# Immigrants in the New Zealand Labour Market: a Cohort Analysis using 1981, 1986 and 1996 Census Data

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This study examines the relative labour market position of immigrants using unit record data from the 1981, 1986, and 1996 population censuses. We compare the labour market outcomes of immigrants immediately after arrival in New Zealand and in subsequent years with those of New Zealand-born individuals who have similar characteristics. We identify the factors associated with differences in labour market outcomes, and analyse the changes in the relative labour market outcomes of immigrants between 1981 and 1996. We find that, in the period, in the first year after arrival in New Zealand a typical immigrant had a 20 percent lower income than a comparable New Zealand-born resident. This entry disadvantage disappeared after 20–30 years of residence. Convergence was generally quicker for participation and employment rates than for income. In addition, the evidence suggests a substantial amount of heterogeneity. Most notably, Asian and Pacific Islands immigrants of the early 1990s came with a much larger entry disadvantage than other groups of immigrants or earlier arrivals. The decline in relative labour market outcomes for this group can not be explained by the changing country-of-origin composition, nor by changes in any of the observed characteristics. One possible explanation is that structural changes in the labour market have caused an increased penalty for migrants from predominantly non-English-speaking countries.

## 1 Introduction

NEW ZEALAND IS A COUNTRY with a tradition of immigration. However, the ease and extent by which immigrants become integrated into the domestic labour market is likely to be one of the key factors behind the New Zealanders' future attitudes towards immigration. Immigrants who have high levels of productivity or skills that are in high demand are more likely to make a significant economic contribution than others. Their tax contributions are likely to be higher, and their need for social assistance lower. The benefits of

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immigration to New Zealand are, therefore, likely to be higher if immigrants fully realise their productive potential and perform well in the labour market.

This article provides empirical evidence on the labour market position of immigrants. It complements previous research on New Zealand data by Poot *et al* (1988), Poot (1993) and Zodgekar (1997), among others. The study extends the previous research by providing information up to 1996, adopting a different methodology in order to compare outcomes of immigrants and New Zealand-born residents, and by addressing a number of hitherto—at least in the New Zealand context—unanswered questions.

The two main objectives of this article are: to compare the labour market outcomes of immigrants in the 1970s, 1980s and 1990s with those of New Zealand-born residents with similar socio-economic characteristics, both at entry and in subsequent years; and to identify the factors associated with relatively good and relatively poor outcomes. Three different indicators of labour market outcomes are used, namely labour force participation on census day, employment (conditional on participation) on census day, and annual income (conditional on employment) on census day. The main performance factors include the educational qualifications of immigrants and New Zealand-born residents, their age and, for explaining participation decisions, their family and parental status.

So far as immigrants are concerned, the authors suspect that the cumulative amount of time spent in New Zealand is an important determinant of their relative labour market outcomes, and accordingly, all of the analyses control in one way or another for this 'years since migration' (YSM) effect. An equally important influence is that of language proficiency. Unfortunately, a direct question on language was only included in data for 1996, which precludes a comparative analysis of the effect of language over time. Instead, immigrants are classified either by one of six regions of origin or, based on their country of birth, by English-speaking/non-English-speaking background. The region/English background factor is likely to capture not only the effect of language, but also other characteristics such as 'cultural similarity' that are likely to be correlated with outcomes. Finally, the analysis addresses two further issues of immigrants' relative labour market outcomes, namely the importance of age at arrival and the size of the arrival group.

The results from this study indicate that a typical immigrant entered with an income shortfall of about 20 percent relative to a similar New Zealand-born resident. This shortfall tended to disappear after 20–30 years of residence. Differences in participation and employment rates were less long-lived. Immigrants with an English-speaking background typically 'out-performed' migrants with non-English-speaking backgrounds. Most notably, Asian and Pacific Islands immigrants who came to New Zealand in the early 1990s had a much larger entry disadvantage than both other immigrant groups who arrived

at the same time or Asian and Pacific Islands immigrants who came before 1986. This decline in the relative labour market outcomes cannot be fully explained by the changing country-of-origin composition, or by changes in any of the observed characteristics. One possible hypothesis is that structural changes in the labour market might have put immigrants with insufficient language skills at an increasing disadvantage.

The structure of the article is as follows. Section 2 provides some definitions, describes the datasets and the sampling methods, and concludes by providing basic summary statistics. Section 3 starts with a discussion of the methodology that is used in order to compute education- and age-adjusted differences in outcomes between immigrants and New Zealand-born persons. This methodology is then used to compare the incomes and rates of participation and employment of recent immigrants and New Zealanders who have similar demographic and educational characteristics.

Section 4 deals with the issue of convergence. It is well known that cross-section data alone are insufficient to determine whether—and how fast—immigrants adjust to the host country labour market conditions, and so an alternative pooled regression model is presented. The results from the analysis are presented by way of predicting age-outcome profiles (income, participation, employment) for a 25-year-old immigrant and a New Zealander of the same age over the next 25 years.

Section 5 provides details on the various performance factors and their contributions in explaining the differences in labour market outcomes. In particular, this section evaluates possible explanations of the declining fortunes of some immigrant groups who arrived in the first half of the 1990s. Section 6 summarises the main findings and suggests directions for further research.

## 2 Data

The analysis in this article is based on unit-record data from the 1981, 1986 and 1996 New Zealand Census of Population and Dwellings. The 1991 census was excluded from the study since it contains no information on the year in which an immigrant arrived in New Zealand. The study population comprises all working-age individuals (aged 15–64 years) who were living in New Zealand on census night. The data are composed of three different sub-samples: a 5 percent random sample of all individuals born in New Zealand; a 20 percent random sample of all individuals born in the United Kingdom or Ireland; and the full population of all other immigrants (ie, people born outside New Zealand, the United Kingdom or Ireland).[2] Descriptive statistics in this paper are computed using appropriately weighted data.

[2] See the companion report (Winkelmann and Winkelmann, 1998) for more details, including an account on how missing responses were dealt with.

For the purpose of this study, immigration status is solely defined by place of birth. An *immigrant* is someone who lives in New Zealand but was born outside of New Zealand. An immigrant may or may not be a New Zealand citizen or permanent resident, and may or may not have been born to New Zealand parents. In particular, foreigners on study or work permits may be included in the immigrant population so long as they gave a New Zealand address as their usual place of residence. The lack of information on the residence status of immigrants is unfortunate, but unavoidable with census data.

A *recent immigrant* is an immigrant who had spent fewer than five years in New Zealand at census day. In 1996, for instance, a recent immigrant was an immigrant who arrived between March 1991 and February 1996.[3] While one might be tempted to think of the stock of recent immigrants as being representative of the flow of immigrants over the period, this view ignores the possibility of out-migration and death. A quantitative assessment of the incidence of out-migration will be provided below. For much of the analysis, it is essential to distinguish between *cohorts* of immigrants. A cohort is a group of immigrants who arrived in New Zealand in the same calendar year(s). For simplicity, we group all immigrants into eight distinct cohorts: pre-1960, 1961–65, 1966–70, 1971–75, 1976–80, 1981–85, 1986–90 and 1991–95. Pre-1980 cohorts are observed in all three census years, whereas the 1981–85 cohort is observed twice, and the 1986–90 and 1991–95 cohorts only once.

In parts of the analysis, immigrants are grouped by region of birth. The six possibilities are: the United Kingdom and Ireland; Australia; Europe and North America; Pacific Islands; Asia; and 'other' regions. An alternative classification is by English background status, based on the 1996 question on English proficiency. If more than 95 percent of 'most recent' (0–1 years of residence) immigrants from any country responded that they were proficient in English, all immigrants from that country in all three census years were classified as having an 'English-speaking background' (ESB). Else, their status was 'non-English-speaking background' (NESB).

Finally, the fact that Statistics New Zealand had redefined several of the variables between the three census years had to be allowed for. Whenever possible, definitions have been adopted that make the information as consistent as possible over time. The key variables where definitional adjustments had to be made were labour force status and highest qualification. The problem of classification changes to the highest qualification level was by-passed by using broadly-defined groups, for which no changes had occurred (using the categories:

[3] In the full report, a slightly different convention was adopted, in that 'recent' immigrants were defined as those with fewer than six years of residence. However, for the purpose of a uniform treatment with five-yearly cohort dummies in the regression part, this alternative classification is used.

no qualification, school qualification, vocational qualification and university qualification). The labour force status definition used in this study is based on the pre-1986 definition of unemployment. The 'unemployed' are all those people who were not employed and who had looked for a job during the previous four weeks. Those who had looked for work using newspapers only, or who were not available for work, are not excluded under this definition, in contrast to the current official definition of unemployment.

This section of the article concludes with some simple descriptive statistics of the final dataset. Table 1 gives absolute and relative population frequencies for working-age immigrants by region of origin and census year, and separate data for all immigrants and recent immigrants only.

**TABLE 1: Working-age immigrants by region of birth**

| | *1981* | | *1986* | | *1996* | |
|---|---|---|---|---|---|---|
| | *No* | *%* | *No* | *%* | *No* | *%* |
| *All immigrants* | | | | | | |
| United Kingdom and Ireland | 179,825 | 56.37 | 178,805 | 52.47 | 151,615 | 36.09 |
| Australia | 27,487 | 8.62 | 29,189 | 8.56 | 31,535 | 7.51 |
| Europe and North America | 42,954 | 13.46 | 47,042 | 13.80 | 50,012 | 11.90 |
| Pacific Islands | 41,644 | 13.05 | 52,253 | 15.33 | 74,193 | 17.66 |
| Asia | 18,831 | 5.90 | 24,446 | 7.17 | 88,889 | 21.16 |
| Other | 8,295 | 2.60 | 9,072 | 2.66 | 23,892 | 5.69 |
| Total | 319,036 | 100.00 | 340,807 | 100.00 | 420,136 | 100.00 |
| Total as % of working age population | | 16.2 | | 16.3 | | 18.8 |
| *Recent immigrants* | | | | | | |
| United Kingdom and Ireland | 12,020 | 31.12 | 12,325 | 27.52 | 14,775 | 14.92 |
| Australia | 5,527 | 14.31 | 4,717 | 10.53 | 6,156 | 6.22 |
| Europe and North America | 5,956 | 15.42 | 8,140 | 18.17 | 12,871 | 13.00 |
| Pacific Islands | 7,340 | 19.00 | 9,887 | 22.08 | 8,748 | 8.84 |
| Asia | 6,141 | 15.90 | 8,133 | 18.16 | 46,607 | 47.08 |
| Other | 1,638 | 4.24 | 1,585 | 3.54 | 9,838 | 9.94 |
| Total | 38,622 | 100.00 | 44,787 | 100.00 | 98,995 | 100.00 |
| Total recent as % of all immigrants | | 12.1 | | 13.1 | | 23.6 |

*Note*: Columns do not add up to 100 percent due to rounding.

In 1981, New Zealand's working-age population was 16.2 percent foreign-born. During the next 15 years, the share of foreign-born among the resident working-age population increased by 2.6 percentage points to 18.8 percent in 1996. Simultaneously, the composition of immigrants by region of origin shifted

substantially. The contribution of immigration from the United Kingdom and Ireland, while still important, declined. Although absolute immigration flows (per five years, net of out-migration) from the United Kingdom increased (from 12,000 between March 1976 and February 1981 to almost 15,000 between March 1989 and February 1996), the share of UK and Irish immigrants among all immigrants slipped to 36 percent in 1996.

There were two reasons for this decline. Firstly, the inflows were well below levels sufficient to replace immigrants who had reached the cut-off working age of 65 years. More importantly, immigration flows from other regions of origin, most notably Asia, but also Europe and North America and 'other' regions, increased disproportionally (whereas flows from Australia and the Pacific Islands did not follow any trend). In 1996, almost one in two recent immigrants was born in Asia. The large immigration flows in the early 1990s were reflected in the large proportion of recent immigrants among all immigrants in 1996 (24 percent), almost twice as high a proportion as in 1986.

The shift of immigrants towards non-traditional sources such as Asia is one of the factors that has had substantial implications for the labour market outcomes of New Zealand's immigrants.

**TABLE 2: Educational attainment of immigrants and New Zealand-born (in percent)**

| | | *Qualifications* | | |
|---|---|---|---|---|
| | *No qualifications* | *School* | *Vocational* | *University* |
| *1981* | | | | |
| All immigrants | 45.8 | 25.9 | 20.5 | 6.2 |
| Recent immigrants | 36.5 | 28.9 | 19.5 | 12.1 |
| New Zealand-born | 49.5 | 26.7 | 16.9 | 3.6 |
| *1986* | | | | |
| All immigrants | 30.9 | 27.9 | 31.2 | 8.5 |
| Recent immigrants | 21.8 | 30.1 | 30.6 | 14.7 |
| New Zealand-born | 38.8 | 28.5 | 24.8 | 5.2 |
| *1996* | | | | |
| All immigrants | 23.3 | 31.9 | 27.8 | 15.5 |
| Recent immigrants | 12.8 | 34.9 | 22.8 | 25.8 |
| New Zealand-born | 29.6 | 34.7 | 26.1 | 8.0 |

Another factor that will prove important over the course of this study is the comparatively high proportion of immigrants with advanced degrees (relative to the New Zealand-born working-age population). The 'education gap' is large, and, depending on the metric one uses, is actually increasing over time. This is seen in Table 2.

For instance, 12.1 percent of recent immigrants had a university degree in 1981, but only 3.6 percent of New Zealanders. The difference was 8.5 percentage points. By 1996, this difference had increased to 17.8 percentage points. In relative terms the difference was roughly stable, with recent immigrants being about three times (and all immigrants about two times) as likely to have a university degree than New Zealand-born residents. Immigrants were also more likely to have a vocational qualification, although the differences were smaller in both absolute and relative terms. In summary, there can be no doubt that New Zealand's immigrants are relatively skilled, in terms of the crude qualification measures available in the census, and this fact should stack the odds in favour of immigrants when it comes to labour market outcomes.

This section concludes with a brief discussion of New Zealand's out-migration experience. Out-migration is an important issue, since it not only affects the number and composition of immigrants over time, but also puts limitations on what can be learnt from census data about the past and future labour market outcomes of those who stay. This issue will be discussed further in section 4. For now, out-migration is looked at only with regard to whether or not it was a quantitatively important phenomenon in the New Zealand context.

Out-migration rates ideally refer to immigrant flows. However, any immigrant arrival cohort has already been partially reduced in size by the time it is observed in the nearest census. The problem is smaller if only very recent immigrants are considered. Here, the focus is on immigrants with 0–1 year's residence since migration (ie, immigrants who are in the country for a period of 23 months at most), and 2–5 years since migration, respectively. By comparing the number of enumerated immigrants from a certain region of origin and of a certain age in both 1986 and 1996, we can compute 10-year out-migration rates formally as:

$$[1 - (\text{cohort size in 1996 census}/\text{cohort size in 1986 census})] \times 100$$

This number gives the combined effect of return-migration, step-migration, deaths, and sampling error (due to temporary absences of immigrants at census night, misclassifications in both the year of arrival and country of origin variables, or, in general, a changing coverage rate of the census).[4]

Table 3 shows that out-migration was quantitatively important. Forty-three percent of recently arrived immigrant men (those who had come to New Zealand in the 23 months prior to the census) and 32 percent of recently arrived immigrant women were not enumerated by the 1996 census among those aged 25–44 years

[4] Step-migration refers to a situation where a New Zealand foreign-born resident leaves the country permanently to take up residency in a country other than the country of birth/origin. Such step-migration is observed, for instance, for Samoan immigrants in New Zealand who move to Australia having obtained New Zealand citizenship after three years of residence (see Brown, 1998).

**TABLE 3: Ten-year out-migration rates (in percent) by age in 1986, years in New Zealand, region of origin, and gender, 1986–1996**

| | *United Kingdom* | *Australia* | *Europe* | *Pacific Islands* | *Asia* | *Other* | *Total* |
|---|---|---|---|---|---|---|---|
| *Men* | | | | | | | |
| Age in 1986: 15–24 years | | | | | | | |
| YSM 0–1 | -51.6 | -73.4 | -73.8 | -4.2 | -54.1 | -35.3 | -40.6 |
| YSM 2–5 | -39.6 | -53.3 | -35.6 | -33.1 | -54.8 | -23.3 | -40.7 |
| Age in 1986: 25–44 years | | | | | | | |
| YSM 0–1 | -45.9 | -65.1 | -50.0 | -10.4 | -43.8 | -36.8 | -42.7 |
| YSM 2–5 | -34.4 | -53.7 | -35.2 | -16.2 | -26.8 | -18.7 | -31.8 |
| *Women* | | | | | | | |
| Age in 1986: 15–24 years | | | | | | | |
| YSM 0–1 | -39.3 | -72.8 | -64.1 | 14.9 | -40.2 | -18.7 | -26.0 |
| YSM 2–5 | -28.4 | -50.8 | -39.9 | -26.9 | -43.8 | 16.4 | -33.3 |
| Age in 1986: 25–44 years | | | | | | | |
| YSM 0–1 | -37.9 | -62.1 | -46.6 | 11.9 | -21.6 | -25.0 | -31.9 |
| YSM 2–5 | -24.0 | -48.2 | -32.4 | -9.6 | -20.3 | -12.8 | -25.0 |

*Note*: YSM = years since migration.

in 1986. For this age group, out-migration rates tended to be somewhat lower for more established immigrants who had spent 2–5 years in the country prior to the census. One possible explanation is that most immigrants with a very high propensity to out-migrate had already done so soon after arrival. This sifting process reduces the average out-migration propensity among those with a longer period of residence. This pattern was not observed for the younger age group, which might be due to the inclusion of students in our sample.

Except for immigrants from the Pacific Islands, out-migration rates were higher for younger immigrants. Rates varied substantially by region of origin. The highest rates were recorded for Australian immigrants, the lowest for Pacific Islands immigrants. Overall, out-migration rates were substantial, and this has to be kept in mind in the following analysis.

## 3 Adjusted entry differentials

Immigrants and New Zealanders differ in a number of respects, and so any direct comparison between the two groups is likely to be misleading. In this section, a simple approach is used to distinguish between two alternative explanations for differences between labour market outcomes of immigrants and of New Zealand-born residents. One explanation is linked to differences in observable productive characteristics (such as age and education) and to differences in the level of economic activity (hours of work when income is considered). The other

explanation is that there is a 'genuine' immigrant effect, ie, labour market outcomes for immigrants are intrinsically different from those of New Zealand-born residents with *similar* productive characteristics.

Several explanations for such intrinsic differences have been put forward in the literature.[5] For instance, immigrants need time to familiarise themselves with the host country's labour market institutions, to learn the local language and customs, to generate credible information about their skills, and to find a good match between these factors. By the same token, the effect of these transition problems can be expected to decline as a function of time spent in New Zealand. Over time, immigrants' labour market outcomes should converge to those of similar New Zealand-born residents.

In this section a cohort analysis of the relative incomes of employed immigrants and New Zealand-born residents is conducted, that explicitly measures how much of the difference in incomes, participation and employment rates between immigrants and New Zealand-born residents remain after control for hours of work, gender and productive characteristics. In all cases, *differences* are used to formalise the notion of 'relative' outcomes: for income, the (absolute) difference in logarithmic income provides an approximation of the percentage difference in the level of income between immigrants and New Zealand-born residents; for participation and employment rates, the difference is measured by the percentage point difference between the respective rates.

Technically, *unadjusted* log income differentials (together with their estimated standard errors) are obtained by regressing logarithmic income ($y$) on a constant and a set of eight cohort indicator variables $C_k$ where $k$ = pre-1960, 1961–65, 1966–70, 1971–75, 1976–80, 1981–85, 1986–90, 1991–95, using data for immigrants and New Zealand-born residents.[6]

$$\log(y_{it}) = \alpha_t + \sum_{k=1}^{8} \eta_k C_k + \varepsilon_{it} \qquad (1)$$

In this equation, $i$ denotes the individual, $t$ the census year and $\varepsilon$ is a stochastic error term.

For instance, $C_{1961–65}$ is set to unity if the observation is for an immigrant who entered New Zealand between 1961 and 1965. Otherwise, the value of $C_{1961–65}$ is zero. For each immigrant one, and only one, of the eight cohort indicators takes the value 1, whereas all indicators are set to zero for New Zealand-born residents. As a consequence, in this simple regression, the mean log income of New Zealand-born residents is given by the estimated constant, whereas the log income differential between of immigrants of cohort $k$ and New Zealand-born residents is given by the regression coefficient on the variable $C_k$.

[5] The classic reference is Chiswick (1978). See also Borjas (1994).

[6] If data from the 1981 or 1986 censuses are analysed, one has to drop the last three or two cohort indicators for obvious reasons.

*Adjusted* log income differentials are obtained in a similar manner. However, now logarithmic income is regressed on the same nine variables (a constant, and eight cohort indicator variables) *plus* the following set of variables: hours, a male indicator, highest qualification level (indicators for school, vocational and university qualifications), age and age squared:

$$\log(y_{it}) = \alpha_t + X_{it}\beta_t + \sum_{k=1}^{8} \eta_{kt} C_{ik} + \varepsilon_{it} \qquad (2)$$

Here, the coefficient for cohort $k$, $\eta_{kt}$, measures the log income differential in year $t$ between immigrants who entered New Zealand in period $k$ and New Zealand-born residents *who are otherwise similar*, ie, have the same values for the $X_{it}$ variables. Hence, the remaining difference is the part of the overall difference between immigrants of cohort $k$ and New Zealand-born residents that is *not* associated with differences in endowment or economic activity.

These models are estimated using observations on employed individuals only.[7] In this context, the coefficients on age and education can be interpreted as 'returns'. For instance, the coefficient on *university* gives the predicted log income differential between university graduates and workers without qualifications (the reference group) who have otherwise similar characteristics. This coefficient approximates the percentage gap in income between the two qualification levels, *ceteris paribus*.[8] Finally, both returns and cohort effects are allowed to vary over time, as model (2) is estimated separately for each census year.[9]

Discussion focuses first on the results for the adjusted and unadjusted log income differentials of *recent* immigrants, ie, $\eta_{1976-80}$ in 1981, $\eta_{1981-85}$ in 1986, and $\eta_{1991-95}$ in 1996. These differentials might be referred to as 'entry' differentials, although one should keep in mind that the recent cohort includes immigrants who have been in the country for up to five years. Figure 1 shows the adjusted and unadjusted log income differentials for recent immigrants in the three census years.

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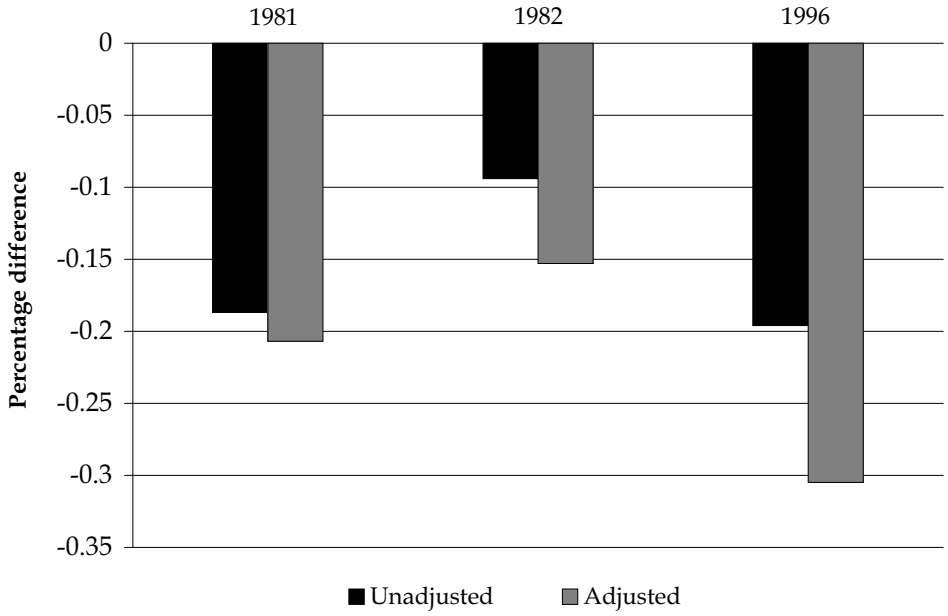
[7] Census income data are provided in grouped form. For this analysis, the midpoints of the group were assigned and then logarithms taken. A more elaborate method using grouped regression techniques did not lead to any differences in the substantive results.

[8] In instances where changes are large, the log approximation becomes somewhat imprecise. One can then use the formula $e^b$-1 (where $b$ is the log differential) in order to obtain the correct percentage change.

[9] The returns are restricted to be the same for New Zealand-born workers and immigrants. The rationale behind this restriction is that the specific interest at this stage is to determine the part of the overall (ie, unadjusted) income differential that *cannot* be explained by differences in endowments (ie, the adjusted wage differential). The analysis is not interested in finding out the channels through which apparently similar endowment points might lead to different outcomes, the two possibilities being either a difference in the intercept, or cohort- and time-specific differences in the way that endowments $X$ are evaluated by the labour market.

**FIGURE 1: Unadjusted and adjusted log income differentials between recent immigrants and New Zealand-born workers, 1981, 1986 and 1996**




In 1981, average incomes of employed recent immigrants and employed New Zealand-born residents differed by about 18 percent. In 1986, this income shortfall of immigrants decreased to less than 10 percent. The 1996 gap was close to 20 percent. How does the adjustment change the conclusions? First, adjusted log income differentials exceed unadjusted differentials in all years. The main driving factor behind this result is the relatively high education level of immigrants. Hence, immigrants 'look better' when compared to an average New Zealand-born resident (who turns out to have a relatively low level of qualification) than when compared to a 'similar' New Zealand-born resident (who has a higher education level and hence a higher income than the average New Zealand-born resident). The effect of the adjustment increases steadily over time, partially reflecting the increasing (absolute) gap in the proportion of university graduates. By 1996, the adjusted income differential of 30 percent was about 50 percent larger than the unadjusted log income differential. Hence, far from being able to 'explain' income difference, differences in personal characteristics actually exacerbate the disparities between immigrants and New Zealand-born residents.

How justified is it to think of a 'representative' immigrant in the New Zealand context? Figures 2 and 3 show 1996 income differentials for recent immigrants by sub-groups. Figure 2 distinguishes between migrants with an English-speaking background (ESB) and those with a non-English-speaking background (NESB), while Figure 3 looks at six separate regions of origin.

**FIGURE 2: Unadjusted and adjusted log income differentials, recent English-speaking background (ESB) and non-English-speaking background (NESB), 1996**

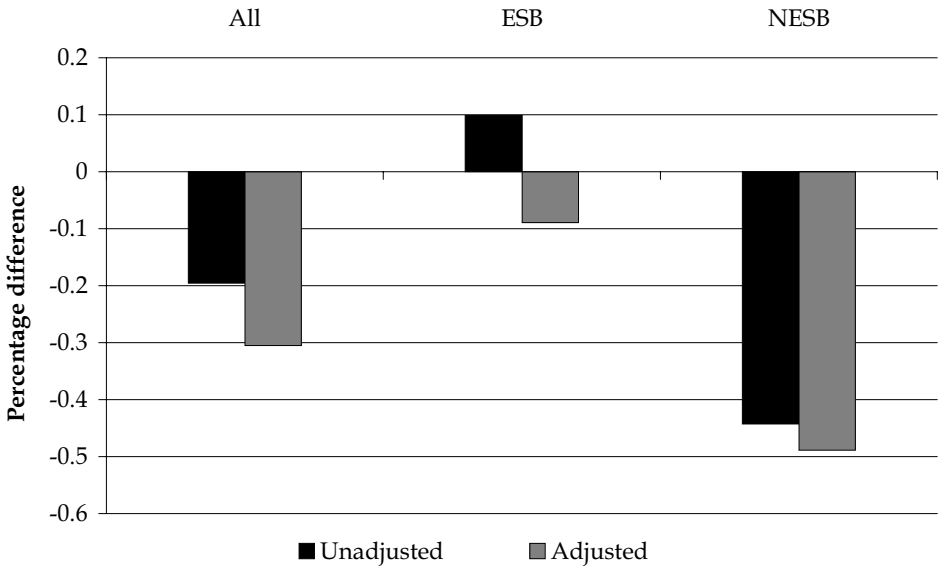
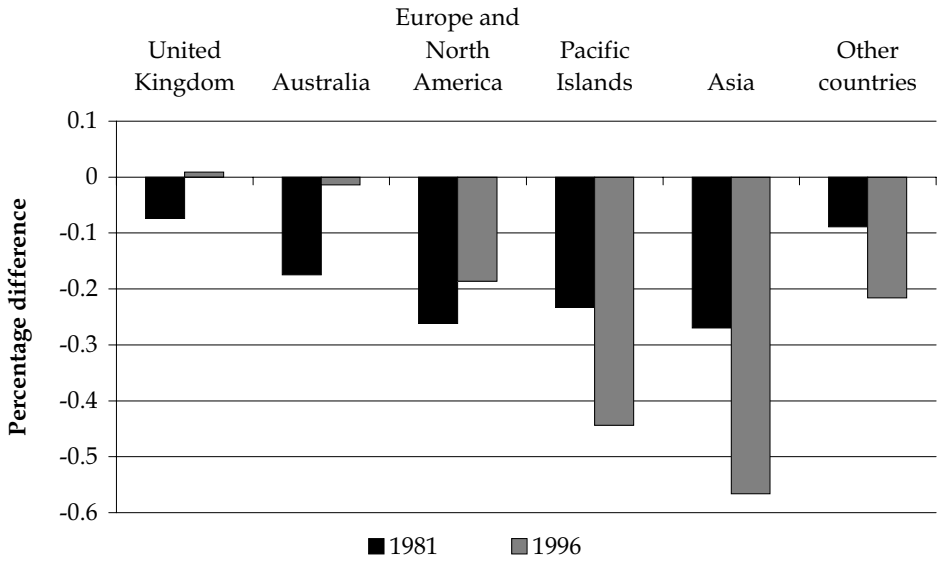



Figure 2 shows that the 1996 relative incomes of recent ESB and NESB migrants differ widely. The unadjusted results indicate that ESB migrants had in fact an income premium, ie, incomes above those of the average New Zealander. Once the differences in characteristics are taken into account, however, a small shortfall of less than 10 percent emerged. NESB migrants, by contrast, had a log income differential of almost 50 percent. The adjustment made less of a difference for NESB migrants than it did for ESB migrants, as the average characteristics of the former group of immigrants were more similar to those of New Zealand-born residents (in terms of observables such as age and qualifications).

Figure 3 shows that for the 1996 census year, immigrants essentially could be classified into three different categories. British, Irish and Australian immigrants had incomes that were very close to those of similar New Zealand-born residents. European and North American and 'other' immigrants filled a medium position with an adjusted income differential of around 20 percent, while Pacific Islands and Asian immigrants had large adjusted 1996 differentials of 45 percent and 55 percent, respectively. Fifteen years earlier, the distribution of log income differentials across the regions of origin was much more equal. The increased inequality in 1996 was fuelled both by a relative improvement in the position of UK and Australian immigrants and by a relative deterioration in the position of Asian and Pacific Islands immigrants. Some possible explanations for these trends are followed up below.

**FIGURE 3: Adjusted log income differentials, recent immigrants, by region of origin, 1981 and 1996**




Income of those who are employed is only one among several indicators of relative labour market performance. While it is an important and frequently used indicator, it is likely to understate the true gap between New Zealand-born residents and immigrants since it includes only immigrants who have already cleared a first 'hurdle' in the integration process, namely that of finding a job. Moreover, this group of immigrants is likely to be positively selected, ie, better than average.

In order to analyse the participation and employment rates of immigrants and New Zealand-born persons, model (2) is modified to account for the binary dependent variable.[10] For convenience, the Logit model is used, where

$$P(y_{it}=1)=\frac{e^{\xi_{it}}}{1+e^{\xi_{it}}}$$

and, as before,

$$\xi_{it}=\alpha_i+X_{it}\beta_t+\sum_{k=1}^{8}\eta_{kt}C_{it}$$

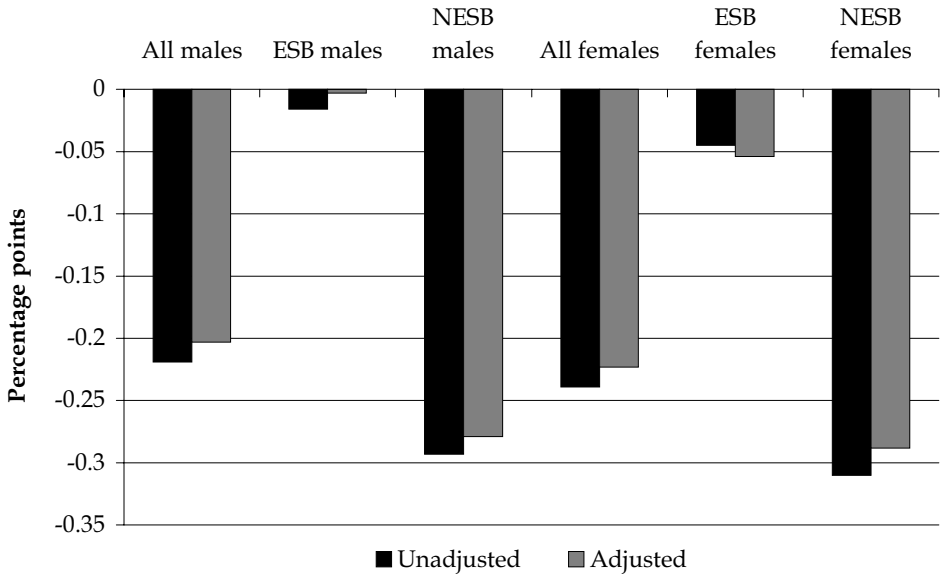
There are some changes in the $X$ variables, as the hours of work variable is dropped and controls for parental and family status are included. Also, the model is estimated separately for men and women. Finally, it should be stressed that the

[10] That is, $y_{it}$=1 if a person is employed. Otherwise, $y_{it}$=0. The participation indicator variable is defined analogously.

analysis of participation is for the entire working-age population, whereas the relevant sample for the employment regressions only includes participants.

The Logit model is intrinsically non-linear and the parameters $\beta_t$ and $\eta_{kt}$ no longer have a simple direct interpretation. This problem can be solved by using the estimated parameters to obtain the average predicted probabilities (of being participant or employed) for a certain group (New Zealand-born residents or immigrants of cohort $k$), where the predictions are based on the actual characteristics of individuals in each group. The percentage point differences between predicted immigrant and natal probabilities then provide estimates of the adjusted participation and employment (conditional on participation) differentials – our preferred metric for the relative labour market outcomes of immigrants.

**FIGURE 4: Unadjusted and adjusted differences in participation rates, New Zealand-born and recent immigrants, 1996**



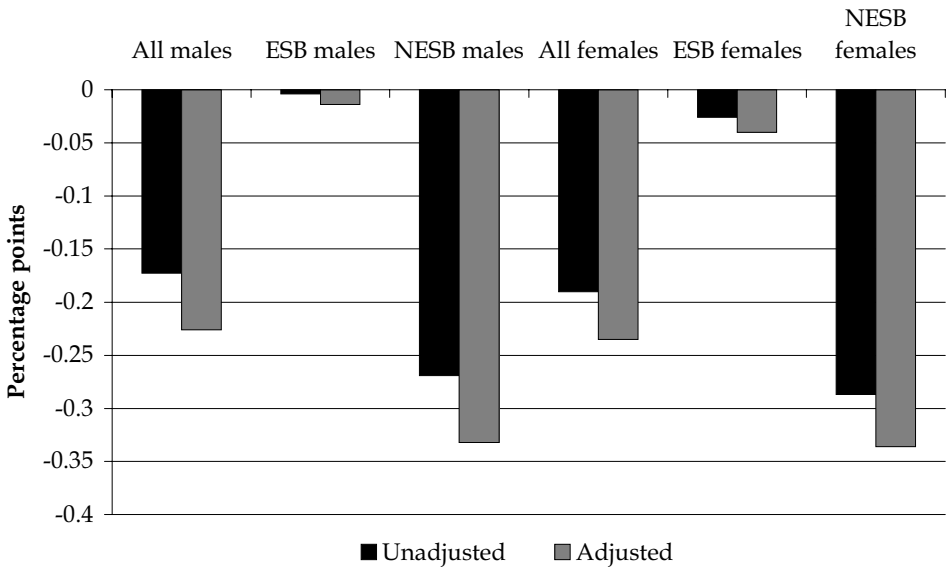

*Note*: ESB = English-speaking background; NESB = non-English-speaking background.

Figure 4 shows the adjusted 1996 participation differences between recent immigrants and New Zealand-born residents, by gender, and further broken down into ESB and NESB. The overall gap ranged from 20 to 25 percentage points. In the case of participation rates, adjusting for differences in characteristics reduced the differences between immigrants and New Zealand-born residents somewhat. One likely explanation is the dominance of the age effect. Recent immigrants were, on average, younger than New Zealand-born residents, which contributed to a lower participation rate for this group. However, most of the

differences in participation rates remain unexplained by the observed characteristics. As already observed for income, there were large differences between ESB and NESB immigrants. In 1996, ESB migrants had participation rates very similar to those of New Zealand-born residents; in particular, among men, while the female adjusted gap was only 5 percentage points. By contrast, NESB migrants had participation rates that were between 25 and 30 percentage points below those of New Zealand-born residents, in adjusted terms.

Relative employment rates showed a very similar pattern, with large differences for recent NESB immigrants (about 33 percentage points in adjusted terms), virtually no differences for ESB male immigrants, and very small differences for ESB female immigrants. In contrast to participation, adjusted employment differentials were larger than the unadjusted ones, which is likely a reflection of the relatively low proportion of unskilled workers among immigrants in conjunction with a relatively high unemployment rate among unskilled workers.

**FIGURE 5: Unadjusted and adjusted differences in employment rates, New Zealand-born and recent immigrants, 1996**




*Note*: ESB = English-speaking background; NESB = non-English-speaking background.

To summarise, labour market outcomes of immigrants in the first years after entry (measured as income, participation and employment), after taking into account differences in individual characteristics, were 'inferior' to those of New Zealand-born residents in most cases, recent British and Australian immigrant men in 1996 being the only exception. While observed characteristics such as age and education turned out to be rather unimportant in explaining differentials in

outcome, other unobserved factors that are captured by the region of origin distinction and by 'English-speaking background' status were very important. Male British and Irish and Australian recent immigrants were almost indistinguishable from New Zealand-born residents in 1996. By contrast, in that same year recent immigrants from non-English-speaking countries, mostly Asian and Pacific Islands peoples, had very large differentials in labour market outcomes, be it income, participation or employment rates. The large differentials between regions of origin was a novel experience for New Zealand, as the disparities among earlier cohorts were much smaller. (See, for instance, Figure 3 for evidence on the 1976–80 cohorts in the 1981 census.)

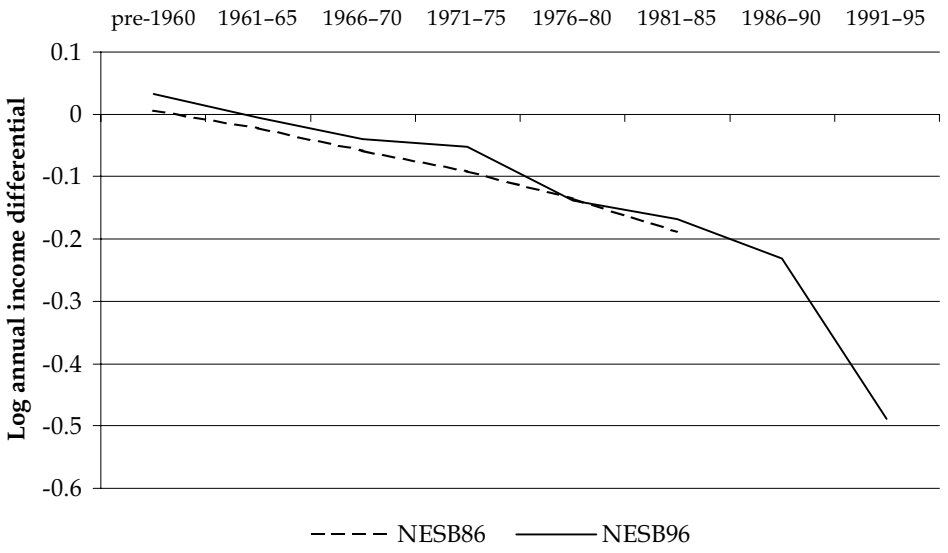
The initial labour market outcome is not the only factor that determines the overall success of immigrants in the New Zealand labour market. There is also the question of if, and how fast, immigrants improve their relative position with time spent in the country. In the following section, the evidence for past immigrants' convergence in labour market outcomes will be examined.

## 4 Convergence

As a first approach to the problem, one might consider plotting the estimated cohort effects from model (2) against the period of arrival. Figure 6 provides such a plot. The $x$-axis gives the end-points of the respective arrival periods, ie, the cohorts. For instance, the point for '95' on the crossed line for the 1996 census gives the adjusted log income differential between immigrants (here, with non-English-speaking backgrounds) who entered New Zealand between 1991 and 1995, and New Zealand-born residents. This estimate has been discussed earlier in the analysis of 'recent' immigrants. However, Figure 6 also shows the adjusted 1996 log income differentials (these are the $\eta_{kt}$'s from model (2)) for immigrants who arrived in earlier five-year periods: from 1956–60 through to 1986–90.

What we find is that the most recent (1991–95) cohort had a differential of approximately -50 percent. However, immigrants who came to New Zealand in earlier periods performed much better in 1996 than did recent arrivals. For instance, NESB immigrants who arrived between 1986 and 1990 (labelled '90') had an estimated income differential of 'only' about 23 percent in 1996. This corresponds to an 'improvement' of 27 percentage points relative to the 1991–95 cohort. The estimated 1996 log income differential of the 1981–85 cohort was another six percentage points smaller than the 1986–90 differential. The same pattern continued for earlier cohorts. In each case, the relative incomes of earlier cohorts exceeded those of later cohorts. Or, to put it differently, the absolute value of the log income differential is a monotonically decreasing function of the years spent in New Zealand. Does this finding mean that earlier cohorts were better off *because* they had spent more time in New Zealand and thus had had the opportunity to adjust to the new environment? Or were there possibly other factors at work that would render such an inference invalid?

**FIGURE 6: Adjusted log income differentials for non-English background migrants, by period of arrival, 1986 and 1996**




*Note*: NESB = non-English-speaking background.

A comparison of the two curves for the 1986 and 1996 census in Figure 6 shows that the suggested causal inference is certainly questionable. For instance, the 1981–85 cohort had a relative income gap of 19 percent in 1986. This cohort was 'recent' in that year. However, the same cohort of immigrants, 10 years later, features in the 1996 census. By that time, this cohort had accumulated 10 more years of residence and the estimated relative income gap had decreased to 17 percent. Hence, the effective 'return' to 10 years of residence was only two percentage points for this cohort, much less than the 29 percentage points suggested by the single 1996 cross-section. The discrepancy between the two comparisons arises from the fact that recent immigrants in 1996 performed less well, in relative terms, than recent immigrants in 1986. In such a situation, estimates of convergence rates from cross-section will be upwardly biased, as is well known in the literature (see, for instance, Borjas, 1994).

This problem has prompted the development of a methodology that enables the effects of genuine convergence to be separated from the effects of potentially changing cohort quality. Consider, for instance, the following model:

$$\log(y) = \alpha + X\beta + \sum_{k=1}^{8} \eta_k C_k + \delta YSM + \phi YSM^2 + \gamma YEAR86 + \lambda YEAR96 + \varepsilon \qquad (3)$$

The coefficients $\eta_k$ measure the percentage difference in income between immigrants of cohort *k* and otherwise similar New Zealand-born residents *in the first year after arrival* (for $YSM=0$), whereas $\delta$ and $\phi$ estimate the rate of convergence. A typical income adjustment path for cohort *k* would feature an

initial income disadvantage upon entry ($\eta_k<0$), combined with subsequently faster income growth for foreign-born workers ($\delta>0$). $\delta$ literally measures the relative income growth attributable to the first year of residence. If, as we expect, $\phi$ is negative, then relative income growth slows by $-2\phi$ percentage points in each subsequent year. In this framework, income convergence occurs, if at all, after $\left(-\delta+\sqrt{\delta^2-4\phi\eta_k}\right)\Big/2\phi$ years.[11]

Estimating models such as (3) requires pooled data from at least two cross-sections. Technically, this is the case because in a single cross-section, ie, with data for a single census year such as 1996 the period of arrival is perfectly known once the years since migration are determined, and hence adds no new, independent information. The model is not identified.[12] Intuitively, differences in the relative economic position between arrival cohorts in a given census year can arise from two independent sources that are observationally equivalent. The first is differences in the period of residence—this is called the *convergence effect* and captured by the variable YSM. The second explanation is differences in the entry position—this is called the *cohort effect* and captured by $C_k$. Simply observing that earlier cohorts perform better in the labour market than more recent ones does not reveal whether it is because they have spent more years in New Zealand, or because they were more able in the first place, or both. In repeated cross-sections, however, the same cohort is observed at least twice, which allows us to single out the two separate effects.

In this study, the model was estimated jointly for the 1981, 1986 and 1996 census years. Moreover, model (3) was generalised somewhat by interacting the qualification variables with both an immigrant dummy and the YSM polynomial. In this way, entry differentials between immigrants and New Zealand-born residents and convergence rates are allowed to vary by qualification level.[13]

Presentation of the results starts with a discussion of entry differentials for the various region of origin groups. While the same issue has been addressed in the previous section by comparing adjusted income differentials for recent

[11] Selective out-migration may distort this inference. If, on average, the less successful migrants leave, then the estimated convergence rates will overstate the true economic progress of those who stay (see, for instance, Borjas, 1994).

[12] Although identification can be formally achieved through the choice of functional form – YSM enters as a second-order polynomial while the year of arrival is modelled as a step function through the eight cohort dummies – most economists consider this to be an unsatisfactory solution. In particular, a slight modification in the functional form of one variable (such as including $YSM^3$) tends to produce dramatic changes in the estimated coefficients of the other variable.

[13] An example of the results from a typical regression model is given in Appendix A. The full set of regression is available in Winkelmann and Winkelmann (1998).

immigrants in 1981, 1986 and 1996, model (3) offers two distinct advantages. Firstly, it estimates the adjusted differentials *in the first 12 months after arrival* (for YSM=0), rather than mixing together immigrants with between zero and four years of residence. Secondly, the model enables estimation of the entry differentials for immigrants who arrived in New Zealand as far back as the 1960s or earlier, and thereby gives a better indication of the long-run trends in income differentials.

**FIGURE 7: Income differentials of male immigrants of each entry cohort, by region of birth**

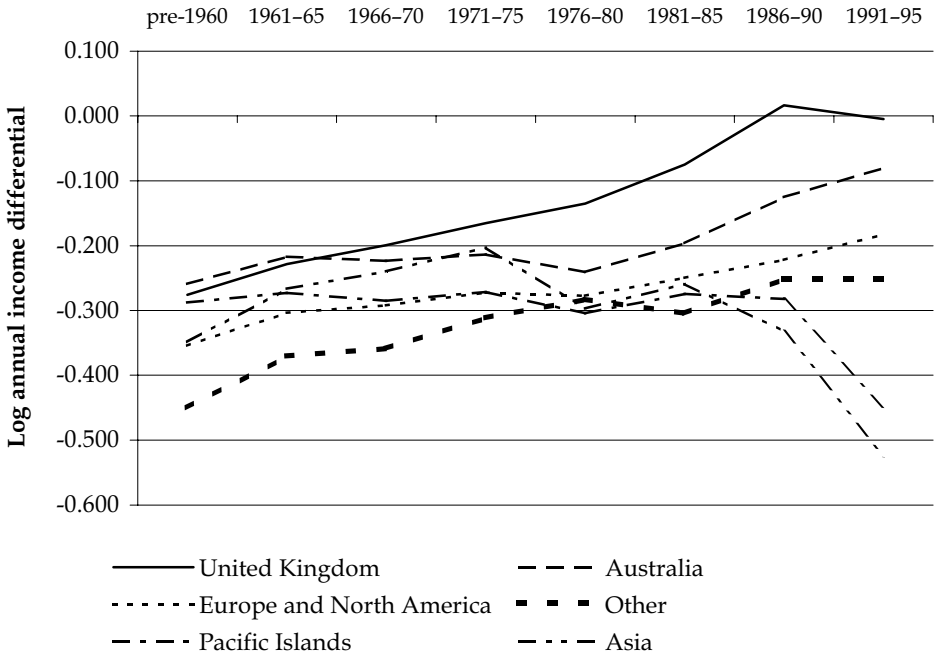



Figure 7 plots the entry differentials for male immigrants, pre-1960 to 1995.[14] It corroborates what was said before in the context of English- versus non-English-speaking migrants. Pre-1981 entry differentials were relatively similar for the various region of origins (with the possible exception of the United Kingdom and 'other' countries). Since the 1980s, the gap between English background migrants (mainly from the United Kingdom, Australia and Europe and North America) and non-English background immigrants started to widen, as the relative income

[14] Literally speaking, these entry differentials compare *unqualified* immigrant and New Zealand-born workers. While the size of the differentials depend on the qualification level, the trend over time is unaffected by the selected qualification group in the context of this model.

position improved for the former group of immigrants but stagnated for the latter. This trend continued at a moderate pace throughout the second half of the 1980s. The early 1990s were marked by an extraordinarily large increase in entry income differentials for the 1991–95 cohorts of Pacific Islands and Asian immigrants, confirming the pattern found in the previous section. As Figure 8 shows, this development was without precedent in New Zealand's immigration history over the past four decades and is clearly at odds with long-term trends.

**FIGURE 8: Income differentials of female immigrants of each entry cohort, by region of birth**

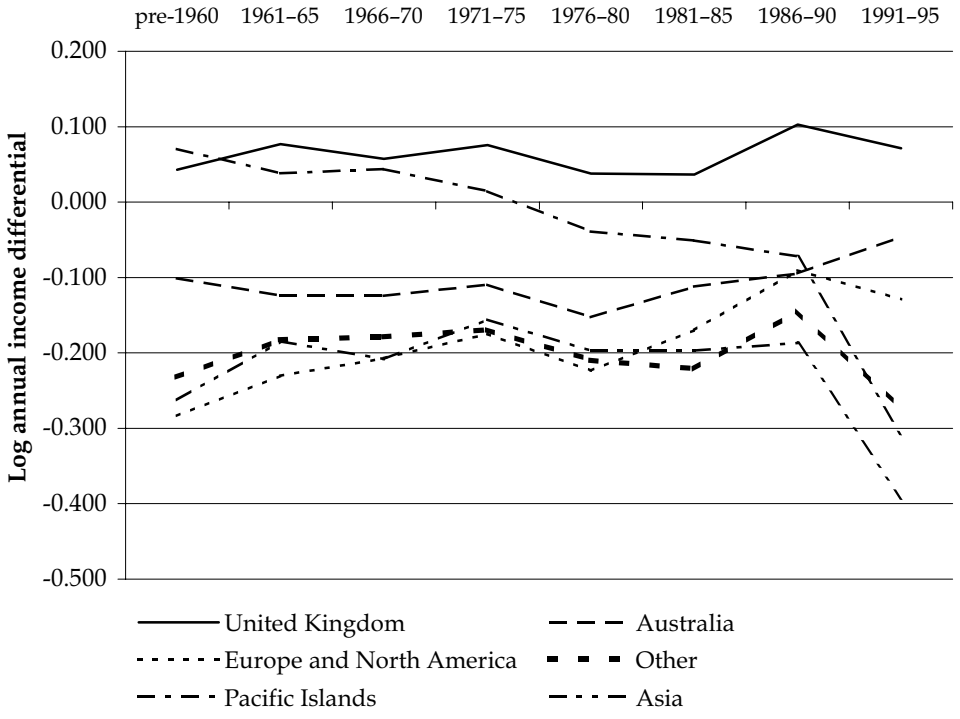
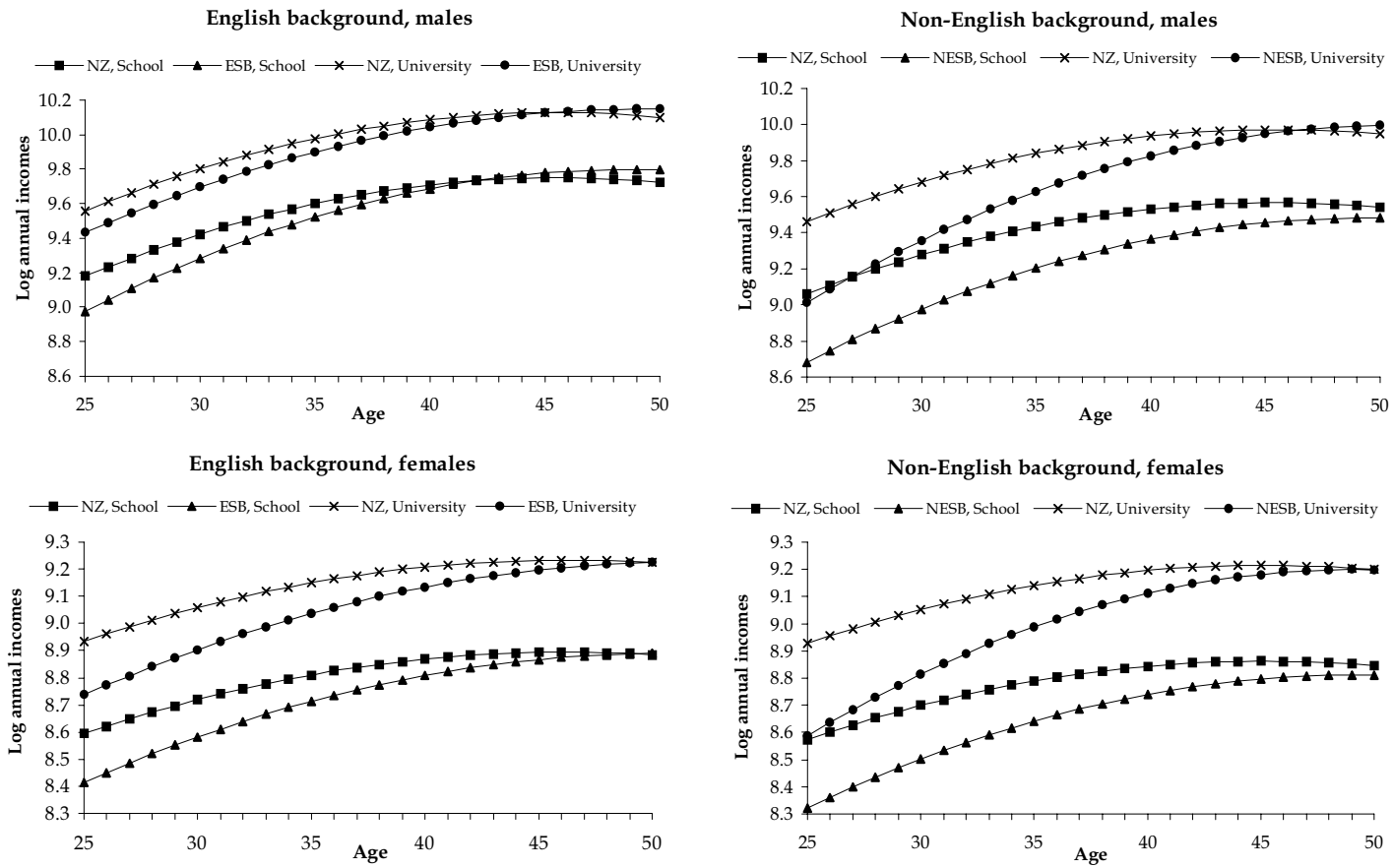



Figure 8 repeats the same type of analysis for female immigrants. While the female pattern differs somewhat from the male one – female British immigrants had a positive adjusted entry differential throughout the period, as did female Pacific Islands immigrants up to 1975—we observe the same relative improvements of Australian, European and North American immigrants since the 1980s and the same large decline in adjusted differentials for Asian and Pacific Islands immigrant women between 1990 and 1995.

Next, we turn to the issue of convergence. Figure 9 summarises the predicted income position of hypothetical immigrants and New Zealand-born residents over the life cycle, based on the estimated regression coefficients. The estimated

**FIGURE 9: Age log income profiles of immigrants and New Zealand-born residents, by English background and gender**




*Note*: ESB = English-speaking background; NESB = non-English-speaking background.

models were quite flexible, allowing for differences in age (log) income profiles between immigrants along several dimensions. Figure 9 captures this heterogeneity by displaying separate profiles by English-speaking background, gender, and education (school versus university). In all panels, the age at which the hypothetical immigrant entered New Zealand is set to 25. Both the immigrant and the New Zealand-born worker are followed from the age of 25 through to the age of 50. Finally, both are assumed to work full-time (40 hours per week) and immigrants' entry differentials are assumed to equal the (arithmetic) cohort average for the group. In this context, the *y*-axis gives the predicted log income for a worker with the specified characteristics. Differentials over the life cycle (moving along a profile) or differentials over groups (the gaps between profiles) can be interpreted as approximate measures of relative (percentage) income differentials.

For example, the upper left graph of Figure 9 shows the age income profiles of male English background migrants. The vertical distance between the two qualification curves gives the percentage difference in log annual income between school graduates and university graduates of a given age. Both New Zealand-born residents and immigrants had substantial returns to a university qualification, about 38 percent and (initially) about 46 percent, respectively. The vertical distance between the immigrant and New Zealand-born resident curves, for a given qualification level, gives the approximate percentage difference in income between immigrants and New Zealand-born residents. This vertical difference declines with age and eventually disappears, after about 18 years for school graduates and after about 20 years for university graduates. Hence, convergence is predicted to take place.

The main reason why convergence profiles were allowed to differ by education level was the interest in the 'skill transferability hypothesis'. According to this hypothesis, immigrants face an initial disadvantage in the host labour market, relative to New Zealand-born residents with the same qualifications, because it takes time to generate credible information about the true value of the qualification, or, in the case of some professions, to obtain the required license. As a consequence, more highly qualified immigrants are likely to face a larger initial disadvantage than less highly qualified immigrants, and also to have faster subsequent convergence rates as the true value of their qualifications is revealed.

Figure 9 indicates that this hypothesis appears not to be supported by the experience of English background male immigrants. To the contrary, less qualified ESB immigrants had a larger initial income disadvantage and faster subsequent adjustment rates. However, the transferability hypothesis is supported by the experience of non-English background immigrant men, depicted in the upper right panel of Figure 9, as more qualified non-English background migrants had a substantially larger entry disadvantage but also faster subsequent

income growth. The difficulty of NESB immigrants in making productive use of their qualifications upon arrival is illustrated by the low initial returns to a university qualification (relative to a school degree) of only 33 percent (compared to 46 percent for ESB migrants).

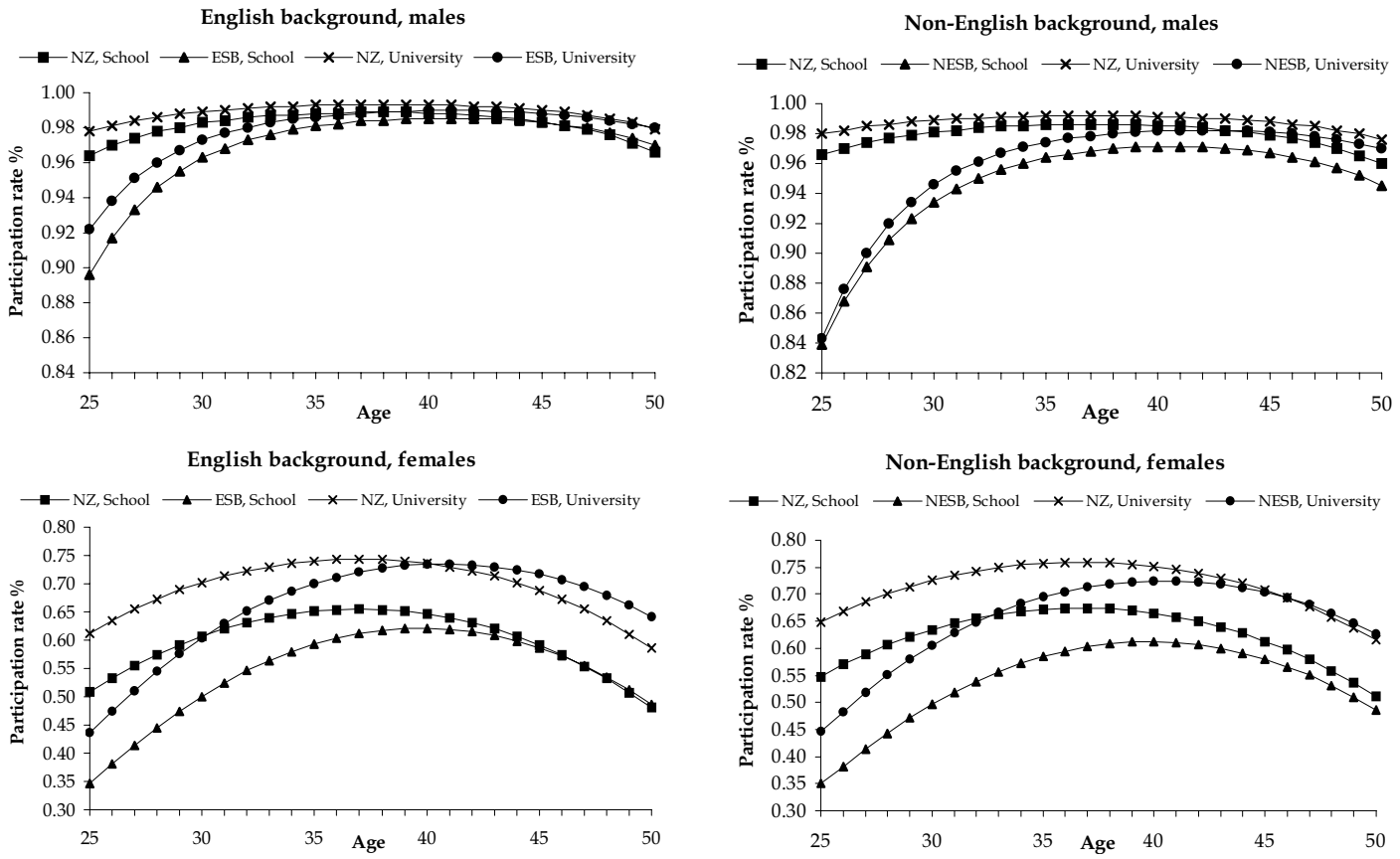
As expected, the overall income differentials relative to New Zealand-born residents were much larger for NESB migrants than for ESB migrants. NESB migrants with university qualifications are predicted to reach parity with similar New Zealand-born residents, although it will take about 20 years. NESB migrants with only school qualifications are unlikely to reach New Zealand-born resident income levels within the time horizon of this analysis.

Are women different? The two lower panels of Figure 9 repeat the previous type of analysis for female immigrants. Female profiles tended to be flatter than male ones. There were two contributing factors. Firstly, female returns to experience were smaller (as were the returns to qualifications). Incomes of female New Zealand-born residents increased by 35 percent over the 25-year period, compared with an increase of 54 percent for males. Secondly, female immigrants had slower rates of convergence. The differences between ESB and NESB migrants were less pronounced than those for men, and convergence was achieved after about 25 years for ESB immigrants and NESB immigrants with a university qualification.

Figure 10 shows age labour force participation profiles for a hypothetical 25-year-old immigrant and a similar-aged New Zealand-born resident over the next 25 years of their careers. The profiles are drawn for a joint parent (ie, a parent who lives together with a partner) with either a university or school qualification. The left axis literally gives the probability that a randomly selected person with certain characteristics (eg, New Zealand-born resident, aged 35, with university qualification) participates in the labour market. Differences between two profiles can be interpreted as the marginal effect (measured in percentage points) of a variable, either university qualification versus school qualification, or New Zealand-born resident versus immigrant, on the participation probability, *ceteris paribus.*

A 25-year-old New Zealand-born man with university qualification had a predicted participation probability of about 97 percent. The participation probability of a similar ESB immigrant was 92 percent for university graduates and 90 percent for school graduates. After five years of residence, the New Zealand-born immigrant difference was less than two percentage points. A 25-year-old NESB immigrant man had an initial participation probability of 84 percent. Again, convergence was reasonably fast and after five years, the differences were less than five percentage points. However, predicted NESB participation rates never reached those of New Zealand-born residents for school graduates. One possible explanation for the lower initial participation rates of

**FIGURE 10: Age-participation profiles, by English background and gender**




*Note*: ESB = English-speaking background; NESB = non-English-speaking background.

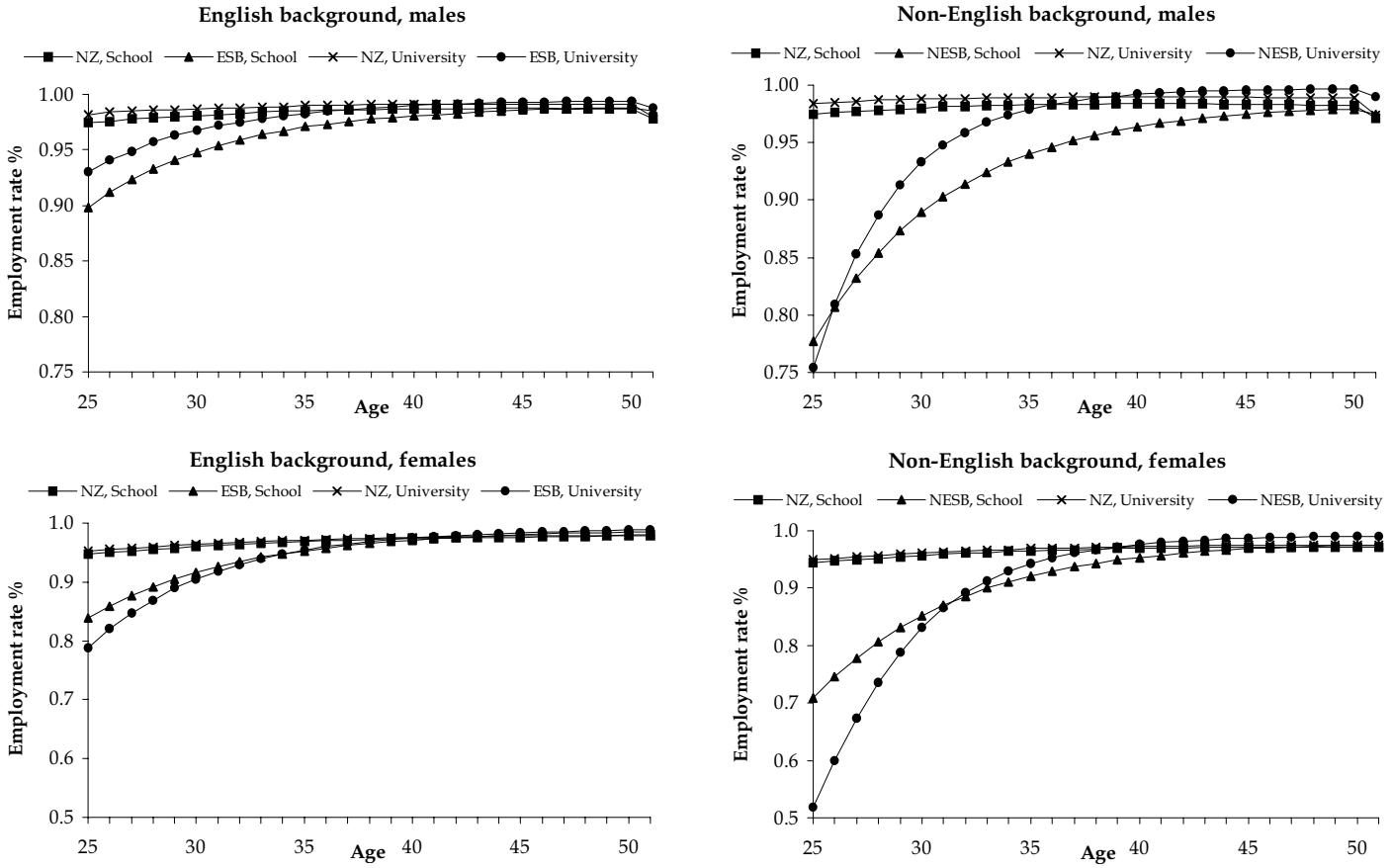
NESB immigrants, in particular for the 1991–95 cohort of immigrants, is participation in education. There is evidence that NESB immigrants have higher participation rates in education and training, which partially explains their lower initial labour force participation rates.

The lower part of Figure 10 shows the predicted profiles for women. They differ from the male profiles in a number of aspects. First, participation rates were generally at least 20 percentage points lower. Secondly, the life-cycle pattern was more pronounced. Thirdly, the qualification level had a larger predicted effect on participation rates. Fourthly, differences between immigrants and New Zealand-born residents were larger, and it took immigrant women about 15 years until their participation rates converged to, or approached, those of New Zealand-born residents. Finally, the ESB/NESB difference in participation patterns was less prominent for women than for men.

The same type of analysis can be repeated for employment rates. Figure 11 shows predicted employment probabilities, conditional on participation in the labour market. Hence, 1 minus the employment rate gives the unemployment rate. Employment rates of New Zealand-born men were up to 10 percentage points higher than those of just-arrived ESB immigrants, and more than 20 percentage points higher than those of just-arrived NESB immigrants. Convergence rates were relatively high, in particular for NESB migrants with a university qualification, and after 10 years only NESB school graduates were left with a sizeable gap. Among women, the estimated entry gap was much larger among those who came from a non-English background country. However, their relative improvements were fast with convergence or 'near'-convergence after 10 to 15 years.

Several general conclusions can be taken from this analysis. The pooled regression approach provides a useful tool for disentangling entry and convergence effects. It can be equally well applied to the analysis of relative incomes, participation rates, or employment rates. In either case, inferring convergence rates from cross-section data alone would lead to overly optimistic conclusions, as the rate of progress would be overstated. Nevertheless, even the pooled analysis showed ample evidence of the integration of immigrants. A 'typical' immigrant arrived with an income shortfall of about 20 percent relative to a similar New Zealand-born resident, which disappeared after 20 to 30 years of residence. The differences in participation and employment rates tended to disappear even faster, after 5 to 15 years in most cases. Not all groups were equally succesful, however. Less skilled immigrants from NESB countries, mostly Asia and the Pacific Islands, were shown to have outcomes below those of similar New Zealand-born residents either permanently or for long periods of time. British and Irish immigrants, by contrast, 'outperform' similar New Zealand-born persons soon after arrival.

**FIGURE 11: Age-employment profiles, by English background and gender**




*Note*: ESB = English-speaking background; NESB = non-English-speaking background.

Finally, highly qualified immigrants were more likely to reach income parity with qualified New Zealand-born residents than were less qualified immigrants (with less qualified New Zealand-born residents). The specific effect of qualifications on the adjustment profiles varied for different groups of immigrants. In particular, more qualified ESB migrants had a *smaller* entry disadvantage and *slower* subsequent income growth than less qualified ESB migrants, whereas more qualified NESB migrants had a *larger* entry disadvantage and *faster* subsequent income growth. One possible interpretation is that the transferability of skills was higher for ESB migrants than for NESB migrants, giving the former group a higher return to skills upon arrival.

## 5 Performance factors

So far the discussion has concentrated on three distinct performance factors: educational qualification, years in New Zealand, and region of origin. All of these factors have been found to be important determinants of immigrants' relative labour market outcomes in New Zealand. In this section, the importance of a handful of additional potential performance factors are investigated.

### *5.1 The effect of age at arrival*

Previous overseas research has suggested that age at arrival is an additional potential performance factor (see, for instance, Borjas, 1994; Fry, 1997). One argument is that immigrants who arrive at young ages are more likely to be educated at host country schools, and the skills they learn there are more highly valued in the host country labour market. In general, they are more likely to have labour market outcomes similar to those of New Zealand-born residents. Translated into relative age-income profiles, this would suggest a smaller initial entry disadvantage combined with smaller subsequent relative income growth for immigrants who arrived at younger ages, relative to immigrants who arrive at older ages. To make this a valid comparison, one has to account for the fact that there tends to be a negative correlation in the sample between age at arrival and period of residence.

The specific effect of age at arrival on relative incomes can be estimated from a general model in which immigrant and New Zealand-born age-income profiles are determined independently. For New Zealand-born workers the profiles are modelled as usual by including *age* and $age^2$, whereas for immigrants, two additional terms $age_{im}$ and $age^2_{im}$ are included in order to allow the age polynomial coefficients to differ between New Zealand-born workers and immigrants. $Age_{im}$ and $age^2_{im}$ are set to zero for non-immigrants. But since for immigrants $age_{im}$ = *age at arrival (AAA) + years since migration (YSM)*, $(AAA+YSM)$ and $(AAA+YSM)^2$ can be equivalently included. In order to single out the separate contributions of *AAA* and *YSM*, the polynomial is expanded and, as final regressors, *AAA*, *YSM*, $AAA^2$, $YSM^2$, and *AAA*YSM* are included in addition to the other standard controls (*age*,

*age*$^2$, *qualifications*, *cohort*, *hours*). Again, the model is estimated on pooled data separately by gender and English-speaking background.

Based on the regression results, the entry differential (ie, setting YSM to zero) of an immigrant arriving at the age of 15, 25 or 35, respectively, is computed as is the relative income position after 10 years of residence for those immigrants (as well as the relative position of an immigrant who arrived 10 years earlier at the age of five). A set of selected results is given in Table 4.

**TABLE 4: Log income differential between male immigrants and New Zealand-born residents of same age, by age at arrival and years in New Zealand**

| | *All* | *ESB* | *NESB* |
|---|---|---|---|
| Arrival at age 15 | -0.161 | -0.170 | -0.113 |
| Arrival at age 25 | -0.258 | -0.184 | -0.314 |
| Arrival at age 35 | -0.298 | -0.171 | -0.425 |
| Arrival at age 5, after 10 years | -0.028 | -0.054 | 0.046 |
| Arrival at age 15, after 10 years | -0.141 | -0.086 | -0.166 |
| Arrival at age 25, after 10 years | -0.198 | -0.091 | -0.290 |
| Arrival at age 35, after 10 years | -0.197 | -0.068 | -0.323 |

*Notes*: 1. ESB = English-speaking background; NESB = non-English-speaking background.
2. Regressions include cohort dummies, period effects, school, vocational and university qualifications, hours, age, age$^2$, AAA, YSM, AAAYSM, AAA$^2$ and YSM$^2$.

The results confirm that age at arrival is an important performance factor. The male entry income disadvantage is estimated to be 16 percent for a 15-year-old, but 30 percent for a 35-year-old. Similarly, the relative income of a 15-year-old is predicted to increase by two percentage points over the next 10 years, compared to 10 percent for the 35-year-old. As a result, incomes differentials of immigrants who arrived at different ages do narrow with periods of residence.

A decomposition of the age at arrival effect by immigrants of English-speaking backgrounds shows that the aggregate result is mainly driven by the experience of NESB migrants. In fact, for male immigrants with an English-speaking background, the differential effects by age at arrival are virtually non-existent. In contrast, the large differential effect for NESB migrants is compatible with the hypothesis that learning a language and integration into a different culture are much easier at an earlier age.

While children under the age of 15 are not observed directly in the sample of working-age immigrants, they are observed when they become of working age. It turns out that a 15-year-old male immigrant who arrived as a five-year-old boy closely resembles, in terms of income, a 15-year-old New Zealand-born resident. This holds true for both ESB and NESB migrants. For NESB migrants who arrived at

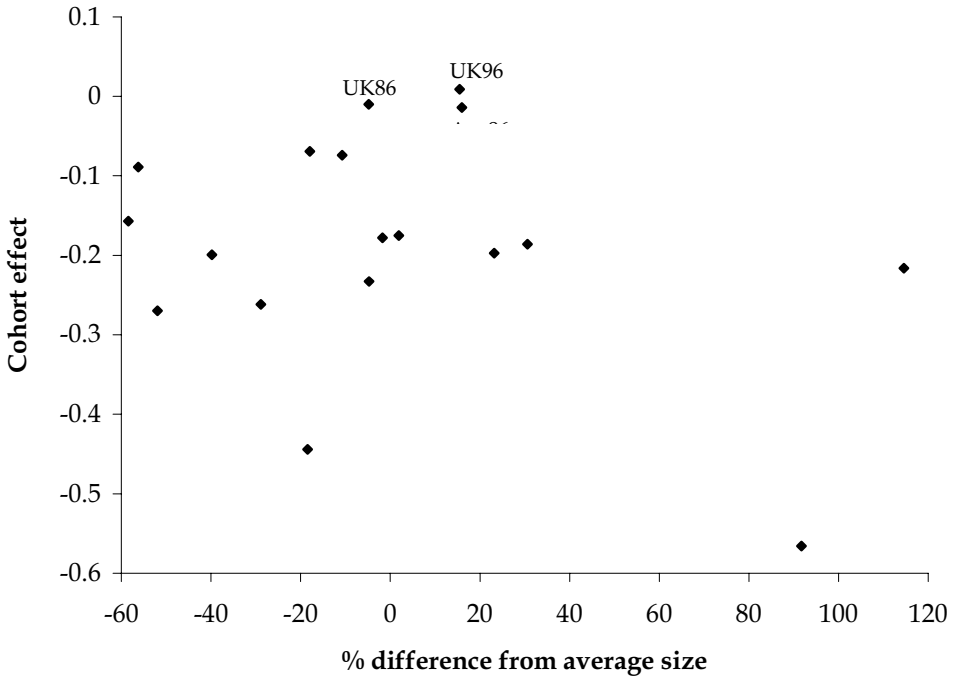
the age of five, the predicted income even exceeds the predicted income of a 15-year-old New Zealand-born resident, by 4 percent. This finding shows how beneficial it is in terms of labour market integration to arrive in New Zealand as a child. It also suggests the absence of persistent inter-generational income differentials based on English-speaking background.

### *5.2 The effect of cohort-size*

The size of an arrival cohort might be negatively related to its relative labour market outcome. For instance, if labour markets are segmented and there is a shortage of jobs, a larger number of immigrant arrivals might *ceteris paribus* reduce the labour market incomes for this cohort. This argument, if valid, could provide a partial explanation for the large income entry differential of the relatively large cohort of recent Asian immigrants in 1996. In addition, this hypothesis has important policy implications as the immigration intake in each year can be influenced by policy settings.

Figure 12 combines information on the cohort sizes of 1976–80 arrivals in the 1981 census, 1981–85 arrivals in the 1986 census, and 1991–95 arrivals in the 1996 census, by region of origin, with the adjusted log income differentials for these cohorts from model (2). Sizes are measured separately for each region, relative to the average number of employed recent immigrants over the three census years.

**FIGURE 12: Relative cohort size and entry differential for recent immigrants**



For instance, the average number of recent employed immigrants from Asia over 1981, 1986 and 1996 was 7,009. The 1996 cohort size of 13,434 exceeded the average by 92 percent.

It is evident that there is no simple relationship between relative cohort size and income differential, and no negative relationship in particular. While it is true that the very large Asian 1991–95 cohort did rather poorly, so did the Pacific Islands 1991–95 cohort, which was in fact small relative to previous Pacific Islands cohorts. For some regions of origin, such as the United Kingdom and Ireland or the Pacific Islands, there was a positive association between cohort size and the adjusted log income differentials. Overall, however, the evidence simply suggests the lack of any systematic pattern.[15]

### *5.3 The effect of language proficiency*

The 1996 census provided direct information on English proficiency.[16] Table 5 gives selected results and analyses the interaction between English proficiency and the ESB/NESB classification. The estimates from three models are listed in increasing order of generality (ie, model (a) restricts the coefficients on ESB and the interactive term to zero, model (b) only restricts the coefficient on the interactive terms).

English proficiency was found to have had a large effect on the relative incomes of immigrants. Proficient immigrants' incomes exceeded those of otherwise similar non-proficient male immigrants by approximately 37 percent. One possible reason for this is that the proficiency variable, through its correlation with country of origin, merely captures differences in unobserved characteristics of immigrants with different countries of birth. The next column of the table includes 'Born in an English-speaking country' (ie, ESB) in addition to actual proficiency in order to control for this possibility. The coefficient on proficiency now measures the specific effect of language proficiency, holding the immigrant's English background constant. The coefficient is somewhat reduced in size but remains large at about 30 percent.

In addition, ESB has an independent effect of 21 percent. The ESB coefficient picks up any factors that are unrelated to actual proficiency but are related rather to differences in other performance factors associated with country of birth. Those other factors might include cultural characteristics, differences in educational quality, 'Western' style education, differences in linkages to the New Zealand labour market, and other characteristics that aid or hinder labour market

[15] Similar results were obtained in a plot of income differentials against the relative cohort sizes of all immigrants rather than employed immigrants only.

[16] The exact question was: 'In which language could you have a conversation about a lot of everyday things?', with options: English; Māori; Samoan; New Zealand sign language; and other (please specify).

**TABLE 5: Estimates of the effects of English proficiency and English-speaking background on income, 1996 (standard errors in parentheses)**

| *Model* | *(a)* | *(b)* | *(c)* |
|---|---|---|---|
| Proficient in English | 0.370 (0.010) | 0.298 (0.010) | 0.305 (0.010) |
| ESB | | 0.212 (0.004) | 0.435 (0.059) |
| Proficient * ESB | | | -0.224 (0.060) |

*Notes*: 1. ESB = English-speaking background.

2. Data are for working-age men in the 1996 Census.

3. The dependent variable is logarithmic income; other regressors are eight cohort dummies, qualification, hours, age, and age$^2$.

integration. Are the effects of proficiency and ESB cumulative? Model (c) of Table 5 includes an interactive term for those immigrants who are both proficient and have an English-speaking background. The estimated coefficient on the interactive term is negative and statistically significant, indicating that the returns to proficiency are larger for NESB migrants than for ESB migrants, or, equivalently, that the returns to being an ESB are larger for non-proficient migrants than for proficient migrants. Proficiency and ESB status have some degree of substitutability and the returns to English proficiency can be computed as approximately 30.5 percent for NESB migrants and 8.1 percent for ESB migrants.[17]

While English proficiency is an important factor at the individual level, there is another question, namely whether changes in proficiency can partially explain the decline in the performance of the latest arrival cohort. It would be both possible and plausible that a lower proficiency rate of 1996 recent immigrants, relative to previous cohorts immediately after arrival, contributed partially to the decline in their relative labour market outcomes. However, there is no way of empirically validating this possibility, as the proficiency question was asked only once, in the 1996 census.

### *5.4 Compositional effects and the declining relative incomes of the 1991–95 NESB cohort*

Throughout this study, evidence has been found for systematic differences between the cohort of immigrants who arrived between 1991 and 1995, and previous cohorts. Was the decline in the relative labour market outcomes of Asian and Pacific Islands immigrants associated with shifts in the country of origin mix of the migrant inflows from those regions?

[17] From regression (3), for a proficient ESB migrant all three coefficients contribute to income and 0.305+0.435-0.0224=0.516. A non-proficient ESB migrant gets 0.435. The difference between the two, 0.081, is the return to proficiency for ESB migrants.

In the case of Asia, there is some empirical support for this hypothesis. In the 1990s, an increasing share of immigrants came from North Asian countries. Migrants from those countries had relatively low employment rates and incomes in 1996. Consider the following decomposition exercise: there were 14 Asian origin countries with at least 1,000 immigrants in one of the census years. Table 6 gives the adjusted income differentials for recent immigrants from each country in both 1986 and 1996. As previously, the adjustment controls for age, age$^2$, qualification and gender. Let $p$ denote the proportion of immigrants from a specific Asian country among all recent Asian immigrants.

**TABLE 6: Adjusted log income differentials for recent Asian immigrants, 1986 and 1996**

| | *1986* | | *1996* | |
|---|---|---|---|---|
| | *Income differential* ($diff_{86}$) | *Proportion* ($p_{86}$) | *Income differential* ($diff_{96}$) | *Proportion* ($p_{96}$) |
| Kampuchea | -0.089 | 0.180 | -0.239 | 0.012 |
| Indonesia | -0.205 | 0.031 | -0.445 | 0.014 |
| Malaysia | -0.361 | 0.086 | -0.437 | 0.065 |
| Philippines | -0.449 | 0.091 | -0.551 | 0.076 |
| Singapore | -0.189 | 0.038 | -0.285 | 0.015 |
| Thailand | -0.202 | 0.012 | -0.421 | 0.024 |
| Vietnam | -0.114 | 0.085 | -0.390 | 0.016 |
| China | -0.256 | 0.122 | -0.721 | 0.209 |
| Hong Kong | -0.222 | 0.056 | -0.476 | 0.083 |
| Japan | 0.208 | 0.113 | -0.197 | 0.104 |
| Korea | -0.922 | 0.040 | -0.732 | 0.167 |
| Taiwan | -0.034 | 0.005 | -0.652 | 0.057 |
| India | -0.253 | 0.111 | -0.500 | 0.113 |
| Sri Lanka | -0.055 | 0.025 | -0.386 | 0.039 |

The overall log income differential between recent Asian immigrants and New Zealand-born residents in a given year is simply the weighted average of the country-specific log income differentials, where the weights are provided by the proportions:

$$diff_t^{Total} = \sum_{i=1}^{14} diff_{it} p_{it}$$

Moreover, the overall change in the differential can be computed as:

$$diff_{96} * p_{96} - diff_{86} * p_{86} = -0.545 - (-0.201) = -0.344$$

How much of this change is due to changes in composition, and how much to changes in country-specific differentials? Using the regression results, the change

in the overall recent Asian-New Zealand-born resident income differential can be decomposed as follows

$$diff_{96} * p_{96} - diff_{86} * p_{86} = diff_{96} * (p_{96} - p_{86}) + p_{86} * (diff_{96} - diff_{86})$$

The first term on the right side gives the overall change caused by the change in composition, evaluated at the 1996 differentials. With the above numbers, $diff_{96} * x_{86}$ = -0.431. Hence, had the composition not changed between 1986 and 1996 an aggregate log-income differential of -0.431 would have been observed in 1996. It was actually -0.545. The difference between the two, 0.114 percentage points, is the increase in the (recent) Asian income differential that is explained by compositional changes. This constitutes about one-third of the total increase in the log income differential. Alternatively, the change in composition could be evaluated using the 1986 differentials. With $diff_{86} * p_{96}$ = -0.310, 0.109 percentage points of the actual change, again about one-third, are explained by compositional effects.

The other two-thirds of the increase were associated with increases in the entry income differentials for recent immigrants from specific countries. The data does not reveal whether these changes were caused by changes in unobserved characteristics (either quantity or returns) within countries, or by changes in the receiving conditions in the New Zealand labour market. Note that the income differentials of recent immigrants (adjusted for New Zealand-born resident-immigrant demographic differences, and partially adjusted for level of economic activity) increased for *every* Asian country, with the exception of Korea. Yet the rank order of Asian nations, ordered in terms of size of the income differentials, did not change all that much. Thus, the influence of unmeasured or uncontrolled country-specific factors on labour market outcomes had some important persistent components.

## 6 Conclusions

This study used the 1981, 1986 and 1996 population censuses as observation points in order to:

- compare the labour market outcomes of immigrants immediately after arrival in New Zealand and in subsequent years with those of similar New Zealand-born individuals
- identify the factors associated with differences in labour market outcomes
- identify and explain changes in the relative labour market outcomes of immigrants between 1981 and 1996.

New Zealand's immigrants have always had relatively high levels of formal qualifications. Factors that are rewarded by the current point system for immigration under the General Skills Category, such as education, age at arrival and age, were found to be important determinants of an immigrant's success in the New Zealand labour market, as was proficiency in the English language.

While immigrants' labour market outcomes initially after arrival were generally below those of similar New Zealand-born persons, over time all immigrants can be expected to reach, or at least approach, the labour market outcomes of similar New Zealand-born persons. The estimated time to convergence in participation and employment rates was, at 5 to 15 years, relatively fast for most groups of immigrants. Income convergence is predicted to take about twice as long. Among immigrants from non-English-speaking backgrounds in particular, there is support for the hypothesis that part of the initial shortfall in labour market outcomes is associated with the specific problem of limited skill transferability, at least in the short run.

One intriguing finding was the changing fortune of the latest arrival cohort of immigrants, those who arrived in the first half of the 1990s. After controlling for the various factors that potentially affect relative incomes, such as age, education and the level of economic activity, it was found that immigrants with an English background improved their position relative to previous arrivals, whereas Asian and Pacific Islands immigrants had substantially lower relative incomes than previous arrivals from these regions. It is too early to assess whether this trend towards increased disparity in labour market outcomes will continue in the future.

One possible explanation could be that changes in the labour market—such as a decline of the manufacturing sector and the increasing importance of personal and business services—might have favoured immigrants from countries that share both the language and cultural background of the New Zealand society. Alternatively, one might look at the possible effects of the substantial reforms in immigration policy and the introduction of a point system in 1991. However, the lack of a counter-factual and the limited information available in census data would render such an endeavour highly speculative. Having the benefit of one additional post-reform observation point from the next census in 2001 will be important.

The study concludes with a caveat. The purpose of this article was to analyse one particular aspect of the economic benefits of immigration to New Zealand, namely their labour market outcomes. This is not to deny the existence of many other aspects that are equally important for assessing the effects of immigration on the New Zealand society. One such further issue is, for instance, the link between immigration and the labour market outcomes for New Zealand-born workers.

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## Appendix

Example of regression results from pooled model, comparison of male immigrants and New Zealand-born residents, by English-speaking background and non-English-speaking background. The full set of results is available from the authors on request.

| | *English-speaking background* | | *Non-English-speaking background* | |
|---|---|---|---|---|
| | *Coeff* | *Std Err* | *Coeff* | *Std Err* |
| Cohort Pre-1960 | -0.3318 | 0.0217 | -0.3432 | 0.0209 |
| Cohort 1961–65 | -0.2648 | 0.0189 | -0.2877 | 0.0179 |
| Cohort 1966–70 | -0.2484 | 0.0169 | -0.2873 | 0.0155 |
| Cohort 1971–75 | -0.2148 | 0.0144 | -0.2659 | 0.0126 |
| Cohort 1976–80 | -0.2324 | 0.0129 | -0.3102 | 0.0105 |
| Cohort 1981–85 | -0.1987 | 0.0131 | -0.2774 | 0.0103 |
| Cohort 1986–90 | -0.1371 | 0.0145 | -0.3199 | 0.0102 |
| Cohort 1991–95 | -0.0753 | 0.0148 | -0.4636 | 0.0122 |
| 1986 Census | 0.6419 | 0.0316 | 0.8534 | 0.0349 |
| 1996 Census | 0.1718 | 0.0323 | 0.3587 | 0.0345 |
| Years in NZ | 0.0165 | 0.0013 | 0.0083 | 0.0012 |
| Years * School | -0.0024 | 0.0012 | 0.0075 | 0.0012 |
| Years * Vocational | -0.0051 | 0.0011 | 0.0023* | 0.0012 |
| Years * University | -0.0130 | 0.0013 | 0.0187 | 0.0014 |
| Years in NZ$^2$/100 | -0.0174 | 0.0021 | -0.0017* | 0.0022 |
| Years * School | 0.0055 | 0.0026 | -0.0108 | 0.0029 |
| Years * Vocational | 0.0074 | 0.0023 | -0.0038* | 0.0029 |
| Years * University | 0.0309 | 0.0029 | -0.0261 | 0.0034 |
| Hours of work | 0.0114 | 0.0002 | 0.0127 | 0.0002 |
| Hours * 1986 | -0.0044 | 0.0002 | -0.0054 | 0.0003 |
| Hours * 1996 | 0.0017 | 0.0002 | -0.0006 | 0.0002 |
| Age | 0.1148 | 0.0011 | 0.1071 | 0.0013 |
| Age * 1986 | -0.0005* | 0.0016 | -0.0102 | 0.0018 |
| Age * 1996 | 0.0259 | 0.0017 | 0.0203 | 0.0018 |
| Age$^2$/100 | -0.1245 | 0.0015 | -0.1169 | 0.0017 |
| Age$^2$ * 1986 | -0.0017* | 0.0020 | 0.0102 | 0.0023 |
| Age$^2$ * 1996 | -0.0308 | 0.0021 | -0.0241 | 0.0023 |
| School qualification | 0.1328 | 0.0086 | 0.1035 | 0.0088 |
| School qualification * 1986 | 0.0033* | 0.0117 | 0.0107* | 0.0118 |
| School qualification * 1996 | 0.0397 | 0.0120 | 0.0707 | 0.0124 |
| School qualification * Immigrant | 0.0223* | 0.0172 | -0.0047* | 0.0166 |
| School qualification * Immigrant * 1986 | -0.0005* | 0.0136 | -0.0448 | 0.0153 |
| School qualification * Immigrant * 1996 | -0.0467 | 0.0153 | -0.1162 | 0.0164 |

*continued over page*

| | *English background* | | *Non-English background* | |
|---|---|---|---|---|
| | *Coeff* | *Std Err* | *Coeff* | *Std Err* |
| Vocational qualification | 0.2499 | 0.0087 | 0.2371 | 0.0089 |
| Vocational qualification * 1986 | -0.0169* | 0.0112 | 0.0029* | 0.0113 |
| Vocational qualification * 1996 | -0.0158* | 0.0121 | 0.0246 | 0.0124 |
| Vocational qualification * Immigrant | 0.0318* | 0.0165 | 0.0373 | 0.0185 |
| Vocational qualification * Immigrant * 1986 | 0.0256 | 0.0124 | -0.0275* | 0.0160 |
| Vocational qualification * Immigrant * 1996 | -0.0089* | 0.0148 | -0.0626 | 0.0176 |
| University qualification | 0.4912 | 0.0153 | 0.4798 | 0.0156 |
| University qualification * 1986 | 0.0364* | 0.0200 | 0.0596 | 0.0204 |
| University qualification * 1996 | 0.0643 | 0.0194 | 0.1053 | 0.0199 |
| University qualification * Immigrant | 0.0851 | 0.0225 | -0.1118 | 0.0237 |
| University qualification * Immigrant * 1986 | 0.0146* | 0.0233 | 0.0037* | 0.0258 |
| University qualification * Immigrant * 1996 | -0.0099* | 0.0234 | -0.0698 | 0.0251 |
| $R^2$ | 0.449 | | 0.415 | |

*Notes*: * indicates coefficients that are *insignificant* at the 0.05 level.
Dependent variable is logarithmic annual income of employed persons.