1.01
University Lecturer and/or Tutor	0.9%	2.5%	2.4%	15.73	1.04	0.60
General Manager	2.8%	2.3%	2.9%	13.20	1.14	0.31
Administration Manager	2.4%	2.0%	2.4%	13.18	1.26	0.45
Technical Representative	1.1%	1.9%	1.4%	12.87	1.26	0.40
Sales and/or Marketing Manager	2.0%	1.9%	2.0%	12.87	1.19	0.13
Secondary School Teacher	1.4%	1.8%	2.0%	15.72	0.57	0.16
General Labourer	2.8%	1.8%	2.6%	11.08	0.56	-0.69
			Female			
General Clerk	6.5%	4.6%	5.4%	11.93	1.64	0.27
Sales Assistant	5.9%	4.9%	4.9%	11.39	1.03	-0.14
Primary School Teacher	4.2%	2.8%	3.2%	14.79	0.90	0.16
Registered Nurse	4.1%	6.2%	4.4%	14.28	0.15	-0.11
Secretary	3.9%	2.7%	3.6%	11.91	0.73	-0.01
Cleaner	3.2%	2.2%	2.9%	10.92	0.11	-0.89
Information Clerk / Other Receptionist	3.0%	2.3%	2.4%	11.70	0.94	0.06
Care Giver	2.5%	2.4%	2.4%	11.44	0.65	-0.29
Accounts Clerk	2.2%	2.1%	2.5%	11.88	1.36	0.27
Office Manager	2.0%	0.8%	1.6%	11.99	1.16	0.16
Registered Nurse	4.1%	6.2%	4.4%	14.28	0.15	-0.11
Sales Assistant	5.9%	4.9%	4.9%	11.39	1.03	-0.14
General Clerk	6.5%	4.6%	5.4%	11.93	1.64	0.27
Primary School Teacher	4.2%	2.8%	3.2%	14.79	0.90	0.16
Secretary	3.9%	2.7%	3.6%	11.91	0.73	-0.01
Secondary School Teacher	1.9%	2.4%	2.2%	15.56	0.69	0.23
Care Giver	2.5%	2.4%	2.4%	11.44	0.65	-0.29
Information Clerk and Other Reception	3.0%	2.3%	2.4%	11.70	0.94	0.06
Cleaner	3.2%	2.2%	2.9%	10.92	0.11	-0.89
Accounts Clerk	2.2%	2.1%	2.5%	11.88	1.36	0.27

Note: Pooling 1996, 2001, and 2006 data. NZ = New Zealand-born, RM = Recent Migrants, EM = Earlier Migrants. Recent migrants have lived in New Zealand for less than five years. Mean years of education for recent and earlier migrants is relative to the New Zealand-born.

Table 6: The Relationship between Years of Overeducation and Individual Characteristics by Qualification for Men

	No Quals	School Quals	Post-School Certificate	Post-School Diploma	Bachelor Degree	Higher Degree
Potential Experience	-0.004**	-0.063**	-0.011**	-0.026**	-0.007**	0.009**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)
Pot Exp-Squared/100	-0.009**	0.082**	0.020**	0.027**	-0.011**	-0.050**
	(0.001)	(0.002)	(0.002)	(0.003)	(0.004)	(0.005)
Currently Married/De-Facto	-0.136**	-0.185**	-0.115**	-0.095**	-0.076**	0.052*
	(0.005)	(0.007)	(0.007)	(0.013)	(0.014)	(0.023)
Previously Married	-0.015**	0.003	0.047**	0.019	0.009	0.084**
	(0.005)	(0.007)	(0.008)	(0.015)	(0.019)	(0.027)
Couple w/ No Children	0.035**	0.036**	0.046**	-0.033**	-0.065**	-0.101**
	(0.006)	(0.007)	(0.007)	(0.013)	(0.015)	(0.022)
Couple w/ Children	0.036**	0.034**	0.052**	-0.046**	-0.054**	-0.095**
	(0.005)	(0.006)	(0.007)	(0.012)	(0.013)	(0.020)
Single Parent	0.016**	0.050**	0.060**	-0.008	0.016	-0.033
	(0.006)	(0.008)	(0.009)	(0.018)	(0.022)	(0.035)
Lives in Urban Area	-0.013**	-0.083**	-0.080**	-0.193**	-0.285**	-0.216**
	(0.004)	(0.006)	(0.006)	(0.011)	(0.015)	(0.023)
Hours Worked at Main Job	0.002**	0.001**	0.002**	-0.003**	-0.009**	-0.012**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Has Multiple Jobs	-0.099**	-0.009	-0.194**	-0.111**	-0.093**	-0.340**
	(0.006)	(0.007)	(0.007)	(0.010)	(0.011)	(0.014)
Australia	0.872**	0.139**	0.332**	-0.039	-0.135**	-0.017
	(0.014)	(0.012)	(0.013)	(0.023)	(0.023)	(0.032)
Pacific Islands	0.046**	0.409**	-0.196**	0.206**	-0.207**	-0.132**
	(0.004)	(0.007)	(0.008)	(0.018)	(0.023)	(0.042)
British Isles	0.120**	-0.094**	0.072**	-0.090**	-0.246**	-0.057**
	(0.005)	(0.005)	(0.004)	(0.007)	(0.010)	(0.009)
Western Europe	0.337**	-0.209**	0.036*	-0.072**	-0.043	0.020
	(0.022)	(0.016)	(0.014)	(0.024)	(0.030)	(0.032)
Northern Europe	1.007**	0.653**	0.405**	-0.166	-0.059	0.125
	(0.070)	(0.056)	(0.049)	(0.118)	(0.098)	(0.099)
Southern Europe	-0.845**	-0.452**	-0.022	-0.031	-0.177	-0.212
	(0.060)	(0.059)	(0.060)	(0.105)	(0.131)	(0.122)
South-Eastern Europe	0.319**	0.126**	0.129**	0.131*	0.215**	0.287**
	(0.043)	(0.031)	(0.032)	(0.064)	(0.042)	(0.066)
Eastern Europe	0.544**	0.135**	0.088*	0.373**	0.197**	0.165**
	(0.069)	(0.037)	(0.039)	(0.066)	(0.058)	(0.062)
North Africa/Middle East	-1.491**	-0.539**	-0.438**	0.200**	0.122**	-0.166**
	(0.041)	(0.032)	(0.039)	(0.058)	(0.038)	(0.050)
South-East Asia	-1.379**	-0.179**	-0.309**	0.232**	0.294**	0.257**
	(0.015)	(0.015)	(0.019)	(0.028)	(0.017)	(0.033)
North-East Asia	-0.729**	-0.187**	-0.425**	0.265**	0.445**	0.284**
	(0.017)	(0.013)	(0.021)	(0.029)	(0.017)	(0.025)
Northern America	1.073**	0.100**	0.218**	-0.187**	-0.169**	-0.239**
	(0.032)	(0.020)	(0.025)	(0.039)	(0.025)	(0.027)
Central/South America	-0.667**	0.211**	-0.176**	0.298**	0.365**	0.297**
	(0.023)	(0.017)	(0.020)	(0.026)	(0.016)	(0.020)
Southern/Central Asia	-0.944**	-0.974**	-0.454**	0.068	0.073	-0.017

	(0.051)	(0.036)	(0.044)	(0.069)	(0.059)	(0.077)
Sub-Saharan Africa	-1.064**	-0.660**	-0.022	-0.122**	-0.365**	-0.353**
	(0.037)	(0.015)	(0.014)	(0.019)	(0.019)	(0.024)
Any Qual Gained in NZ		0.385**	0.404**	-0.052**	-0.151**	0.065**
		(0.007)	(0.008)	(0.011)	(0.014)	(0.017)
Arrived Before 1957	-0.285**	0.031	-0.843**	0.108	0.342**	0.019
	(0.027)	(0.041)	(0.037)	(0.060)	(0.086)	(0.107)
Arrived 1957-1966	-0.177**	0.022	-0.717**	0.109**	0.332**	0.185*
	(0.015)	(0.025)	(0.022)	(0.039)	(0.058)	(0.073)
Arrived 1967-1976	-0.042**	-0.014	-0.519**	0.097**	0.230**	0.082
	(0.009)	(0.016)	(0.015)	(0.027)	(0.039)	(0.049)
Arrived 1977-1986	0.066**	-0.005	-0.281**	0.031	0.108**	-0.053
	(0.010)	(0.012)	(0.012)	(0.022)	(0.027)	(0.032)
Arrived 1987-1996	0.149**	0.032**	0.220**	-0.064**	-0.056**	-0.105**
	(0.015)	(0.012)	(0.013)	(0.023)	(0.016)	(0.019)
Arrived 1997- 2006	0.188**	-0.026	1.021**	-0.111**	-0.138**	0.038
	(0.022)	(0.017)	(0.018)	(0.030)	(0.020)	(0.026)
Year is 2001	-0.085**	-0.053**	-0.020**	0.043**	0.062**	0.265**
	(0.003)	(0.004)	(0.004)	(0.007)	(0.009)	(0.014)
Year is 2006	-0.201**	-0.128**	-0.159**	-0.205**	-0.028**	0.228**
	(0.003)	(0.005)	(0.004)	(0.008)	(0.009)	(0.015)
R-squared	0.610	0.270	0.170	0.050	0.060	0.070
Observations	335,568	404,742	338,283	159,315	163,032	92,187

Notes: Standard errors in parenthesis. * significant at 5%; ** significant at 1%. All regressions also include controls for geographical location and whether marriage status or hours of work are missing. All immigrant specific characteristics are defined so that the coefficients can be interpreted as the difference in the outcome between a particular group of immigrants and average immigrant in the sample.

Table 7: The Relationship between Years of Overeducation and Individual Characteristics by Qualification for Women

	No Quals	School Quals	Post-School Certificate	Post-School Diploma	Bachelor Degree	Higher Degree
Potential Experience	-0.001	-0.060**	-0.010**	-0.036**	-0.019**	-0.006*
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)
Pot Exp-Squared/100	-0.008**	0.080**	0.020**	0.043**	0.023**	-0.004
	(0.001)	(0.001)	(0.002)	(0.003)	(0.004)	(0.006)
Currently Married/De-Facto	-0.097**	-0.100**	-0.016	-0.212**	-0.211**	-0.136**
	(0.007)	(0.007)	(0.011)	(0.013)	(0.014)	(0.024)
Previously Married	-0.042**	-0.006	0.052**	-0.005	-0.031*	0.032
	(0.005)	(0.006)	(0.009)	(0.011)	(0.014)	(0.022)
Couple w/ No Children	0.037**	0.055**	0.064**	0.127**	0.125**	0.110**
	(0.007)	(0.007)	(0.011)	(0.013)	(0.015)	(0.024)
Couple w/ Children	0.039**	0.056**	0.028**	-0.072**	-0.094**	-0.075**
	(0.007)	(0.006)	(0.011)	(0.012)	(0.013)	(0.023)
Single Parent	0.005	-0.012*	0.037**	-0.019	-0.092**	-0.041
	(0.005)	(0.005)	(0.008)	(0.010)	(0.014)	(0.023)
Lives in Urban Area	0.062**	0.005	0.046**	0.021*	-0.039**	-0.063**
	(0.005)	(0.005)	(0.008)	(0.009)	(0.013)	(0.023)
Hours Worked at Main Job	-0.005**	-0.007**	-0.008**	-0.015**	-0.019**	-0.017**
	0.000	0.000	0.000	0.000	0.000	0.000
Has Multiple Jobs	-0.079**	0.012*	-0.154**	-0.018*	0.003	-0.137**
	(0.006)	(0.005)	(0.008)	(0.008)	(0.010)	(0.015)
Australia	0.859**	0.120**	0.260**	-0.074**	-0.373**	-0.209**
	(0.014)	(0.010)	(0.016)	(0.019)	(0.020)	(0.034)
Pacific Islands	-0.033**	0.288**	-0.296**	0.206**	-0.191**	0.044
	(0.005)	(0.007)	(0.010)	(0.016)	(0.022)	(0.047)
British Isles	0.285**	0.050**	0.147**	-0.133**	-0.393**	-0.175**
	(0.005)	(0.004)	(0.007)	(0.007)	(0.011)	(0.010)
Western Europe	0.313**	-0.024	0.073**	0.011	-0.206**	-0.050
	(0.022)	(0.015)	(0.020)	(0.022)	(0.030)	(0.035)
Northern Europe	0.608**	0.307**	0.390**	0.006	-0.178*	0.261**
	(0.070)	(0.044)	(0.070)	(0.072)	(0.080)	(0.100)
Southern Europe	-0.755**	-0.271**	-0.013	-0.141	-0.127	-0.725**
	(0.073)	(0.060)	(0.093)	(0.118)	(0.103)	(0.124)
South-Eastern Europe	-0.475**	-0.040	0.083	0.285**	0.096*	0.222**
	(0.045)	(0.030)	(0.050)	(0.063)	(0.040)	(0.066)
Eastern Europe	0.705**	0.047	0.079	0.469**	0.325**	0.549**
	(0.076)	(0.034)	(0.053)	(0.055)	(0.047)	(0.059)
North Africa/Middle East	-1.591**	-0.653**	-0.337**	0.242**	0.170**	-0.088
	(0.074)	(0.042)	(0.063)	(0.072)	(0.044)	(0.076)
South-East Asia	-1.163**	-0.127**	-0.074**	0.333**	0.528**	0.398**
	(0.014)	(0.012)	(0.018)	(0.025)	(0.014)	(0.033)
North-East Asia	-1.071**	-0.165**	-0.221**	0.571**	0.436**	0.530**
	(0.017)	(0.012)	(0.023)	(0.024)	(0.016)	(0.028)
Northern America	1.010**	0.246**	0.428**	-0.110**	-0.155**	-0.286**
	(0.042)	(0.019)	(0.033)	(0.033)	(0.022)	(0.027)
Central/South America	-0.772**	-0.732**	-0.092	0.243**	0.067	-0.112
	(0.058)	(0.034)	(0.054)	(0.063)	(0.054)	(0.083)
Southern/Central Asia	-1.014**	-0.028	-0.148**	0.149**	0.582**	0.539**

	(0.027)	(0.017)	(0.031)	(0.032)	(0.019)	(0.025)
Sub-Saharan Africa	-1.219**	-0.971**	-0.169**	-0.177**	-0.454**	-0.336**
	(0.041)	(0.012)	(0.022)	(0.018)	(0.020)	(0.029)
Any Qual Gained in NZ		0.370**	0.544**	-0.029**	-0.167**	0.044**
		(0.006)	(0.010)	(0.011)	(0.013)	(0.016)
Arrived Before 1957	-0.063*	0.008	-0.938**	0.231**	0.026	0.170
	(0.025)	(0.033)	(0.050)	(0.054)	(0.088)	(0.126)
Arrived 1957-1966	-0.158**	0.002	-0.822**	0.099**	0.147*	0.039
	(0.015)	(0.020)	(0.029)	(0.035)	(0.057)	(0.086)
Arrived 1967-1976	-0.058**	-0.022	-0.522**	0.031	0.113**	0.053
	(0.009)	(0.013)	(0.019)	(0.024)	(0.038)	(0.057)
Arrived 1977-1986	0.034**	-0.020	-0.215**	0.002	0.083**	-0.034
	(0.011)	(0.010)	(0.015)	(0.020)	(0.026)	(0.038)
Arrived 1987-1996	0.156**	0.053**	0.362**	0.012	-0.018	-0.101**
	(0.017)	(0.012)	(0.018)	(0.021)	(0.016)	(0.022)
Arrived 1997- 2006	0.263**	-0.019	1.160**	-0.133**	-0.070**	0.041
	(0.026)	(0.016)	(0.025)	(0.028)	(0.020)	(0.027)
Year is 2001	-0.170**	-0.124**	-0.152**	-0.059**	-0.069**	0.056**
	(0.003)	(0.004)	(0.006)	(0.006)	(0.010)	(0.015)
Year is 2006	-0.328**	-0.256**	-0.295**	-0.341**	-0.285**	-0.107**
	(0.003)	(0.004)	(0.006)	(0.007)	(0.009)	(0.016)
R-squared	0.360	0.170	0.130	0.080	0.120	0.070
Observations	295,464	508,377	231,867	224,805	182,577	82,248

Notes: Standard errors in parenthesis. * significant at 5%; ** significant at 1%. All regressions also include controls for geographical location and whether marriage status or hours of work are missing. All immigrant specific characteristics are defined so that the coefficients can be interpreted as the difference in the outcome between a particular group of immigrants and average immigrant in the sample.

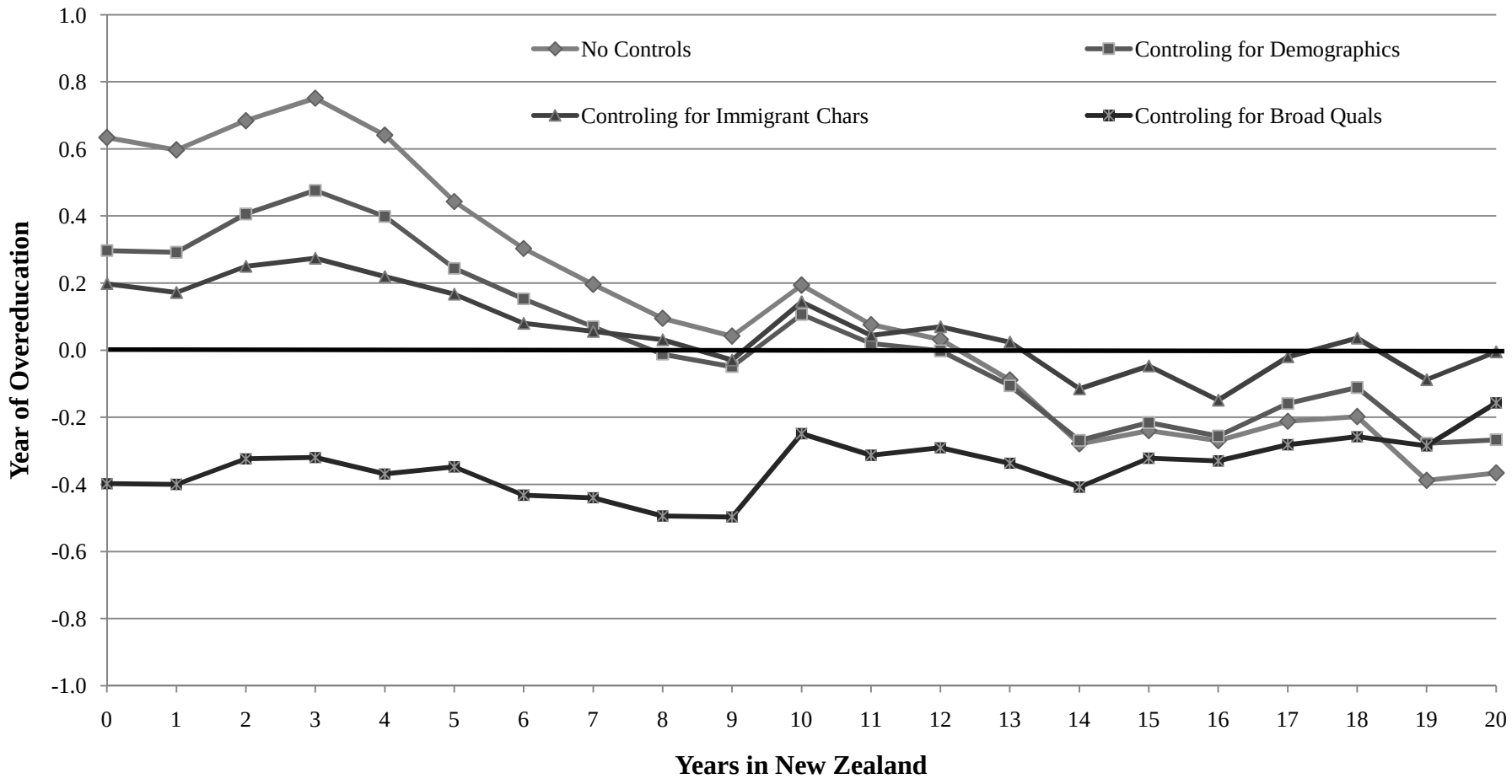

Figure 2: Years of Overeducation for Male Immigrants by Years in New Zealand

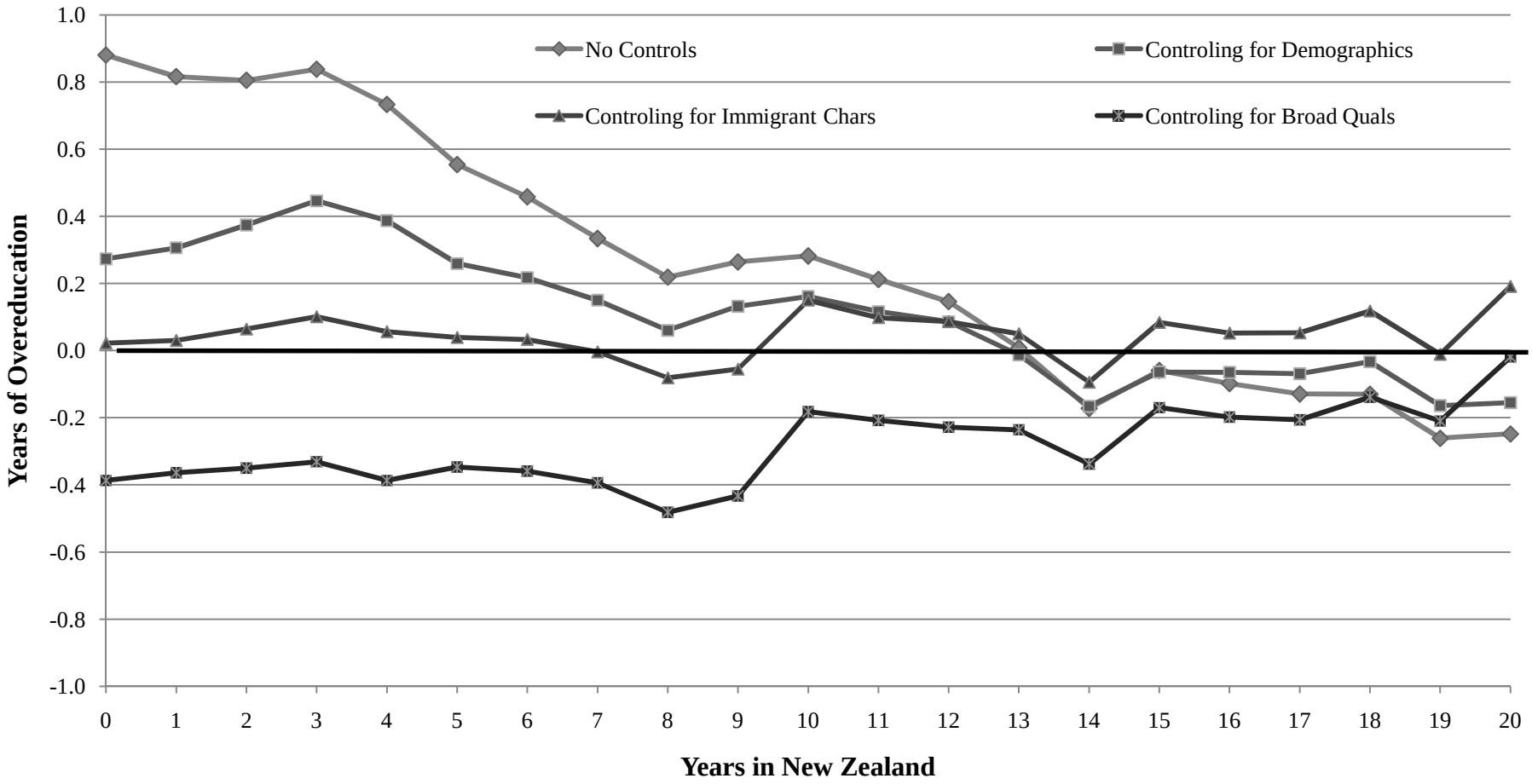

Figure 3: Years of Overeducation for Female Immigrants by Years in New Zealand

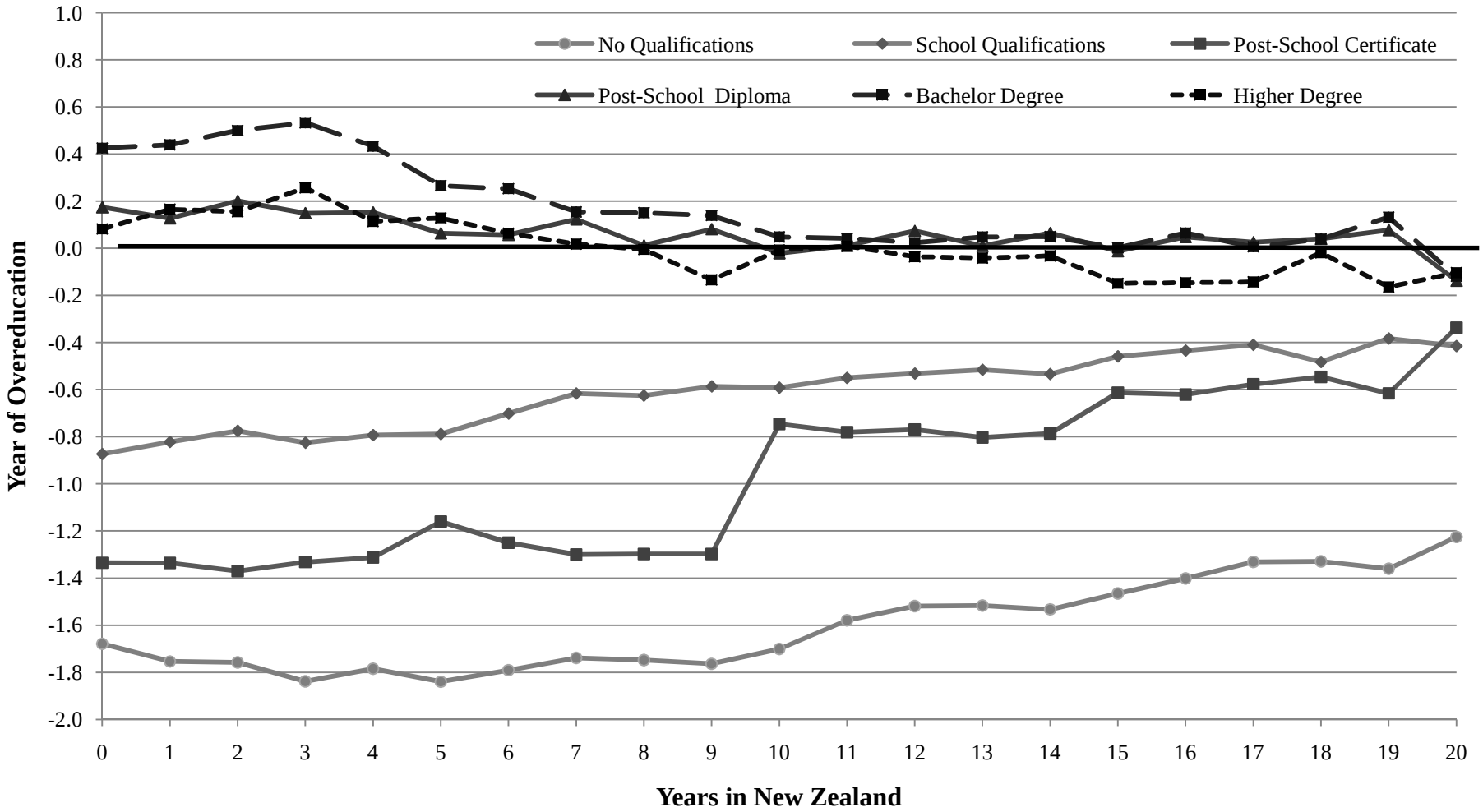

Figure 4: Years of Overeducation for Male Immigrants by Education and Years in New Zealand

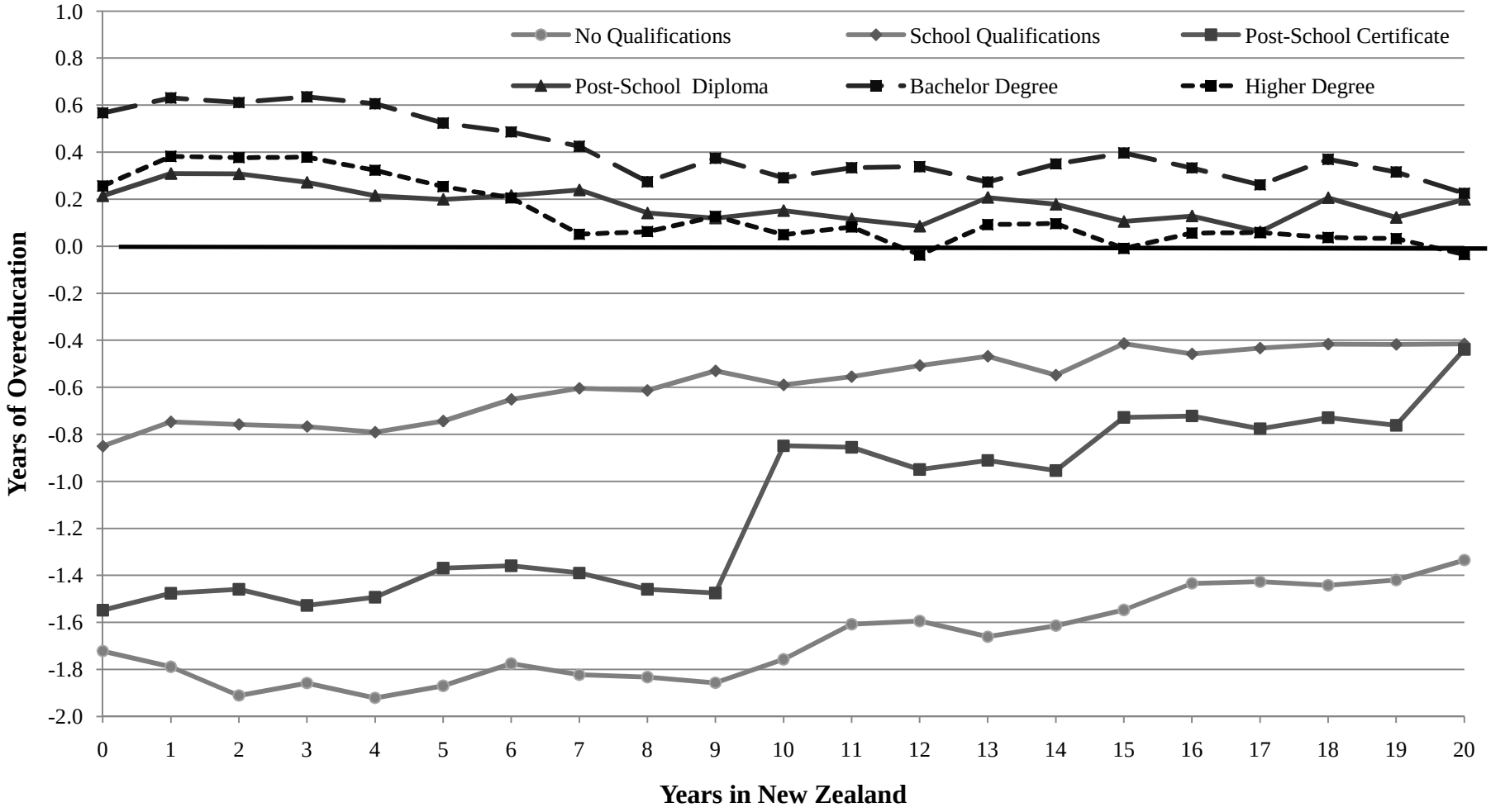

Figure 5: Years of Overeducation for Female Immigrants by Education and Years in New Zealand