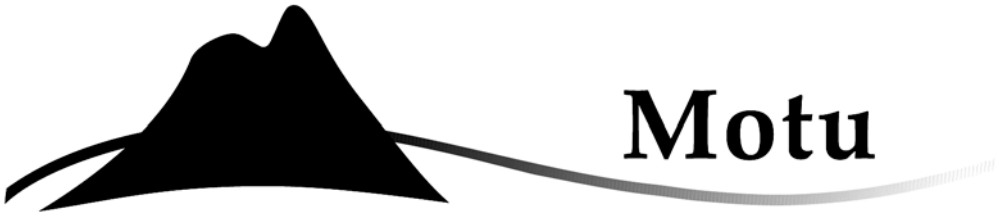

The Labour Market Adjustment of Immigrants in New Zealand

Steven Stillman and David C. Maré

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Author contact details

Steven Stillman
Motu Economic and Public Policy Research
Email stillman@motu.org.nz

David C.Maré
Motu Economic and Public Policy Research
Email dave.mare@motu.org.nz

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Motu Economic and Public Policy Research
PO Box 24390
Wellington
New Zealand

Email info@motu.org.nz
Telephone +64-4-939-4250
Website www.motu.org.nz

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Abstract

This paper uses data from the 1997–2007 New Zealand Income Survey to examine the economic performance of immigrants in New Zealand. Specifically, we use a synthetic cohort approach to examine how employment rates, hourly wages, annual income and occupations for immigrants compare to those for the NZ-born. We estimate the time pattern of adaptation in a semi-parametric manner for immigrants from different birth regions and with different qualifications. We also examine the possible impact of immigrants getting different returns to qualifications. The pattern of entry disadvantage followed by subsequent relative improvement is more pronounced for employment rates than for wage rates or occupational rank. It is also more pronounced for immigrants born in Asia. Outcomes for immigrants from the Pacific Islands never catch up with the NZ-born.

JEL classification
J24, J31, J61

Keywords
Immigration, labour market outcomes, occupational choice, assimilation, New Zealand

1 Introduction

Nearly a quarter of New Zealand's population is foreign-born and forty percent of migrants have arrived in the past ten years. Moreover, immigrants to New Zealand are more qualified than the NZ-born workforce, as a consequence of skill-focused immigrant selection policies. Despite the magnitude of these immigrant flows, limited research has examined the economic performance of immigrants in New Zealand.[1] This study extends the existing New Zealand literature in a number of ways. Unlike previous studies, which have all used Census data, we use data from the 1997–2007 New Zealand Income Survey (NZIS). Because the NZIS is an annual survey and different cohorts of migrants are observed in successive years, weaker assumptions are needed to separately identify the impact of additional years in New Zealand on labour market outcomes from general macroeconomic and ageing effects.[2] Thus, we use a synthetic cohort approach to examine how employment rates, hourly wages, annual income and occupations for immigrants compare to those for the NZ-born. This is the first paper on immigrant performance in New Zealand to examine wage adaption, as wage rates are not measured in the Census.

Besides using this different data source, we extend the previous work in this area along a number of dimensions. First, we examine how outcomes for immigrants change with years spent in New Zealand in a semi-parametric manner that makes no assumptions about the time pattern of labour market outcomes as more host country experience is acquired. Importantly, this approach reveals that the assimilation profile is almost never quadratic, as is typically assumed in most studies in this literature. Next, using this same framework, we consider the role that occupational choice plays in explaining differences in outcomes between immigrants and the NZ-born. We examine occupational choice both as an outcome variable and as a possible explanation for differences in hourly wages and

[1] Exceptions include Poot (1993), Winkelmann and Winkelmann (1998a; 1998b), MacPherson et al. (2000), Boyd (2006), New Zealand Immigration Service (2003), and Statistics New Zealand (2004). See section two for a further discussion.

[2] It is still necessary to assume some structure on cohort effects. As discussed further in section 5, we assume that immigrants that arrive in a ten-year period can be grouped together as the same cohort and that ageing effects are the same for both immigrants and the NZ-born, but given these two assumptions we can semi-parametrically identify both the impact of accumulating time in New Zealand (often called assimilation effects) and macroeconomic effects.

income between immigrants and the NZ-born. One small innovation that we make is that we classify occupations by the average wage earned by the NZ-born in each occupation over the entire sample period. This allows us to rank occupations in a continuous metric that has the same explicit ordering for immigrants and the NZ-born.

We also extend previous work by examining whether the relationship between qualifications and labour market outcomes differs for migrants and the NZ-born, and the role that this plays in explaining differences in outcomes between the two groups. This is a flexible way of allowing for the possibility that immigrants with the same qualifications as New Zealanders have less human capital either because their degrees were earned overseas or because they have lower local skills such as English language ability. Along the same lines, we examine how the process of labour market assimilation varies for immigrants with different educational qualifications and those born in different regions. While one weakness of the NZIS for examining immigrant outcomes is that detailed country of birth information is unavailable, we are still able to classify migrants as being born in one of five regions from which there are large differences in immigrant characteristics and outcomes.

2 Background

2.1 International Literature

There is a large literature, reviewed in Borjas (1994), Borjas (1999) and Duleep (2008), that examines how well immigrants perform in the host country's economy and the impact that immigrants have on the labour market opportunities of non-immigrants. Analysing the relationship between immigrant earnings and their duration of stay in the United States, seminal work by Chiswick (1978) identified two key features that have been confirmed in most subsequent studies. First, immigrants experience an initial entry disadvantage, having poorer outcomes when they first arrive than comparable native-born workers. Second, relative outcomes for immigrants improve the longer they remain in the host country. Subsequent studies have examined the magnitude and robustness of these patterns across different countries, immigrant groups, and outcomes, and using different analytical methods, and have investigated a range of potential explanations for the observed patterns.

The standard approach to estimating immigrant earnings progress is by regression estimation of an augmented wage equation, modelling wages as a function of human capital and other worker characteristics. Additional variables are then added to estimate the initial wage penalty faced by immigrants, and the degree of improvement as a function of years since migration. Borjas (1985) demonstrated the importance of using longitudinal data on arrival cohorts to control for cohort variation in unobserved human capital. In cross-sectional studies, such as that of Chiswick (1978), a decline over time in cohort 'quality' will lead to an overstatement of post-arrival wage growth. Borjas' study identifies such cohort declines in the US, and reverses Chiswick's finding that immigrant earnings overtake those of comparable natives after 10 to 15 years – showing instead a pattern of incomplete convergence for recent arrival cohorts.

Even with longitudinal data, there are challenges in separately identifying the influences of the year of arrival, years since arrival, age at arrival, current age and labour market experience, with additional constraints required to enable identification (see Borjas 1999; and McKenzie 2006 for in-depth discussions of this point). Furthermore, with synthetic cohort designs, such as in Borjas (1999), the rate of improvement may be overstated as a result of selective remigration. If immigrants who fare poorly are more likely to leave, average wages of longer duration immigrants will be higher as a result of compositional change, independent of the rate of true improvement (Lubotsky 2007; Beenstock et al. 2005).[3]

A range of explanations have been investigated for the general pattern of entry disadvantage followed by relative improvement. Chiswick (1978) hypothesises that immigrants enter with low levels of local human capital, and that post-entry growth reflects acquisition of local skills and knowledge. Subsequent studies have found support for such a process, as reflected in lower returns to pre-arrival human capital (Friedberg 2000), and investment in local skills (Duleep and Regets 1999; Duleep 2007), language skills (Chiswick and Miller 2001), and job networks (Frijters et al. 2005;

[3] It is also possible that selective remigration might work in the other direction. This will occur if more successful migrants are more likely to remigrate because they are attracted to other countries offering higher returns to skills, reach target levels of 'migrant' earnings more quickly, or gain less from migration than

Daneshvary et al. 1992). There is also evidence that new immigrants face discrimination in the labour market, which may weaken as the immigrant becomes more integrated in the host country (Riach and Rich 2002).

Although much of the influential US literature has focused on immigrant earnings rates as a metric of labour market performance, recent studies have investigated other dimensions of the jobs held by immigrants, such as occupational rank, or the mismatch between immigrants' qualifications and their occupation. For example, Chiswick and Miller (2007; 2008) examine cross-sectional variation in wages and occupational allocation of different arrival cohorts to gauge how much of post-arrival increases in wages may be due to shifts between occupations, as opposed to within-occupation wage growth. They find that occupational sorting accounts for over half of the returns to education for non-English-speaking migrants.[4] For these migrants, individuals with higher pre-immigration experience are sorted into lower paid occupations, whereas for English-speaking migrants, occupational sorting enhances the returns to their pre-immigration experience. Liu et al. (2004) finds that within-occupation wage differentials decline over time, complementing the gains from occupational mobility.

Occupational mobility appears to be a more significant feature of wage improvement for immigrants from non-English speaking backgrounds and for less-qualified immigrants. These patterns are consistent with earlier longitudinal analysis in Chiswick et al. (2005), which finds that new immigrants tend to enter lower paying occupations than they were in their source country, and subsequently move into higher paying occupations. This "U-shaped pattern of occupational mobility" is more pronounced for lower qualified immigrants with less transferable skills, and appears to be a stronger pattern in Australia than in the United States. An alternative approach to analysing the role of occupational allocation in immigrant wage growth is to examine patterns of 'overeducation' –

immigrants with generally poor outcomes in New Zealand. Ultimately, this impact of selective remigration on average migrant cohort earnings is an empirical question.

[4] In Australia, occupational sorting accounts for about 3.5 percentage points of the return to education for both migrants and the Australian-born. However, Australian-born workers have higher education returns, so the proportional contribution is higher for migrants. In the US, the percentage point contribution is 4.8 ppt for US-

whether immigrants have higher levels of qualifications than native workers in the same occupation. Several recent studies have found evidence of immigrant overeducation in several countries, and have shown that immigrants receive low returns to their excess education, interpreting this as evidence of the imperfect transferability of immigrant skills (OECD 2007b; Lindley and Lenton 2006; Green et al. 2007; Sanromà et al. 2008)

The factors and processes that lead to duration-related improvements in the wages and occupations of immigrant jobs are also evident in immigrants' success in securing jobs. Many studies also consider quantity measures of immigrant assimilation, using measures such as employment, self-employment, unemployment and participation rates. (eg, Chiswick et al. 1997; Funkhouser 2000; Husted et al. 2001; Winkelmann and Winkelmann 1998b; OECD 2007a; 2008). While similar generic patterns of entry disadvantage and subsequent improvement are evident for both quantity and price dimensions of labour market success, the relative strength of the two forms of adjustment varies across countries. For example, Antecol et al. (2003) examine differences between Australia, Canada, and the United States and find that wage adjustment dominates in the United States, whereas in Australia, employment adjustment accounts for all of the observed assimilation, with Canada in between. They argue that institutional features of the respective labour markets, such as the "relatively inflexible wages and generous unemployment insurance in countries like Australia" may be at the root of these differences. Similarly, Causa and Jean (2008) compare patterns of immigrant integration in 12 OECD countries and argue that differing labour market policies are a significant influence on the assimilation patterns in different countries.

2.2 Institutional Situation in New Zealand[5]

Over the past 30 years, there have been substantial changes to New Zealand immigration policy, though with a maintained focus on selecting migrants with skills that are valued in the New Zealand

born workers and only 3.0 ppt for foreign-born workers, although the proportional contribution is still higher for migrants, due to higher education returns for the US-born.

[5] This section draws on section 4.9 of Winkelmann and Winkelmann (1998a), OECD (2004) and the very useful 'Timeline of policy change' in Merwood (2008). Data are sourced from Winkelmann (2000), NZ Immigration Service (2001), Merwood (2008) and the statistics at http://www.immigration.govt.nz/migrant/general/general information/statistics/.

labour market and who are likely to settle well in New Zealand. Until 1987, skilled migration policy favoured migrants from traditional source countries – primarily the United Kingdom, Western European and North America, with some additional low skill migration from the Pacific Islands, and those in occupations with identified skill shortages, as included on the 'Occupational Priority List' (OPL). The Immigration Act 1987 removed the traditional source country preference and rationalised the OPL system, requiring a firm employment offer for residence applications made on occupational grounds.

The Immigration Amendment Act 1991 represented a fundamental shift in selection policy; replacing the OPL with a points-system (the General Skills Category). Applicants were granted points for employability, age and settlement factors and had to meet certain character and health requirements. Those with the highest scores were selected with the aim of meeting an annual numerical migration target. The policy was maintained until 2003, with modifications to put more weight on English language ability (in 1995 and 2002), on having a job offer (1995), and on having a job offer relevant to the applicant's qualifications and experience (2002). In 2003, the policy was replaced by the 'Skilled Migrant Category' policy, also based on the awarding of points for job offers, work experience, qualifications and age, with additional recognition of partners' employment and experience, NZ qualifications, and employment outside Auckland. In 2007, the points schedule was modified to award points for employment, qualifications and experience in specified areas of anticipated future growth, for study in New Zealand, and for partners' skills and experience.[6]

New Zealand currently approves around 50,000 people each year for permanent residence, adding more than 1 percent annually to the New Zealand population. Over the past fifteen years, permanent residence approvals have fluctuated between 30,000 and 55,000 per year. Skilled and business migrants currently account for 60 percent of residence approvals, a figure that has varied between around one-half and three-quarters over at least the past 15 years. Family-related approvals

[6] The administration of the system also changed, from a monthly selection of successful applicants from a ranked pool, to the setting of a monthly pass mark (in 1995), above which acceptance was automatic, and back to a ranked pool – now of prospective immigrants' 'expressions of interests', from which a selected subset are invited to apply for residence.

account for most of the remainder, with the balance being approvals reflecting humanitarian and international responsibilities.

A significant direction of change in immigration policy over recent years has been the expansion of temporary migration approvals. Temporary permit approvals have grown markedly; over 180,000 people per year are currently approved for entry under temporary work or student permits up from around 45,000 10 years earlier.[7] The number of people arriving on student permits peaked at around 85,000 in 2002/03 and 2003/04, whereas the number of people admitted on work-related temporary permits has increased consistently, reaching 115,000 in 2006/07. The expansion reflects a strengthened policy focus on labour-market-focused temporary migrants who can bring skills and experience in occupations and areas identified as suffering from skill shortages. Relevant temporary migration policies include long-term business visas, talent visas, job-search visas, the re-establishment of a list of priority occupations, and an expansion of approvals for working holidays.

Overall, the dominant focus of economic migration policy has been on selecting permanent residents and temporary migrants on the basis of their expected labour market contribution and settlement prospects. For both residents and temporary migrants, this might be expected to reduce the entry disadvantage faced by entering migrants, and to result in a relatively rapid convergence of immigrants' labour market outcomes to those of comparable NZ-born workers. In addition, strengthened settlement policies aim to improve further the speed and success of settlement for immigrants (New Zealand Immigration Service 2007) .

2.3 Previous New Zealand Research

There are relatively few studies that have examined immigrant adaptation in New Zealand and the majority have relied on simple Census tabulations. For example, Poot et al. (1988) analysed adaptation of age-adjusted labour force participation and unemployment rates using 1981 Census data. Poot (1993) extended this with data from the 1981 and 1986 Censuses to examine convergence of

[7] Some people are counted in both the permanent residence and temporary figures, as around 20,000 of the permanent residence approvals had previously been admitted on a temporary permit, and a growing proportion of permanent residence applications (77% in 2006/07) were received from people already in New Zealand. (Merwood 2008).

median incomes conditional on employment, controlling for age, occupation, country of origin and years since migration. Comparisons of immigrant and native incomes, employment rates and unemployment rates have also been analysed for later Censuses by Boyd (2006). Given the policy focus on skilled migration, there have also been two studies of labour market outcomes for skilled migrants, using data from the 2001 Census data (Statistics New Zealand 2004; New Zealand Immigration Service 2003). Each contains some cohort analyses of employment status or income convergence, and confirms improvements over immigrants' first five to ten years.

The only true microeconometric analysis of immigrant assimilation in New Zealand is that of Winkelmann and Winkelmann (1998a), which presents an extensive range of analyses of immigrant assimilation in terms of incomes, incomes for those employed, employment and participation.[8] The use of unit-record data from three Censuses allows the authors to control for a range of compositional factors, including unobservable cohort effects. They find that new immigrants to New Zealand face an entry disadvantage that diminishes with years of residence, that immigrants from English speaking countries had relatively small initial differentials that tended to disappear within 10 to 20 years of residence, and that Asian and Pacific Island immigrants had larger initial differentials and, in some cases, were predicted not to reach parity with natives over their working careers.

Their composition-adjusted estimates show slower improvements in immigrant outcomes than is evident in unadjusted profiles, suggesting that some of the apparent improvement that is evident in cross-sectional descriptive summaries is a result of more recent cohorts having observable and unobservable characteristics that are associated with poorer outcomes. However, even controlling for characteristics, entry disadvantage is much greater for the most recent 'non-English-speaking background' immigrant arrivals in their sample – those who arrived between 1991 and 1995 - than for previous entry cohorts. Boyd (2006) is able to trace the improvement in outcomes for this arrival

[8] A condensed version is published as Winkelmann and Winkelmann (1998b).

cohort by the time of the 2001 Census.[9] She shows that they experienced substantial improvements over their first 5 to 10 years, with employment rates rising from 55% to 69%.

There is limited New Zealand evidence of occupational assimilation processes. Statistics New Zealand (2004) compares the occupational distribution of different arrival cohorts but the patterns show more about the different skills of the cohorts than the process of occupational change for any given cohort. Interestingly, OECD (2007b) finds that, in New Zealand, overeducation affects native workers *more* than immigrant workers, which is an exception to the general OECD pattern.

Remigration rates of immigrants to New Zealand are high. Winkelmann and Winkelmann (1998a), estimate that 28 percent of arriving migrants depart within 5 years, and 43 percent within 10 years. Boyd (2006) confirms a 5-year remigration rate of 30 percent for the 1996 to 2001 period, and highlights that the rate is as high as 50 percent for those who were 20 to 24 year-old at arrival. If the immigrants who leave have poorer labour market outcomes than the average for their arrival cohort, their departure will raise the average outcomes for the cohort and will give the appearance of post-arrival improvements even if individual migrants experience no such improvements (and vice-versa if immigrants who leave have better labour market outcomes than the average for their arrival cohort).

Maré et al. (2007) compare the composition of migrants in NZ less than 5 years in 1996 to the composition of those who are observed in New Zealand 5 to 10 years after arrival in 2001 (ie., the same cohort five-years later). They find that the composition is largely unchanged in regards to the gender composition and age distribution. There is some change in the qualifications distribution but remigration is stronger for those with no qualifications as well as for those with degree qualifications. On balance, this suggests that it is unlikely that changing composition due to selective remigration has a large impact on our estimates of immigrant adaptation.

[9] Boyd (2006) is also able to control for cohort variation using a synthetic cohort design with data from four censuses to trace out patterns of convergence of average incomes for four cohorts of 26-30 year old recent migrants. The ability to control for a full range of compositional factors is limited by the tabular data that is used.

3 Data and Sample Characteristics

This paper uses unit record data from the 1997–2007 New Zealand Income Survey (NZIS). This is a departure from previous studies of immigrant adaptation in New Zealand, which have invariably used data from the five-yearly Census of Population and Dwellings. While there are certain advantages to using Census data, in particular the availability of large samples of immigrants and detailed country of birth information, there are two important limitations. First, since the Census only provides five-yearly snapshots of the populations, it requires strong assumptions to separately identify the impact of additional years in New Zealand on labour market outcomes from general macroeconomic and ageing effects. Second, the Census does not collect any information on hourly wage rates and thus these previous studies have been unable to examine wage adaptation.[10]

Since 1997, the NZIS has been carried out by Statistics New Zealand (SNZ) each June quarter as a supplement to the Household Labour Force Survey (HLFS). Taken together, the two surveys collect data on household structure, the socio-demographic characteristics of household members, and labour force activity in the reference week and recent incomes for individuals at least 15 years old. The HLFS has a sample size of approximately 15,000 households and 28,000 adults. About 85% of these respondents also complete the NZIS.[11] Sampling weights are calculated by SNZ to increase the representativeness of the HLFS, and are used in all analyses in this paper.

The HLFS collects information on how many years each individual has lived in New Zealand and aggregated country of birth.[12] We restrict our analysis throughout to individuals aged 25-59 to exclude students and individuals nearing retirement. This provides a sample of nearly 185,650 observations. We drop a further 610 observations who are foreign-born and missing years in New

[10] Unfortunately, neither the Census nor the NZIS/HLFS collect immigrant specific data, such as citizenship status or visa category upon entry to New Zealand.

[11] Wage and income data are imputed for all HLFS sample members who fail to complete the NZIS. Individuals with imputed data are dropped when examining wage rates and annual incomes because, as discussed in Hirsch and Schumacher (2004), including imputed data leads to biased estimates of mean differences between groups when the attribute being studied (here, migration status) is not a criterion used in the imputation procedure.

[12] There are eight possible choices which were the most common immigrant countries in 1986 when the HLFS was started. These can be aggregated up to four meaningful groups, Australia, United Kingdom, Pacific Islands, and Asia, and a residual category for all other foreign-born individuals. Based on figures from the 2006 Census, the rough breakdown of the residual category is 40% non-UK Europe, 40% Africa and the Middle East (mainly South Africa) and 20% Americas (mainly the US and Canada).

Zealand and 865 observations who are missing other key covariates. For our descriptive statistics, we classify individuals as being either NZ-born, a recent migrant or an earlier migrant. Recent migrants are all individuals who have lived in New Zealand for less than 5 years and earlier migrants are all other individuals born in a foreign country. We also stratify all of our analysis by gender, given the large differences in labour market outcomes between men and women, particular for immigrants.

We examine four labour market outcomes throughout this paper. The first is employment, defined as whether an individual worked any hours in the last week for pay, was away from work but receiving accident compensation, or worked any unpaid hours for a family business. The second is the (log) real hourly wage rate for all workers, which is calculated by dividing the sum of actual income from wage/salary employment in the last week and actual self-employment income in the last year divided by 52, by actual total hours work in the last week.[13] Because of dropping imputed records and the suppression of outliers, this measure is missing for roughly one-quarter of the employed population (as well as for all the non-employed). The implications of this are discussed when presenting the results.

The third labour market outcome is annual total income measured in brackets in the final survey question which reads, "I am going to read out a list of (thirteen) income groups, and I'd like you to tell me which of these groups covers your total income from all the kinds of income we have talked about. This is before tax and is for the 12 months ending today. But don't include irregular lump sum payments." These brackets are then assigned a continuous value by SNZ using distributional information for total income as measured in the separate Household Economic Survey. While there are obvious disadvantages to examining this outcome, it is the only annual measure of income in the

[13] Individuals reporting real wages less than $4 or greater than $150 are recoded to missing along with all individuals with imputed data. These thresholds are approximately the real youth minimum wage at the start of our sample period and the 99.5 percentile of the wage distribution. This mainly has the effect of dropping individuals with negative self-employment income and thus negative wages and a few observation with unrealistically high wage rates (ie. over $1000 per hour). This recoding effects 4-5% of workers in each gender and migrant group. Overall, for men, 9-10 percent of workers are either missing wage data or have wages that are outside the valid range and a further 17-19 percent have imputed data. For women, 10-13 percent of workers are either missing wage data or have wages that are outside the valid range and a further 12-14 percent have imputed data. There is little difference in the percentage of workers with valid wage data across migrant groups; for men, 74% of employed NZ-born, 73% of employed earlier migrants and 72% of employed recent migrants have valid wage data while for women the numbers are 75%, 74% and 76%, respectively.

NZIS and is the same question that is used in the Census, which allows us to directly compare our results to those in previous papers. The measure is also dropped for the roughly fifteen percent of the population with imputed NZIS records, but is available for non-working individuals.

Our final labour market outcome is a constructed continuous measure of occupational rank, as in Chiswick et al. (2005). We have access to information on each employed worker's current occupation at the two-digit NZSCO90 classification group level, which records twenty-six different occupations. For each of these occupations, we calculate the average real wage of NZ-born workers over the entire sample period, separately by gender. We then assign these values to each NZ-born and immigrant worker based on their gender and occupation. This method ranks occupations in a continuous metric that has the same explicit ordering for immigrants and the NZ-born and can be examined using the same framework that is used to look at the other labour market outcomes. This measure is available for individuals with imputed records in the NZIS since the occupational information comes from the HLFS, but is unavailable for people who are not currently employed.

Table 1 presents the demographic characteristics of the three nativity groups (recent migrants, earlier migrants, NZ-born) stratified by gender. Our analysis sample consists of 68,526 NZ-born men, 4,461 male recent migrants, 13,313 male earlier migrants, 77,659 NZ-born women, 5,188 female recent migrants, and 15,015 female earlier migrants. Immigrants increased from 18 percent of the overall population in 1997 to 25 percent of the overall population in 2007. As in most countries, recent migrants are younger than the non-immigrant population. But, unlike the US where most immigrants are low-skilled, in New Zealand, recent migrants are more highly qualified than the NZ-born, with 41 percent of male recent migrants and 36 percent of female recent migrants having university degrees compared with only 14 percent of the NZ-born men and 13 percent of NZ-born women. This is reflected throughout the qualification distribution, with fewer migrants having no qualifications compared to the NZ-born. This is not surprising given that, as discussed above, NZ operates a structured immigration system that focuses mainly on higher-skilled migrants.

There are also notable differences in other characteristics. Unsurprisingly, the ethnic distribution of migrants differs a great deal from that of the NZ-born. Only 41 (38) percent of male (female) recent migrants and 56 (53) percent of male (female) earlier migrants classify themselves as

European compared with 89 (88) percent of NZ-born males (females). In fact, almost the entire non-European and non-Māori population is foreign-born (and hence we do not control for ethnicity when examining differences in outcomes between migrants and the NZ-born in a regression framework). Immigrants are more likely to be married than the NZ-born and recent immigrants are less likely to be divorced/separated/widowed. Interestingly, earlier migrants are as likely or more likely than the NZ-born to be in this category. Similarly, immigrants are more likely to live in a household classified as 'couple with children' than the NZ-born. There are large differences in settlement location of migrants compared to the NZ-born. For example, 95 percent of recent migrants and 92 percent of earlier migrants live in urban areas compared with 84 percent of the NZ-born.

Table 1 also presents the labour market outcomes for the three nativity groups stratified by gender. Employment rates are much lower among recent migrants compared to both earlier migrants and the NZ-born, confirming earlier NZ findings by Winkelmann and Winkelmann (1998a), and Boyd (2006) . For example, only 78 percent of male recent migrants and 54 percent of female recent migrants are employed compared with 86 percent of male earlier migrants, 68 percent of female recent migrants, 89 percent of NZ-born males and 73 percent of NZ-born females. Wage variation across the nativity groups is much smaller, with male recent migrants having an average wage of $23 per hour in 2007 dollars compared with $24 per hour for male earlier migrants and NZ-born and female recent migrants having an average wage of $19 per hour versus $21 per hour for female earlier migrants and NZ-born. Male immigrants work in occupations than pay on, average, $1 more per hour than the occupations in which NZ-born males are working, while female immigrants work, on average, in the same occupations as NZ-born females.

However, it is worth nothing that, based on differences in qualifications, we might expect migrants, to have higher wages and be working in higher paid occupations than the NZ-born, and this is why a regression analysis is needed to make a proper comparison. The large differences in employment rates, together with possible differences in hours of work, translate to large differences in annual incomes between recent migrants and the other nativity groups. For example, the average recent male migrant earns 40 thousand dollars per annum, while the average earlier male migrant

earns 47 thousand per annum, and the average NZ-born male earns 48 thousand per annum. The same figures for women are 21, 27 and 28 thousand dollars, respectively.

Finally, Table 1 presents information on immigrant-specific characteristics. On average, earlier migrants have lived in New Zealand for 20 years and were aged 23 when they arrived. Among this group, 32 percent of men and 30 percent of women arrived prior to age eighteen, and thus are likely to have done some of their formal education in New Zealand. Among recent migrants, the average age is 35. The difference in the average arrival age between earlier and recent migrants is partially mechanical since recent migrants who were less than 21 years-olds at arrival are excluded from our sample since the lower age cut-off is 25. In our empirical analyses, we group the immigrant population into six arrival cohorts: before 1958; 1958-67; 1967-78; 1978-87; 1988-97; 1998-2007 to control for differences in the quality of migrants coming to New Zealand over time.[14]

The source region distribution of recent immigrants differs from that of earlier migrants in a way that reflects the movement away from traditional source country preferences in 1987. For example, 36 (32) percent of male (female) earlier migrants were born in the UK compared with only 21 (18) percent of male (female) recent migrants. Similarly, 22 (23) percent of male (female) earlier migrants were born in the Pacific Islands versus only 11 (11) percent of male (female) recent migrants. Conversely, recent migrants are much more likely to have been born in Asian countries, with 28 (30) percent of male (female) recent migrants born in Asia versus only 14 (16) percent of male (female) earlier migrants.

Table 2 presents the same characteristics stratified by gender and region of birth (ie. NZ-born, Australia, UK, Pacific, Asia, Other). Pooling recent and earlier immigrants, the average age of immigrants is quite similar to that of the NZ-born, except for immigrants born in the UK, who are on average 3 years older than New Zealanders, and immigrants born in Asia, who are on average 2 years younger than New Zealanders. On the other hand, there is a large variation in the qualification distribution for migrants from different sources countries. Only 8 (6) percent of male (female)

migrants from the Pacific Islands have university degrees versus 49 (38) percent of male (female) migrants from Asia. These differences are largely related to the different immigration categories under which individuals from different countries are migrating (mainly family versus skilled migration). The changing mix of source-countries over time is also clearly evident in the average years since arrival, which is only 8 years for immigrants from Asian countries, and 22 years for immigrants from the United Kingdom. Asian immigrant men and women first arrived at older ages than did other immigrant groups, with an average of 31 years of age, compared with a range of 22 to 25 years of age for immigrants from the United Kingdom, Pacific Islands and Australia.

Outcomes also vary across different groups of migrants defined by region of birth or qualifications. Asian immigrants have the lowest employment rate of all the region-of-birth groups shown, with only 73 percent of men and 52 percent of women being employed, compared with a maximum of 91 percent for UK men and 75 percent for UK women. Immigrants from two of the regions, Asia and the Pacific, earn hourly wage rates that are on average lower than those for the NZ-born. For Pacific immigrants, some of this difference is associated with their lower qualifications levels, whereas this is not so for Asian immigrants, whose higher qualifications would be expected to lead to a wage premium. Similarly, while Pacific Islanders are found to work in lower paying occupations than both other immigrants and New Zealanders, Asians work, on average, in higher (for men) or similar (for women) paying occupations as the NZ-born. Real annual income differences reflect the employment and wage variation, and also capture differences in hours of work over the year. In accordance with the comparatively low employment and wage rates for Asian and Pacific immigrants, these groups have substantially lower mean annual incomes.

4 Descriptive Evidence

We begin by examining outcomes for different immigrant cohorts by gender and years in New Zealand. These results are presented in graphical form in Figure 1. The upper three panels in this figure display the results for men and the lower three panels display the results for women. The first

[14] Because the NZIS only asks how many years each individual has lived in New Zealand and not their year of

column presents average employment rates for each ten-year cohort of immigrants (classified as discussed above) depending on how long they have been in New Zealand. These results are purely descriptive and do not control for business-cycle or ageing effects. The solid line in this graph represents the average outcome for the NZ-born over the entire sample period. This is not adjusted for differences in the characteristics of immigrants and the NZ-born, which may be associated with either higher or lower employment rates on average. The patterns confirm the findings of Winkelmann and Winkelmann (1998a) and Boyd (2006), showing a 20 to 30 percentage point employment rate entry disadvantage for recent cohorts, which approaches the average rate for the NZ-born after around 20 years. The entry disadvantage of the 1998 to 2007 arrival cohort is slightly smaller than that of the previous cohort for both men and women.

The second column presents average (log) real wages for employed immigrants (with non-imputed IS data) for each ten-year cohort of immigrants depending on how long they have been in New Zealand. Average wages of male immigrants who have been in New Zealand for less than 20 years are only slightly below those of the NZ-born, although as indicated above, comparing the wages of the more highly qualified recent immigrants with those of less highly qualified NZ-born workers may understate the true entry disadvantage. Male immigrants who have been in New Zealand for more than 30 years have average earnings about 10 percent higher than the average NZ-born worker. Again, the higher average age of this group and the greater potential contribution of selective remigration may account for at least some of their higher wage rates. For women, there appear to be relatively strong improvements in wage rates for each cohort as they spend more years in New Zealand. Recent cohorts have smaller entry disadvantages, potentially reflecting the higher levels of formal qualifications among recent cohorts of immigrant women.

The third column presents average real annual income for immigrants (with non-imputed IS data) for each ten-year cohort of immigrants depending on how long they have been in New Zealand. Improvements in employment rates, wages, hours of work, and other income together contribute to

first arrival, immigrants who have not lived continuously in New Zealand since first arriving will be assigned to a more recent arrival cohort than their true arrival cohort.

improvements in immigrants' annual incomes. Recent cohorts of immigrant men and women have incomes that are about $9,000 less than the average NZ-born person, which is a higher percentage disadvantage for women. Female immigrants who have been in New Zealand for 10 to 20 years have incomes that are roughly equal to the average for those of their New Zealand counterparts, while male immigrants still have incomes that are around $3,000 less than the NZ-born. Longer-staying migrants generally earn more than the NZ-born average, although regression methods are needed to control for the influence of ageing and cohort effects.

We next compare the occupational distribution of earlier and recent migrants to that of the NZ-born. We do this in two ways. First, in Figure 2, we present the distribution of one-digit occupations for employed individuals for the three nativity groups stratified by gender. There are nine one-digit occupational groups (Legislators, Administrators, and Managers; Professionals; Technicians and Associate Professionals; Clerks; Service and Sales Workers; Agriculture, Fishery and Forestry Workers; Trades Workers; Plant and Machine Operators; and Elementary Occupations) plus an additional group for workers with missing occupational data. Among men, recent migrants are disproportionately Professionals, Technicians and Associate Professionals, and Service and Sales workers, and are underrepresented in Legislators/Admin/Managers and in Agricultural. Among women, recent migrants are disproportionately in Service and Sales and underrepresented in Legislators/Admin/Managers and in Agricultural. On the other hand, earlier migrants look fairly similar to the NZ-born, suggesting that occupational mobility may be part of the immigrant adaptation process.

Next, in Figure 3, we compare the distribution of 2-digit occupations held by recent and earlier migrants to that held by the NZ-born, where these occupations are classified by the average real wage of NZ-born workers in these occupations over the sample period. This figure shows the proportion of immigrants in each occupation less the proportion of NZ-born workers. Again, this is stratified by gender. These results indicate that both recent and earlier migrant men are under-represented in low-paying occupations and over-represented in high-paying ones compared to NZ-born men. On the other hand, recent migrant women are over-represented at both the bottom and top of the occupational

wage distribution compared to NZ-born women. A similar pattern is seen for earlier migrant women, but their occupational rank distribution is much closer to NZ-born women.

Finally, in Figure 4, we examine how occupational rank varies for different immigrant cohorts by gender and years in New Zealand. In other words, this figure is analogous to Figure 1, but with occupational rank as the outcome variable. For immigrant men with fewer than 15 years in NZ, there is no strong evidence of improving occupational rank with length of stay, whereas for earlier cohort of immigrant men, there is evidence of improvement. The more recent cohorts also have high occupational rank compared with both that of the NZ-born and older cohorts of migrants, possibly due to their higher qualifications. For immigrant women, improvements in occupational rank are much less pronounced, although each cohort appears to make some gains as they stay longer in NZ.

5 Main Results

5.1 Regression Model

We extend the descriptive evidence by estimating regressions models of the relationship between labour market outcomes, whether an individual is an immigrant, if so, how long they have lived in New Zealand, and other characteristics. These models take the following form:

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

where *i* indexes individuals and *t* indexes time, Y_{it} is an indicator variable for whether an individual is employed, their log real hourly wage (if employed and responding to the NZIS), their real annual income (if responding to the NZIS) or the average log real wage for NZ-born in their 2-digit occupation (if employed). Imm_{it} is an indicator variable for whether an individual is an immigrant to New Zealand, $YrsNZ_{it}$ is the number of years that an individual has lived in New Zealand (set to zero if they are NZ-born),[15] X_{it} are other control variables to allow for differences between immigrants and the NZ-born, such as human capital, that are related to differences in outcomes, α_t are time fixed

[15] Setting years since arrival to zero for the NZ-born has no impact on the results because a separate indicator variable is included for whether an individual is an immigrant (ie. this variable can be set to any number for the NZ-born without impacting the results).

effects which control for aggregate changes in employment, wages and incomes over time and e_{it} is a mean zero idiosyncratic error term.

We extend upon previous papers in the international literature by allowing outcomes for immigrants to change with years spent in New Zealand in a semi-parametric manner that makes no assumptions about how labour market outcomes evolve as more host country experience is acquired.[16] We do this by including a series of indicator variables for all observed magnitudes of years in NZ (zero to fifty-eight years). In all cases, we also estimate separate OLS regressions stratified by gender to allow for different assimilation profiles for male and female immigrants. We rely on an OLS regression for each outcome even though employment is a discrete outcome, because this approach is more amenable to semi-parametrically estimating the impact of years spent in NZ.

5.2 Regression Specifications

We begin by estimating five specifications of equation (1) that include progressively more control variables (X_{it}). In the first specification, we include the baseline variables in equation (1) and no additional control variables. The impact of years in New Zealand on average outcomes for immigrants relative to the NZ-born is illustrated by the solid line in each panel of Figure 5. As in Figure 1, the upper three panels in this figure display the results for men and the lower three panels display the results for women. The first column illustrates how employment rates for immigrants relative to the NZ-born differ with time spent in New Zealand. The second column illustrates the same results for log real wages and the third column for real annual income. In each case, we apply a smoothing algorithm to reduce the volatility of the estimates. Specifically, we use an Epanechnikov kernel with a 3-year bandwidth. In other words, each point on the graph in Figure 3 is a weighted average of five adjacent coefficients for neighbouring years spent in New Zealand, with declining weights.[17] We also

[16] Clark and Lindley (2009) also take a semi-parametric approach to estimating immigrant labour market assimilation using local linear regression models. Given that years since arrival is a discrete variable, our approach is preferable since local regression techniques are designed to be applied to continuous variables.

[17] The coefficient at years=0 which indicated the initial difference in outcomes between migrants and the NZ-born is not averaged.

graph only up to 35 years in New Zealand since the remaining coefficients out to 58 years in New Zealand are typically extremely imprecisely estimated and based only on specific immigrant cohorts.[18]

The first important thing to notice when examining these results is that the assimilation profile is almost never quadratic, which is a restriction that is commonly imposed in this literature. Thus, allowing for a semi-parametric profile reveals meaningful differences in evaluating the performance of immigrants as they spend more time in New Zealand. In particular, for employment rates for both men and women, and for wage and annual incomes for women, the improvement is relatively steep through until around 10-20 years, after which the gradient is essentially flat.

Each graph in Figure 5 contains four more profiles in addition to the bold 'no controls' line. These relate to the different regression specifications with progressively fuller sets of covariates added. The first extension is to control for differences in human capital between immigrants and the NZ-born. Specifically, we include a quadratic in age, indicator variables for whether an individual has low school qualifications (primary proficiency examination, school certificate or other school qualifications), has high school qualifications (sixth-form, higher school leaving certificate, or university bursary), or has foreign school qualifications (with a default category of no qualifications), an indicator variable for whether an individual has post-school vocational qualifications and an indicator variable for whether they have a university degree. The impact of ageing and qualifications on labour market outcomes is assumed here to be the same for immigrants and the NZ-born. We later examine whether the returns to qualifications are, in fact, different for immigrants and the NZ-born,

[18] With only 11 years of data, all points in the assimilation profiles are, in fact, identified by the variation in outcomes across 11 annual entry cohorts of new migrants. Thus, it is not possible to separately identify the role that long-run changes in immigration policy have had on say initial labour market outcomes. However, with further assumptions, it would be potentially possible to identify the impact of business cycles on initial labour market outcomes. One important advantage of the semi-parametric approach used here is that long-run changes in cohort quality will not bias our results for differences in initial labour market outcomes and early assimilation (ie. because we have no functional form assumption, the observations that are used to identify say changes in outcomes from 20 to 30 years in New Zealand have no influence on the results for changes in outcomes from 0 to 10 years in New Zealand). This is not the case when parametric models are estimated.

but it is not possible to allow age effects to differ and at the same time identify the impact of years spent in New Zealand since these both increase at the same rate.[19]

Given that immigrants to New Zealand are generally more qualified than the NZ-born, we expect that adding these control variables will shift the profiles for immigrants in a downward direction (i.e. they will look relatively less successful than the NZ-born). The results from this specification are presented as long-dashed lines in Figure 5. As expected, the relative outcomes for immigrants look slightly less favourable when we standardise for age and qualification differences. The impact is most pronounced for the log wage outcome, and for men's incomes, both of which are strongly related to age and education. We present the coefficients for the control variables (X_{it}) included in this model (as well as the remaining specifications) in Table 3 (employment rates), Table 4 (log real wage rates) and Table 5 (real annual income).

In the third specification, we include additional controls for whether the individual is married, widowed/divorced/separated (with a default category of never married), their family type (couple with no children, couple with children, single with children or non-family, which is the default), an indicator variable for whether they live in an urban area, and a series of indicator variables for geographic location (one of twelve local government regions). As shown in Table 1, many of these characteristics differ between immigrants and the NZ-born and are likely to be associated with differential success in the labour market. These results are presented as intermittently long-dashed lines. The impact on the estimated relative outcomes for immigrants is largest for wages and for incomes, although for all of the graphs, controlling for these household and location characteristics makes immigrant outcomes look worse. This reflects the more advantageous household and location characteristics of immigrants. Once we control for these advantages and compare similar immigrants and NZ-born adults, the immigrant disadvantage appears greater.

Our results up to this point assume that outcomes are the same for all immigrants conditional on their human capital and other observables characteristics. However, it is quite likely that the

[19] In our current regression model, it would actually be possible to allow for different age effects for immigrants and the NZ-born because we are restricting the age effects to be quadratic, but it is difficult to justify this given

unobserved quality of immigrants varies over time due to changes in immigration policy and the relative attractiveness of migrating to New Zealand. In the fourth specification, we add controls for the arrival cohort to which a particular immigrant belongs. Specifically, we include five indicator variables for whether an immigrant arrived in 1958-67; 1967-78; 1978-87; 1988-97; and 1998-2007.[20] A sixth indicator variable for arriving prior to 1958 is dropped from the model. The included variables are not defined as typical 0/1 variables, but instead using the deviation contrast where an indicator variable is coded as 0 if the individual did not arrive in that cohort, and 1 if they did arrive in that cohort (as is the typical way these variables are coded), but all included indicator variables are coded as -1 when the individual arrived prior to 1958 (ie. in the omitted category).

When this coding scheme is used the estimated coefficients sum to zero over the full set of categories (including the category that is dropped from the model, ie. whether an immigrant arrived prior to 1958) and are interpreted as the difference in the outcome for an immigrant in a particular cohort versus an immigrant from the average cohort (as opposed to versus the outcome for immigrants in the omitted category). The coefficient for the omitted category can be calculated as minus the sum of the estimated coefficients. This approach is used for all immigrant specific variables included in the regression model (in particular in the fifth specification), because this allows β, the coefficient on the Imm_{it} indicator variable, to retain its interpretation as the difference between the average New Zealander and the average immigrant, conditional on other characteristics. On the other hand, if the traditional approach for defining indicator variables was used, this coefficient would instead be interpreted as the difference between the average New Zealander and the average immigrant in the omitted cohort (here, the pre-1958 cohort).

The results from this regression specification are presented as dotted lines in each panel of Figure 5 and again in Tables 3 – 5. With one exception, controlling for unobserved cohort effects

the arbitrary nature of the restriction on the age effects.

[20] The choice of ten-year cohorts and the particular year cutoffs used to assign the cohorts is entirely arbitrary. It is not possible to jointly identify single year cohort effects and semi-parametrically estimate the impact of years in New Zealand since these will perfectly co-vary. However, we have tested whether our main results are robust to using either five-year or two-year entry cohort effects. Making this change has little qualitative impact, but it does decrease the precision of our estimates. Thus, we have decided to continue using ten-year cohorts.

leads to a flattening of the slope of the adaptation profiles. Some of the apparent improvement in relative outcomes for immigrants as they spend more years in New Zealand can be attributed to differences in unobserved cohort characteristics. As first found in Borjas (1985) for the US, more recent immigrant cohorts to New Zealand generally have less favourable unobservable characteristics. Thus, for any given cohort, there is less improvement with years spent in NZ. The one exception is employment rates for males. In this case, adjusting for cohort effects leads to a steeper profile, implying that recent cohorts have unobservable attributes that make them more likely to be employed, although the differences are small. We speculate that this may be related to immigration policy settings, which over time have given increased priority to residence applicants having a job offer.

In the fifth and final specification, we include additional controls for differences in immigrant characteristics. This controls for compositional differences in the immigrant population that are related to how long individuals have lived in New Zealand. In other words, it accounts for the fact that some immigrant groups have generally been less successful in the New Zealand labour market and have been in New Zealand for more or less time than the average immigrant. In particular, we control for whether an immigrant arrived in New Zealand prior to age 18 and thus likely received some education in New Zealand, and whether an immigrant is from Australia (the omitted category), the United Kingdom, Asia, the Pacific Islands or elsewhere (coded Other). As in the prior specification, these are all defined using the deviation contrast with the coefficients on each category adding to zero. In the case of the indicator for whether an immigrant arrived in New Zealand prior to age 18, where there are only two categories, the impact of arriving prior to 18 compared to arriving at 18 or greater can be calculated as 2 times the reported coefficient (recall that the coefficient on the omitted category is just minus the sum of the other coefficients and that all coefficients are interpreted as the difference versus an immigrant with the average likelihood of arriving prior to 18).

The results from this regression specification are presented as intermittently dashed and dotted lines in each panel of Figure 5 and again in Tables 3 – 5. In most cases, the profiles are similar to those obtained in the previous specification which controlled for immigrant cohort fixed effects. This suggests that the cohort fixed effects generally capture the same information as is contained in the region of birth and age at arrival measures. For men's wages and incomes, the additional controls lead

to a further flattening of the years-in-New Zealand profile, reflecting that even within 10-year arrival cohorts, some of the apparent improvement in wages is a result of more recent arrivals having less favourable region-of-birth characteristics.

5.3 Summary of Main Results

We believe that the extended regression model presented in the fifth specification provides the most robust comparison of outcomes between immigrants and New Zealanders since it allows for both differences in human capital and sociodemographic characteristics between immigrants and the NZ-born and allows for differences in outcomes for diverse groups of immigrants. It therefore comes closest to tracing the adaptation path followed by an individual migrant.

In Figure 6, we again present the results from the final regression specification, but now also graph 95 percent confidence intervals for our estimates. The confidence intervals are calculated as twice the standard error on the weighted mean of neighbouring coefficients. Again, the upper three panels in this figure display the results for men and the lower three panels display the results for women. The first column illustrates how employment rates for immigrants relative to the NZ-born differ with time spent in New Zealand. The second column illustrates the same results for log real wages and the third column for real annual income.

For both employment rates and annual incomes, there is evidence of a statistically significant improvement in relative outcomes over the first 10 years in New Zealand, and a stabilisation after that at levels at or slightly below that of comparable New Zealanders. However, both male and female migrants have wage rates that are generally below those of comparable New Zealanders. The confidence intervals are relatively wide, so that for immigrant men, we cannot reject the absence of any post-arrival improvements. For immigrant women, the only statistically significant improvement is for the comparison of entry wages and wages after 15 years.

5.4 The Role of Occupational Choice

Using this same framework, we now consider the role that occupational choice plays in explaining differences in outcomes between immigrants and the NZ-born. As with the wage outcome, occupational rank is defined only for people who are employed. First, in the first column of Figure 7

and in Table 6, we present the results from estimating the five specifications of regression model (1) where the outcome variable is defined as occupational rank, as measured by the average log real wage for the NZ-born in each 2-digit occupation. In the second column of Figure 7, we present the results from the fifth specification including confidence intervals as in Figure 6.

The solid line shows relative occupational rank without any covariate controls. Immigrant men have occupational rank that is consistently above that of the average NZ-born worker, while immigrant women have occupational rank that is generally similar to that of NZ-born women. As was the case for the other labour market outcomes, controlling for age, qualification, household type and location serve to reduce the estimated relative outcomes of immigrants. The more advantageous characteristics of immigrants account for some of their better raw outcomes, especially for more recent migrants. Adjusting for unobserved cohort characteristics has minimal impact on the profile, but as for the wage outcomes, controlling for region of birth leads to a further flattening of the occupational rank profile. In particular, even within decadal arrival cohorts, migrants who have been in New Zealand for more than 25 years have region-of-birth and age-at-arrival characteristics associated with high occupational rank.

Overall, controlling for the full set of individual and household characteristics makes the relative occupational rank of immigrants look less favourable. For both men and women, immigrants with less than 15 to 20 years in New Zealand have significantly lower occupational rank than comparable NZ-born workers. Improvements are evident for both men and women, although the confidence intervals are reasonable large. For men, the improvement of occupational rank is barely significant between their first few years and 20 years after arrival. For women, there is a significant improvement within the first 15 years after arrival.

Note that the only way that immigrants can improve their occupational rank is by changing two-digit occupation. The results imply that some occupational upgrading does occur for immigrants as part of their adaptation to the New Zealand labour market. In order to gauge the contribution of occupational upgrading to estimated wage profiles, we estimate the full-model specification for the wage outcome, but include also a set of 2-digit occupational dummy variables. The resulting wage profile shows the pattern of wage adaptation that occurs *within* occupations. i.e. excluding the

contribution of the occupational upgrading that was shown in Figure 7. The first column in Figure 8 again presents the results for log real wages as estimated in the fifth regression specification (the second column of Figure 6), Then, in the second column, we present the equivalent results when occupational fixed effects are added to the model. The profiles are visually very similar, and not statistically distinguishable, implying that occupational upgrading is not a significant contributor to estimated wage adaptation.

In Figure 9, we repeat this exercise but examine relative differences in annual income. For women, we again find that occupational upgrading is not a significant contributor to estimated income adaptation. However, for men, we see that, controlling for differences in occupation, the income gap for migrants in NZ for less than 5 years is 25 percent smaller (7,500 vs 10,000) and consequently the annual income – years in NZ adaptation gradient is now entirely flat. This indicates that the relative increase in income for male migrants during the first 10 years in NZ occurs because these migrants are switching into higher paid occupations in terms of annual income.

5.5 The Importance of Different Returns to Human Capital

We next extend our regression model by examining whether the relationship between qualifications and labour market outcomes differs for migrants and the NZ-born, and the role that this plays in explaining differences in outcomes between the two groups. This is a flexible way of allowing for the possibility that the value of the human capital held by immigrants with the same qualifications as New Zealanders is less because of the imperfect transferability of skills gained overseas or because of poorer complementary skills, such as English language ability. In Figure 10, we present results that compare the impact of years in New Zealand on each of the four outcomes derived in our main model (ie the fifth specification in Figure 5) to results from a similar model that, in addition, allows the return to qualifications to differ for New Zealanders and immigrants. This is done by interacting each of the qualification control variables with an indicator variable for whether an individual is an immigrant and again with an indicator variable for whether they arrived at less than age 18. This allows for different returns to qualifications for these two immigrant groups.

In the underlying regressions, there is no statistical difference in the returns to qualifications between the NZ-born and immigrants who arrived in New Zealand before the age of 18. Immigrants arriving at later ages earn more of a premium from vocational qualifications than the NZ-born do, in terms of wages, incomes, and occupational rank, perhaps reflecting the particular mix of vocational qualifications held. University-qualified immigrants receive less of an income premium from their qualifications than do NZ-born graduates, and immigrant males also receive less benefit in terms of occupational rank. Overall, unlike what Friedberg (2000) finds for the US, foreign-earned qualifications appear to be fairly portable to the New Zealand labour market.[21] Consistent with this, the results in Figure 10 show that the estimated assimilation profiles from models that allow for group-specific qualification premia are very similar to those that constrain qualification premia to be the same across all groups. Thus, in the New Zealand context, differences in returns to qualification make a limited contribution to the estimated patterns of immigrant adaptation.

5.6 Heterogeneity Across Immigrants

In this last sub-section, we examine how the process of labour market assimilation varies for immigrants with different educational qualifications, those born in different regions, and those who arrived in New Zealand at different ages. While one weakness of the NZIS for examining immigrant outcomes is that detailed country of birth information is unavailable, we are still able to classify migrants as being born in one of five regions between which there are large differences in immigrant characteristics and outcomes.

We first examine models that stratify by educational qualifications. Specifically, we divide the sample into four groups, individuals with no qualifications, those with school qualifications, those with post-school vocational qualifications, and those with university degrees. We estimate the fifth specification of regression model (1) for each of these groups. The results are presented in Figure 11 (employment, wages and income for men), Figure 12 (employment, wages and income for women), and Figure 13 (occupational choice for both genders).

[21] This results is consistent with the fact that skilled migrants to NZ typically need to have their qualifications

There is an entry-level disadvantage in employment rates for immigrant men who have university qualifications, and also for those who lack qualifications. Subsequent improvements in the relative employment rates for university-qualified men see them reach parity with their NZ-born counterparts within about 10 years. For those without qualifications, the process of catching up is slower, taking around 20 years. The patterns are slightly different for immigrant women. The entry disadvantage of immigrant women without qualifications is relatively small, and not statistically significant. For other qualification groups, immigrant women enter with a relative disadvantage that is eliminated after about 10 years.

Conditional on being employed, university qualified immigrant men, and immigrant women with vocational or university qualifications are the only groups to experience a significant wage disadvantage at the point of entry. Even then, the differences from the NZ-born are only just significant due in part to imprecisely estimated effects. Surprisingly, school-qualified immigrants appear to lose ground in terms of relative wage rates after about 20 years in New Zealand.

Immigrant women of all qualification levels have annual incomes that are similar to those of their NZ-born counterparts. In contrast, immigrant men have incomes that are at or below the level of comparable NZ-born men. University qualified immigrant men experience low initial incomes that approach NZ-born levels after about 15 years. It takes considerably longer for unqualified immigrant men to catch up to the NZ-born, and for those with vocational qualifications, there is no evidence of catching up. Relative annual incomes of unqualified immigrant men are initially low, and remain low for at least 20 to 25 years. In contrast, immigrant women without qualifications experience no significant income gap.

As shown in Figure 13, convergence of occupational rank is strongest for employed immigrants with vocational or university qualifications, and for unqualified immigrant women. However, the size of effects is not strong, and with the exception of a long period of relatively low occupational rank for immigrant men with vocational qualifications, is mostly statistically insignificant. As with wages,

‘recognised’ as being identical to their NZ equivalents in order for them to count in the points system.

there is some evidence that school-qualified immigrants lose ground in occupational rank after 15 to 20 years compared with their NZ-born comparators.

We next examine models that stratify by immigrant region of birth. Specifically, we divide the sample into the five region-of-birth groups used throughout the analysis. Since this is a characteristic that is defined only for immigrants, in each case we compare outcomes for immigrants from a particular region of birth to outcomes for the full sample of the NZ-born, conditional on the variables included in the regression model.[22] Again, we estimate the fifth specification of regression model (1) for each of these groups. The results are presented in Figure 14 (employment, wages and income for men), Figure 15 (employment, wages and income for women), and Figure 16 (occupational choice for both genders).

There are two common and striking patterns across all four outcome variables. First, the pattern of entry disadvantage followed by subsequent relative improvement is primarily a feature of adaptation for immigrants from Asian countries and to a lesser extent to the group of 'other' countries. Second, immigrant men from Pacific Island countries have consistently worse outcomes than the NZ-born, with no evidence of convergence.[23] This contrasts with the findings of Poot (1993) who shows income convergence for Pacific immigrants in particular occupations using 1986 Census data. A lack of convergence is also evident for the occupational rank of immigrant women from Pacific countries, but not for their other outcomes. For Australian and United Kingdom immigrants, there is little evidence that they have outcomes any different from those of comparable New Zealanders.

Finally, we examine models that stratify by whether an immigrant arrived in New Zealand prior to turning 18. These results are presented in Figures 17 (employment, wages and income) and 18

[22] Comparing immigrants from each region of birth to the full sample of the NZ-born allows for a simple comparison of the outcomes for one group of immigrants to those for another group. For Asian and Pacific Island immigrants, an alternative would be to compare their outcomes to only NZ-born individuals with Asian or Pacific Island ethnicity. This approach implicitly assumes that there is something about being Asian or a Pacific Islander that leads to different labour market outcomes in New Zealand and that we should be controling for this when examining outcomes for immigrants from this ethnic group. We find this reasoning unsatisfactory; however, there is scope for a worthwhile empirical study to jointly consider the impact of ethnicity and immigration status on labour market outcomes.

[23] As discussed in the previous footnote, these results are consistent with both there being pathways that lead to poor labour market outcomes for Pacific Islanders in New Zealand, in general, and there being pathways specific to immigrants from the Pacific Islands.

(occupational choice). As in the previous analysis, since this is a characteristic that is defined only for migrants, in each case we compare outcomes for immigrants from one of the two age-at-arrival groups to outcomes for the full sample of the NZ-born, conditional on the variables included in the regression model. Because we only include people in the sample when they are 25 and older, no individuals have arrived in NZ prior to turning 18 and had been in NZ for less than 7 years. The coefficients for 8 and 9 years in NZ for this particular group are also estimated over a very small sample (i.e. only individuals that arrived at age 16 and 17 in 1988–1989) and the resulting coefficients were extremely imprecisely estimated, thus we start the graphs for this group at 10 years in NZ.

Immigrants who arrived before they turned 18 have outcomes that are indistinguishable from those of comparable NZ-born people, with the possible exception of immigrant women, who appear to lose ground relative to their NZ-born counterparts after 20 to 25 years in New Zealand. In contrast, those who arrived at older ages experience poor initial employment rates and incomes that converge towards those of the NZ-born. For males, the convergence is only partial but for female immigrants, is complete within 15 years. Relative wages are also lower for immigrant who arrived later in life, although not always significantly so for men, and the wage gap is still evident after they have spent 35 years in New Zealand. Occupational rank also remains relatively low for immigrant men and women who arrive after age 18, for at least 30 years after arrival.

6 Conclusions

In this paper, we use data from the 1997–2007 New Zealand Income Survey (NZIS) to examine how employment rates, hourly wages, annual income and occupations for immigrants compare to those for the NZ-born. Extending previously literature in this area, we examine how outcomes for immigrants change with years spent in New Zealand in a semi-parametric manner that makes no assumptions about the time pattern of labour market outcomes as more host country experience is acquired and consider the role that occupational choice plays in explaining differences in outcomes between immigrants and the NZ-born.

Our preferred regression specification shows that newly arriving immigrants experience, on average, employment rates that are 20 percentage points lower than comparable NZ-born people, and

annual incomes that are ten to fifteen thousand dollars lower. For immigrants who gain employment, occupational rank is 5 to 8 percent lower, and hourly wages are 10 to 15 percent lower than for comparable NZ-born workers. After around 15 years in New Zealand, however, relative outcomes have improved to the point where employment rates for immigrants are about the same level or slightly below those of their NZ-born counterparts, and the income difference is halved for men and eliminated for women. For employed immigrants, occupational rank is about the same level or slightly below that of comparable NZ-born workers after 15 years in New Zealand. The relative wage disadvantage for immigrant men remains more or less unchanged at about 10 to 15 percent lower for many years after arrival and for immigrant women has closed to within 5 percent of comparable New Zealand born women workers after 15 years.

We examined whether the wage disadvantage experienced by immigrants reflects a low return to qualifications gained outside New Zealand and found some evidence that university qualified immigrants receive a smaller wage premium for their qualifications than do NZ-born university graduates. However, immigrants with vocational qualifications receive a higher premium for their qualifications. Overall, the size of these effects is relatively small and allowing for different returns to qualifications does not change the implied pattern of wage disadvantage and non-convergence.

Not all immigrants experience the same adjustment over time in relative labour market outcomes. The pattern of entry disadvantage followed by subsequent improvement is particularly pronounced for immigrants from the Asian region and, to a lesser extent, for those from the non-classified regions, which consist of non-UK Europe, Africa and the Middle East (mainly South Africa) and the Americas (mainly US and Canada). Immigrants from the Pacific region have poor relative outcomes at the time of arrival, with no improvement as they spend more years in New Zealand. University qualified immigrants recover their entry disadvantage relatively quickly, within around 10 years, whereas immigrant men without qualifications have a much slower improvement, taking around 20 years. These findings are perhaps unsurprising, since less qualified immigrants, who are not admitted under the skill migration categories and include refugees and other humanitarian migrants, and immigrants from the Pacific Islands may benefit greatly from immigration to New

Zealand, even if their labour market outcomes lag behind similarly qualified New Zealanders, because the labour market opportunities in their origin country are much worse than those in New Zealand.

Overall, there is much stronger evidence of adaptation for employment rates than for wage or occupational rank. The dominance of quantity adjustment over price adjustment in the pattern of adaptation of New Zealand immigrants makes New Zealand more similar to Australia than to the United States. Antecol et al. (2003) attribute the dominance of quantity adjustment in the Australian case to relatively inflexible wages and generous unemployment insurance. The summary indicators in Table 7 show that New Zealand has labour market institutions that are closer to those of Australia than to those of the United States. In fact, New Zealand's earnings dispersion is smaller than that of the other countries listed, suggesting more limited scope for relative wage adjustments.

There are a number of related questions that this line of research could pursue. For example, it would be interesting to examine whether the initial entry disadvantage experienced by immigrants vary with macroeconomic conditions in New Zealand, and whether this affects the patterns of subsequent improvement? (eg, as in Barth et al. 2004; Aslund and Rooth 2007; Chiswick et al. 1997) Future work could also examine whether average outcomes of immigrants arriving in different years reflect changes over time in immigration selection policies, or whether the rate of subsequent improvement is related to settlement policy settings? (eg, Cobb-Clark 2004; Edin et al. 2004).

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Table 1: Descriptive Statistics by Gender and Immigrant Status

	Male			Female		
Mean or Percent	NZ-Born	Recent Migrants	Earlier Migrants	NZ-Born	Recent Migrants	Earlier Migrants
Age	41.1	37.7	43.5	41.0	37.0	43.1
No School Qualifications	35.2%	12.8%	24.7%	31.6%	14.7%	25.4%
Low School Qualifications	28.4%	5.4%	14.1%	28.7%	4.7%	13.8%
High School Qualifications	34.6%	7.5%	20.6%	37.7%	6.3%	19.2%
Foreign School Qualifications	1.7%	74.3%	40.5%	2.0%	74.2%	41.5%
Vocational Qualifications	48.9%	37.3%	43.0%	43.8%	36.3%	37.1%
University Degree	13.9%	42.2%	24.7%	12.9%	35.5%	20.7%
European	89.0%	40.8%	55.8%	87.5%	37.9%	52.9%
Maori	11.7%	0.4%	0.4%	13.6%	0.4%	0.5%
Pacific Islander	1.6%	7.1%	18.2%	1.8%	7.8%	19.6%
Asian	0.7%	28.8%	15.7%	0.7%	29.3%	16.5%
Other Ethnicity	0.8%	23.5%	11.1%	0.7%	25.4%	12.0%
Never Married	19.9%	15.3%	12.7%	15.1%	9.4%	8.9%
Currently Married	72.6%	81.8%	80.7%	72.9%	84.8%	78.7%
Separated/Divorced/Widowed	7.5%	2.8%	6.7%	12.0%	5.8%	12.4%
Non-Family	19.2%	20.3%	17.1%	13.2%	13.0%	13.5%
Couple with No Children	25.2%	22.5%	21.6%	26.2%	24.0%	22.1%
Couple with Children	49.9%	53.9%	56.6%	47.0%	53.9%	52.0%
Single Parent	5.7%	3.2%	4.8%	13.7%	9.1%	12.4%
Lives in Urban Area	82.9%	95.3%	92.5%	84.4%	94.5%	91.9%
Currently Employed	88.6%	77.5%	85.6%	72.6%	53.8%	67.5%
Percent of Emploed with Wage Data	73.8%	72.2%	72.6%	75.3%	76.3%	74.2%
Real Hourly Wage in All Jobs	23.7	23.1	24.3	20.6	19.2	20.7
Real Annual Income (thous)	48.4	39.6	46.6	27.7	20.5	26.8
Real Mean Occupational Wage	23.0	24.1	24.0	20.1	19.8	20.0
Years Since First Arrival		2.0	20.7		2.0	20.1
Age at First Arrival		35.7	22.8		35.0	23.0
Less than 18 at Arrival in NZ			32.1%			29.5%
Arrived prior to 1958			4.2%			3.7%
Arrived between 1958 and 1967			10.6%			10.1%
Arrived between 1968 and 1977			24.3%			22.8%
Arrived between 1978 and 1987			21.1%			21.6%
Arrived between 1988 and 1997		21.2%	31.5%		22.0%	33.7%
Arrived between 1998 and 2007		78.8%	8.2%		78.0%	8.0%
Born in Australia		4.6%	5.8%		4.6%	7.0%
Born in the United Kingdom		21.4%	36.2%		17.6%	32.0%
Born in Asia		27.5%	13.9%		29.8%	16.3%
Born in Pacific Islands		10.5%	21.5%		11.2%	22.8%
Born Elsewhere Not NZ		36.1%	22.6%		36.8%	22.0%
Number of Individuals	68,526	4,461	13,313	77,659	5,188	15,015

Note: Real Values are in 2003 Dollars

Table 2: Descriptive Statistics by Region of Birth and Gender

	Male						Female					
Mean or Percent	NZ	Australia	UK	Asia	Pacific	Other	NZ	Australia	UK	Asia	Pacific	Other
Age	41.1	41.0	44.3	39.3	41.1	41.5	41.0	41.5	44.4	39.3	40.5	40.6
European	89.0%	93.1%	96.9%	2.8%	4.8%	53.5%	87.5%	94.2%	97.0%	3.5%	4.9%	53.5%
Maori	11.7%	2.4%	0.3%	0.2%	0.5%	0.2%	13.6%	2.8%	0.2%	0.2%	0.4%	0.3%
Pacific Islander	1.6%	1.2%	1.3%	1.1%	76.9%	1.2%	1.8%	1.1%	1.1%	1.4%	78.2%	1.5%
Asian	0.7%	0.3%	0.2%	65.6%	18.6%	16.1%	0.7%	0.6%	0.4%	61.8%	17.4%	15.7%
Other Ethnicity	0.8%	4.6%	1.7%	31.2%	2.3%	29.6%	0.7%	2.8%	1.7%	34.1%	2.3%	29.8%
No School Qualifications	35.2%	21.0%	18.8%	14.1%	43.7%	14.0%	31.6%	17.5%	20.0%	17.7%	42.5%	14.7%
Low School Qualifications	28.4%	17.3%	13.9%	5.2%	16.1%	9.1%	28.7%	18.1%	14.3%	4.1%	17.6%	7.3%
High School Qualifications	34.6%	27.0%	22.3%	10.4%	14.3%	14.9%	37.7%	24.5%	21.6%	8.6%	13.9%	14.0%
Foreign School Qualifications	1.7%	34.7%	44.9%	70.2%	25.7%	61.9%	2.0%	39.6%	44.0%	69.5%	26.0%	63.8%
Vocational Qualifications	48.9%	50.8%	54.6%	26.1%	30.5%	41.4%	43.8%	41.9%	45.6%	28.4%	27.5%	40.0%
University Degree	13.9%	26.5%	24.4%	49.4%	7.9%	38.0%	12.9%	21.0%	21.1%	38.4%	6.3%	32.9%
Never Married	19.9%	15.9%	11.0%	17.5%	10.6%	15.0%	15.1%	9.9%	7.4%	9.5%	12.1%	8.1%
Currently Married	72.6%	76.0%	81.7%	79.4%	84.0%	80.1%	72.9%	76.9%	80.8%	83.5%	74.7%	82.6%
Separated/Divorced/Widowed	7.5%	8.1%	7.3%	3.1%	5.4%	4.9%	12.0%	13.2%	11.8%	7.0%	13.2%	9.4%
Non-Family	19.2%	18.6%	14.6%	22.2%	17.8%	19.2%	13.2%	12.0%	11.1%	14.6%	17.8%	11.8%
Couple with No Children	25.2%	26.3%	33.4%	13.7%	10.4%	20.3%	26.2%	33.7%	33.7%	14.9%	10.2%	23.2%
Couple with Children	49.9%	50.1%	48.9%	59.3%	66.1%	56.0%	47.0%	43.2%	47.0%	57.8%	55.5%	54.4%
Single Parent	5.7%	5.0%	3.1%	4.8%	5.6%	4.5%	13.7%	11.1%	8.2%	12.6%	16.4%	10.6%
Lives in Urban Area	82.9%	87.8%	88.3%	99.1%	99.5%	92.2%	84.4%	85.8%	87.1%	98.6%	99.1%	90.7%
Years Since First Arrival		18.5	21.5	8.1	16.2	12.2		18.5	22.2	8.1	16.1	11.4
Age at First Arrival		22.4	22.8	31.2	24.9	29.2		23.0	22.2	31.2	24.4	29.2
Less than 18 at Arrival in NZ		35.3%	36.2%	8.0%	20.6%	17.2%		26.7%	37.0%	6.1%	22.6%	14.3%
Currently Employed	88.6%	89.4%	90.5%	72.7%	77.7%	84.5%	72.6%	71.3%	75.3%	51.8%	56.6%	64.0%
Real Hourly Wage in All Jobs	23.7	27.7	27.1	20.5	17.7	25.2	20.6	22.0	22.1	19.0	15.7	21.8
Real Annual Income (thous)	48.4	55.8	55.2	32.9	31.1	46.5	27.7	30.3	29.7	19.9	20.5	25.9
Real Mean Occupational Wage	23.0	24.5	24.9	24.2	21.0	24.6	20.1	20.2	20.7	19.7	17.5	20.6
Number of Individuals	68,526	987	5,657	2,649	4,126	4,355	77,659	1,315	5,543	3,425	4,923	4,997

Note: Real Values are in 2003 Dollars

Table 3: OLS Regression of Employment Rates by Gender

	Male				Female			
	Age/Qual	Hhold	Cohort FE	Mig Chars	Age/Qual	Hhold	Cohort FE	Mig Chars
Age	0.0215**	0.0155**	0.0156**	0.0144**	0.0399**	0.0601**	0.0600**	0.0596**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)
Age-Squared/100	-0.0260**	-0.0207**	-0.0208**	-0.0193**	-0.0443**	-0.0706**	-0.0705**	-0.0699**
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Low School Quals	0.0703**	0.0618**	0.0620**	0.0601**	0.105**	0.0984**	0.0983**	0.0961**
	(0.003)	(0.003)	(0.003)	(0.003)	(0.005)	(0.005)	(0.005)	(0.005)
High School Quals	0.0893**	0.0806**	0.0808**	0.0773**	0.140**	0.127**	0.127**	0.124**
	(0.003)	(0.003)	(0.003)	(0.003)	(0.005)	(0.005)	(0.005)	(0.005)
Foreign School Quals	0.0589**	0.0476**	0.0481**	0.0449**	0.0964**	0.0847**	0.0852**	0.0840**
	(0.006)	(0.006)	(0.006)	(0.006)	(0.008)	(0.008)	(0.008)	(0.008)
Vocational Quals	0.0599**	0.0523**	0.0522**	0.0478**	0.0751**	0.0742**	0.0743**	0.0718**
	(0.003)	(0.003)	(0.003)	(0.003)	(0.004)	(0.003)	(0.003)	(0.003)
University Degree	0.0470**	0.0421**	0.0424**	0.0426**	0.115**	0.0978**	0.0979**	0.0988**
	(0.004)	(0.004)	(0.004)	(0.004)	(0.005)	(0.005)	(0.005)	(0.005)
Currently Married		0.106**	0.106**	0.111**		-0.0425**	-0.0424**	-0.0369**
		(0.006)	(0.006)	(0.006)		(0.007)	(0.007)	(0.007)
Formerly Married		0.0404**	0.0404**	0.0397**		-0.013	-0.013	-0.0137*
		(0.007)	(0.007)	(0.007)		(0.007)	(0.007)	(0.007)
Couple with No Kids		0.0410**	0.0410**	0.0328**		0.0953**	0.0949**	0.0868**
		(0.006)	(0.006)	(0.006)		(0.007)	(0.007)	(0.007)
Couple with Children		0.0208**	0.0210**	0.0178**		-0.0499**	-0.0500**	-0.0544**
		(0.006)	(0.006)	(0.006)		(0.007)	(0.007)	(0.007)
Single Parent		-0.115**	-0.114**	-0.113**		-0.187**	-0.187**	-0.185**
		(0.008)	(0.008)	(0.008)		(0.006)	(0.006)	(0.006)
Lives in Urban Area		-0.0300**	-0.0301**	-0.0275**		-0.001	-0.001	0.001
		(0.003)	(0.003)	(0.003)		(0.005)	(0.005)	(0.005)
Arrived 1958-1967			-0.006	-0.023			0.032	0.016
			(0.016)	(0.016)			(0.021)	(0.021)
Arrived 1968-1977			0.006	-0.007			0.025	0.011
			(0.012)	(0.012)			(0.015)	(0.015)
Arrived 1978-1987			-0.010	-0.006			-0.020	-0.013
			(0.012)	(0.012)			(0.016)	(0.016)
Arrived 1988-1997			-0.009	0.012			-0.0655**	-0.0429*
			(0.015)	(0.015)			(0.019)	(0.019)
Arrived 1998-2007			0.035	0.0615**			-0.028	-0.003
			(0.019)	(0.019)			(0.023)	(0.023)
<18 at Arrival				0.0158**				0.010
				(0.005)				(0.006)
Born in the UK				0.0670**				0.0694**
				(0.005)				(0.007)
Born in Asia				-0.0991**				-0.0907**
				(0.009)				(0.009)
Born in Pacific Islands				-0.0445**				-0.0252**
				(0.007)				(0.008)
Born Elsewhere Not NZ				0.0166**				0.002
				(0.006)				(0.007)
R-squared	0.05	0.09	0.09	0.09	0.07	0.10	0.10	0.10
Observations			86,300				97,862	

Note: All regressions include survey year and years since migration fixed effects. Regional fixed effects are added in the second specification. All immigrant specific variables including the cohort fixed effects are estimated in deviation from mean form, eg each coefficient can be interpreted as the differences from the average migrant and sum to zero including the default group. ** significant at 1% level, * significant at 5% level.

Table 4: OLS Regression of Log Real Hourly Wage by Gender

	Male				Female			
	Age/Qual	Hhold	Cohort FE	Mig Chars	Age/Qual	Hhold	Cohort FE	Mig Chars
Age	0.0544**	0.0490**	0.0490**	0.0468**	0.0287**	0.0357**	0.0357**	0.0349**
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Age-Squared/100	-0.0586**	-0.0534**	-0.0534**	-0.0507**	-0.0310**	-0.0404**	-0.0404**	-0.0393**
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Low School Quals	0.127**	0.107**	0.107**	0.102**	0.150**	0.135**	0.135**	0.130**
	(0.006)	(0.006)	(0.006)	(0.006)	(0.007)	(0.006)	(0.006)	(0.006)
High School Quals	0.250**	0.223**	0.223**	0.215**	0.271**	0.249**	0.249**	0.242**
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
Foreign School Quals	0.193**	0.180**	0.180**	0.165**	0.228**	0.213**	0.213**	0.202**
	(0.012)	(0.012)	(0.012)	(0.012)	(0.011)	(0.011)	(0.011)	(0.011)
Vocational Quals	0.0644**	0.0629**	0.0629**	0.0538**	0.0421**	0.0487**	0.0488**	0.0447**
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
University Degree	0.336**	0.319**	0.320**	0.318**	0.279**	0.270**	0.271**	0.268**
	(0.008)	(0.008)	(0.008)	(0.008)	(0.007)	(0.007)	(0.007)	(0.007)
Currently Married		0.114**	0.114**	0.126**		0.0460**	0.0461**	0.0546**
		(0.009)	(0.009)	(0.009)		(0.009)	(0.009)	(0.009)
Formerly Married		0.0789**	0.0782**	0.0764**		0.0285**	0.0285**	0.0268**
		(0.011)	(0.011)	(0.011)		(0.009)	(0.009)	(0.009)
Couple with No Kids		0.0350**	0.0343**	0.018		0.0346**	0.0344**	0.0212*
		(0.010)	(0.010)	(0.010)		(0.010)	(0.010)	(0.010)
Couple with Children		0.0250**	0.0245**	0.0186*		-0.0187*	-0.0188*	-0.0252**
		(0.009)	(0.009)	(0.009)		(0.010)	(0.010)	(0.010)
Single Parent		-0.0589**	-0.0590**	-0.0564**		-0.0858**	-0.0858**	-0.0844**
		(0.012)	(0.012)	(0.012)		(0.008)	(0.008)	(0.008)
Lives in Urban Area		0.110**	0.110**	0.116**		-0.0436**	-0.0436**	-0.0390**
		(0.008)	(0.008)	(0.008)		(0.009)	(0.009)	(0.009)
Arrived 1958-1967			0.033	-0.021			0.015	-0.013
			(0.035)	(0.035)			(0.032)	(0.033)
Arrived 1968-1977			0.0634*	0.028			0.043	0.025
			(0.026)	(0.025)			(0.023)	(0.023)
Arrived 1978-1987			-0.008	0.004			0.007	0.014
			(0.026)	(0.025)			(0.023)	(0.023)
Arrived 1988-1997			-0.0878**	-0.037			-0.017	0.014
			(0.031)	(0.031)			(0.029)	(0.029)
Arrived 1998-2007			-0.133**	-0.055			-0.030	0.014
			(0.038)	(0.037)			(0.035)	(0.035)
<18 at Arrival				0.0332**				0.0337**
				(0.008)				(0.009)
Born in the UK				0.163**				0.109**
				(0.010)				(0.010)
Born in Asia				-0.217**				-0.139**
				(0.015)				(0.015)
Born in Pacific Islands				-0.144**				-0.129**
				(0.010)				(0.010)
Born Elsewhere Not NZ				0.0232*				0.0339**
				(0.012)				(0.011)
R-squared	0.15	0.18	0.18	0.20	0.13	0.16	0.16	0.17
Observations			55,579				52,117	

Note: All regressions include survey year and years since migration fixed effects. Regional fixed effects are added in the second specification. All immigrant specific variables including the cohort fixed effects are estimated in deviation from mean form, eg each coefficient can be interpreted as the differences from the average migrant and sum to zero including the default group. ** significant at 1% level, * significant at 5% level.

Table 5: OLS Regression of Annual Real Income by Gender

	Male				Female			
	Age/Qual	Hhold	Cohort FE	Mig Chars	Age/Qual	Hhold	Cohort FE	Mig Chars
Age	4.256**	3.450**	3.450**	3.277**	1.042**	2.520**	2.518**	2.494**
	(0.130)	(0.130)	(0.130)	(0.130)	(0.084)	(0.087)	(0.087)	(0.087)
Age-Squared/100	-4.583**	-3.761**	-3.762**	-3.547**	-1.021**	-2.901**	-2.898**	-2.863**
	(0.150)	(0.160)	(0.160)	(0.160)	(0.100)	(0.110)	(0.110)	(0.110)
Low School Quals	9.174**	7.716**	7.709**	7.388**	5.072**	5.073**	5.064**	4.917**
	(0.340)	(0.330)	(0.330)	(0.330)	(0.220)	(0.220)	(0.220)	(0.220)
High School Quals	17.05**	15.33**	15.32**	14.79**	9.417**	9.314**	9.304**	9.131**
	(0.380)	(0.370)	(0.370)	(0.370)	(0.250)	(0.250)	(0.250)	(0.250)
Foreign School Quals	11.70**	10.64**	10.65**	9.761**	5.820**	6.022**	6.020**	6.052**
	(0.680)	(0.670)	(0.670)	(0.670)	(0.440)	(0.430)	(0.430)	(0.440)
Vocational Quals	4.168**	3.784**	3.777**	3.089**	2.812**	2.810**	2.814**	2.677**
	(0.290)	(0.290)	(0.290)	(0.280)	(0.200)	(0.200)	(0.200)	(0.200)
University Degree	21.29**	20.40**	20.41**	20.32**	15.20**	13.84**	13.85**	13.91**
	(0.530)	(0.520)	(0.510)	(0.510)	(0.380)	(0.370)	(0.370)	(0.370)
Currently Married		11.15**	11.15**	11.92**		-3.894**	-3.884**	-3.552**
		(0.480)	(0.480)	(0.470)		(0.370)	(0.370)	(0.360)
Formerly Married		5.427**	5.412**	5.265**		0.085	0.075	0.023
		(0.560)	(0.560)	(0.560)		(0.310)	(0.310)	(0.310)
Couple with No Kids		1.891**	1.874**	0.649		4.046**	4.025**	3.541**
		(0.530)	(0.530)	(0.520)		(0.410)	(0.410)	(0.410)
Couple with Children		2.474**	2.459**	2.009**		-6.509**	-6.521**	-6.780**
		(0.490)	(0.490)	(0.480)		(0.390)	(0.390)	(0.390)
Single Parent		-4.390**	-4.388**	-4.199**		-4.325**	-4.327**	-4.257**
		(0.540)	(0.540)	(0.540)		(0.310)	(0.310)	(0.310)
Lives in Urban Area		1.017*	1.020*	1.434**		-0.925**	-0.922**	-0.771**
		(0.400)	(0.400)	(0.400)		(0.300)	(0.300)	(0.300)
Arrived 1958-1967			3.707	0.441			2.741*	1.967
			(1.990)	(1.960)			(1.280)	(1.280)
Arrived 1968-1977			4.286**	1.912			1.608	0.933
			(1.400)	(1.380)			(0.940)	(0.950)
Arrived 1978-1987			0.519	1.554			-0.054	0.251
			(1.400)	(1.370)			(0.950)	(0.950)
Arrived 1988-1997			-3.385	0.130			-3.539**	-2.365*
			(1.740)	(1.700)			(1.150)	(1.160)
Arrived 1998-2007			-4.201*	0.253			-3.945**	-2.708*
			(2.080)	(2.010)			(1.330)	(1.330)
<18 at Arrival				1.826**				0.721*
				(0.450)				(0.340)
Born in the UK				10.46**				3.262**
				(0.630)				(0.450)
Born in Asia				-14.53**				-5.921**
				(0.710)				(0.480)
Born in Pacific Islands				-9.277**				-1.892**
				(0.530)				(0.370)
Born Elsewhere Not NZ				0.522				0.031
				(0.640)				(0.440)
R-squared	0.17	0.21	0.21	0.23	0.12	0.17	0.17	0.17
Observations			69,280				82,574	

Note: All regressions include survey year and years since migration fixed effects. Regional fixed effects are added in the second specification. All immigrant specific variables including the cohort fixed effects are estimated in deviation from mean form, eg each coefficient can be interpreted as the differences from the average migrant and sum to zero including the default group. ** significant at 1% level, * significant at 5% level.

Table 6: OLS Regression of Occupation Classified by Average Wages by Gender

	Male				Female			
	Age/Qual	Hhold	Cohort FE	Mig Chars	Age/Qual	Hhold	Cohort FE	Mig Chars
Age	0.00792**	0.00885**	0.00885**	0.00825**	0.00813**	0.0113**	0.0113**	0.0108**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Age-Squared/100	-0.00736**	-0.00855**	-0.00855**	-0.00780**	-0.00799**	-0.0120**	-0.0120**	-0.0114**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Low School Quals	0.0604**	0.0541**	0.0541**	0.0526**	0.0851**	0.0815**	0.0815**	0.0796**
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
High School Quals	0.130**	0.119**	0.119**	0.116**	0.144**	0.138**	0.138**	0.136**
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Foreign School Quals	0.102**	0.0970**	0.0970**	0.0899**	0.115**	0.111**	0.111**	0.106**
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Vocational Quals	0.0389**	0.0372**	0.0373**	0.0345**	0.0502**	0.0519**	0.0520**	0.0504**
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
University Degree	0.190**	0.180**	0.180**	0.178**	0.157**	0.154**	0.154**	0.152**
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Currently Married		0.0204**	0.0205**	0.0243**		0.001	0.001	0.005
		(0.003)	(0.003)	(0.003)		(0.004)	(0.004)	(0.004)
Formerly Married		0.0108**	0.0108**	0.0107**		-0.004	-0.004	-0.005
		(0.004)	(0.004)	(0.004)		(0.004)	(0.004)	(0.004)
Couple with No Kids		0.0125**	0.0125**	0.00740*		0.0225**	0.0226**	0.0173**
		(0.003)	(0.003)	(0.003)		(0.004)	(0.004)	(0.004)
Couple with Children		0.003	0.003	0.001		0.001	0.002	-0.001
		(0.003)	(0.003)	(0.003)		(0.004)	(0.004)	(0.004)
Single Parent		-0.0239**	-0.0239**	-0.0235**		-0.0243**	-0.0243**	-0.0237**
		(0.004)	(0.004)	(0.004)		(0.004)	(0.004)	(0.004)
Lives in Urban Area		0.0992**	0.0992**	0.101**		-0.003	-0.003	-0.002
		(0.002)	(0.002)	(0.002)		(0.002)	(0.002)	(0.002)
Arrived 1958-1967			-0.015	-0.0290**			-0.001	-0.012
			(0.010)	(0.010)			(0.011)	(0.011)
Arrived 1968-1977			0.008	0.002			0.012	0.006
			(0.007)	(0.007)			(0.008)	(0.008)
Arrived 1978-1987			0.006	0.012			-0.004	0.000
			(0.007)	(0.007)			(0.008)	(0.008)
Arrived 1988-1997			0.0191*	0.0321**			0.002	0.014
			(0.009)	(0.009)			(0.010)	(0.010)
Arrived 1998-2007			0.007	0.0254*			0.014	0.0314*
			(0.011)	(0.011)			(0.012)	(0.012)
<18 at Arrival				0.0113**				0.0193**
				(0.003)				(0.003)
Born in the UK				0.0456**				0.0470**
				(0.003)				(0.004)
Born in Asia				-0.0310**				-0.0263**
				(0.005)				(0.005)
Born in Pacific Islands				-0.0586**				-0.0620**
				(0.004)				(0.004)
Born Elsewhere Not NZ				0.00907**				0.0137**
				(0.003)				(0.004)
R-squared	0.26	0.30	0.30	0.31	0.22	0.23	0.23	0.24
Observations			74,261				67,511	

Note: All regressions include survey year and years since migration fixed effects. Regional fixed effects are added in the second specification. All immigrant specific variables including the cohort fixed effects are estimated in deviation from mean form, eg each coefficient can be interpreted as the differences from the average migrant and sum to zero including the default group. ** significant at 1% level, * significant at 5% level.

Table 7: Indicators of Labour Market Institutions (2001)

	New Zealand	Australia	Canada	United States
Earnings and Income Dispersion				
90^{th} to 10^{th} pctile gross earnings ratio	2.65	3.12	3.69	4.63
90^{th} to 50^{th} pctile gross earnings ratio	1.77	1.89	1.81	2.28
50^{th} to 10^{th} pctile gross earnings ratio	1.50	1.65	2.03	2.03
Income Gini (Whole population)	0.339	0.317	0.301	0.357
Net replacement rate[1]	52%	53%	51%	29%
Trade Union Density (%)	22.60%	24.30%	28.20%	12.80%
Employment Protection Legislation (EPL2)	1.29	1.47	1.13	0.65

Notes: All data are from the OECD's online database (http://stats.oecd.org/wbos/)

[1] Average of net replacement rates over 60 months of unemployment, 2001 – averaged over four household types

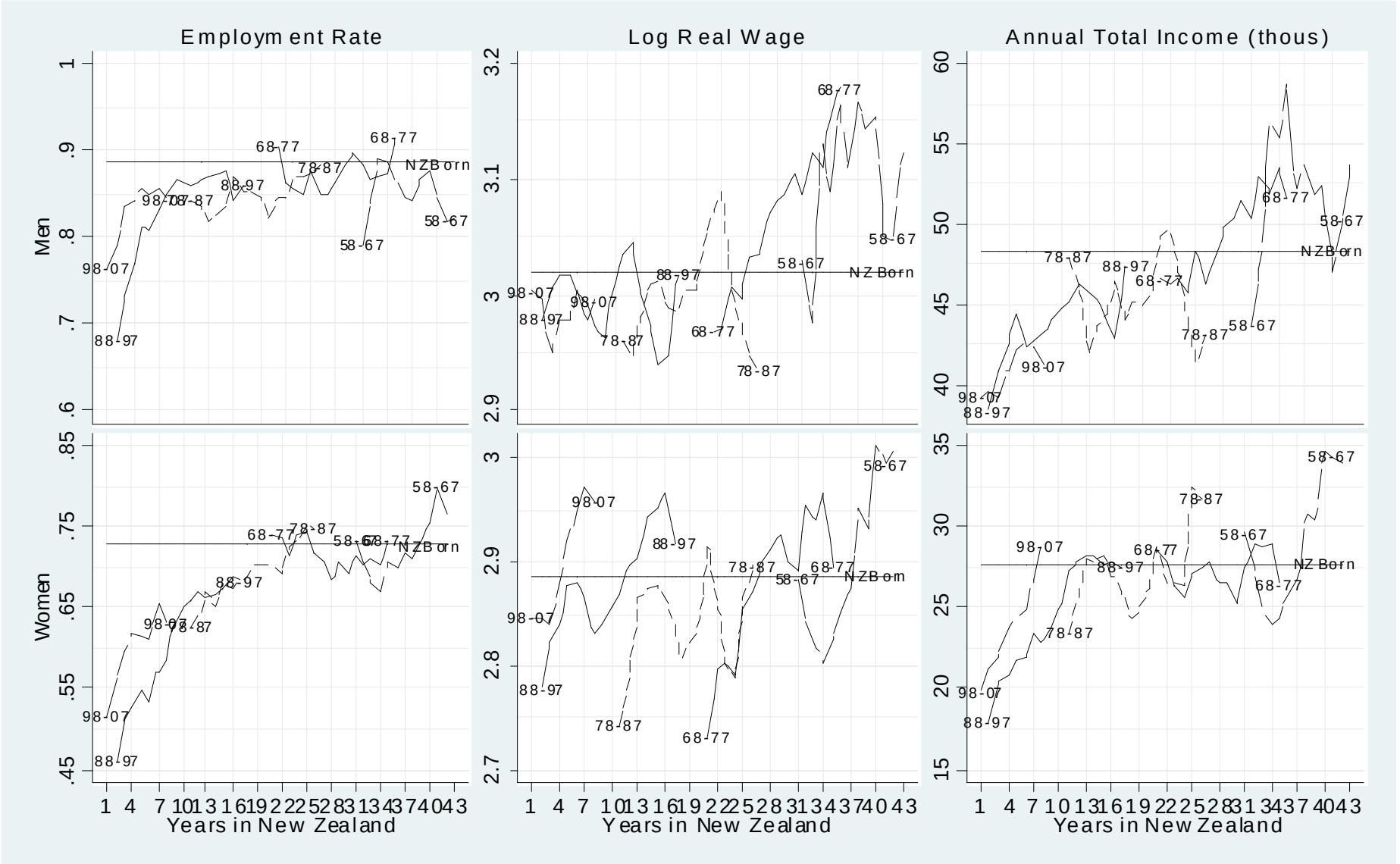

Figure 1: Outcomes for Different Immigrant Cohorts by Gender and Years in New Zealand

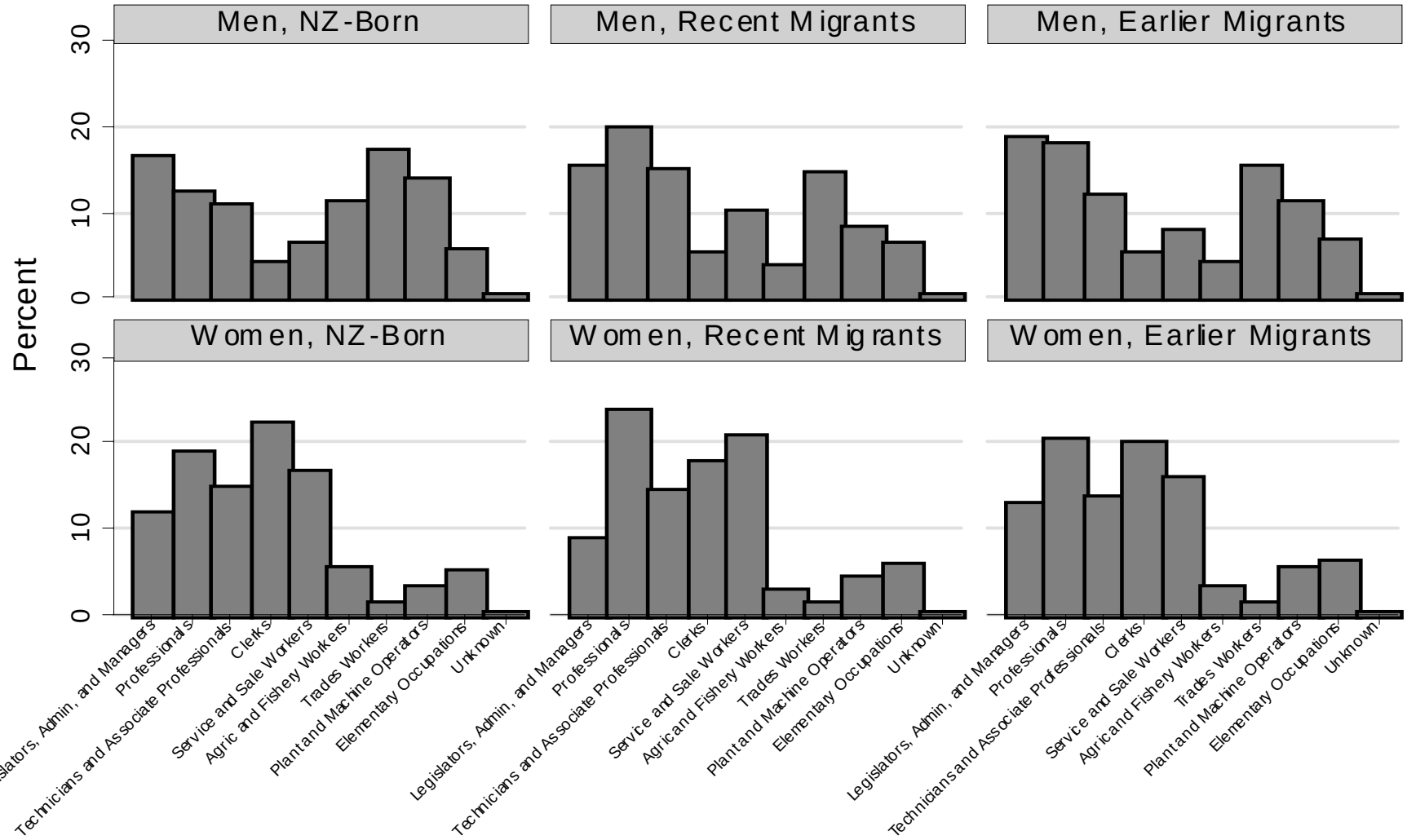

Figure 2: 1-Digit Occupational Distribution by Immigrant Status and Gender

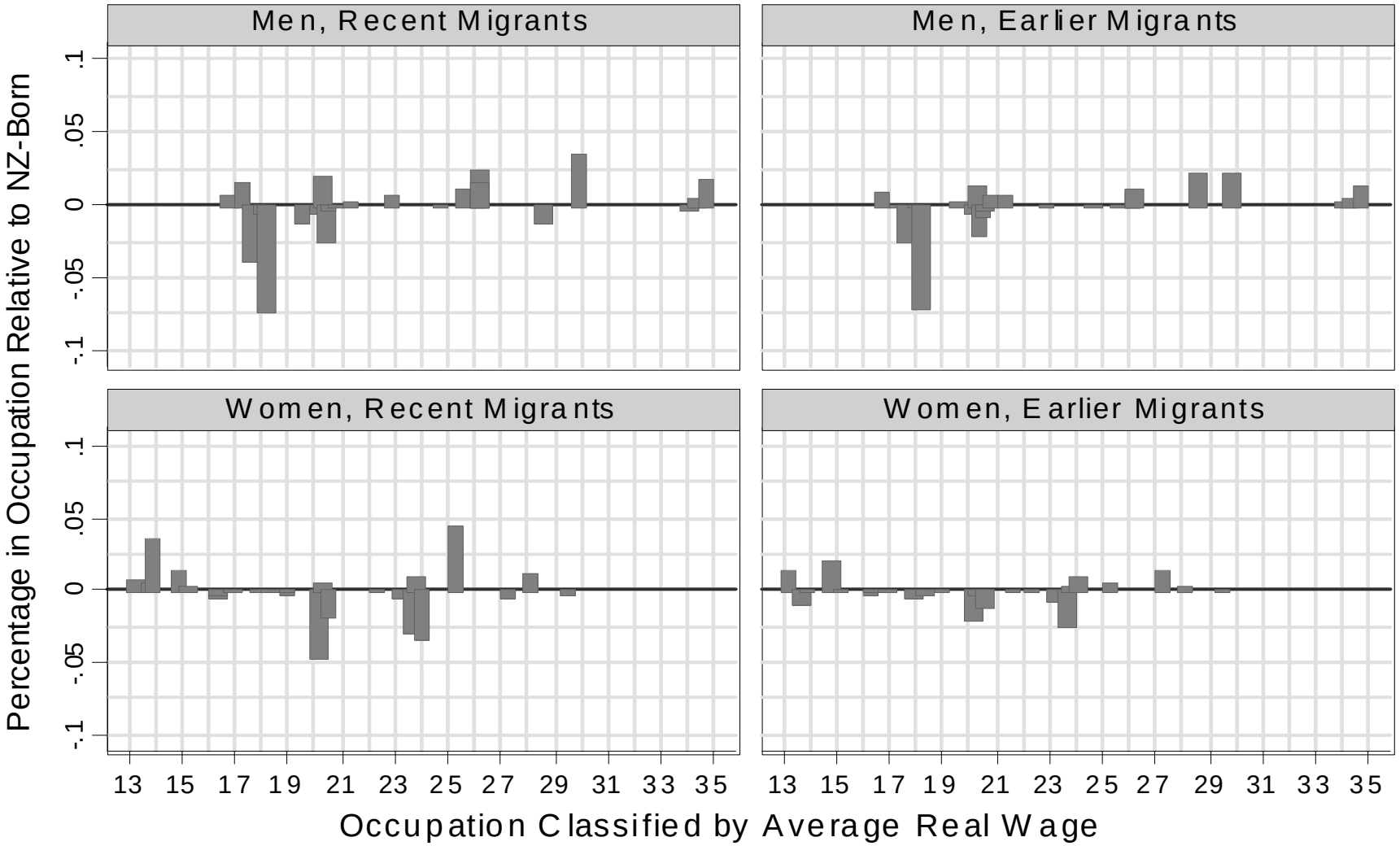

Figure 3: 2-Digit Occupational Distribution for Immigrants Relative to New Zealand-born by Gender

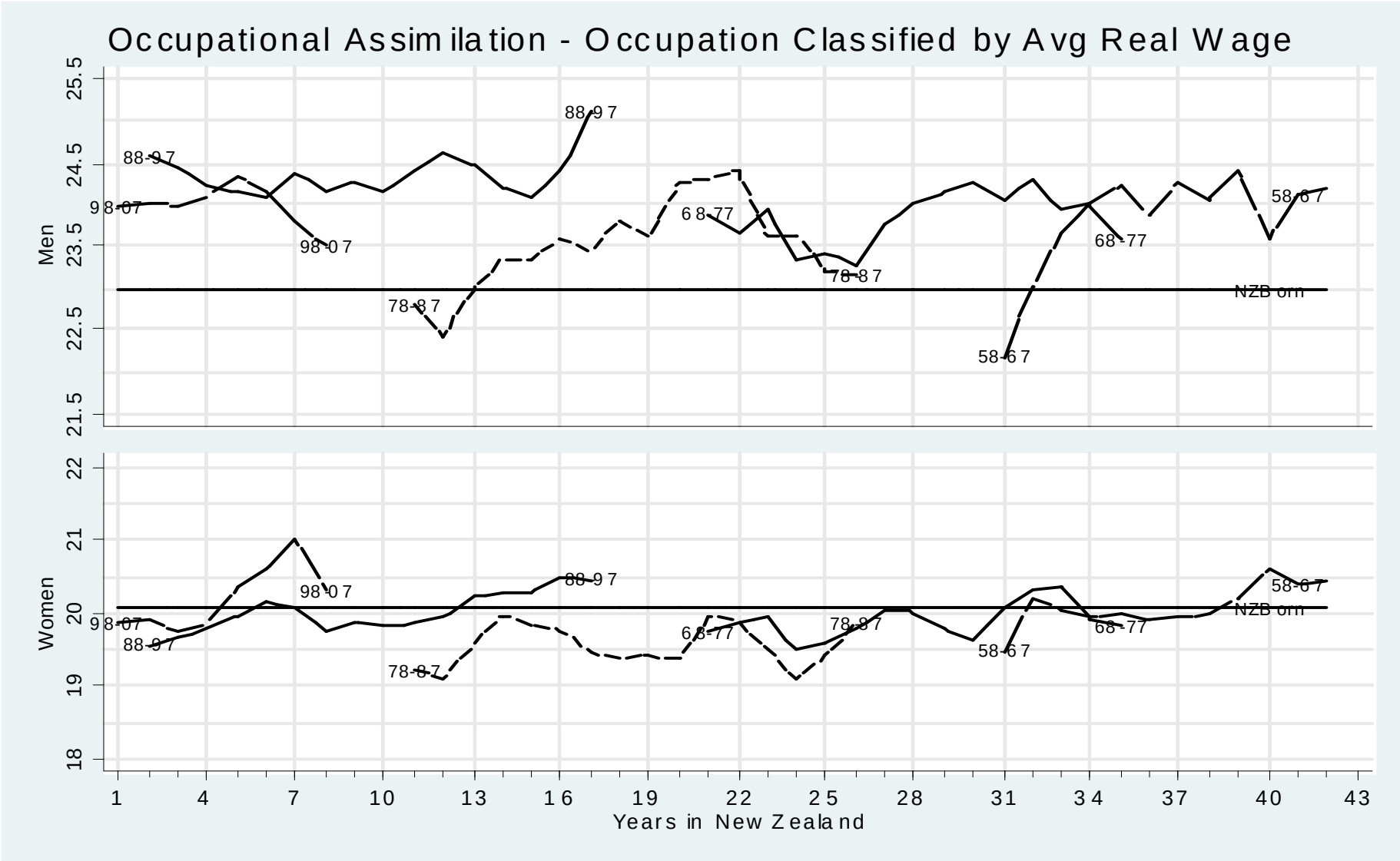

Figure 4: 2-Digit Occupation for Different Immigrant Cohorts by Gender and Years in New Zealand

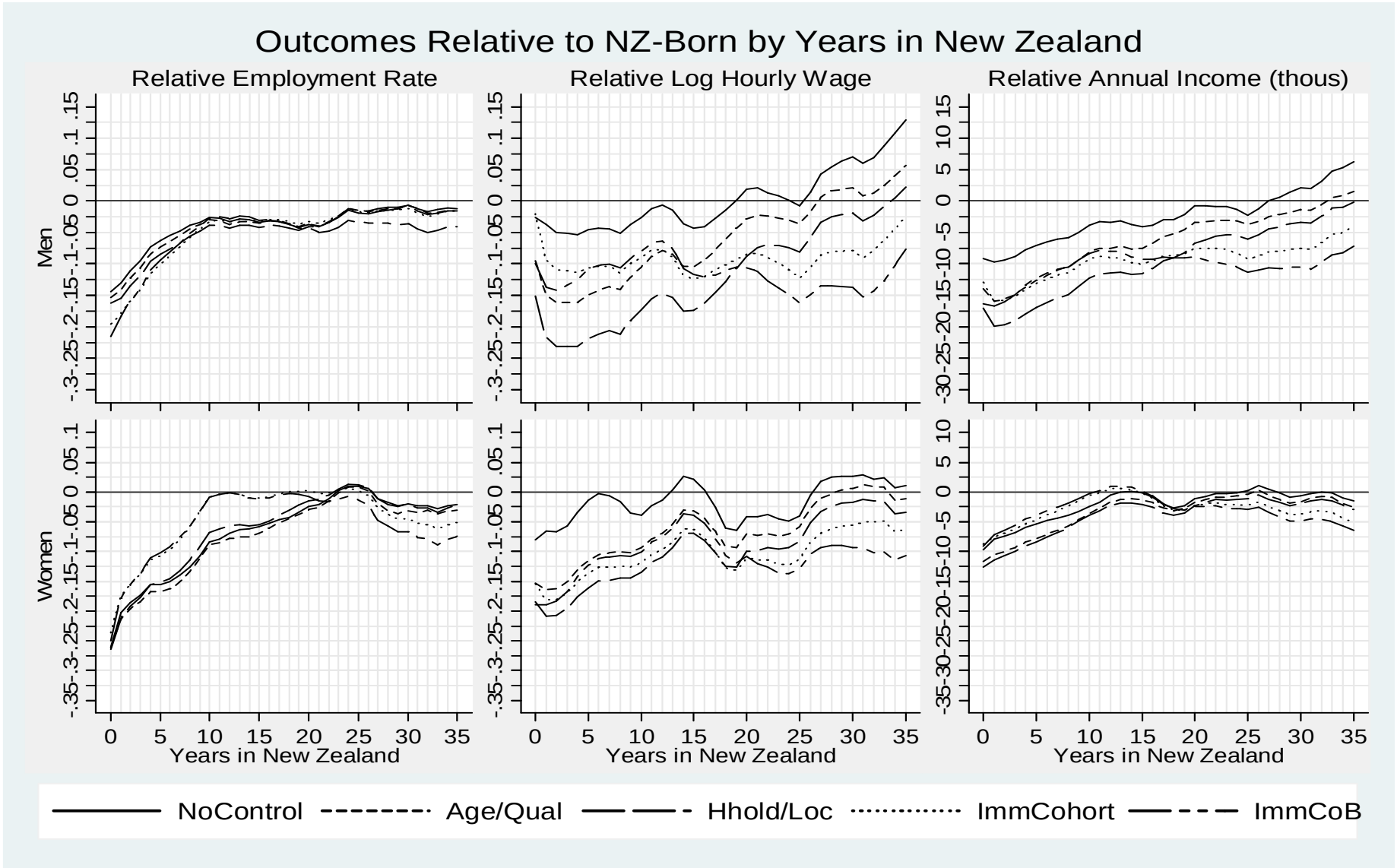

Figure 5: Regression Adjusted Outcomes for Immigrants by Gender and Years in New Zealand – Different Specifications

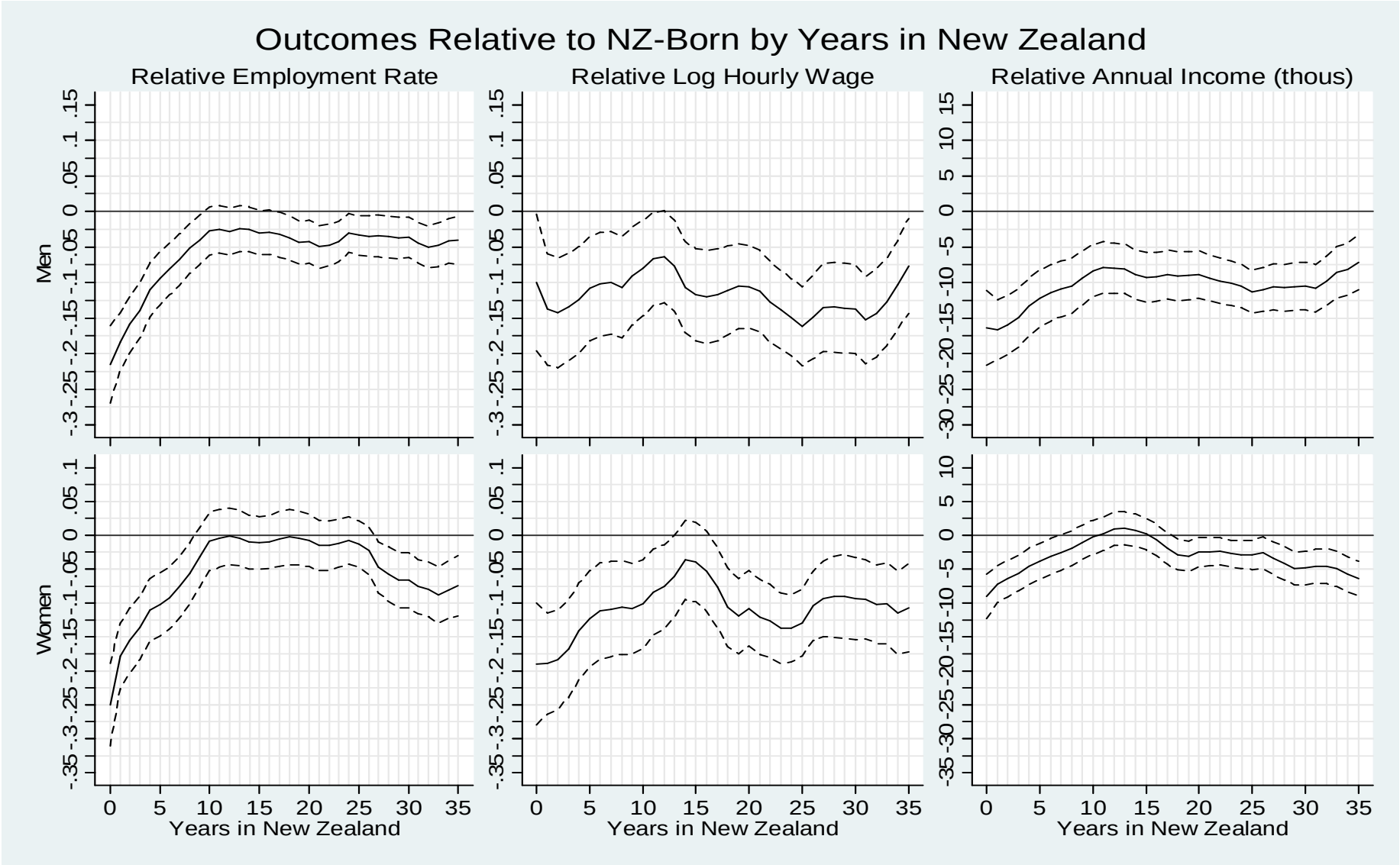

Figure 6: Regression Adjusted Outcomes for Immigrants by Gender and Years in New Zealand – Main Estimates

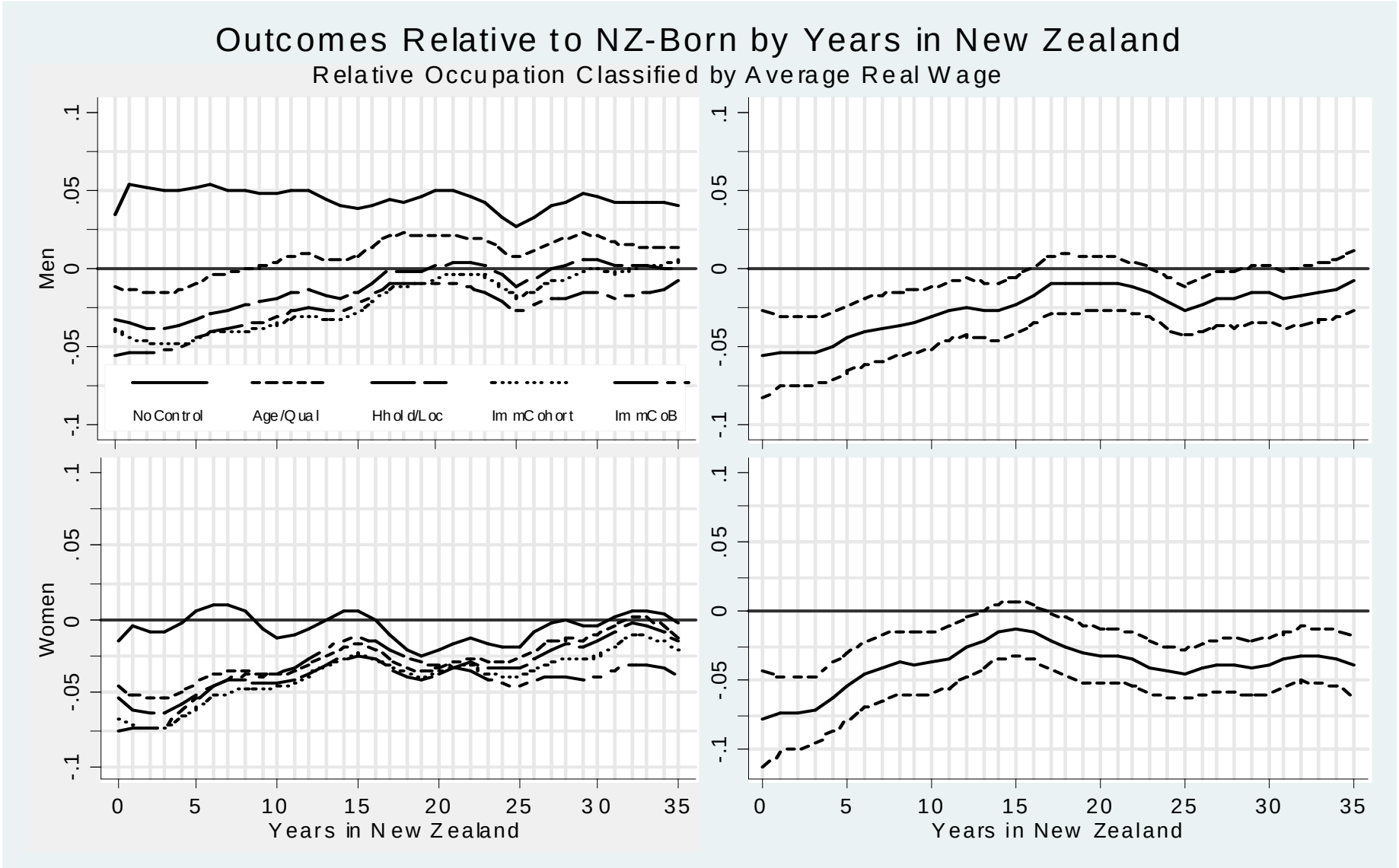

Figure 7: Regression Adjusted 2-Digit Occupational Distribution for Immigrants by Gender and Years in New Zealand

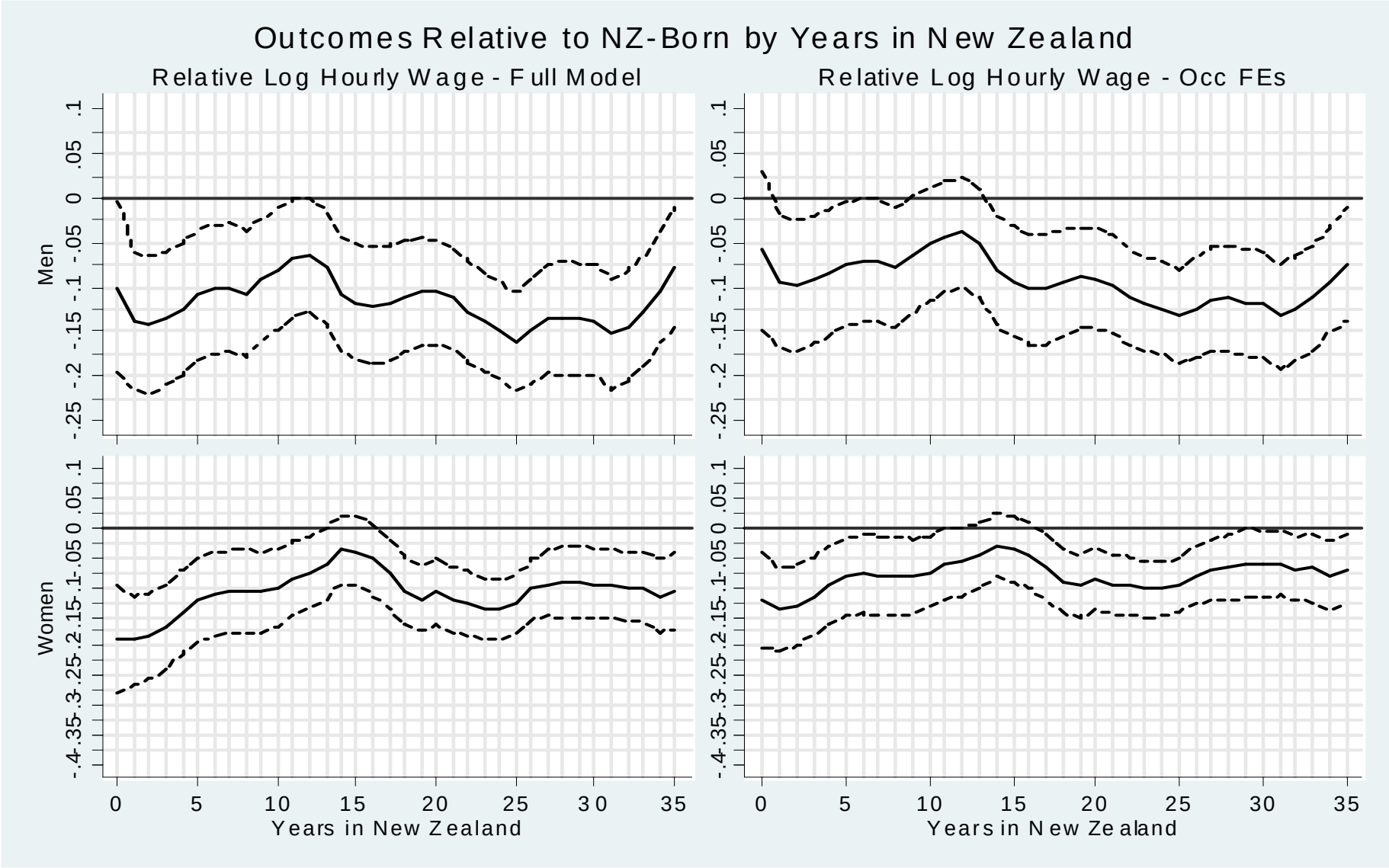

Figure 8: Regression Adjusted Hourly Wages for Immigrants by Gender and Years in New Zealand – Controling for Occupation

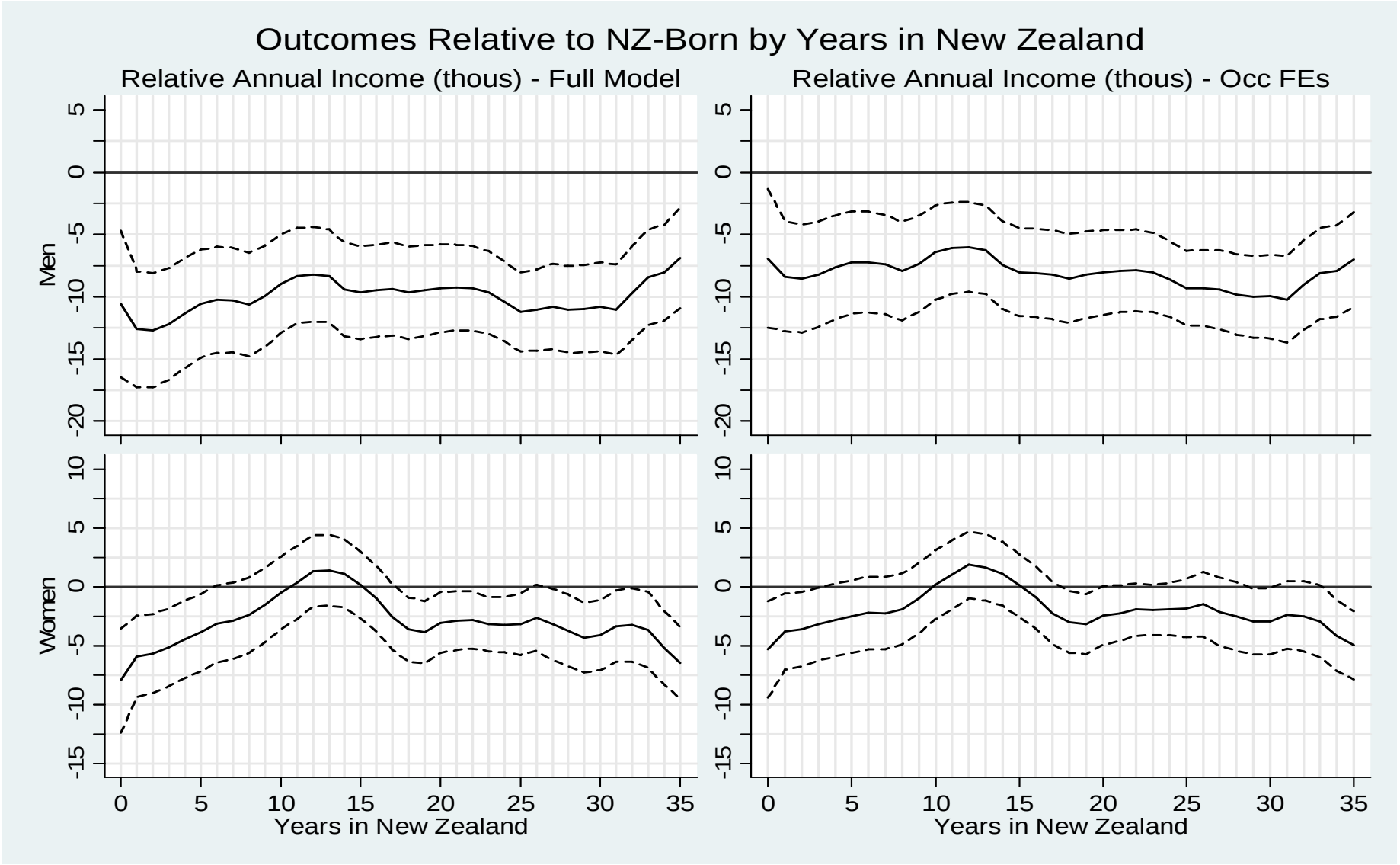

Figure 9: Regression Adjusted Annual Income for Immigrants by Gender and Years in New Zealand – Controling for Occupation

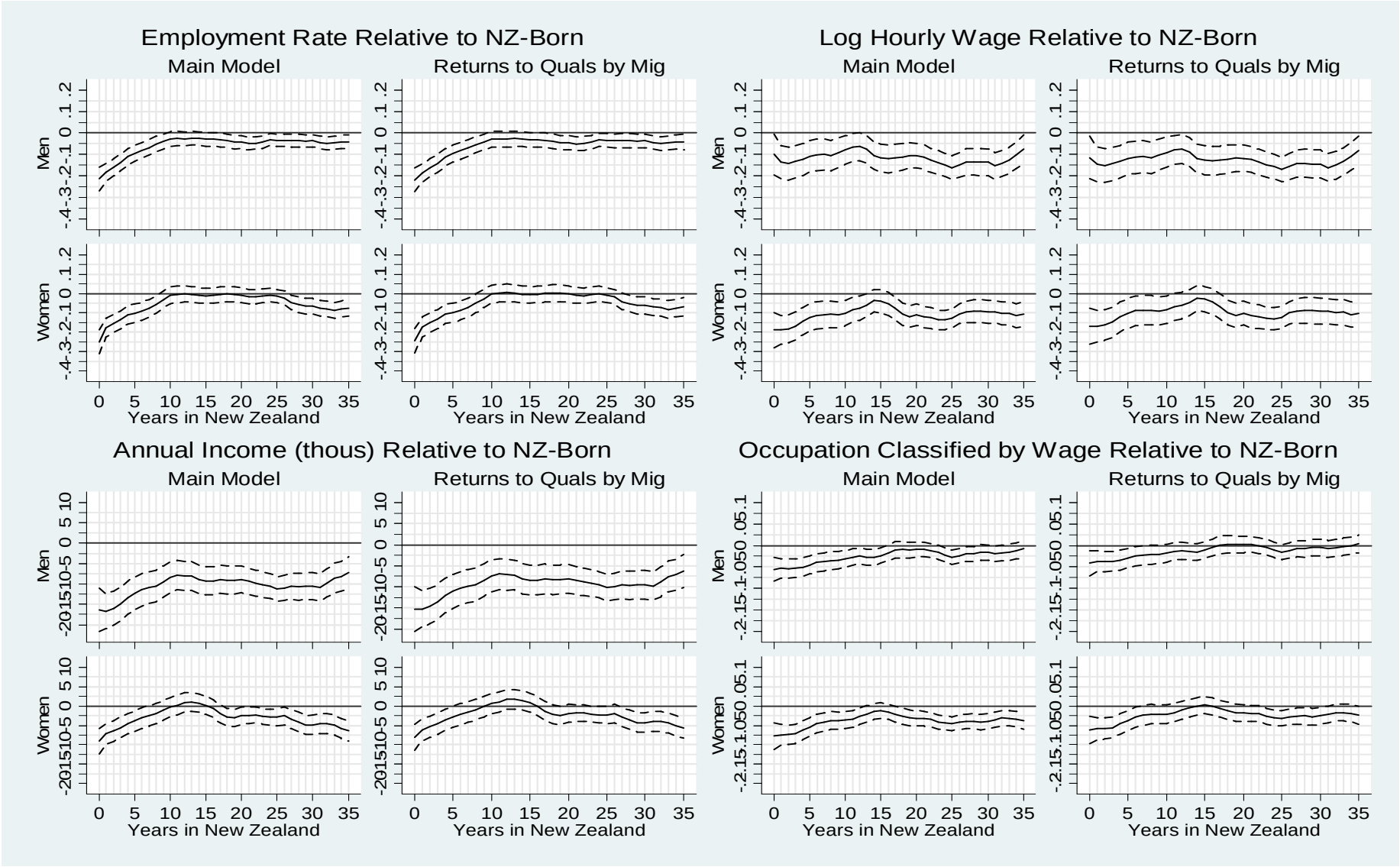

Figure 10: Regression Adjusted Outcomes for Immigrants by Gender and Years in NZ – Returns to Quals Differ for Immigrants

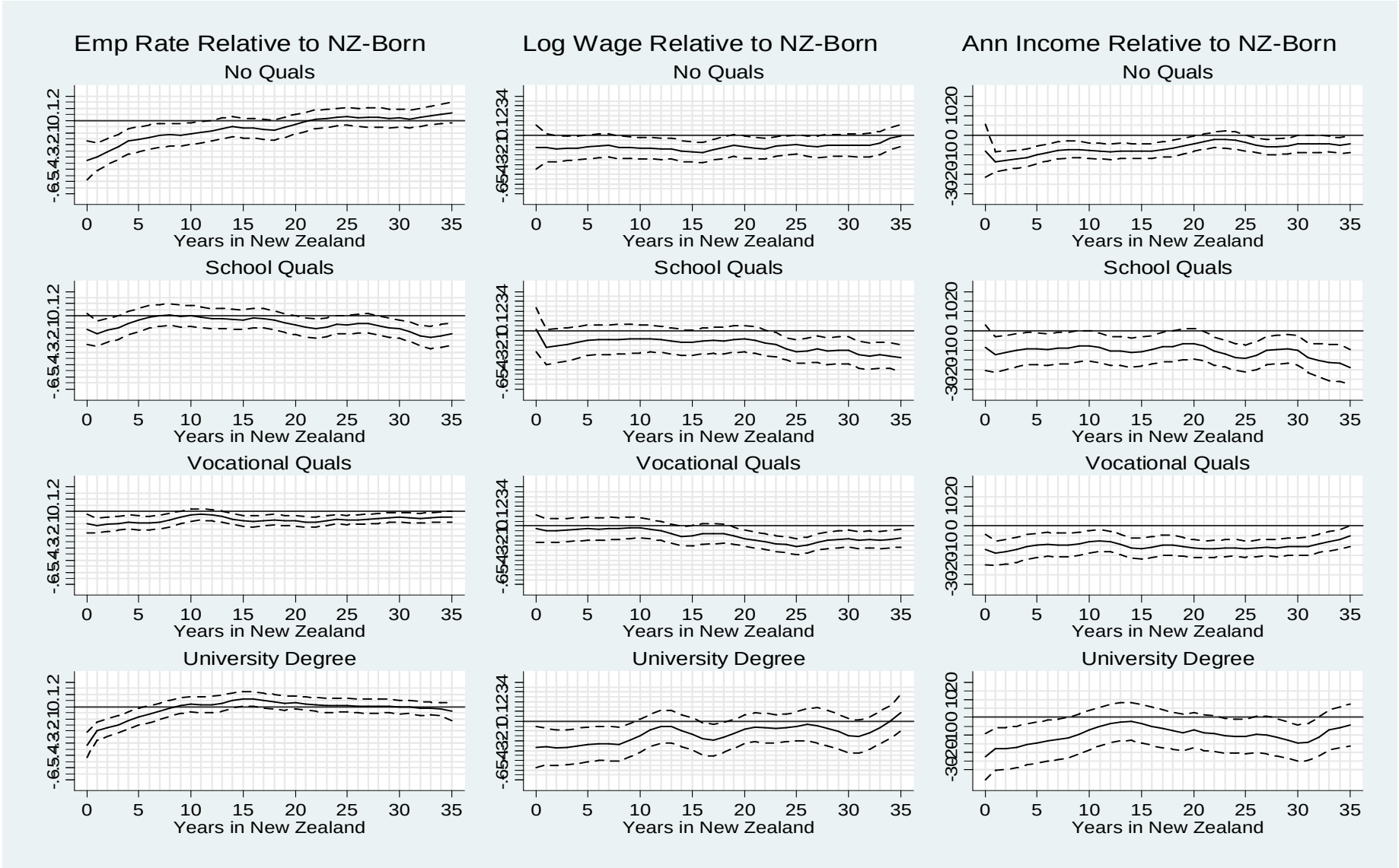

Figure 11: Regression Adjusted Outcomes for Male Immigrants by Qualifications and Years in New Zealand

Figure 12: Regression Adjusted Outcomes for Female Immigrants by Qualifications and Years in New Zealand

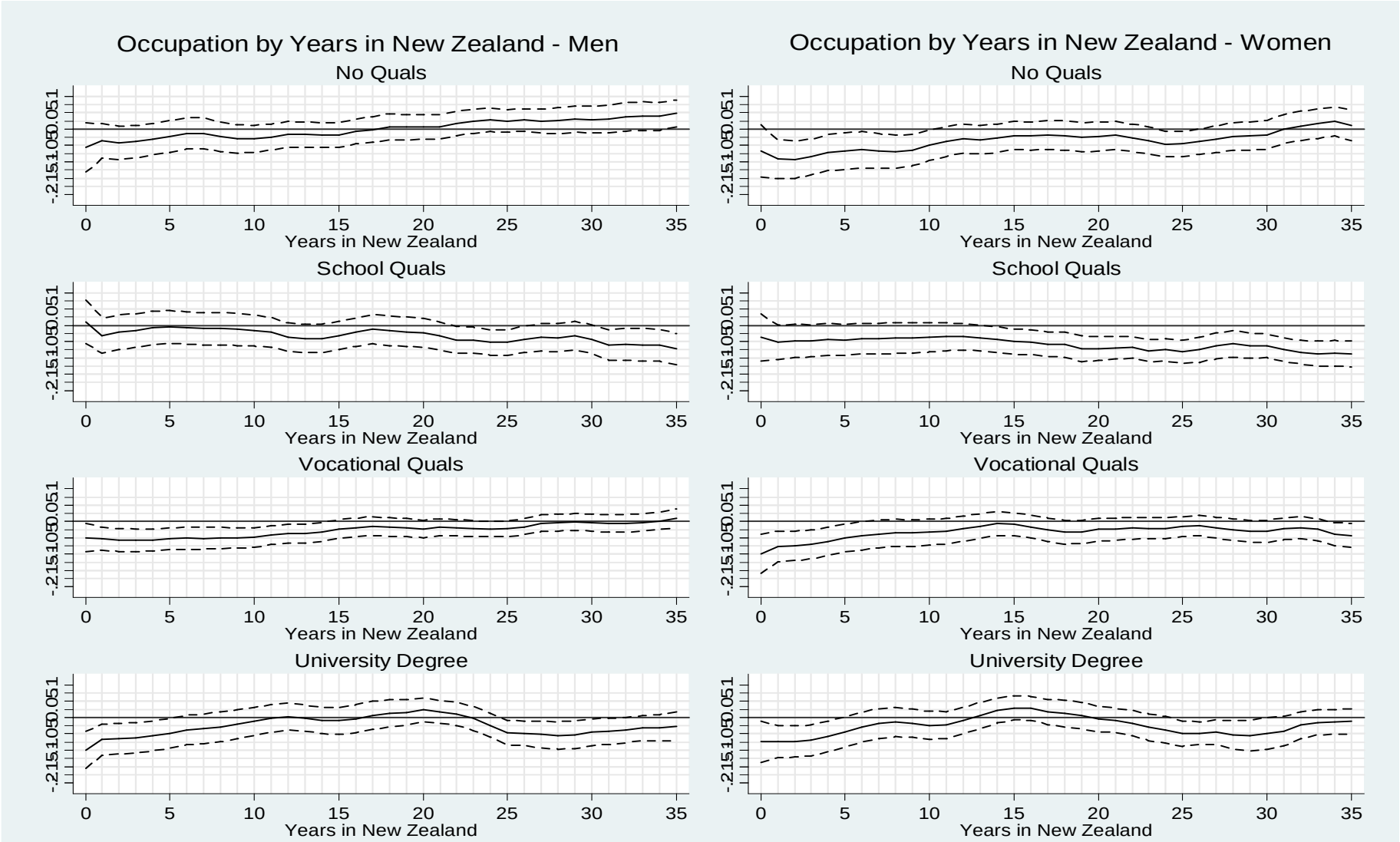

Figure 13: Regression Adjusted 2-Digit Occupation by Gender, Qualifications and Years in New Zealand

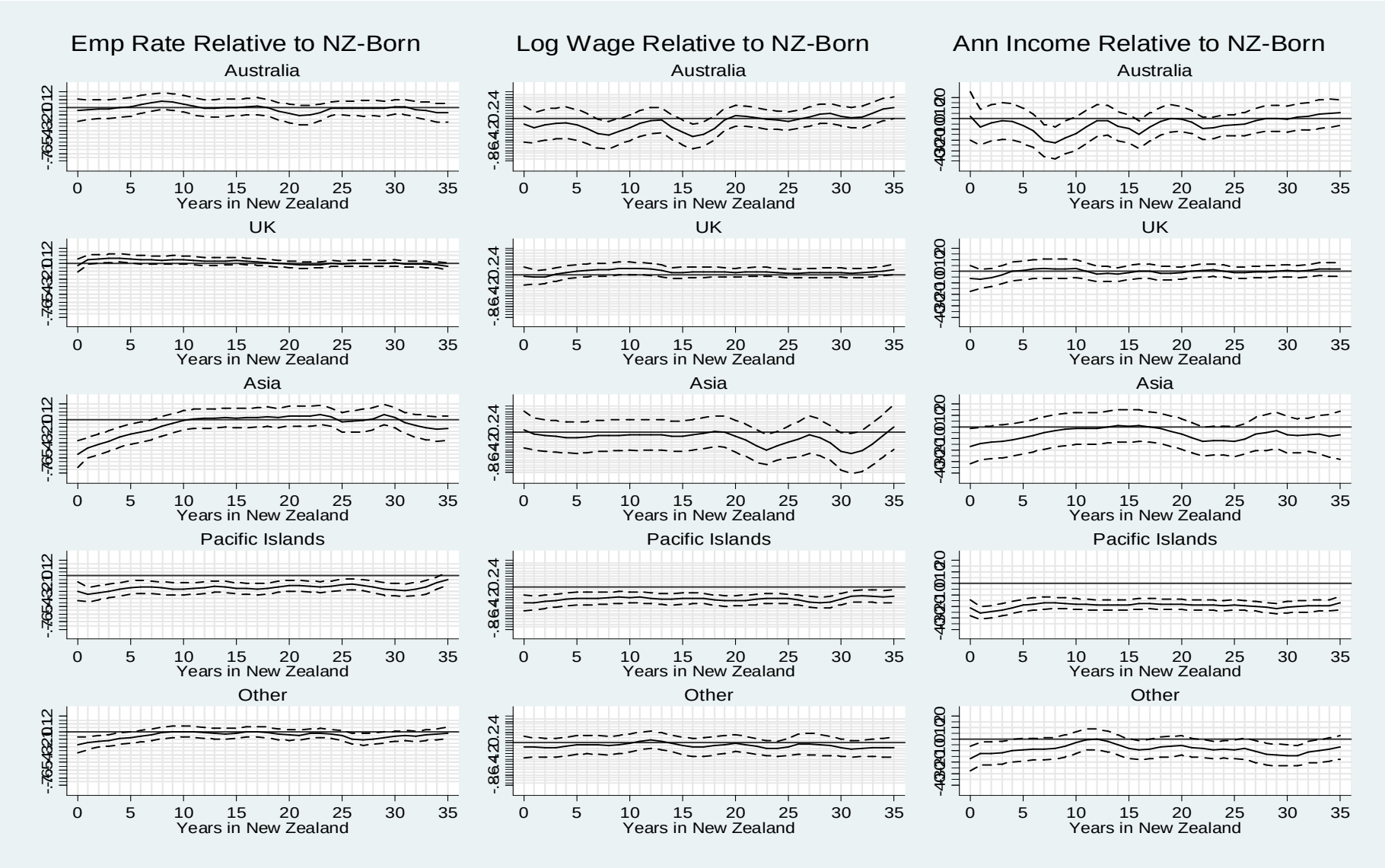

Figure 14: Regression Adjusted Outcomes for Male Immigrants by Region of Birth and Years in New Zealand

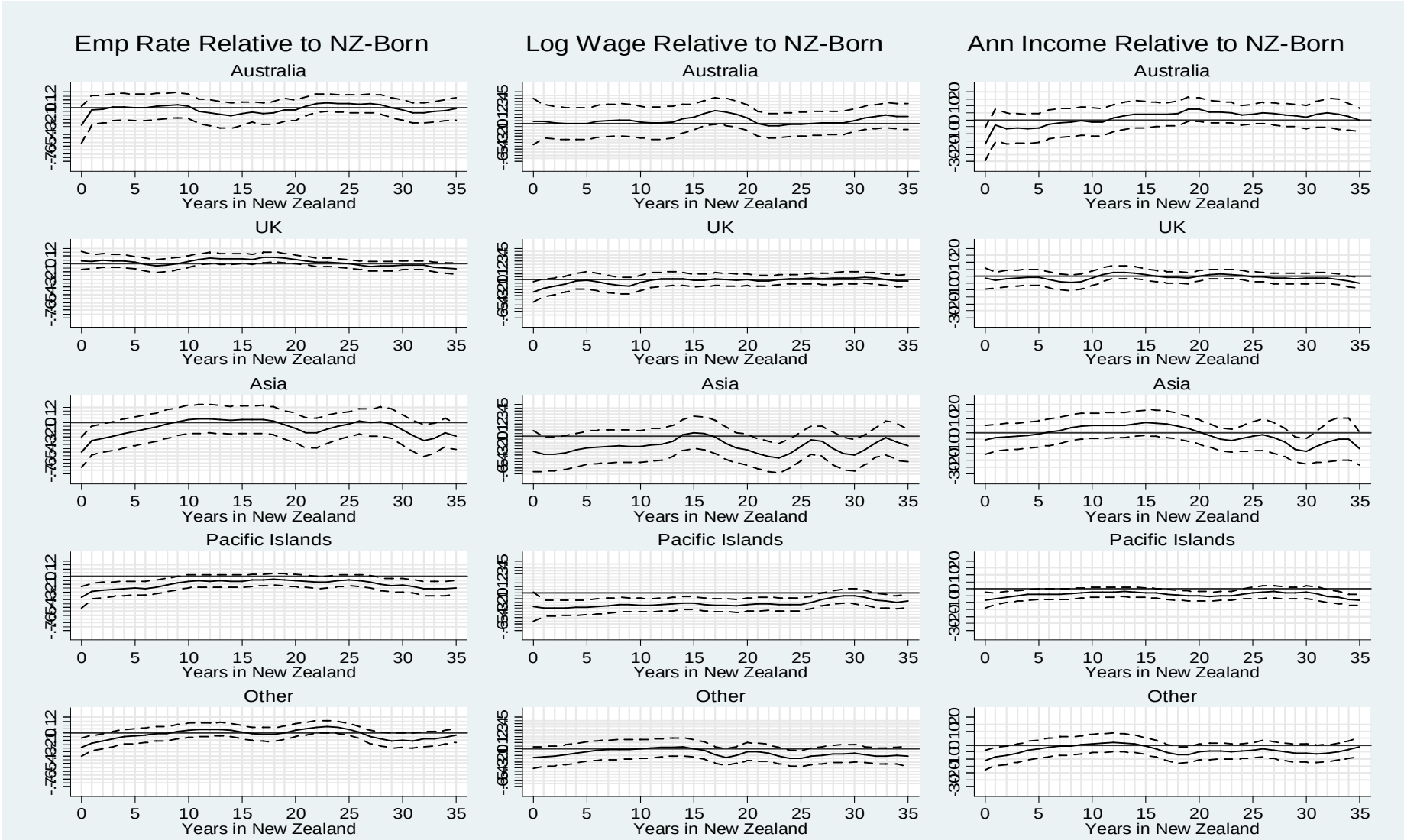

Figure 15: Regression Adjusted Outcomes for Female Immigrants by Region of Birth and Years in New Zealand

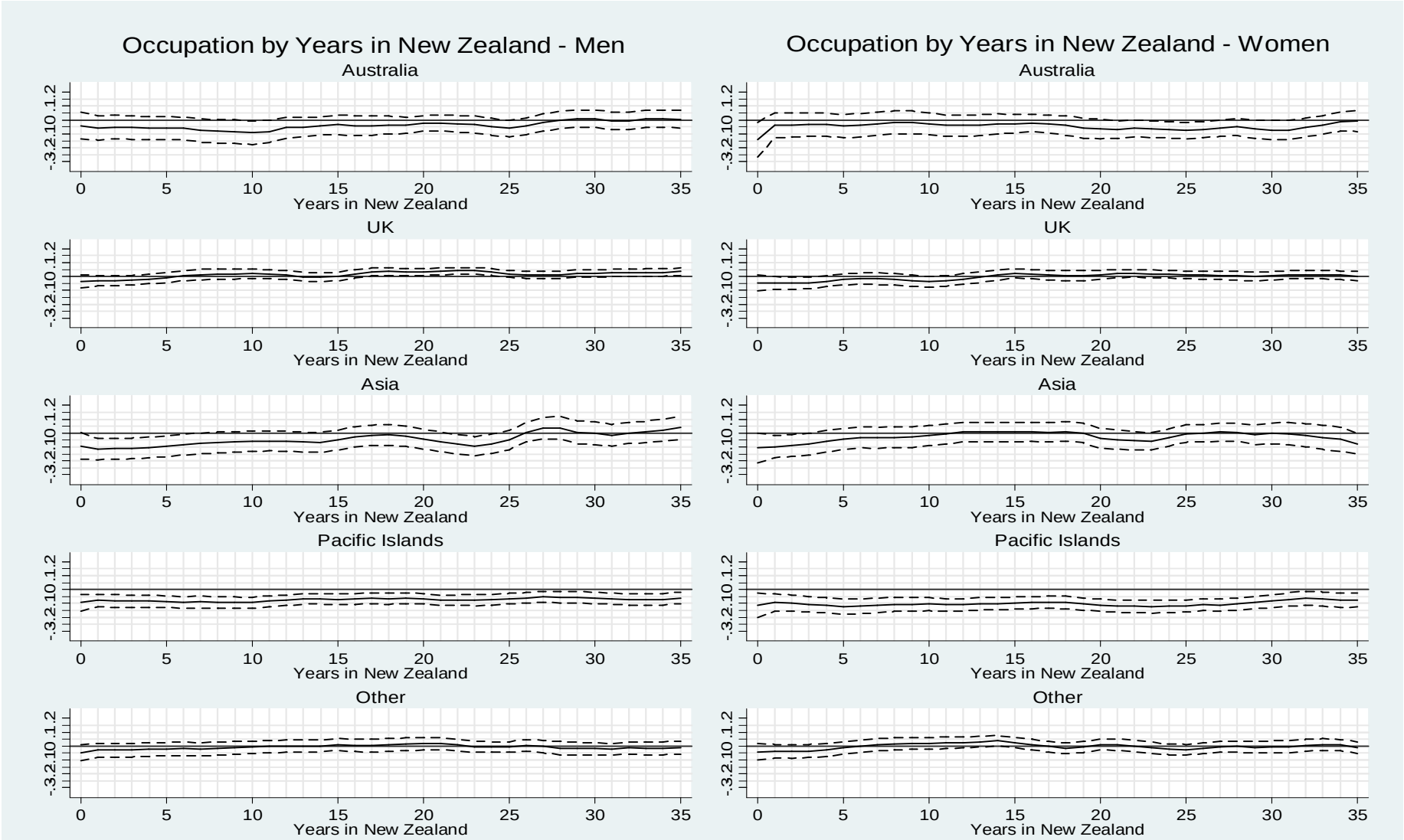

Figure 16: Regression Adjusted 2-Digit Occupation by Gender, Region of Birth and Years in New Zealand

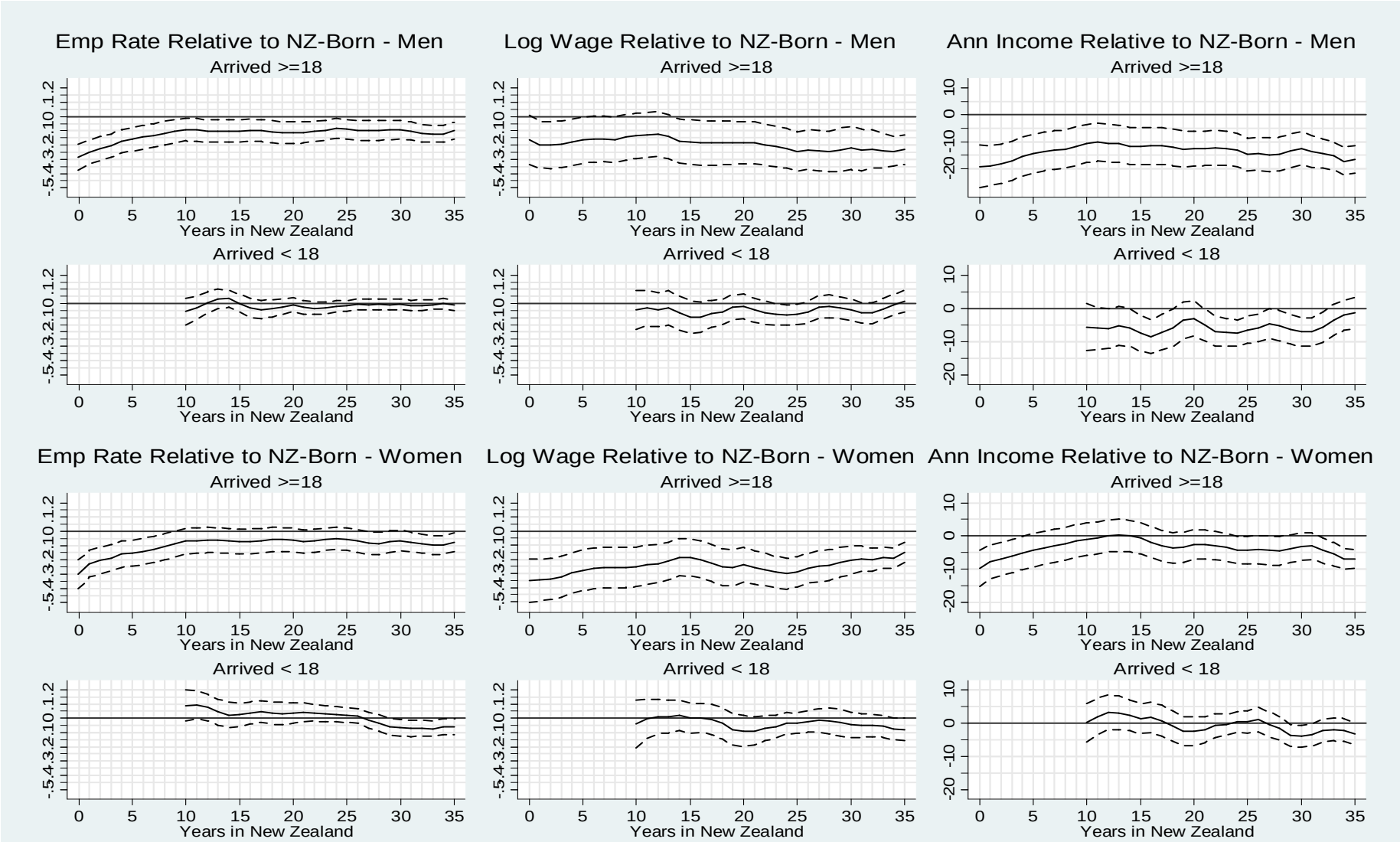

Figure 17: Regression Adjusted Outcomes for Immigrants by Gender, Age at Arrival and Years in New Zealand

Figure 18: Regression Adjusted 2-Digit Occupation by Gender, Age at Arrival and Years in New Zealand

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