

Education and Maori Relative Income Levels over Time: The Mediating Effect of Occupation, Industry, Hours of Work and Locality

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A C K N O W L E D G E M E N T S

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D I S C L A I M E R

The views expressed in this Working Paper are those of the author and do not necessarily reflect the views of the New Zealand Treasury. The paper is presented not as policy, but with a view to inform and stimulate wider debate.

Abstract

This paper examines ethnic differences in the relationship between educational attainment and income in New Zealand over the period 1986 to 1996. In particular, it uses a 50% sample from the Census in each of those years to determine how far ethnic differences in income are explained by educational qualifications, access to higher paying occupations and industries, hours of work, locality of residence and marital status. The study is restricted to all those employed.

Over the period under study, the gap between Maori and European incomes increased. This reflects Maori lower educational qualifications and concentration in occupations and industries that experienced low employment growth at a time when income returns to educational qualifications increased. Those with higher educational qualifications also experienced growth in hours of work, reflecting increasing demand for skills. Nevertheless income returns to qualifications were higher for Maori than for non-Maori in both years. This reflects the particular and increasing disadvantage faced by Maori with no qualifications compared to Europeans with no qualifications and the fact that the gap between mean incomes of Maori and Europeans reduces as qualifications rise. Maori participation in higher education increased strongly over the period.

Controlling for a wide range of characteristics, Maori residing in rural areas are more disadvantaged than any other group. Maori are also less likely to be married. Not being married is associated with lower incomes for males.

By 1996 there was little difference among ethnic groups in access to managerial and professional occupations for people with higher educational qualifications. Overall, most of the ethnic gap in incomes can be explained by differences in the characteristics of the groups, rather than by differences in the way in which these characteristics are translated into income.

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J15
J24
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KEYWORDS Ethnic income disparities; rates of return to education

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Education and Maori Relative Income Levels over Time

1 Introduction

This study investigates the relationship between educational qualifications and income in New Zealand over the period 1981 to 1996. Reducing disparities between Maori and non-Maori New Zealanders in average income is an important and ongoing focus of government policy. This study builds on Maani (2000) by looking at how ethnic differences in the relationship in 1986 and 1996 are mediated by occupation, industry, hours of work, and locality¹.

Over the decade since the mid-1980s those with higher education, skills and training have had a relative increase in employment opportunities, reflected in higher employment rates in occupations and industries which have experienced growth, and higher hours of work and hourly wages. In particular, Maori have been more heavily concentrated in elementary and low skilled jobs, which did not experience growth to the extent that professional and other skill-based occupations have in the past decade². In addition, other studies (Chapple and Rea, 1999) suggest that Maori in rural locations are more disadvantaged in employment outcomes than any other group.

Maani (2000) found that in both 1986 and 1996, Maori had lower qualifications than non-Maori and that, for given qualifications; Maori incomes were lower than non-Maori. However, returns to education were higher for Maori than non-Maori. This study investigates the extent to which these differences are associated with differences in occupation, industry, hours of work, and locality, focussing on all employed persons. It also decomposes the mean income gap across ethnic groups into effects due to differences in the characteristics of the groups, and effects due to differences in the way in which these characteristics are translated into income (after Oaxaca, 1973; and Oaxaca and Ransom, 1999).

¹ This work is part of a vast and growing international literature on the effects of educational investments on income (see for example, Miller (1982), Chapman (1988), McNabb and Richardson (1989) for Australia; Hunt and Hicks (1985), Maani (1996, 1997, 1999 and 2000), Gibson (1988) and Dixon (1988) for New Zealand). The analysis of changes in rates of return to education over time has been pursued by Miller (1984), Chia (1991), and Gregory (1996) for Australia. Borland (1999) has provided a recent and comprehensive survey of analyses on changes in the income distribution in Australia and the contribution of educational attainment and earnings to it. For New Zealand Maani (1997, 1999) has examined the returns to post-compulsory education across four census years; and Ryoo (1988), Behrman and Birdsall (1987), Wilson (1985), and Psacharopoulos (1994) provide international evidence on this question.

² Winkelmann and Winkelmann (1998). Neville and Saunders (1988) investigate similar effects of ethnic differences in occupation and industry in Australia.. Hertzog (1997) also investigates ethnic differences in employment outcomes in New Zealand, and finds them to be associated with differences in the rate of involuntary job separations.

The remainder of this paper is organised as follows. The next section provides a description of the data, and group characteristics. Section 3 sets out the methodology for estimation of rates of return to education. Section 4 reports results of these. Section 5 reports decompositions of ethnic differences in income. Section 6 concludes.

2 Data and group characteristics

This study uses a 50% sample of individual level data from the 1986 and 1996 New Zealand Census of Population and Dwellings³. This allows analysis of changes in relative educational attainment and income levels over a decade of significant economic and policy change. Important for comparisons across time, both 1986 and 1996 were non-recession years with comparable levels of economic activity.

While the focus of the study is on Maori and Non-Maori comparisons, four ethnic categories of ‘Maori’, ‘Part-Maori’, ‘European’ and ‘Other’ are considered separately, where Maori refers to those who identify solely with the Maori ethnicity, and ‘Part-Maori’ refers to those who identify with both Maori and at least another ethnicity. ‘Other’ includes Pacific Island ethnicity, and also other non-European non-Maori immigrants. Immigration patterns since 1991 suggest that, relative to 1986, returns to higher education in 1996 for the ‘Other Ethnic’ return are likely to have been adversely affected by language and other barriers (see for example, Maani, 1999 and Winkleman and Winkleman, 1998). It is thus useful to separate this group in analyses from the ‘European’ ethnic group.

Table 1a and 1b show sample characteristics for males and females, respectively. In both 1996 and 1986 a larger proportion of the “all employed” Maori population had no school qualifications. A notably smaller proportion of the employed Maori labour force was engaged in ‘Managerial and Professional Occupations’. Maori males worked slightly fewer hours per week than any other group in 1986, and fewer than all except the ‘Other’ group in 1996. Maori were less likely than any other group to live in a major urban area. They were also less likely to be married than the European or ‘Other’ ethnic group.

Table 1a – Sample characteristics: employed males

	Maori		Part-Maori		European		Other	
	1986	1996	1986	1996	1986	1996	1986	1996
Hours worked (per week)	42.78	42.86	44.46	45.14	45.69	46.32	43.63	42.52
	(-12.31)	(-14.78)	(-12.04)	(-14.8)	(-11.91)	(-14.3)	(-12.17)	(-14.79)
% No qualifications	61.19	56.39	39.92	33.17	30.54	25.75	44.80	34.10
% Managerial/administrative	1.11	4.70	3.52	9.81	8.00	15.81	2.63	11.73
% Professional	4.11	4.73	10.39	7.17	14.95	12.08	11.82	13.14
% Married	46.55	41.92	49.38	43.34	62.2	58.32	58.02	57.83
% Major urban	59.82	63.18	63.73	67.03	68.13	68.23	88.19	91.95
% Semi-urban	22.00	20.88	19.83	17.64	15.03	14.76	7.36	5.42
Sample size	28,660	18,220	8174	17,129	335,633	281,247	17,274	19,931

Standard deviations in parentheses

³ Compared to the 20% sample in Maani (2000), this allows more precise estimates for small subgroups such as female Maori with post-graduate qualifications.

Table 1b – Sample characteristics: employed females

	Maori		Part-Maori		European		Other	
	1986	1996	1986	1996	1986	1996	1986	1996
Hours worked (per week)	36.25	34.55	36.36	34.78	34.45	33.81	37.46	35.99
	(-12.78)	(-15.88)	(-13.17)	(-16.15)	(-14.39)	(-16.09)	(-13.1)	(-15.44)
% No qualifications	59.02	48.13	38.72	27.34	32.66	22.87	43.43	30.99
% Managerial/administrative	0.65	5.69	1.58	7.97	2.37	10.16	0.95	7.95
% Professional	10.14	11.21	15.8	12.84	20.59	17.7	11.79	14.63
% Married	47.04	41.83	45.52	42.87	59.74	37.4	56.42	55.5
% Major urban	65.36	65.90	69.51	69.01	72.10	70.93	90.60	92.57
% Semi-urban	19.85	19.43	17.04	17.02	13.84	14.10	5.80	4.98
Sample size	16,899	13,242	6,008	15,137	228,524	234,080	12,032	16,157

Standard deviations in parentheses

A more comprehensive set of sample characteristics is provided in Appendix Tables A.1 and A.2 for males and females, respectively⁴.

Figures 1 – 3 show the relationship between qualification levels and income (Figure 1), being in the managerial and professional occupations (Figure 2), and weekly hours worked per week (Figure 3), by ethnic group and gender in both 1986 and 1996. Tables corresponding to these figures are in Appendix B.

Figure 1 shows that for most qualification levels, the income gap (defined as the difference in mean annual gross income) between employed Maori and European males widened over the decade, as noted in Maani (2000). For females, differences among ethnic groups in average incomes for each qualification level were relatively small in both years, except for the lower incomes of members of the ‘Other’ ethnic group with university qualifications in 1996.

Figure 2 represents the proportion of the employed population engaged in managerial and professional occupations. The difference across ethnic groups for males with higher education has decreased significantly between 1986 and 1996. For Maori, Part-Maori and European females the difference had virtually disappeared by 1996, signalling the importance of educational attainment as a means of access to professional and managerial occupations.

Particularly for females, those with higher qualifications tended to work more hours than others in both years (see Figure 3). In addition, those with higher qualifications worked more hours in 1996 than in 1986 – consistent with the increased demand for skills noted earlier. As Maori are more concentrated in groups with lower qualifications, lower hours of work is clearly one explanation both of their lower incomes, and also of the increase in their relative disadvantage over time.

⁴ The means reported in these tables differ from those in the corresponding tables in Maani (2000) because the latter are for the whole working age population, including those unemployed and out of the labour force, while, in the current study, they cover only the employed population. There are also small differences due to the extra control variables used in the regressions in the current study. The sample is restricted to those with observations on all variables included in the regressions.

Figure 1- Income by highest educational qualification and ethnicity

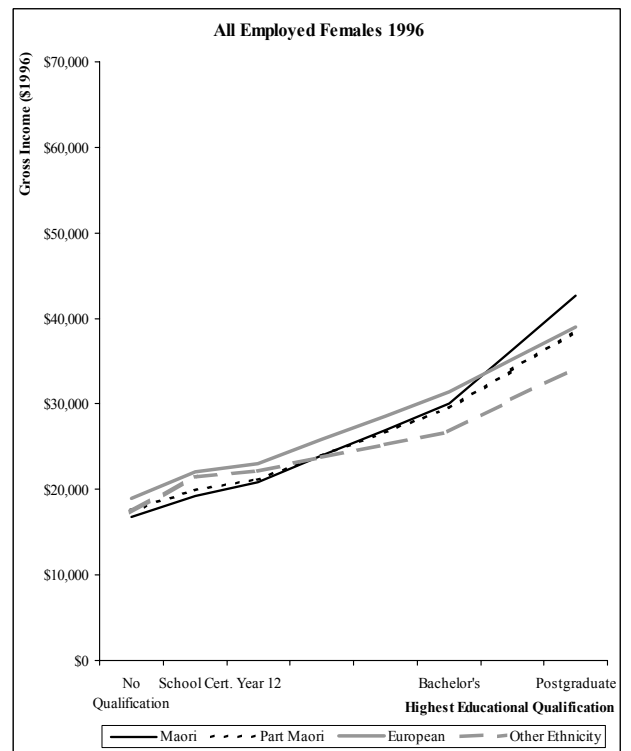
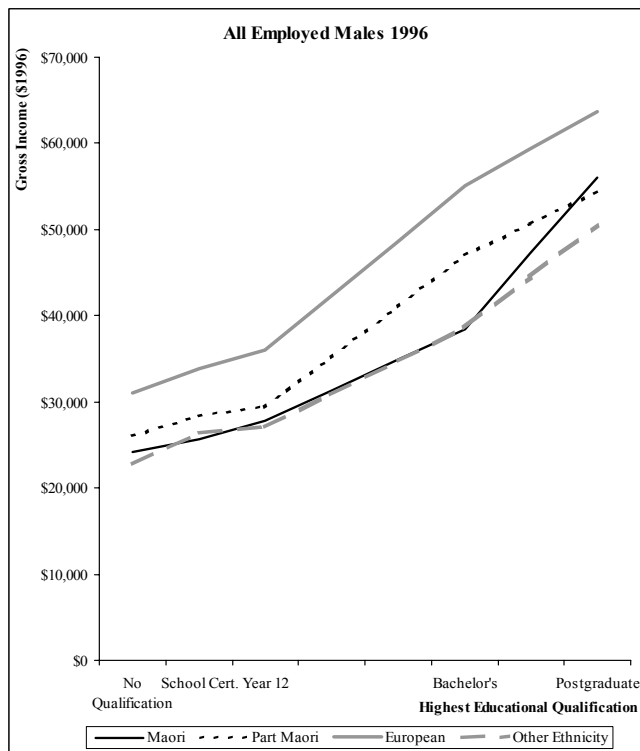
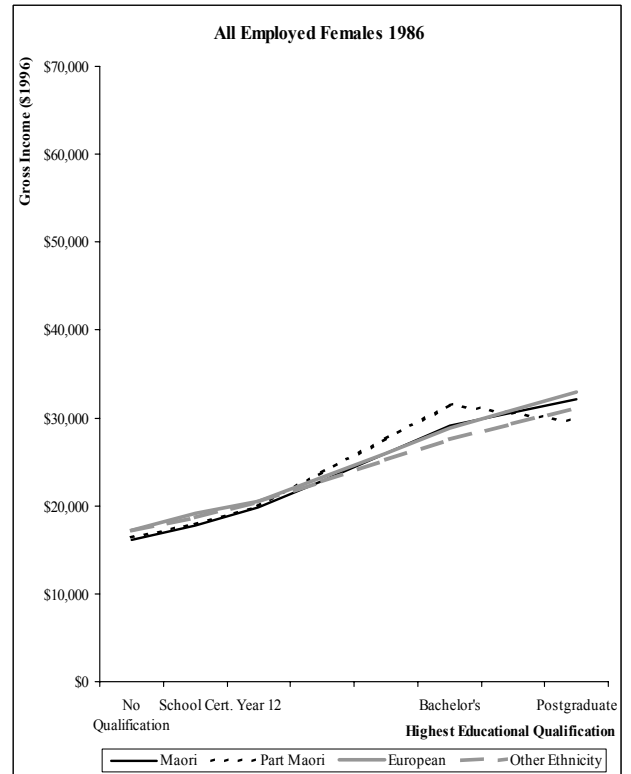
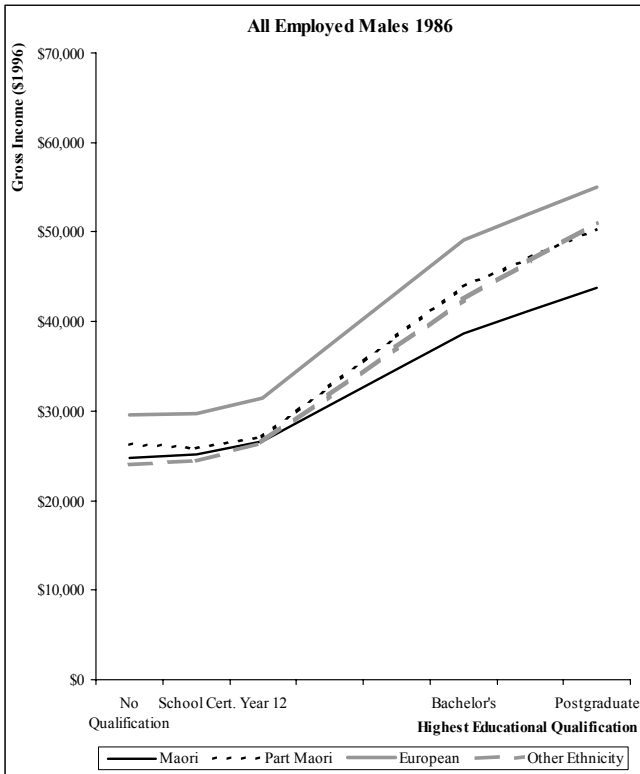


Figure 2 - Managerial and professional occupations by highest educational qualification and ethnicity

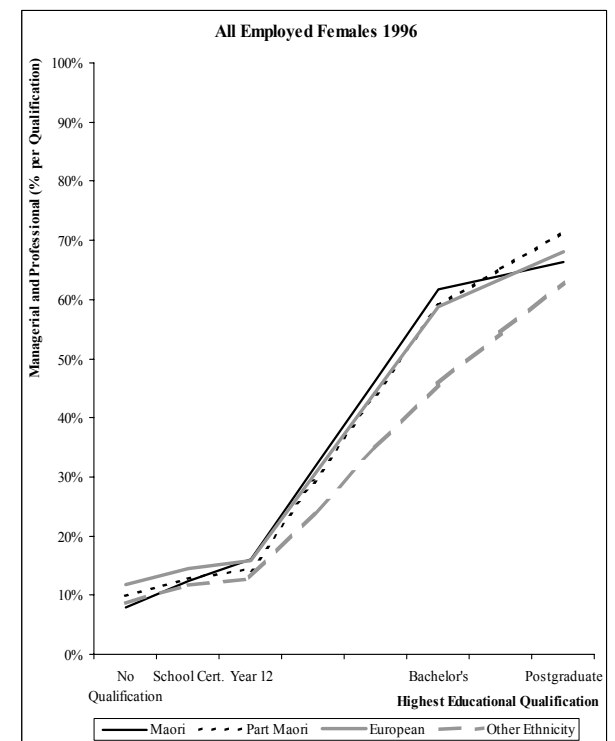
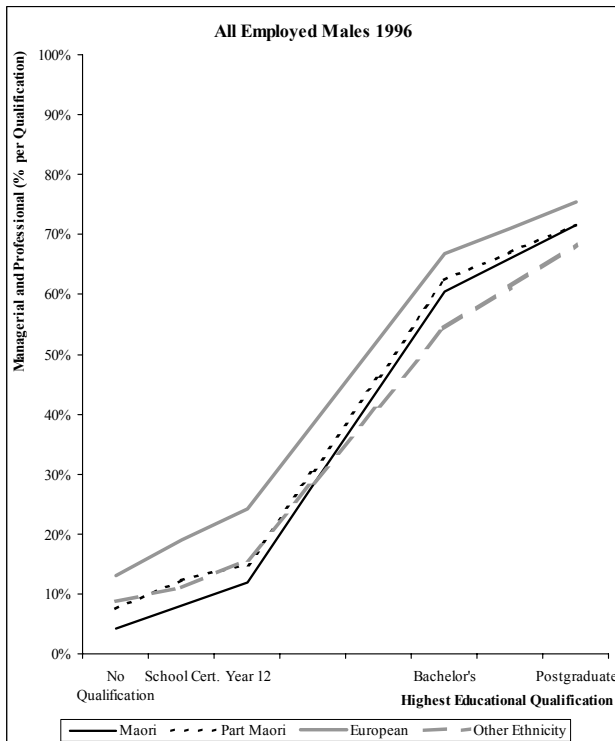
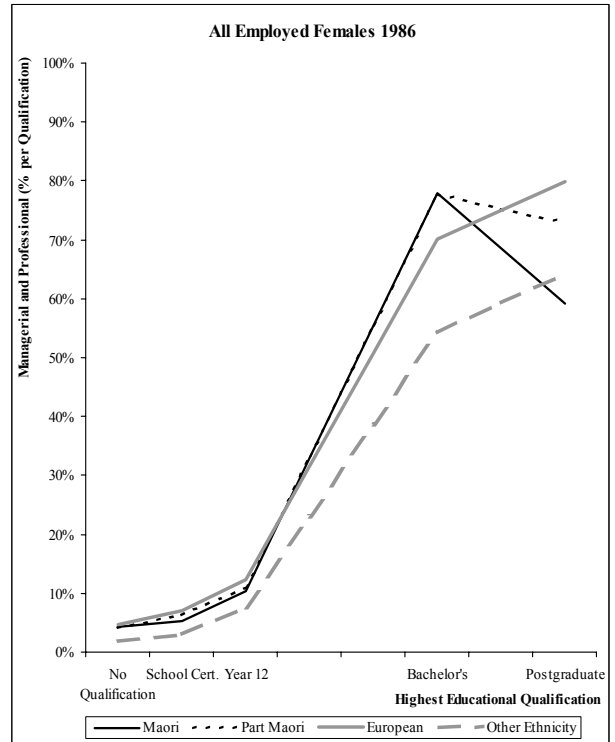
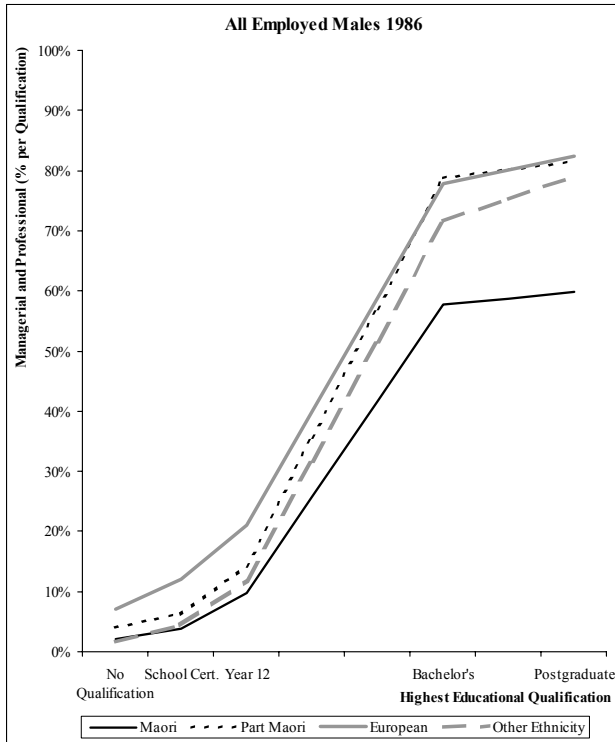
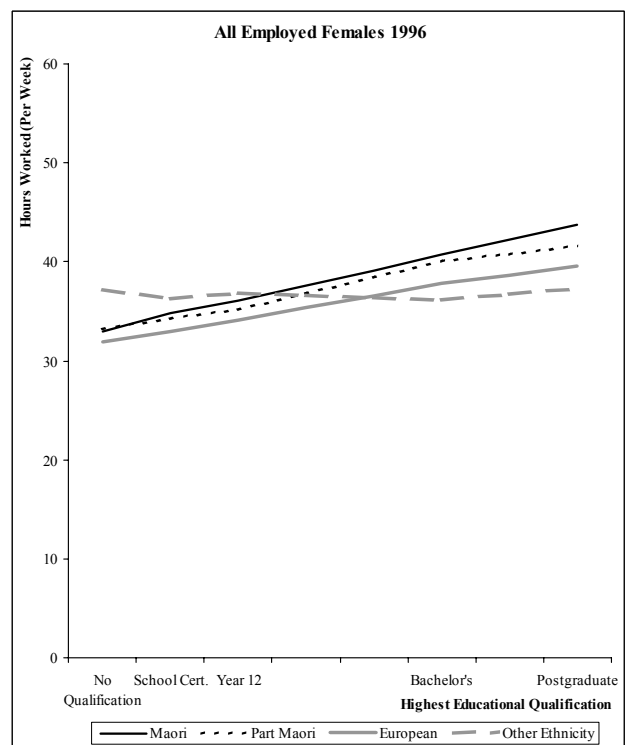
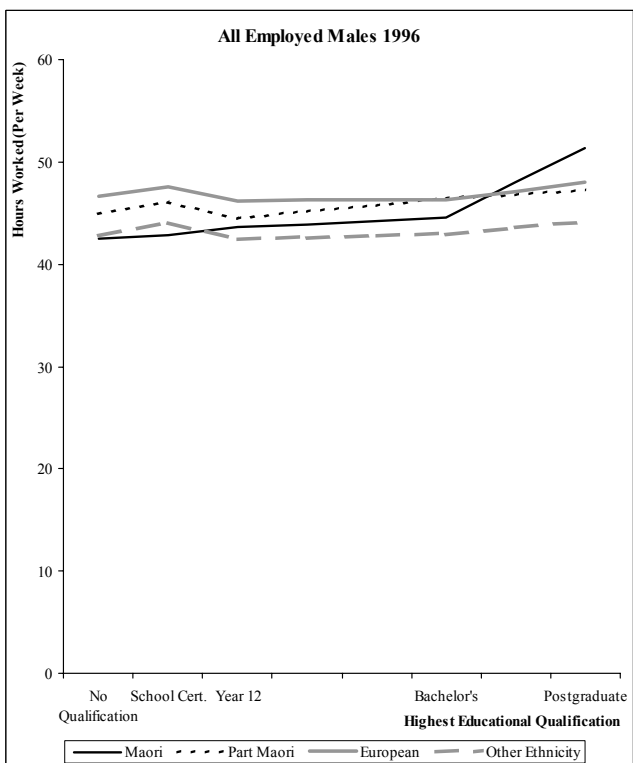
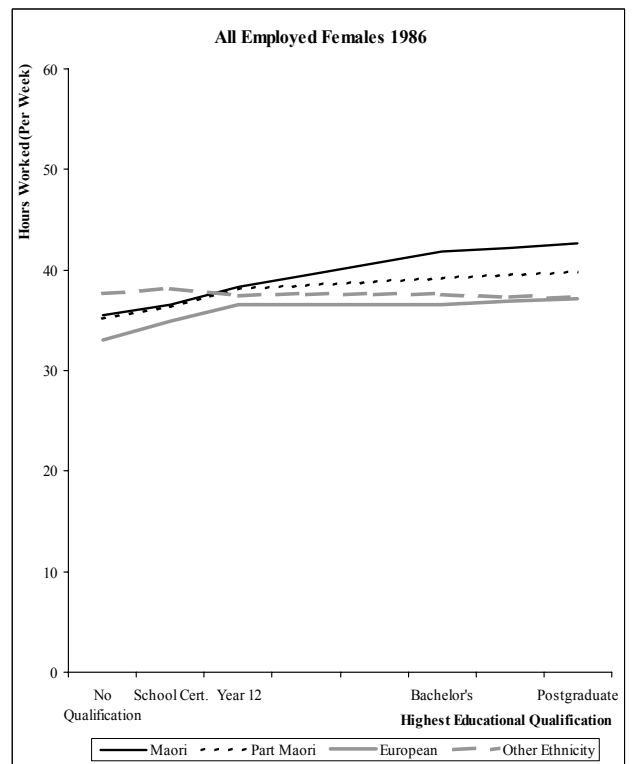
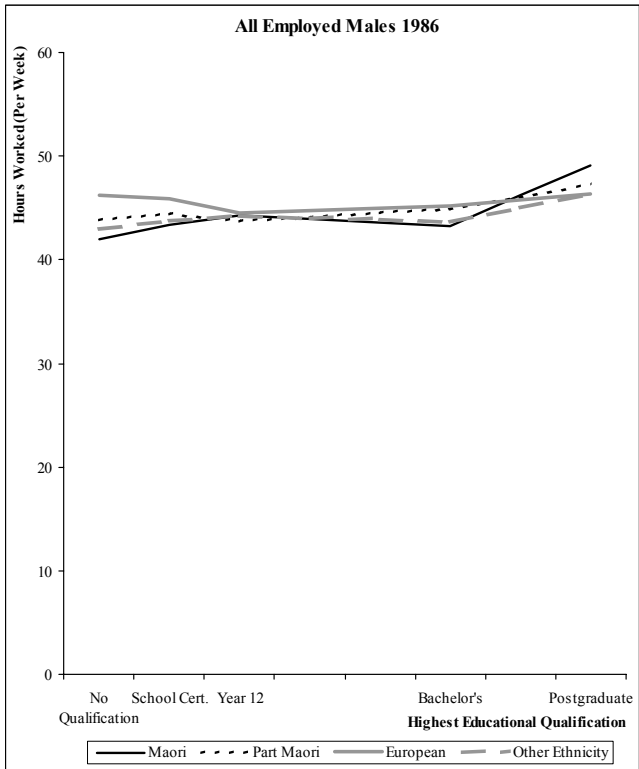


Figure 3 - Hours worked per week by highest educational qualification and ethnicity



Moreover, Figure 3 and Table 1 show that, while in 1986 there was little difference amongst ethnic groups in the hours worked by males, by 1996 European males in all but the highest qualification group, worked more hours than Maori – on average 3.5 hours more per week, equivalent to almost 22 extra 8 hour days of employment per year. In contrast, it may be noted from Figure 3 that Maori females worked more hours per week on average, than other groups.

The analyses in this section have highlighted a few important points. First, there are significant differences in the educational attainment and occupations of Maori and Non-Maori groups. Second, once educational attainment is accounted for (as in Figure 2) much of the occupational difference disappears, particularly in 1996. Third, weekly hours of work, locality of residence and the proportion married vary across ethnic groups, in ways that may help explain differences in income.

3 The specification

The following specification was estimated:

$$\ln Y_{ik} = a_k + \sum b_{jk} X_{ijk} + \sum c_{jk} Z_{ijk} + d_{1k} N_{ik} + d_{2k} N_{ik}^2 + v_{ik} \quad (1)$$

where the dependent variable is the natural logarithm of annual income in current dollars, k stands for each of the four ethnic groups. X_{ijk} represent the six binary educational qualifications variables for individual i , where the excluded educational qualification level is 'no school qualifications'. The explanatory variables, Z_{ijk} , control for occupation⁵ and industry⁶ (18 one digit variables), weekly hours of work, marital status ('married' or 'de facto' versus other categories), and locality of residence ('major urban' and 'rural' versus 'semi-urban'). Variable N measures the potential years of work experience by educational qualification level, in the usual quadratic form.⁷

Equation (1) is estimated for both 1986 and 1996, and all models estimated utilise the White adjustment to correct for heteroscedasticity and for consistent estimates of coefficient variances. The model incorporates before-tax income levels.⁸ The model is unrestricted by ethnicity, gender, and for each year.

⁵ Nine one digit 'occupation' and nine 'industry' categories were controlled for. The 1996 and 1986 census occupation classifications were somewhat different and therefore different specifications for the two years are chosen. The occupation categories in 1986 were: (1) Managerial/administrative, (2) Professional, (3) Clerical, (4) Service, (5) Agricultural, (6) Production/transport workers, and (7) Sales. In 1996 the categories were: (1) Managerial/administrative, (2) Professional, (3) Clerical, (4) Service, (5) Agricultural, (6) Trade oriented, (7) Plant and machine operator, (8) Elementary/low-skilled, and (9) Technical. Importantly, the base occupation category, which is 'Clerical' is used across the two sample years in 1986 and 1996.

⁶ The industry categories in both years were: (1) Agriculture, hunting, forestry, fishing, (2) Mining and quarrying, (3) Manufacturing, (4) Electricity, gas, and water, (5) Construction, (6) Wholesale and retail trade, restaurants and hotels, (7) Transport, communication, (8) Business and financial services, (9) Community, social and personal services.

⁷ Years of experience is specified as 'age - years of schooling - 5' since school starts at age 5 in New Zealand.

⁸ The income information in the New Zealand census (and similar to Australia) is reported in 13 categories, based on an annual gross income. The mid-point of these categories has been used as a measure of income throughout the study. The lowest income category in the census is nil income or loss for which income of zero is designated. The rest of the annual categories were \$2,500 or less, \$2,501-\$5,000, up to \$100,000 or more, for which, based on a Statistics New Zealand estimate, a mid-point of \$130,960 was assumed.

While the expected sign for 'hours of work' is positive, the effects of 'locality of residence' and 'marital status' are a-priori not entirely clear, and examining their effect is of interest, in particular across ethnic groups. In addition, 'urban' living is expected to have a positive coefficient if 'urban' job and employment opportunities are greater than when living in 'rural' or 'semi-urban' areas, but the extent of it may very well vary for the Maori population. Finally, there is wide empirical evidence of a positive relationship for males between being married and income, which is likely to represent mainly supply side effects.

4 Results

Two versions of equation (1) were estimated (without and with hours of work, occupation and industry). The estimates of the second of these are summarised in Tables 2a-2d. Including hours of work, occupation and industry led to a significant decrease in the coefficients on education.⁹ This supports the hypothesis that the positive effect of education on income is partly through improved access to better-paid occupations and industries, and higher hours of work. This effect is relatively stronger for the Maori and 'Other' ethnic groups than for the European and Part-Maori groups.¹⁰

It is interesting to note that while 'hours of work' has a positive effect for all ethnic groups in both years, this significantly increased in 1996 relative to 1986. The results in Tables 2a-2d also show that 'locality' has a statistically significant influence on ethnic income differentials. For example, Maori males residing in rural areas had the greatest disadvantage in income levels, compared to all other ethnic groups.

In addition, while European and Part-Maori males and all females had relatively higher income levels if residing in a major urban area and compared to a semi-urban area, Maori males did not show such an advantage (the same is true for the 'Other' ethnic group). This indicates that the relatively higher proportion of Maori males resident in semi-urban areas is consistent with income incentives as estimated in this study. By the same token, these results indicate that Maori males residing in 'major urban' and 'rural' areas were engaged in employment resulting in relatively lower income returns.¹¹

Overall, the result of adding the new set of variables in the econometric estimations indicates that the link between educational attainment and income is partly through access to certain highly demanded occupations, and greater hours of work. It also shows that, other things equal, Maori males earn higher incomes in 'semi urban' locations (where Maori are most concentrated), and those living in rural locations are the most disadvantaged of any group.

⁹ Incremental F tests based on the two specifications imply that the combined effect of the added variables is statistically significant, with P values smaller than 0.01.

¹⁰ The usual relevant adjustments are made to interpret the coefficients as a *percentage* gain in income in relation to dichotomous (binary) variables for educational qualifications, given the semi-logarithmic functional forms of the 'earnings functions' (see e.g. Halvorsen and Palmquist, 1980). For example, the *percentage* gain in income from an education level is derived as: $g_j = [\exp(b_j) - 1] \text{ times } 100$, where g_j reflects the percentage gain relating to this education level, and b_j is the regression coefficient.

¹¹ It is interesting that for Australia, Daly (1993) did not find a significant difference in the probability of employment for rural and urban Aborigines, which she expected to reflect the effect of the Community Development Employment Project (CDEP) scheme in creating 'employment' in remote areas at the time of the 1986 Census.

Table 2a – Effects of education on incomes of Maori: 1986 and 1996

	Males		Females	
	1986	1996	1986	1996
Intercept	8.9329 (-326.95)	8.7321 (-225.61)	8.1840 (-175.73)	8.4494 (-168.81)
Highest qualification:				
School Certificate	0.0822 (-8.63)	0.1296 (-9.31)	0.0718 (-4.88)	0.1266 (-7.59)
U.E./Sixth Form Cert.	0.1541 (-9.32)	0.2497 (-13.77)	0.1626 (-7.75)	0.2644 (-12.90)
Bursary	0.1839 (-5.05)	0.1936 (-6.70)	0.0656 (-1.28)	0.0885 (-2.52)
Diploma	0.2267 (-29.60)	0.2364 (-16.69)	0.2524 (-16.15)	0.2703 (-14.42)
Bachelor's degree	0.3864 (-8.21)	0.3482 (-8.15)	0.4269 (-7.48)	0.4903 (-12.46)
Postgraduate	0.4778 (-10.62)	0.6497 (-11.97)	0.3189 (-2.85)	0.729 (-13.54)
Hours worked (per week)	0.0056 (-19.17)	0.0105 (-25.94)	0.0189 (-31.74)	0.0141 (-31.54)
Married	0.1478 (-23.09)	0.1740 (-17.29)	-0.1436 (-12.25)	-0.1069 (-8.45)
Major urban	-0.0321 (-4.38)	0.0004 (-0.04)	0.0675 (-5.21)	0.1043 (-6.99)
Rural	-0.0933 (-9.44)	-0.0945 (-9.62)	-0.0545 (-2.83)	-0.0495 (-2.37)
Experience	0.04275 (-39.03)	0.06325 (-36.34)	0.03044 (-124.84)	0.05259 (-25.79)
Experience ²	-0.00079 (-32.70)	-0.00111 (-30.88)	-0.00047 (-12.3)	-0.00089 (-20.47)
F	358.07	275.86	213.81	203.44
Sample size	28,659	18,219	16,898	13,241

Dependent variable: the natural logarithm of annual income. Specification includes one digit occupation and industry dummies. Least squares regression coefficients (t-ratios based on White consistent standard errors)

Table 2b – Effects of education on incomes of Part-Maori: 1986 and 1996

	Males		Females	
	1986	1996	1986	1996
Intercept	8.8399 (168.05)	8.6738 (215.38)	7.9040 (86.28)	8.3508 (152.28)
Highest qualification				
School Certificate	0.0690 (4.09)	0.1202 (8.45)	0.0659 (2.64)	0.0959 (5.59)
U.E./Sixth Form Cert.	0.1258 (5.33)	0.1991 (11.88)	0.1585 (4.98)	0.1825 (9.23)
Bursary	0.0731 (1.69)	0.0501 (2.14)	0.1521 (2.63)	0.0458 (1.74)
Diploma	0.2422 (18.02)	0.2504 (18.66)	0.2308 (8.26)	0.2528 (14.01)
Bachelor's degree	0.3926 (10.31)	0.4424 (16.70)	0.4490 (7.24)	0.3553 (11.87)
Postgraduate	0.4444 (7.04)	0.5954 (17.14)	0.4159 (5.81)	0.5229 (12.12)
Hours worked (per week)	0.0049 (8.49)	0.0111 (26.75)	0.0208 (21.29)	0.0170 (36.93)
Married	0.1772 (13.27)	0.1502 (14.17)	-0.2083 (9.88)	-0.1480 (11.90)
Major urban	-0.0070 (0.52)	0.0580 (4.67)	0.0497 (2.08)	0.1488 (9.67)
Rural	-0.1028 (5.11)	-0.0726 (4.19)	-0.0476 (1.33)	0.0383 (1.73)
Experience	0.04762 (23.58)	0.06839 (39.24)	0.04108 (15.24)	0.05432 (28.94)
Experience ²	-0.00089 (18.98)	-0.00128 (32.74)	-0.00073 (11.04)	-0.00095 (21.95)
F	157.05	370.19	86.98	276.80
Sample size	8,173	17,128	6,007	15,136

Dependent variable: the natural logarithm of annual income. Specification includes one digit occupation and industry dummies. Least squares regression coefficients (t-ratios based on White consistent standard errors)

Table 2c – Effects of education on incomes of Europeans: 1986 and 1996

	Males		Females	
	1986	1996	1986	1996
Intercept	8.9331 (1033.34)	8.8250 (836.09)	8.1418 (545.03)	8.5343 (592.14)
Highest qualification				
School Certificate	0.0473 (15.59)	0.0704 (18.03)	0.0620 (14.27)	0.0826 (17.39)
U.E./Sixth Form Cert.	0.0840 (22.35)	0.1354 (30.97)	0.0925 (16.88)	0.1475 (27.00)
Bursary	0.0249 (3.63)	-0.0434 (7.00)	0.0366 (3.53)	-0.0706 (9.31)
Diploma	0.1784 (83.42)	0.1561 (48.19)	0.1614 (36.55)	0.1788 (37.26)
Bachelor's degree	0.3303 (67.55)	0.3440 (64.49)	0.2832 (32.81)	0.2853 (42.13)
Postgraduate	0.4077 (74.45)	0.4691 (73.49)	0.3688 (35.34)	0.4371 (52.18)
Hours worked (per week)	0.0050 (48.36)	0.0107 (97.38)	0.0224 (136.66)	0.0206 (165.75)
Married	0.1479 (69.64)	0.1443 (55.07)	-0.1983 (63.36)	-0.1677 (55.60)
Major urban	0.0506 (22.04)	0.0847 (27.55)	0.0788 (19.16)	0.1208 (29.61)
Rural	-0.0763 (21.76)	-0.0356 (8.08)	-0.0423 (6.78)	0.0378 (6.43)
Experience	0.04306 (139.92)	0.06117 (149.89)	0.02375 (55.83)	0.04219 (89.15)
Experience ²	-0.00077 (120.46)	-0.00111 (131.88)	-0.00032 (33.42)	-0.00068 (65.94)
F	6574.08	6229.73	3687.49	4764.87
Sample size	335,632	281,246	228,523	234,079

Dependent variable: the natural logarithm of annual income. Specification includes one digit occupation and industry dummies. Least squares regression coefficients (t-ratios based on White consistent standard errors)

Table 2d – Effects of education on incomes of “Other” ethnic groups: 1986 and 1996

	Males		Females	
	1986	1996	1986	1996
Intercept	8.8431 (188.35)	8.6581 (162.12)	8.2951 (106.71)	8.3268 (115.63)
Highest qualification				
School Certificate	0.0495 (3.52)	0.1820 (9.85)	0.0547 (3.14)	0.1973 (10.16)
U.E./Sixth Form Cert.	0.1334 (7.17)	0.2640 (13.73)	0.1292 (5.66)	0.2407 (10.96)
Bursary	-0.0247 (0.84)	0.0545 (2.29)	-0.0320 (0.78)	-0.0210 (0.79)
Diploma	0.1937 (17.21)	0.2508 (16.08)	0.1308 (6.95)	0.1696 (8.73)
Bachelor's degree	0.3235 (13.38)	0.2136 (10.38)	0.2175 (5.70)	0.2103 (9.03)
Postgraduate	0.4154 (13.96)	0.3790 (14.69)	0.3163 (5.71)	0.3488 (10.57)
Hours worked (per week)	0.0091 (19.18)	0.0127 (29.20)	0.0198 (30.02)	0.0179 (37.67)
Married	0.0815 (8.08)	0.0511 (4.30)	-0.1047 (7.83)	-0.1212 (9.72)
Major urban	-0.1050 (6.51)	-0.0702 (3.26)	0.0642 (2.38)	0.0832 (3.34)
Rural	-0.0937 (2.94)	-0.0002 (0.00)	-0.0615 (1.27)	0.0309 (0.63)
Experience	0.03599 (22.66)	0.05819 (31.01)	0.02733 (13.29)	0.04930 (24.39)
Experience ²	-0.00061 (17.42)	-0.00101 (24.59)	-0.00041 (8.47)	-0.00081 (17.82)
F	221.60	350.78	126.78	274.08
Sample size	17,273	19,930	12,031	16,156

Dependent variable: the natural logarithm of annual income. Specification includes one digit occupation and industry dummies. Least squares regression coefficients (t-ratios based on White consistent standard errors)

5 Decompositions

The analyses in the previous sections have established the role of hours of work, occupation, industry and locality in explaining the positive relationship between educational qualifications and income, and thereby the income gap across ethnic groups. An important question for strategies toward reducing the income gap is the extent to which lower educational attainment, or alternatively, potential difficulties for Maori in translating qualifications to income returns can explain the income gap and its increase between 1986 and 1996. This question is addressed by using the estimates of equation 1 (specification 2 in Tables 2a-2d) to decompose the income gap into a component due to differences in the characteristics (such as qualifications) of ethnic groups, and a component due to ethnic differences in the way that these characteristics are translated into income (Oaxaca, 1973). Comparisons are with the European group:

$$\overline{\ln Y_E} - \overline{\ln Y_M} = (b_{0E} - b_{0M}) + \sum_{i=1}^k b_{iE} (\overline{X_{iE}} - \overline{X_{iM}}) + \sum_{i=1}^k \overline{X_{iM}} (b_{iE} - b_{iM}) \quad (2)$$

where ‘E’ denotes European, M Maori, (and subscript ‘P’ may be substituted for M for Part-Maori, and ‘O’ for the ‘Other’ ethnic group depending on the comparison), k the number of explanatory variables, b_i regression coefficients, \overline{X}_i mean characteristics,

$(b_{0E} - b_{0M})$ is the differential in log incomes due to the difference in intercepts, $\sum_{i=1}^k b_{iE} (\overline{X_{iE}} - \overline{X_{iM}})$ is the differential explained by differences in mean personal characteristics, and

$\sum_{i=1}^k \overline{X_{iM}} (b_{iE} - b_{iM})$ is the income differential explained by coefficients.

The above formulation uses the coefficients from the ‘European’ equations as the weight for the effect of differences in the mean ‘characteristic’ of each ethnic group relative to the European group. This has the advantage of using the same set of base coefficients for the decompositions across ethnic groups. However, the choice of the base group for coefficients and mean characteristics can affect the results. In particular, when coefficients (or returns to characteristics) are greater for the European sample, this specification tends to estimate slightly larger ‘characteristic’ effects than when using alternative weights, in which the base groups are reversed. Results from these alternative specifications are compared in Appendix D. The weighting choice does not change any of the conclusions of the Maori, non-Maori decomposition analyses¹².

A second factor relating to the interpretation of the decomposition results when sets of binary variables are present (e.g. for education, occupation, locality, and industry) is that the intercept effects are not invariant to the choice of each base category. However, the sum of the coefficient effects (the *sum* of the intercept and other variable coefficient

¹² A further alternative is the Neumark (1988) method that combines all samples. The Oaxaca method was preferred, because of the large number of observations for the four ethnic categories.

effects) is invariant (Oaxaca and Ransom, 1999). Therefore, in Table 3, the sum of ‘the coefficient effects’ is provided for comparison to the effect of ‘characteristics’.

Table 3 – Decompositions of log income differentials - employed males and females

Log income differential explained by:	1986			1996		
	$\overline{\ln Y_E} - \overline{\ln Y_M}$	$\overline{\ln Y_E} - \overline{\ln Y_P}$	$\overline{\ln Y_E} - \overline{\ln Y_O}$	$\overline{\ln Y_E} - \overline{\ln Y_M}$	$\overline{\ln Y_E} - \overline{\ln Y_P}$	$\overline{\ln Y_E} - \overline{\ln Y_O}$
Males						
Overall difference	0.25064	0.16121	0.22514	0.35388	0.23317	0.31301
Intercept differential	0.00026	0.09320	0.09003	0.09290	0.15122	0.16687
Effect of characteristics	0.18199	0.14181	0.04331	0.23184	0.18064	0.04812
$\sum_{i=1}^k b_{iE} (\bar{X}_{iE} - \bar{X}_{iM P O})$	(72.6%)	(88.0%)	(19.2%)	(65.5%)	(77.5%)	(15.4%)
Effect of coefficients (intercept+ coefficients)	0.06865	0.0194	0.18183	0.12204	0.05253	0.26489
$(b_{0E} - b_{0M P O}) + \sum_{i=1}^k \bar{X}_{iM P O} (b_{iE} - b_{iM P O})$	(27.4%)	(12.0%)	(80.8%)	(34.5%)	(22.5%)	(84.6%)
Females						
Overall difference	0.09795	0.04198	0.00642	0.15531	0.10585	0.08972
Intercept differential	-0.04226	0.23776	-0.15329	0.08485	0.18352	0.20747
Effect of characteristics	0.09007	0.02963	-0.00510	0.11610	0.08367	0.02149
$\sum_{i=1}^k b_{iE} (\bar{X}_{iE} - \bar{X}_{iM P O})$	(92.0%)	(70.6%)	(-79.5%)	(74.7%)	(79.0%)	(24.0%)
Effect of coefficients (Intercept+ coefficients)	0.00788	0.01235	0.01152	0.03921	0.02218	0.06823

Oaxaca Method, Based on the specification 2 in Tables 2a-2d. Percentage contributions to the overall difference in the log income differential are in parentheses.

Table 3 shows both the mean income differentials by ethnicity in 1986 and 1996, and the decomposition of these differentials into a component due to ethnic differences in characteristics (‘Effect of characteristics’), and a component due to ethnic differences in translating these characteristics into income (‘Effect of coefficients’). The first row for both males and females shows the generally smaller gap for the Part-Maori group, and the increase in the gap for all three ethnic groups between 1986 and 1996.

First, a major result of the decomposition analyses is that the majority proportion of the Maori-European income differential for both males and females (65.5% of the differential for males and 74.7% of the differential for females in 1996) can be explained by their higher educational qualifications and differences in other control variables. These results support the hypothesis that, among those employed, differences in education, occupation, hours of work and other work related characteristics make a stronger contribution to differences in income between Maori and European, than do differences in translating similar characteristics into income.

Table 3 also shows that intercept effects made a greater contribution in 1996 compared to 1986 in explaining Maori relative income levels for both males and females. While these intercept effects are specific to the choice of the base categories in the model (e.g. in this case, ‘no school qualifications’, clerical occupation, ‘semi-urban’ locality, single, etc.), the comparisons across ethnic groups are relevant and they highlight the earlier finding that

by 1996 those in the base category of no school qualifications were relatively more disadvantaged in the labour market, and that the effect was greater for Maori males in the base category of 'no school qualifications'.

In addition, Table 3 shows that, for both male and female Part-Maori, income returns to characteristics were higher than for Maori or Other ethnic groups, and closer to those for the European group. Conversely, Other ethnic groups had the lowest income return to characteristics. This is likely to reflect the effect of language barriers and other factors negatively influencing the labour market outcomes of immigrants in this group.

The estimations and decompositions have highlighted the importance of differences in educational attainment in explaining why relative Maori income levels have deteriorated over the period 1986 to 1996. While Maori became more qualified over the period, so did other groups. This, combined with higher returns to educational qualifications meant that Maori had relatively lower incomes in 1996, compared to 1986. The analysis shows that educational qualifications have been exerting their influence on ethnic differences in income over the decade partly through differences in occupation and hours of works. Other factors such as locality have also influenced differentials over time. For example, while European males in major urban areas had significantly higher income levels than those residing in rural or semi-urban areas, Maori males did not face advantages in major cities, but had higher income returns in semi-urban areas. Finally, decompositions have shown that differences in group characteristics rather than returns to characteristics can explain the major part of the ethnic income differentials.

6 Conclusion

The results of the current study provide strong evidence on the contribution of educational attainment to the income gap, and its increase between 1986 and 1996.

This period has experienced major changes in the New Zealand economy leading to higher demand for skills. Given that a large proportion of the Maori population had left school without qualifications and was engaged in elementary occupations, Maori males, in particular, faced barriers in responding to the increased demand in high skill occupations. At the same time, elementary and low skilled jobs did not experience growth to the extent that professional and other skill-based occupations have in the decade. A related finding is the evidence that educational effects on differences in income have partly been mediated through differences in access to hours of work per week.

An important finding is that, while there are significant differences in educational attainment and occupations of Maori and Non-Maori groups, once educational attainment is controlled for, much of the gap in occupational status disappears – particularly in 1996. As a result, the income gap at the higher education levels has narrowed over the period.

The results also show that, other things being equal, Maori in rural areas face particular disadvantages. Further investigation of the reasons for this, and the possibilities for advanced education and employment outside of the urban and semi urban areas is therefore important. Conversely, the relative success of employed Maori residing in semi-urban areas, and further examination of the reasons for it is also of special interest.

The decomposition results highlight the importance of 'characteristics', such as education, hours of work and occupation, rather than differential returns to higher skills by ethnicity in explaining the widened income gap. Indeed, returns to educational investments for Maori

were higher at every level of education. An implication is that for Maori without school qualifications there is a greater relative opportunity cost of not pursuing post-compulsory education. Consistent with this, Maori participation in post-compulsory education increased over the period. Nevertheless, the Maori population, which had a large proportion without school qualifications, was in a disadvantaged position and did not attain tertiary educational levels similar to the rest of the population.

The results of this study suggest that investing in higher education provides important options for the Maori population in reducing the income gap. This is supported by the findings throughout the study that the income gap based on educational attainment within the ethnic group is far greater than the income gap across the ethnic groups and when controlling for educational attainment.

Thus, it is of concern that in the past, and currently the Maori population has not and does not acquire school qualifications at the same rate as others. The results of the current study suggest that this should be a particular focus for further research and policy development.

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Appendix A Sample characteristics

Table A.1 – sample characteristics – all employed males (means & standard deviations)

	Maori		Part-Maori		European		Other	
	1986	1996	1986	1996	1986	1996	1986	1996
Age	32.40 (11.47)	35.37 (11.34)	31.03 (11.34)	33.36 (11.11)	36.69 (12.64)	38.55 (12.00)	33.50 (11.01)	35.08 (10.55)
Annual income 1986 dollars	\$16,039 (\$7,601)	—	\$17,988 (\$9,475)	—	\$21,190 (\$11,447)	—	\$17,094 (\$9,856)	—
Annual income 1996 dollars	\$26,351 (\$12,488)	\$26,366 (\$16,936)	\$29,554 (\$15,568)	\$30,496 (\$21,417)	\$34,814 (\$18,807)	\$38,458 (\$27,350)	\$28,085 (\$16,193)	\$29,907 (\$23,600)
No qualifications	61.19%	56.39%	39.92%	33.17%	30.54%	25.75%	44.80%	34.10%
School Certificate	11.63%	13.32%	14.03%	15.45%	12.19%	12.28%	12.75%	8.77%
U.E./Sixth Form Cert.(year 12)	4.34%	8.08%	8.44%	11.93%	8.39%	10.29%	7.09%	8.54%
Bursary (year 13)	1.13%	3.89%	3.40%	7.44%	2.75%	6.03%	3.91%	7.58%
Diploma	20.59%	15.47%	29.63%	24.74%	37.10%	30.92%	21.44%	16.48%
Bachelor's degree	0.69%	2.08%	2.81%	5.24%	5.46%	9.57%	6.25%	15.96%
Postgraduate qual.	0.43%	0.77%	1.76%	2.03%	3.58%	5.16%	3.77%	8.58%
Hours worked (per week)	42.78 (12.31)	42.86 (14.78)	44.46 (12.04)	45.14 (14.80)	45.69 (11.91)	46.32 (14.30)	43.63 (12.17)	42.52 (14.79)
Managerial/administrative occupation	1.11%	4.70%	3.52%	9.81%	8.00%	15.81%	2.63%	11.73%
Professional	4.11%	4.73%	10.39%	7.17%	14.95%	12.08%	11.82%	13.14%
Clerical	4.83%	4.80%	7.47%	5.56%	8.29%	4.96%	6.85%	7.49%
Service	6.40%	9.12%	6.78%	11.14%	5.90%	7.93%	8.35%	11.63%
Agricultural	11.97%	11.66%	11.02%	10.20%	11.96%	11.54%	4.53%	3.75%
Product./transport workers	68.92%	—	55.03%	—	41.15%	—	59.10%	—
Sales	2.66%	—	5.79%	—	9.76%	—	6.72%	—
Trade orientated	—	12.20%	—	16.17%	—	16.85%	—	12.06%
Plant and machine operator	—	27.66%	—	17.41%	—	10.81%	—	15.59%
Elementary/low-skilled	—	19.35%	—	13.06%	—	7.73%	—	14.40%
Technical	—	5.80%	—	9.47%	—	12.30%	—	10.21%
Agriculture and fisheries industry	12.43%	12.85%	11.01%	11.03%	11.93%	11.73%	4.71%	3.87%
Mining	1.33%	0.76%	0.61%	0.54%	0.62%	0.47%	0.16%	0.10%
Manufacturing	32.90%	25.13%	28.58%	21.68%	23.08%	18.02%	43.34%	26.58%
Electricity	2.42%	0.89%	1.90%	0.79%	1.62%	0.84%	1.07%	0.54%
Construction	14.58%	11.38%	12.42%	11.02%	10.69%	9.91%	6.19%	5.15%
Wholesaling	8.60%	12.28%	13.20%	18.04%	17.68%	19.21%	16.68%	24.34%
Transportation	10.67%	9.26%	10.01%	7.43%	8.95%	6.76%	8.26%	6.74%
Finance	1.64%	5.08%	4.48%	8.55%	7.42%	12.54%	4.80%	11.85%
Social services	15.43%	22.37%	17.80%	20.92%	18.01%	20.51%	14.79%	20.83%
Married	46.55%	41.92%	49.38%	43.34%	62.20%	58.32%	58.02%	57.83%
Major urban	59.82%	63.18%	63.73%	67.03%	68.13%	68.23%	88.19%	91.95%
Semi-urban	22.00%	20.88%	19.83%	17.64%	15.03%	14.76%	7.36%	5.42%
Rural	17.68%	15.87%	15.93%	15.27%	16.52%	16.92%	3.66%	2.56%

Table A.2 – sample characteristics – all employed females

	Maori		Part-Maori		European		Other	
	1986	1996	1986	1996	1986	1996	1986	1996
Age	32.12 (11.32)	35.85 (10.98)	30.27 (11.06)	33.34 (10.92)	35.15 (12.10)	37.88 (11.61)	32.53 (10.84)	34.08 (10.29)
Annual income 1986 dollars	\$10,886 (\$5,897)	—	\$11,747 (\$6,791)	—	\$12,560 (\$7,762)	—	\$11,935 (\$6,751)	—
Annual income 1996 dollars	\$17,885 (\$9,689)	\$19,376 (\$13,055)	\$19,301 (\$11,157)	\$20,973 (\$15,129)	\$20,636 (\$12,752)	\$23,773 (\$18,089)	\$19,610 (\$11,091)	\$21,692 (\$16,046)
No qualifications	59.02%	48.13%	38.72%	27.34%	32.66%	22.87%	43.43%	30.99%
School Certificate	15.90%	16.54%	19.17%	18.66%	17.44%	16.93%	16.19%	10.75%
U.E./Sixth Form Cert.(year 12)	6.40%	10.65%	11.63%	14.95%	10.63%	12.88%	8.61%	9.88%
Bursary (year 13)	1.04%	3.96%	2.30%	8.03%	2.30%	5.88%	3.31%	8.37%
Diploma	16.62%	17.02%	24.30%	23.80%	30.46%	28.41%	21.40%	19.25%
Bachelor's degree	0.70%	2.66%	2.53%	5.40%	4.04%	8.81%	4.95%	15.21%
Postgraduate qual.	0.32%	1.03%	1.35%	1.82%	2.47%	4.21%	2.12%	5.55%
Hours worked (per week)	36.25 (12.78)	34.55 (15.88)	36.36 (13.17)	34.78 (16.15)	34.45 (14.39)	33.81 (16.09)	37.46 (13.10)	35.99 (15.44)
Managerial/administrative occup.	0.65%	5.69%	1.58%	7.97%	2.37%	10.16%	0.95%	7.95%
Professional	10.14%	11.21%	15.80%	12.84%	20.59%	17.70%	11.79%	14.63%
Clerical	20.89%	18.22%	30.96%	24.83%	34.80%	25.08%	25.23%	22.73%
Service	23.24%	20.99%	17.91%	21.58%	13.70%	17.95%	20.45%	19.53%
Agricultural	6.57%	6.27%	5.56%	5.50%	6.61%	6.42%	2.66%	2.15%
Product./transport workers	33.27%	—	18.73%	—	10.05%	—	30.87%	—
Sales	5.24%	—	9.47%	—	11.88%	—	8.06%	—
Trade orientated	—	1.64%	—	1.35%	—	1.24%	—	1.69%
Plant and machine operator	—	8.71%	—	4.99%	—	3.13%	—	9.14%
Elementary/low-skilled	—	17.60%	—	9.04%	—	5.63%	—	12.57%
Technical	—	9.66%	—	11.92%	—	12.70%	—	9.62%
Agriculture and fisheries industry	7.40%	7.08%	6.51%	6.02%	7.63%	7.01%	3.24%	2.36%
Mining	0.16%	0.07%	0.23%	0.10%	0.18%	0.07%	0.10%	0.01%
Manufacturing	28.42%	15.47%	18.96%	10.87%	13.89%	8.83%	30.49%	17.15%
Electricity	0.18%	0.21%	0.35%	0.25%	0.34%	0.29%	0.18%	0.32%
Construction	1.24%	1.05%	1.60%	1.49%	1.78%	1.75%	0.60%	0.58%
Wholesaling	17.72%	18.74%	22.60%	24.04%	23.76%	22.37%	21.09%	24.97%
Transportation	7.81%	5.01%	7.27%	4.84%	5.32%	3.90%	6.03%	4.60%
Finance	4.08%	7.32%	8.36%	12.45%	11.25%	15.20%	8.08%	15.05%
Social services	33.00%	45.05%	34.12%	39.94%	35.86%	40.59%	30.19%	34.96%
Married	47.04%	41.83%	45.52%	42.87%	59.74%	57.40%	56.42%	55.50%
Major urban	65.36%	65.90%	69.51%	69.01%	72.10%	70.93%	90.60%	92.57%
Semi-urban	19.85%	19.43%	17.04%	17.02%	13.84%	14.10%	5.80%	4.98%
Rural	14.56%	14.66%	13.25%	13.96%	13.89%	14.94%	3.41%	2.41%
Sample size	16,899	13,242	6,008	15,137	228,524	234,080	12,032	16,157

Standard deviations in parentheses

Appendix B Sample characteristics by Qualifications

Table B.1 Income and other employment characteristics by highest educational qualification of all employed Maori males in 1986

	Highest educational qualification						
	No qual.	S. Cert.	UE/SFC	Bursary	Diploma	Bachelor	Postgrad.
Age	33.28	28.90	26.66	28.02	33.16	33.01	37.02
Annual income 1986 dollars	\$15,053	\$15,328	\$16,197	\$17,801	\$18,577	\$23,525	\$26,606
	(\$6,977)	(\$7,262)	(\$8,326)	(\$9,892)	(\$8,037)	(\$13,354)	(\$13,821)
Annual income 1996 dollars	\$24,732	\$25,184	\$26,611	\$29,246	\$30,522	\$38,651	\$43,712
	(\$11,463)	(\$11,932)	(\$13,679)	(\$16,252)	(\$13,204)	(\$21,939)	(\$22,707)
Hours worked (per week)	41.94	43.34	44.32	43.36	44.60	43.25	49.13
	(12.40)	(12.57)	(11.89)	(12.12)	(11.78)	(13.04)	(14.20)
Managerial/administrative occupation	0.71%	0.93%	2.64%	2.77%	1.72%	5.97%	8.20%
Professional	1.37%	2.85%	7.20%	9.85%	9.40%	51.74%	51.64%
Clerical	3.07%	7.46%	20.56%	26.46%	3.75%	11.44%	6.56%
Service	4.85%	10.07%	12.16%	15.38%	7.20%	5.97%	7.38%
Agricultural	13.85%	12.25%	8.72%	6.15%	8.10%	2.99%	8.20%
Product./transport workers	74.23%	61.65%	42.72%	35.08%	67.06%	16.92%	13.11%
Sales	1.92%	4.79%	6.00%	4.31%	2.77%	4.98%	4.92%
Agriculture and fisheries industry	13.98%	12.97%	9.84%	6.77%	9.18%	5.47%	9.02%
Mining	1.51%	0.99%	0.56%	0.62%	1.20%	1.00%	0.82%
Manufacturing	35.94%	33.01%	24.64%	25.54%	26.93%	10.45%	4.92%
Electricity	2.08%	1.44%	1.60%	1.85%	4.29%	0.50%	0.00%
Construction	14.97%	11.23%	7.20%	4.00%	17.99%	3.98%	3.28%
Wholesaling	7.35%	10.64%	12.88%	9.23%	10.29%	10.45%	8.20%
Transportation	10.67%	10.64%	11.04%	11.08%	10.75%	6.97%	4.10%
Finance	0.88%	2.40%	6.72%	7.38%	1.49%	13.43%	10.66%
Social services	12.62%	16.69%	25.52%	33.54%	17.88%	47.76%	59.02%
Married	47.24%	35.08%	32.88%	34.77%	54.21%	51.24%	60.66%
Major urban	57.79%	61.23%	68.56%	71.08%	61.65%	71.14%	72.13%
Semi-urban	22.66%	21.57%	16.88%	17.85%	22.11%	11.94%	9.84%
Rural	19.08%	16.54%	13.92%	10.15%	15.84%	15.92%	16.39%
Sample size	17,577	3,338	1,250	325	5,916	201	122

Standard deviations in parentheses

Table B.2 Income and other employment characteristics by highest educational qualification of all employed Maori females in 1986

	Highest educational qualification						
	No qual.	S. Cert.	UE/SFC	Bursary	Diploma	Bachelor	Postgrad.
Age	33.68 (11.46)	28.70 (10.09)	25.20 (8.35)	29.03 (11.07)	32.83 (11.38)	30.38 (9.09)	34.98 (9.35)
Annual income 1986 dollars	\$9,836 (\$5,083)	\$10,810 (\$5,701)	\$12,045 (\$5,986)	\$11,533 (\$6,621)	\$13,651 (\$6,993)	\$17,706 (\$7,882)	\$19,586 (\$13,982)
Annual income 1996 dollars	\$16,160 (\$8,351)	\$17,761 (\$9,367)	\$19,789 (\$9,835)	\$18,948 (\$10,878)	\$22,428 (\$11,489)	\$29,090 (\$12,951)	\$32,179 (\$22,972)
Hours worked (per week)	35.51 (12.92)	36.54 (12.23)	38.27 (11.47)	36.45 (11.96)	37.54 (13.04)	41.83 (12.01)	42.63 (17.02)
Managerial/administrative occupation	0.46%	0.63%	1.48%	2.27%	0.78%	1.69%	3.70%
Professional	3.75%	4.60%	8.96%	9.66%	34.97%	76.27%	55.56%
Clerical	12.40%	33.23%	51.43%	46.59%	26.11%	12.71%	22.22%
Service	27.80%	21.18%	15.24%	18.18%	13.45%	1.69%	9.26%
Agricultural	8.01%	5.90%	3.32%	2.84%	4.06%	1.69%	3.70%
Product./transport workers	42.58%	27.93%	13.11%	14.77%	16.12%	1.69%	3.70%
Sales	5.01%	6.53%	6.46%	5.68%	4.52%	4.24%	1.85%
Agriculture and fisheries industry	8.66%	6.86%	4.43%	2.84%	5.27%	2.54%	7.41%
Mining	0.17%	0.07%	0.18%	0.00%	0.21%	0.00%	0.00%
Manufacturing	35.32%	24.89%	15.24%	17.05%	14.41%	5.08%	1.85%
Electricity	0.15%	0.22%	0.28%	0.00%	0.21%	0.00%	0.00%
Construction	1.13%	1.48%	0.92%	0.57%	1.53%	0.85%	1.85%
Wholesaling	18.52%	21.62%	17.17%	14.20%	12.27%	6.78%	7.41%
Transportation	6.92%	10.27%	12.10%	8.52%	7.29%	0.85%	5.56%
Finance	1.95%	7.12%	11.36%	13.64%	5.09%	9.32%	7.41%
Social services	27.18%	27.45%	38.32%	43.18%	53.72%	74.58%	68.52%
Married	50.88%	40.21%	28.81%	38.07%	47.95%	35.59%	51.85%
Major urban	64.46%	66.14%	70.45%	76.14%	64.57%	76.27%	70.37%
Semi-urban	20.67%	19.29%	17.73%	9.66%	19.35%	11.02%	16.67%
Rural	14.66%	14.47%	11.63%	12.50%	15.76%	11.86%	12.96%
Sample size	9,986	2,696	1,083	176	2,811	118	54

Standard deviations in parentheses

Table B.3 *Income and other employment characteristics by highest educational qualification of all employed Part-Maori males in 1986*

	Highest educational qualification						
	No qual.	S. Cert.	UE/SFC	Bursary	Diploma	Bachelor	Postgrad.
Age	31.67 (12.15)	26.86 (9.83)	26.00 (8.97)	27.70 (10.09)	33.43 (10.72)	33.07 (9.07)	37.76 (10.12)
Annual income 1986 dollars	\$15,955 (\$8,043)	\$15,699 (\$8,207)	\$16,567 (\$9,064)	\$17,280 (\$11,246)	\$20,506 (\$9,414)	\$26,726 (\$12,983)	\$30,651 (\$14,462)
Annual income 1996 dollars	\$26,213 (\$13,215)	\$25,793 (\$13,484)	\$27,219 (\$14,892)	\$28,390 (\$18,477)	\$33,691 (\$15,467)	\$43,910 (\$21,330)	\$50,358 (\$23,761)
Hours worked (per week)	43.80 (12.44)	44.38 (11.77)	43.67 (10.93)	43.44 (13.90)	45.68 (11.65)	44.87 (12.59)	47.25 (13.67)
Managerial/administrative occupation	2.23%	2.69%	3.32%	5.04%	4.89%	7.83%	8.28%
Professional	1.71%	3.65%	10.98%	11.87%	15.32%	70.87%	73.10%
Clerical	4.56%	9.21%	24.71%	20.86%	4.39%	5.65%	4.83%
Service	5.47%	8.51%	11.13%	11.87%	6.53%	3.04%	2.07%
Agricultural	14.07%	11.99%	8.09%	10.79%	9.08%	1.74%	4.83%
Product./transport workers	67.22%	56.65%	33.38%	28.06%	54.37%	6.96%	3.45%
Sales	4.74%	7.30%	8.38%	11.51%	5.42%	3.91%	3.45%
Agriculture and fisheries industry	13.58%	11.82%	8.67%	10.07%	9.49%	2.17%	7.59%
Mining	0.92%	0.35%	0.29%	0.00%	0.53%	0.43%	0.00%
Manufacturing	36.15%	30.15%	20.81%	15.83%	23.49%	12.61%	13.10%
Electricity	1.38%	1.74%	1.30%	2.16%	3.04%	0.43%	0.00%
Construction	12.42%	11.12%	7.66%	6.47%	16.59%	2.61%	1.38%
Wholesaling	12.08%	15.55%	15.17%	16.91%	13.68%	8.26%	4.83%
Transportation	10.00%	10.51%	10.26%	11.51%	10.51%	3.91%	2.07%
Finance	1.50%	3.48%	10.40%	13.67%	3.37%	27.39%	15.17%
Social services	11.99%	15.29%	25.43%	23.38%	19.30%	42.17%	55.86%
Married	48.81%	39.18%	33.09%	34.89%	59.30%	58.26%	69.66%
Major urban	60.64%	63.42%	69.51%	76.62%	62.83%	76.09%	74.48%
Semi-urban	21.41%	19.81%	17.05%	10.07%	20.41%	14.35%	13.79%
Rural	17.40%	16.68%	13.01%	12.23%	16.18%	8.70%	11.03%
Sample size	3,270	1,151	692	278	2,435	230	145

Standard deviations in parentheses

Table B.4 Income and other employment characteristics by highest educational qualification of all employed Part-Maori females in 1986

	Highest educational qualification						
	No qual.	S. Cert.	UE/SFC	Bursary	Diploma	Bachelor	Postgrad.
Age	32.73	27.40	24.57	25.20	31.66	31.49	32.65
Annual income 1986 dollars	\$9,978	\$10,869	\$12,158	\$12,077	\$13,861	\$19,104	\$17,986
Annual income 1996 dollars	\$16,394	\$17,857	\$19,975	\$19,842	\$22,773	\$31,387	\$29,551
	(\$9,047)	(\$9,888)	(\$10,333)	(\$12,172)	(\$12,386)	(\$15,343)	(\$16,485)
Hours worked (per week)	35.12	36.35	38.06	37.71	36.99	39.18	39.73
	(13.56)	(12.25)	(11.57)	(15.15)	(13.33)	(15.95)	(13.32)
Managerial/administrative occupation	1.07%	1.65%	1.86%	2.17%	1.57%	4.61%	7.41%
Professional	3.01%	4.51%	9.14%	9.42%	40.12%	73.03%	65.43%
Clerical	18.82%	42.63%	56.71%	52.90%	29.25%	12.50%	17.28%
Service	26.47%	16.46%	11.57%	14.49%	11.14%	1.32%	4.94%
Agricultural	6.96%	5.20%	4.86%	2.90%	4.65%	4.61%	2.47%
Product./transport workers	32.70%	17.16%	7.86%	10.14%	6.29%	2.63%	1.23%
Sales	10.96%	12.39%	8.00%	7.97%	6.97%	1.32%	1.23%
Agriculture and fisheries industry	7.65%	6.41%	6.00%	4.35%	5.81%	4.61%	2.47%
Mining	0.04%	0.26%	0.57%	0.00%	0.41%	0.00%	0.00%
Manufacturing	29.22%	18.89%	12.14%	13.04%	8.48%	5.92%	7.41%
Electricity	0.39%	0.17%	0.43%	1.45%	0.27%	0.66%	0.00%
Construction	1.68%	1.47%	1.71%	2.17%	1.64%	0.66%	0.00%
Wholesaling	27.29%	29.46%	18.00%	22.46%	14.49%	8.55%	3.70%
Transportation	6.66%	9.19%	11.57%	7.97%	5.40%	1.32%	3.70%
Finance	3.70%	11.18%	16.00%	18.12%	8.34%	13.82%	8.64%
Social services	23.38%	22.96%	33.57%	30.43%	55.16%	64.47%	74.07%
Married	51.74%	40.03%	30.00%	24.64%	49.62%	43.42%	46.91%
Major urban	68.07%	69.67%	71.00%	75.36%	68.76%	75.00%	83.95%
Semi-urban	18.74%	17.42%	16.29%	13.04%	15.99%	12.50%	6.17%
Rural	13.15%	12.74%	12.43%	11.59%	14.90%	11.18%	9.88%
Sample size	2,327	1,154	700	138	1,463	152	81

Standard deviations in parentheses

Table B.5 Income and other employment characteristics by highest educational qualification of all employed European males in 1986

	Highest educational qualification						
	No qual.	S. Cert.	UE/SFC	Bursary	Diploma	Bachelor	Postgrad.
Age	39.05 (13.21)	32.27 (12.61)	30.70 (12.41)	30.44 (11.72)	37.94 (11.73)	35.46 (10.44)	40.14 (10.18)
Annual income 1986 dollars	\$17,999 (\$9,642)	\$18,124 (\$10,445)	\$19,110 (\$11,307)	\$19,080 (\$12,327)	\$22,513 (\$10,560)	\$29,915 (\$15,184)	\$33,466 (\$15,317)
Annual income 1996 dollars	\$29,572 (\$15,842)	\$29,778 (\$17,161)	\$31,397 (\$18,578)	\$31,348 (\$20,253)	\$36,988 (\$17,349)	\$49,149 (\$24,946)	\$54,984 (\$25,166)
Hours worked (per week)	46.27 (12.92)	45.92 (11.58)	44.53 (11.17)	42.80 (13.56)	45.98 (11.52)	45.19 (11.57)	46.37 (12.30)
Managerial/administrative occupation	5.24%	7.60%	10.13%	10.37%	8.81%	11.97%	10.62%
Professional	1.83%	4.53%	10.87%	16.37%	16.85%	65.90%	71.76%
Clerical	6.61%	11.31%	21.87%	20.91%	5.30%	5.18%	4.55%
Service	5.97%	6.78%	7.81%	9.88%	5.74%	1.99%	1.69%
Agricultural	18.93%	16.45%	12.68%	10.36%	7.91%	5.40%	3.62%
Product./transport workers	51.61%	40.56%	23.64%	18.32%	46.66%	3.95%	3.62%
Sales	9.81%	12.76%	12.99%	13.79%	8.73%	5.61%	4.15%
Agriculture and fisheries industry	18.30%	16.20%	12.77%	10.85%	8.13%	6.41%	4.64%
Mining	0.86%	0.50%	0.37%	0.29%	0.54%	0.55%	0.58%
Manufacturing	26.93%	23.27%	17.39%	16.36%	24.09%	12.54%	8.80%
Electricity	1.24%	0.92%	1.16%	0.82%	2.45%	1.27%	0.47%
Construction	11.07%	9.47%	6.25%	4.41%	14.00%	3.36%	2.01%
Wholesaling	18.18%	21.15%	19.75%	22.16%	17.38%	9.28%	6.72%
Transportation	10.31%	8.96%	8.98%	8.27%	9.19%	3.57%	1.71%
Finance	2.30%	6.67%	15.32%	16.28%	5.97%	27.07%	12.32%
Social services	10.80%	12.86%	18.01%	20.56%	18.26%	35.94%	62.75%
Married	64.01%	49.28%	43.65%	40.99%	69.56%	64.34%	74.82%
Major Urban	60.10%	64.62%	71.56%	77.81%	70.31%	79.27%	82.45%
Semi-urban	17.26%	14.61%	12.12%	9.33%	15.47%	10.08%	9.16%
Rural	22.36%	20.45%	15.92%	12.41%	13.90%	10.18%	8.13%
Sample size	103,697	41,372	28,405	9,314	125,299	18,411	12,059

Standard deviations in parentheses

Table B.6 *Income and other employment characteristics by highest educational qualification of all employed European females in 1986*

	Highest educational qualification						
	No qual.	S. Cert.	UE/SFC	Bursary	Diploma	Bachelor	Postgrad.
Age	39.82	31.87	27.78	28.20	35.38	32.59	37.09
	(11.70)	(11.49)	(10.93)	(12.09)	(11.48)	(9.66)	(10.21)
Annual income 1986 dollars	\$10,469	\$11,641	\$12,499	\$11,695	\$13,986	\$17,528	\$20,094
	(\$6,683)	(\$6,877)	(\$6,885)	(\$7,619)	(\$7,989)	(\$10,072)	(\$11,539)
Annual income 1996 dollars	\$17,201	\$19,126	\$20,535	\$19,214	\$22,979	\$28,799	\$33,015
	(\$10,980)	(\$11,299)	(\$11,313)	(\$12,519)	(\$13,125)	(\$16,548)	(\$18,958)
Hours Worked (per Week)	32.99	34.89	36.56	33.86	34.73	36.58	37.20
	(14.93)	(13.70)	(12.44)	(14.38)	(14.71)	(15.00)	(15.18)
Managerial/administrative occupation	1.95%	2.60%	2.45%	2.33%	2.32%	4.37%	3.33%
Professional	2.80%	4.35%	9.88%	16.63%	42.34%	65.77%	76.62%
Clerical	29.67%	48.81%	56.84%	43.40%	28.12%	15.61%	10.51%
Service	22.07%	12.78%	9.02%	15.65%	8.99%	3.26%	2.58%
Agricultural	8.19%	7.45%	6.01%	5.57%	5.93%	3.90%	2.41%
Product./transport workers	18.52%	10.09%	5.95%	5.72%	4.39%	2.14%	1.50%
Sales	16.80%	13.93%	9.84%	10.70%	7.91%	4.95%	3.06%
Agriculture and fisheries industry	9.06%	8.52%	7.29%	6.25%	7.05%	4.72%	3.45%
Mining	0.13%	0.21%	0.25%	0.27%	0.21%	0.15%	0.12%
Manufacturing	21.06%	15.88%	11.69%	9.64%	7.87%	5.70%	4.51%
Electricity	0.32%	0.46%	0.62%	0.44%	0.21%	0.21%	0.11%
Construction	2.02%	2.31%	1.81%	1.44%	1.46%	0.81%	0.39%
Wholesaling	33.09%	29.25%	21.21%	25.02%	14.87%	8.76%	5.82%
Transportation	5.24%	6.86%	7.90%	6.02%	4.28%	2.14%	1.11%
Finance	6.22%	15.19%	23.28%	18.15%	9.50%	13.94%	7.34%
Social services	22.86%	21.32%	25.95%	32.77%	54.54%	63.58%	77.15%
Married	69.62%	55.90%	40.77%	34.12%	61.56%	51.82%	55.31%
Major urban	69.02%	70.76%	73.38%	80.13%	72.51%	80.60%	84.67%
Semi-urban	16.67%	14.56%	12.56%	8.98%	12.47%	8.34%	6.92%
Rural	14.23%	14.54%	13.83%	10.55%	14.85%	10.53%	8.10%
Sample size	75,041	39,991	24,373	5,279	69,846	9,261	5,654

Standard deviations in parentheses

Table B.7 Income and other employment characteristics by highest educational qualification of all employed Other males in 1986

	Highest educational qualification						
	No qual.	S. Cert.	UE/SFC	Bursary	Diploma	Bachelor	Postgrad.
Age	35.10	29.72	28.12	29.29	34.27	33.54	37.60
	(11.60)	(10.00)	(9.68)	(9.44)	(10.31)	(9.54)	(9.41)
Annual income 1986 dollars	\$14,667	\$14,918	\$16,117	\$15,612	\$18,795	\$25,785	\$31,082
	(\$7,119)	(\$7,608)	(\$8,465)	(\$11,124)	(\$9,291)	(\$14,266)	(\$16,735)
Annual income 1996 dollars	\$24,097	\$24,510	\$26,480	\$25,651	\$30,879	\$42,364	\$51,066
	(\$11,696)	(\$12,500)	(\$13,907)	(\$18,276)	(\$15,265)	(\$23,439)	(\$27,494)
Hours worked (per week)	42.98	43.84	44.28	41.73	44.65	43.72	46.40
	(11.76)	(11.76)	(12.63)	(15.40)	(12.13)	(12.39)	(14.23)
Managerial/administrative occupation	0.88%	1.59%	3.41%	4.59%	3.66%	9.43%	6.29%
Professional	0.86%	2.72%	8.35%	10.50%	16.06%	62.20%	72.85%
Clerical	3.55%	8.79%	21.82%	15.53%	5.97%	8.32%	4.29%
Service	8.50%	9.51%	12.25%	13.61%	7.64%	3.42%	2.91%
Agricultural	5.45%	5.07%	5.19%	6.80%	3.50%	1.57%	1.69%
Product./transport workers	75.89%	63.09%	36.82%	38.02%	56.67%	7.86%	4.91%
Sales	4.87%	9.24%	12.17%	10.95%	6.51%	7.21%	7.06%
Agriculture and fisheries industry	5.37%	5.71%	5.52%	6.80%	3.60%	2.13%	2.91%
Mining	0.15%	0.14%	0.16%	0.15%	0.19%	0.18%	0.00%
Manufacturing	55.85%	44.88%	27.09%	32.84%	36.15%	18.39%	9.82%
Electricity	0.66%	0.77%	1.38%	0.59%	2.10%	0.92%	1.07%
Construction	6.35%	5.25%	3.65%	1.63%	9.76%	3.14%	2.30%
Wholesaling	14.54%	19.84%	23.11%	25.44%	17.00%	16.36%	11.04%
Transportation	7.52%	8.74%	11.27%	7.99%	10.92%	3.60%	1.84%
Finance	1.43%	2.99%	9.57%	9.02%	4.41%	21.26%	12.27%
Social services	8.13%	11.68%	18.25%	15.53%	15.87%	34.01%	58.74%
Married	60.29%	49.05%	40.23%	46.30%	62.61%	61.28%	75.15%
Major urban	88.82%	86.96%	87.51%	89.94%	85.91%	90.94%	90.95%
Semi-urban	7.30%	8.20%	7.38%	5.18%	7.77%	6.65%	6.13%
Rural	3.54%	4.08%	4.54%	2.66%	4.49%	2.13%	2.76%
Sample size	7,764	2,208	1,233	676	3,718	1,082	652

Standard deviations in parentheses

Table B.8 Income and other employment characteristics by highest educational qualification of all employed Other females in 1986

	Highest educational qualification						
	No qual.	S. Cert.	UE/SFC	Bursary	Diploma	Bachelor	Postgrad.
Age	35.32 (11.38)	29.54 (9.65)	26.56 (9.04)	28.82 (9.37)	32.31 (10.30)	30.78 (8.13)	35.01 (9.21)
Annual income 1986 dollars	\$10,525 (\$5,533)	\$11,370 (\$5,745)	\$12,451 (\$6,584)	\$11,167 (\$7,294)	\$13,121 (\$6,804)	\$16,842 (\$10,459)	\$18,962 (\$11,875)
Annual income 1996 dollars	\$17,291 (\$9,091)	\$18,681 (\$9,439)	\$20,457 (\$10,817)	\$18,347 (\$11,983)	\$21,557 (\$11,178)	\$27,670 (\$17,184)	\$31,154 (\$19,510)
Hours worked (per week)	37.69 (13.33)	38.16 (13.20)	37.54 (12.10)	36.52 (14.71)	36.66 (12.73)	37.61 (13.71)	37.26 (13.53)
Managerial/administrative occupation	0.53%	0.82%	1.15%	1.50%	1.28%	1.84%	3.14%
Professional	1.43%	2.25%	6.43%	7.75%	28.34%	52.43%	61.18%
Clerical	10.75%	35.63%	55.95%	28.75%	33.49%	27.81%	19.61%
Service	27.83%	18.56%	13.82%	21.50%	14.42%	4.52%	5.49%
Agricultural	4.03%	1.58%	2.40%	2.25%	1.89%	1.17%	0.78%
Product./transport workers	47.00%	30.78%	12.19%	28.25%	14.62%	4.19%	5.49%
Sales	8.42%	10.38%	8.06%	10.00%	5.96%	8.04%	4.31%
Agriculture and fisheries industry	4.16%	2.51%	3.45%	3.00%	2.98%	1.68%	0.78%
Mining	0.08%	0.05%	0.10%	0.00%	0.19%	0.00%	0.39%
Manufacturing	43.56%	31.65%	14.68%	29.25%	16.36%	9.72%	8.63%
Electricity	0.13%	0.31%	0.19%	0.25%	0.12%	0.50%	0.00%
Construction	0.34%	0.61%	1.25%	0.25%	0.89%	0.34%	1.18%
Wholesaling	22.10%	23.98%	23.70%	22.25%	17.67%	16.75%	11.76%
Transportation	4.60%	8.03%	8.54%	8.50%	6.84%	4.02%	2.35%
Finance	2.29%	10.33%	18.23%	10.25%	9.78%	23.79%	9.41%
Social services	22.73%	22.55%	29.85%	26.25%	45.17%	43.22%	65.49%
Married	62.57%	52.56%	39.06%	43.50%	55.03%	57.12%	65.88%
Major urban	90.93%	91.16%	88.20%	93.50%	88.75%	93.47%	91.37%
Semi-urban	5.86%	5.32%	6.81%	3.75%	6.46%	4.69%	4.71%
Rural	3.06%	3.32%	4.70%	2.50%	4.60%	1.84%	3.14%
Sample size	5,236	1,956	1,042	400	2,586	597	255

Standard deviations in parentheses

Table B.9 *Income and other employment characteristics by highest educational qualification of all employed Maori males in 1996*

	Highest educational qualification						
	No qual.	S. Cert.	UE/SFC	Bursary	Diploma	Bachelor	Postgrad.
Age	37.00	32.28	30.23	28.35	36.35	35.58	40.77
	(11.58)	(10.35)	(9.62)	(10.51)	(10.42)	(10.41)	(10.79)
Annual income 1996 dollars	\$24,223	\$25,625	\$27,772	\$24,675	\$30,802	\$38,456	\$56,031
	(\$14,561)	(\$15,192)	(\$17,658)	(\$19,930)	(\$19,088)	(\$28,317)	(\$33,492)
Hours worked (per week)	42.46	42.87	43.63	40.30	43.97	44.54	51.40
	(14.86)	(14.19)	(13.94)	(16.11)	(15.10)	(14.83)	(15.34)
Managerial/administrative occupation	2.79%	5.43%	8.06%	6.73%	7.20%	11.61%	21.28%
Professional	1.47%	2.59%	3.93%	4.77%	10.55%	48.81%	50.35%
Clerical	3.67%	7.15%	9.35%	8.98%	3.39%	5.54%	4.26%
Service	6.29%	12.70%	18.29%	21.18%	9.07%	6.86%	3.55%
Agricultural	14.03%	11.30%	8.67%	8.70%	7.73%	2.11%	2.84%
Trade orientated	9.65%	11.43%	8.81%	7.43%	26.93%	1.85%	0.71%
Plant and machine operator	35.25%	26.39%	18.50%	14.31%	13.80%	1.06%	2.84%
Elementary/low-skilled	23.63%	17.63%	14.36%	17.53%	10.34%	8.44%	5.67%
Technical	3.22%	5.38%	10.03%	10.38%	10.98%	13.72%	8.51%
Agriculture and fisheries industry	15.10%	12.58%	10.03%	9.68%	9.18%	3.17%	3.55%
Mining	1.00%	0.53%	0.41%	0.14%	0.49%	0.26%	0.00%
Manufacturing	28.49%	25.77%	20.60%	19.50%	19.45%	3.69%	6.38%
Electricity	0.81%	1.03%	0.68%	0.28%	1.38%	0.53%	0.00%
Construction	12.13%	9.70%	8.47%	6.03%	14.72%	0.79%	2.13%
Wholesaling	10.39%	14.51%	16.06%	21.60%	14.08%	7.92%	6.38%
Transportation	10.80%	9.78%	7.11%	4.07%	7.02%	3.43%	1.42%
Finance	3.65%	4.81%	8.06%	9.96%	5.58%	19.00%	9.93%
Social services	17.64%	21.29%	28.59%	28.75%	28.10%	61.21%	70.21%
Married	43.45%	36.00%	30.96%	25.11%	49.56%	50.66%	62.41%
Major urban	59.85%	64.16%	69.11%	72.79%	65.41%	82.32%	78.72%
Semi-urban	22.46%	20.06%	18.29%	15.01%	20.54%	9.50%	11.35%
Rural	17.64%	15.70%	12.40%	12.20%	14.01%	8.18%	9.22%
Sample size	10,309	2,433	1,476	713	2,833	379	141

Standard deviations in parentheses

Table B.10 Income and other employment characteristics by highest educational qualification of all employed Maori females in 1996

	Highest educational qualification						
	No qual.	S. Cert.	UE/SFC	Bursary	Diploma	Bachelor	Postgrad.
Age	38.69	34.21	29.78	25.95	36.02	32.56	38.21
	(10.69)	(10.19)	(8.78)	(9.74)	(11.08)	(8.60)	(9.80)
Annual income 1996 dollars	\$16,770	\$19,220	\$20,898	\$15,734	\$23,178	\$29,994	\$42,688
	(\$11,661)	(\$11,244)	(\$12,547)	(\$11,415)	(\$13,608)	(\$18,923)	(\$26,400)
Hours worked (per week)	32.91	34.78	36.07	32.57	36.84	40.68	43.77
	(15.71)	(15.19)	(15.36)	(16.26)	(16.41)	(16.12)	(17.93)
Managerial/administrative occupation	4.15%	6.50%	9.60%	4.92%	6.19%	10.20%	15.33%
Professional	3.87%	5.82%	6.42%	7.39%	32.18%	51.56%	51.09%
Clerical	12.53%	27.00%	32.60%	27.65%	16.40%	10.48%	8.03%
Service	23.37%	20.68%	19.20%	28.60%	16.98%	6.80%	3.65%
Agricultural	8.55%	5.59%	4.94%	4.17%	3.80%	0.57%	0.00%
Trade orientated	2.03%	1.68%	1.34%	1.70%	0.97%	0.00%	0.00%
Plant and machine operator	13.21%	7.82%	4.52%	3.79%	2.30%	0.28%	0.00%
Elementary/low-skilled	25.57%	14.55%	9.95%	11.17%	6.23%	8.22%	5.84%
Technical	6.74%	10.36%	11.43%	10.61%	14.94%	11.90%	16.06%
Agriculture and fisheries industry	9.59%	6.09%	6.14%	3.98%	4.16%	1.98%	2.92%
Mining	0.11%	0.09%	0.00%	0.00%	0.00%	0.00%	0.00%
Manufacturing	21.73%	15.32%	8.89%	9.66%	6.06%	1.13%	2.19%
Electricity	0.19%	0.23%	0.49%	0.00%	0.13%	0.28%	0.00%
Construction	1.08%	1.50%	0.78%	0.38%	1.15%	0.28%	1.46%
Wholesaling	20.17%	20.18%	21.95%	27.84%	11.89%	7.08%	4.38%
Transportation	5.32%	5.91%	5.79%	3.41%	3.67%	2.83%	1.46%
Finance	4.45%	9.82%	12.84%	14.58%	7.21%	10.76%	7.30%
Social services	37.37%	40.86%	43.12%	40.15%	65.74%	75.64%	80.29%
Married	47.23%	41.59%	30.84%	15.72%	42.35%	32.01%	42.34%
Major urban	62.92%	65.86%	67.54%	76.33%	66.76%	78.75%	84.67%
Semi-urban	22.07%	18.91%	17.01%	12.88%	17.90%	11.05%	2.92%
Rural	14.99%	15.23%	15.46%	10.80%	15.34%	10.20%	12.41%
Sample size	6,411	2,200	1,417	528	2,262	353	137

Standard deviations in parentheses

Table B.11 Income and other employment characteristics by highest educational qualification of all employed Part-Maori males in 1996

	Highest educational qualification						
	No qual.	S. Cert.	UE/SFC	Bursary	Diploma	Bachelor	Postgrad.
Age	35.32 (11.74)	31.69 (10.67)	29.36 (9.33)	26.51 (9.59)	35.39 (10.54)	34.00 (9.69)	38.23 (10.40)
Annual income 1996 dollars	\$26,044 (\$16,519)	\$28,338 (\$19,089)	\$29,393 (\$20,987)	\$22,945 (\$20,383)	\$34,241 (\$20,923)	\$47,005 (\$33,581)	\$54,415 (\$34,408)
Hours worked (per week)	44.96 (14.66)	46.12 (14.19)	44.47 (14.32)	39.40 (17.77)	46.60 (14.45)	46.38 (15.47)	47.21 (14.57)
Managerial/administrative occupation	6.09%	10.10%	11.27%	9.84%	11.53%	18.63%	18.05%
Professional	1.41%	2.14%	3.74%	3.59%	9.08%	43.68%	53.58%
Clerical	4.26%	5.78%	9.28%	12.10%	3.28%	6.65%	3.72%
Service	7.27%	13.03%	16.81%	24.59%	10.13%	4.32%	3.72%
Agricultural	14.06%	12.09%	9.28%	8.20%	7.72%	3.55%	2.87%
Trade orientated	14.17%	16.07%	11.81%	5.93%	28.31%	1.55%	1.15%
Plant and machine operator	28.84%	19.49%	13.22%	10.07%	9.57%	1.44%	0.57%
Elementary/low-skilled	19.82%	14.16%	11.52%	13.11%	6.53%	4.21%	4.30%
Technical	4.08%	7.13%	13.07%	12.57%	13.85%	15.96%	12.03%
Agriculture and fisheries industry	14.99%	13.44%	9.52%	8.67%	8.42%	4.77%	3.44%
Mining	0.87%	0.38%	0.29%	0.08%	0.54%	0.33%	0.29%
Manufacturing	26.87%	24.75%	19.63%	12.26%	20.19%	8.76%	5.73%
Electricity	0.68%	0.45%	0.73%	0.47%	1.26%	0.67%	0.86%
Construction	13.01%	11.45%	7.63%	4.84%	14.18%	2.11%	1.72%
Wholesaling	14.58%	18.85%	22.74%	34.35%	17.55%	9.53%	9.17%
Transportation	9.67%	7.25%	6.85%	6.79%	6.36%	3.22%	2.01%
Finance	3.61%	6.31%	11.37%	11.32%	8.19%	32.59%	20.63%
Social services	15.72%	17.12%	21.23%	21.23%	23.30%	38.03%	56.16%
Married	46.27%	38.87%	32.70%	21.39%	52.34%	49.11%	55.01%
Major urban	60.49%	63.91%	71.38%	77.05%	67.95%	81.26%	80.80%
Semi-urban	21.62%	19.19%	15.50%	12.65%	16.26%	8.76%	8.02%
Rural	17.85%	16.90%	13.02%	10.30%	15.70%	9.98%	10.89%
Sample size	5,732	2,663	2,058	1,281	4,274	902	349

Standard deviations in parentheses

Table B.12 Income and other employment characteristics by highest educational qualification of all employed Part-Maori females in 1996

	Highest educational qualification						
	No qual.	S. Cert.	UE/SFC	Bursary	Diploma	Bachelor	Postgrad.
Age	37.70	33.21	29.50	24.10	34.11	31.99	36.93
	(11.08)	(10.20)	(8.82)	(8.06)	(10.85)	(9.35)	(10.50)
Annual income 1996 dollars	\$17,623	\$19,870	\$21,164	\$15,712	\$23,418	\$29,503	\$38,546
	(\$12,883)	(\$13,896)	(\$14,481)	(\$14,296)	(\$14,845)	(\$19,625)	(\$25,637)
Hours worked (per week)	33.16	34.27	35.18	31.58	36.13	39.99	41.57
	(16.44)	(15.80)	(15.23)	(17.40)	(15.92)	(16.84)	(16.25)
Managerial/administrative occupation	7.48%	9.52%	9.68%	6.21%	6.55%	9.78%	11.96%
Professional	2.39%	3.23%	4.60%	3.76%	28.64%	49.14%	59.42%
Clerical	19.61%	31.37%	38.20%	30.23%	19.22%	12.47%	6.88%
Service	25.32%	21.85%	18.75%	34.48%	18.64%	8.07%	3.62%
Agricultural	8.17%	6.32%	5.56%	4.00%	3.95%	2.08%	0.36%
Trade orientated	1.91%	1.55%	1.45%	0.57%	1.16%	0.37%	0.00%
Plant and machine operator	9.77%	5.83%	3.33%	2.94%	1.99%	0.12%	0.00%
Elementary/low-skilled	17.05%	9.38%	5.83%	6.13%	4.34%	3.06%	3.99%
Technical	8.31%	10.96%	12.61%	11.68%	15.52%	14.91%	13.77%
Agriculture and fisheries industry	8.53%	6.88%	6.31%	4.90%	4.53%	2.69%	0.72%
Mining	0.19%	0.14%	0.04%	0.00%	0.06%	0.00%	0.00%
Manufacturing	17.89%	12.79%	10.21%	6.05%	5.47%	4.03%	1.81%
Electricity	0.14%	0.21%	0.39%	0.33%	0.28%	0.37%	0.00%
Construction	1.31%	2.35%	2.32%	0.90%	1.10%	0.49%	0.36%
Wholesaling	27.78%	28.63%	23.70%	39.05%	15.30%	12.35%	6.88%
Transportation	5.13%	5.55%	6.31%	4.66%	3.76%	2.20%	2.54%
Finance	6.93%	14.65%	18.97%	15.11%	10.47%	18.09%	14.86%
Social services	32.10%	28.80%	31.76%	29.00%	59.04%	59.78%	72.83%
Married	52.54%	47.17%	38.06%	16.75%	42.94%	34.35%	44.20%
Major urban	64.41%	65.33%	68.99%	79.17%	68.79%	82.15%	85.51%
Semi-urban	19.82%	19.25%	16.34%	12.25%	16.43%	8.31%	9.78%
Rural	15.76%	15.38%	14.63%	8.58%	14.77%	9.54%	4.71%
Sample size	4,187	2,847	2,283	1,224	3,621	818	276

Standard deviations in parentheses

Table B.13 Income and other employment characteristics by highest educational qualification of all employed European males in 1996

	Highest educational qualification						
	No qual.	S. Cert.	UE/SFC	Bursary	Diploma	Bachelor	Postgrad.
Age	42.36	36.69	33.50	29.60	39.41	37.84	41.45
	(12.27)	(11.82)	(10.96)	(11.86)	(11.14)	(10.82)	(10.17)
Annual income 1996 dollars	\$31,021	\$33,842	\$35,988	\$28,662	\$38,850	\$55,051	\$63,724
	(\$21,409)	(\$23,627)	(\$25,890)	(\$27,239)	(\$23,862)	(\$36,184)	(\$36,995)
Hours worked (per week)	46.68	47.52	46.21	38.99	46.94	46.31	47.98
	(15.17)	(14.06)	(13.44)	(17.91)	(13.38)	(13.20)	(13.60)
Managerial/administrative occupation	11.65%	16.45%	19.61%	15.64%	15.71%	21.17%	18.57%
Professional	1.45%	2.50%	4.63%	5.65%	10.46%	45.53%	56.92%
Clerical	4.47%	6.13%	8.99%	10.43%	2.85%	4.63%	2.71%
Service	6.99%	9.71%	12.15%	20.65%	6.45%	3.22%	1.90%
Agricultural	18.53%	16.58%	12.53%	9.39%	8.48%	4.82%	2.35%
Trade orientated	16.36%	15.67%	10.71%	6.77%	28.94%	1.48%	0.76%
Plant and machine operator	21.61%	14.11%	8.64%	6.13%	6.61%	1.21%	0.62%
Elementary/low-skilled	13.49%	8.96%	7.59%	9.49%	4.45%	2.75%	2.63%
Technical	5.45%	9.89%	15.16%	15.85%	16.05%	15.18%	13.54%
Agriculture and fisheries industry	18.38%	16.73%	12.43%	9.20%	8.73%	5.81%	3.29%
Mining	0.76%	0.44%	0.22%	0.17%	0.45%	0.24%	0.50%
Manufacturing	22.78%	19.26%	15.53%	11.58%	20.08%	9.39%	5.55%
Electricity	0.58%	0.45%	0.44%	0.45%	1.38%	0.93%	0.72%
Construction	11.15%	9.94%	7.12%	5.08%	14.55%	2.04%	1.04%
Wholesaling	18.43%	22.66%	23.64%	32.56%	18.36%	12.12%	7.78%
Transportation	8.96%	7.81%	7.11%	6.26%	6.18%	3.43%	2.16%
Finance	4.84%	8.61%	15.67%	15.61%	10.35%	35.04%	21.32%
Social services	14.12%	14.11%	17.85%	19.10%	19.92%	31.01%	57.64%
Married	62.05%	54.08%	46.70%	29.99%	64.75%	59.43%	67.90%
Major urban	57.53%	62.12%	70.03%	79.11%	69.09%	81.42%	85.25%
Semi-urban	18.77%	16.05%	13.39%	9.42%	15.37%	8.68%	7.36%
Rural	23.66%	21.79%	16.51%	11.39%	15.45%	9.71%	7.06%
Sample size	73,275	34,865	29,154	17,074	87,639	27,077	14,581

Standard deviations in parentheses

Table B.14 Income and other employment characteristics by highest educational qualification of all employed European females in 1996

	Highest educational qualification						
	No qual.	S. Cert.	UE/SFC	Bursary	Diploma	Bachelor	Postgrad.
Age	44.07	38.17	32.61	26.54	38.51	34.48	38.62
	(10.63)	(10.59)	(9.91)	(10.79)	(11.19)	(10.22)	(10.21)
Annual income 1996 dollars	\$18,911	\$22,011	\$23,047	\$15,930	\$25,209	\$31,368	\$38,936
	(\$15,012)	(\$16,746)	(\$16,657)	(\$15,230)	(\$17,240)	(\$22,094)	(\$26,381)
Hours worked (per week)	31.87	33.00	34.10	28.90	34.56	37.82	39.53
	(16.19)	(15.80)	(15.32)	(16.89)	(16.16)	(16.16)	(16.33)
Managerial/administrative occupation	10.17%	11.69%	11.27%	7.77%	8.67%	11.61%	11.76%
Professional	1.69%	2.75%	4.68%	4.05%	32.88%	47.23%	56.34%
Clerical	24.73%	36.99%	38.68%	29.17%	17.77%	11.67%	7.25%
Service	25.98%	18.84%	16.37%	33.80%	13.73%	6.33%	3.41%
Agricultural	9.01%	8.50%	7.29%	5.12%	5.87%	3.07%	2.09%
Trade orientated	1.91%	1.35%	1.36%	1.08%	1.03%	0.40%	0.19%
Plant and machine operator	7.36%	3.36%	2.39%	2.30%	1.25%	0.54%	0.29%
Elementary/low-skilled	12.25%	5.80%	4.22%	5.14%	2.46%	2.36%	2.48%
Technical	6.91%	10.72%	13.74%	11.57%	16.34%	16.78%	16.18%
Agriculture and fisheries industry	9.55%	9.32%	8.04%	5.64%	6.34%	3.69%	2.62%
Mining	0.07%	0.09%	0.07%	0.07%	0.04%	0.07%	0.10%
Manufacturing	14.46%	10.75%	9.31%	7.14%	5.27%	4.75%	3.11%
Electricity	0.21%	0.36%	0.41%	0.33%	0.22%	0.32%	0.28%
Construction	2.22%	2.73%	2.34%	1.28%	1.31%	0.70%	0.37%
Wholesaling	30.56%	27.13%	24.43%	38.01%	14.12%	11.80%	7.75%
Transportation	3.82%	4.85%	5.73%	4.54%	3.07%	2.77%	1.55%
Finance	9.71%	18.00%	23.33%	16.80%	12.03%	20.94%	13.73%
Social services	29.39%	26.78%	26.33%	26.18%	57.60%	54.96%	70.48%
Married	68.25%	63.53%	51.04%	24.07%	60.12%	45.87%	52.75%
Major urban	64.96%	66.67%	69.40%	80.05%	70.70%	81.68%	83.96%
Semi-urban	18.48%	15.90%	14.53%	9.44%	13.10%	8.07%	6.85%
Rural	16.56%	17.40%	16.05%	10.48%	16.16%	10.15%	9.08%
Sample size	54,314	40,202	30,461	13,868	67,170	20,750	9,904

Standard deviations in parentheses

Table B.15 Income and other employment characteristics by highest educational qualification of all employed Other males in 1996

	Highest educational qualification						
	No qual.	S. Cert.	UE/SFC	Bursary	Diploma	Bachelor	Postgrad
Age	37.60	31.91	29.75	25.66	35.96	35.79	39.24
	(11.01)	(9.71)	(8.98)	(8.51)	(10.05)	(8.77)	(9.04)
Annual income 1996 dollars	\$22,859	\$26,448	\$27,122	\$19,916	\$31,352	\$38,538	\$50,531
	(\$14,349)	(\$18,175)	(\$19,393)	(\$20,105)	(\$20,459)	(\$29,886)	(\$36,241)
Hours worked (per week)	42.81	44.07	42.47	34.68	43.38	42.95	44.25
	(14.10)	(14.00)	(14.63)	(18.37)	(14.19)	(15.02)	(14.80)
Managerial/administrative occupation	7.97%	9.91%	12.67%	10.21%	13.08%	18.62%	15.99%
Professional	0.95%	1.25%	3.08%	4.36%	11.10%	35.69%	52.26%
Clerical	4.83%	10.54%	13.60%	16.27%	5.86%	7.04%	4.35%
Service	10.81%	12.31%	17.49%	28.24%	10.89%	7.79%	3.01%
Agricultural	5.60%	5.01%	3.89%	3.77%	2.53%	2.06%	1.10%
Trade orientated	15.48%	15.21%	9.88%	5.79%	21.65%	3.02%	1.22%
Plant and machine operator	28.29%	20.74%	13.71%	7.42%	8.81%	4.39%	2.14%
Elementary/low-skilled	23.69%	17.49%	13.54%	12.56%	8.48%	5.45%	4.06%
Technical	2.39%	7.52%	12.14%	11.39%	17.59%	15.95%	15.87%
Agriculture and fisheries industry	5.54%	4.96%	4.07%	4.10%	2.71%	2.37%	1.39%
Mining	0.09%	0.17%	0.06%	0.00%	0.09%	0.16%	0.12%
Manufacturing	40.70%	31.79%	23.18%	13.60%	22.98%	14.11%	7.71%
Electricity	0.22%	0.28%	0.29%	0.20%	0.96%	1.03%	0.81%
Construction	6.09%	7.12%	4.71%	2.86%	8.57%	1.96%	1.56%
Wholesaling	22.68%	25.41%	30.68%	39.30%	25.35%	23.20%	12.80%
Transportation	6.82%	8.38%	8.60%	7.55%	7.28%	5.70%	3.01%
Finance	4.58%	6.78%	10.81%	12.75%	11.55%	25.79%	20.22%
Social services	13.28%	15.10%	17.61%	19.65%	20.51%	25.69%	52.38%
Married	61.38%	49.12%	41.89%	23.49%	61.23%	67.52%	75.43%
Major urban	90.60%	90.03%	91.52%	94.34%	91.61%	94.61%	93.11%
Semi-urban	6.72%	6.04%	5.17%	3.58%	5.56%	3.58%	4.69%
Rural	2.63%	3.93%	3.31%	2.08%	2.71%	1.71%	1.97%
Sample size	6,875	1,755	1,721	1,537	3,325	3,211	1,726

Standard deviations in parentheses

Table B.16 Income and other employment characteristics by highest educational qualification of all employed Other females in 1996

	Highest educational qualification						
	No qual.	S. Cert.	UE/SFC	Bursary	Diploma	Bachelor	Postgrad.
Age	38.33	32.71	29.36	23.36	34.66	33.67	37.01
	(10.39)	(9.13)	(8.25)	(6.73)	(10.24)	(8.24)	(8.92)
Annual Income 1996 sollars	\$17,287	\$21,489	\$22,240	\$13,779	\$22,992	\$26,858	\$34,278
	(\$11,910)	(\$12,140)	(\$13,816)	(\$12,934)	(\$14,796)	(\$20,369)	(\$26,213)
Hours worked (per week)	37.29	36.37	36.85	28.44	35.77	36.20	37.35
	(15.64)	(14.08)	(15.56)	(17.39)	(14.89)	(15.10)	(15.61)
Managerial/administrative occupation	7.65%	9.08%	9.47%	4.82%	6.86%	10.83%	9.94%
Professional	1.12%	2.80%	3.43%	3.28%	25.86%	34.86%	52.93%
Clerical	10.61%	36.55%	40.12%	34.67%	26.65%	18.76%	9.94%
Service	23.41%	19.25%	21.18%	34.96%	16.87%	10.87%	6.52%
Agricultural	4.51%	1.31%	1.56%	1.46%	1.43%	0.93%	0.55%
Trade orientated	3.22%	2.23%	1.25%	1.09%	0.86%	0.56%	0.00%
Plant and machine operator	20.90%	7.54%	3.93%	2.85%	3.02%	3.22%	0.44%
Elementary/low-skilled	25.59%	12.96%	7.66%	7.15%	5.11%	4.59%	3.20%
Technical	3.00%	8.28%	11.40%	9.71%	13.34%	15.38%	16.46%
Agriculture and fisheries industry	4.73%	1.60%	1.93%	1.24%	1.78%	1.37%	0.55%
Mining	0.00%	0.00%	0.00%	0.00%	0.06%	0.00%	0.00%
Manufacturing	33.39%	18.22%	11.03%	7.81%	6.99%	9.02%	3.76%
Electricity	0.12%	0.51%	0.44%	0.29%	0.38%	0.44%	0.33%
Construction	0.55%	1.09%	1.00%	0.51%	0.41%	0.56%	0.11%
Wholesaling	27.71%	26.44%	27.73%	40.22%	20.33%	19.36%	15.03%
Transportation	3.08%	6.11%	6.17%	5.40%	5.11%	4.95%	3.20%
Finance	5.31%	17.53%	21.74%	17.15%	15.95%	25.48%	16.46%
Social services	25.12%	28.50%	29.97%	27.37%	48.98%	38.81%	60.55%
Married	66.67%	52.88%	43.99%	16.72%	56.39%	59.82%	65.64%
Major urban	91.33%	92.06%	92.96%	96.42%	91.20%	93.12%	94.14%
Semi-urban	6.14%	5.94%	5.11%	2.26%	5.27%	4.15%	3.31%
Rural	2.51%	2.00%	1.93%	1.24%	3.53%	2.58%	2.54%
Sample size	5,100	1,751	1,605	1,370	3,148	2,484	905

Standard deviations in parentheses

Appendix C Additional Regression Results

Table C.1 *Income effects of secondary and tertiary education of males: 1986 and 1996*

	Maori males		Part-Maori males		European males		Other males	
	1986	1996	1986	1996	1986	1996	1986	1996
Intercept	8.9329 (326.95)	8.7321 (225.61)	8.8399 (168.05)	8.6738 (215.38)	8.9331 (1033.34)	8.8250 (836.09)	8.8431 (188.35)	8.6581 (162.12)
School Certificate	0.0822 (8.63)	0.1296 (9.31)	0.0690 (4.09)	0.1202 (8.45)	0.0473 (15.59)	0.0704 (18.03)	0.0495 (3.52)	0.1820 (9.85)
U.E./Sixth Form Cert.	0.1541 (9.32)	0.2497 (13.77)	0.1258 (5.33)	0.1991 (11.88)	0.0840 (22.35)	0.1354 (30.97)	0.1334 (7.17)	0.2640 (13.73)
Bursary	0.1839 (5.05)	0.1936 (6.70)	0.0731 (1.69)	0.0501 (2.14)	0.0249 (3.63)	-0.0434 (7.00)	-0.0247 (0.84)	0.0545 (2.29)
Diploma	0.2267 (29.60)	0.2364 (16.69)	0.2422 (18.02)	0.2504 (18.66)	0.1784 (83.42)	0.1561 (48.19)	0.1937 (17.21)	0.2508 (16.08)
Bachelor's degree	0.3864 (8.21)	0.3482 (8.15)	0.3926 (10.31)	0.4424 (16.70)	0.3303 (67.55)	0.3440 (64.49)	0.3235 (13.38)	0.2136 (10.38)
Postgraduate qual.	0.4778 (10.62)	0.6497 (11.97)	0.4444 (7.04)	0.5954 (17.14)	0.4077 (74.45)	0.4691 (73.49)	0.4154 (13.96)	0.3790 (14.69)
Hours worked (per week)	0.0056 (19.17)	0.0105 (25.94)	0.0049 (8.49)	0.0111 (26.75)	0.0050 (48.36)	0.0107 (97.38)	0.0091 (19.18)	0.0127 (29.20)
Managerial/administrative occupation	0.1487 (5.57)	0.1209 (4.38)	0.1840 (5.16)	0.2336 (9.80)	0.2470 (63.89)	0.2948 (53.83)	0.3610 (11.80)	0.1357 (5.57)
Professional	0.0364 (1.74)	0.0814 (2.82)	0.1246 (4.14)	0.1419 (5.37)	0.1119 (30.11)	0.2285 (38.33)	0.2056 (9.02)	0.3972 (16.06)
Service	0.0413 (2.24)	-0.0292 (1.20)	0.1029 (3.24)	0.0025 (0.10)	-0.0472 (9.78)	-0.0051 (0.82)	-0.1620 (6.60)	-0.2295 (9.94)
Agricultural	-0.2421 (10.95)	-0.2577 (8.49)	-0.1894 (4.26)	-0.1417 (4.49)	-0.2794 (42.63)	-0.1352 (16.55)	-0.3434 (8.45)	-0.2367 (5.37)
Product./transport workers	-0.1518 (11.56)	—	-0.1031 (4.22)	—	-0.1212 (39.63)	—	-0.1413 (8.11)	—
Sales	-0.0674 (2.80)	—	0.0056 (0.17)	—	0.0157 (3.88)	—	-0.0430 (1.68)	—
Trade orientated	—	-0.0754 (3.36)	—	-0.0307 (1.38)	—	-0.0300 (5.49)	—	-0.0774 (3.47)
Plant and machine operator	—	-0.0825 (4.07)	—	-0.0370 (1.70)	—	-0.0616 (10.86)	—	-0.1312 (6.22)
Elementary/low-skilled	—	-0.2231 (10.41)	—	-0.1755 (7.59)	—	-0.1759 (27.78)	—	-0.2599 (11.54)
Technical	—	0.0580 (2.20)	—	0.1154 (4.86)	—	0.1730 (31.11)	—	0.1580 (6.76)

Dependent variable: The natural logarithm of annual income (t-ratios in parentheses)

Table C.1 continued: Income effects of secondary and tertiary education of males

	Maori males		Part-Maori males		European males		Other males	
	1986	1996	1986	1996	1986	1996	1986	1996
Mining industry	0.1882 (6.56)	0.2589 (4.63)	0.3367 (5.35)	0.3324 (5.79)	0.1804 (16.35)	0.2581 (17.03)	0.1463 (1.01)	0.5571 (6.24)
Manufacturing	0.1189 (6.48)	0.1955 (7.98)	0.1726 (4.54)	0.1764 (6.81)	0.0949 (15.22)	0.1332 (19.22)	0.0481 (1.35)	0.2142 (5.21)
Electricity	0.1219 (5.52)	0.2830 (7.53)	0.1764 (3.71)	0.2282 (5.27)	0.1420 (18.35)	0.2781 (27.06)	0.1021 (2.17)	0.5225 (9.49)
Construction	0.0064 (0.33)	0.0631 (2.35)	0.0715 (1.77)	0.0562 (1.99)	0.0564 (8.62)	0.0460 (6.16)	0.0808 (2.12)	0.1396 (3.07)
Wholesaling	-0.0920 (4.45)	-0.0505 (1.91)	-0.0328 (0.81)	-0.0543 (1.99)	-0.0525 (8.16)	-0.0609 (8.51)	-0.0610 (1.64)	-0.0541 (1.29)
Transportation	0.1204 (6.21)	0.1319 (4.84)	0.1889 (4.74)	0.1905 (6.50)	0.1551 (23.97)	0.1633 (21.29)	0.1221 (3.27)	0.2313 (5.26)
Finance	0.0413 (1.41)	0.1088 (3.53)	0.0941 (1.92)	0.1907 (6.35)	0.1642 (24.10)	0.2154 (29.02)	0.0575 (1.41)	0.2712 (6.29)
Social services	-0.1096 (5.60)	-0.0256 (1.02)	-0.0264 (0.65)	-0.0101 (0.38)	0.0245 (3.93)	-0.0098 (1.40)	-0.0045 (0.12)	0.0811 (1.95)
Married	0.1478 (23.09)	0.1740 (17.29)	0.1772 (13.27)	0.1502 (14.17)	0.1479 (69.64)	0.1443 (55.07)	0.0815 (8.08)	0.0511 (4.30)
Major urban	-0.0321 (4.38)	0.0004 (0.04)	-0.0070 (0.52)	0.0580 (4.67)	0.0506 (22.04)	0.0847 (27.55)	-0.1050 (6.51)	-0.0702 (3.26)
Rural	-0.0933 (9.44)	-0.0945 (9.62)	-0.1028 (5.11)	-0.0726 (4.19)	-0.0763 (21.76)	-0.0356 (8.08)	-0.0937 (2.94)	-0.0002 (0.00)
Experience	0.04275 (39.03)	0.06325 (36.34)	0.04762 (23.58)	0.06839 (39.24)	0.04306 (139.92)	0.06117 (149.89)	0.03599 (22.66)	0.05819 (31.01)
Experience ²	-0.00079 (32.70)	-0.00111 (30.88)	-0.00089 (18.98)	-0.00128 (32.74)	-0.00077 (120.46)	-0.00111 (131.88)	-0.00061 (17.42)	-0.00101 (24.59)
F	358.07	275.86	157.05	370.19	6574.08	6229.73	221.60	350.78
Sample size	28,659	18,219	8,173	17,128	335,632	281,246	17,273	19,930

Dependent variable: The natural logarithm of annual income

Least squares regression (t-ratios based on White consistent standard errors, in parentheses)

Table C.2 Income effects of secondary and tertiary education of females: 1986 and 1996

	Maori females		Part-Maori females		European females		Other females	
	1986	1996	1986	1996	1986	1996	1986	1996
Intercept	8.1840	8.4494	7.9040	8.3508	8.1418	8.5343	8.2951	8.3268
	(175.73)	(168.81)	(86.28)	(152.28)	(545.03)	(592.14)	(106.71)	(115.63)
School Certificate	0.0718	0.1266	0.0659	0.0959	0.0620	0.0826	0.0547	0.1973
	(4.88)	(7.59)	(2.64)	(5.59)	(14.27)	(17.39)	(3.14)	(10.16)
U.E./Sixth Form Cert.	0.1626	0.2644	0.1585	0.1825	0.0925	0.1475	0.1292	0.2407
	(7.75)	(12.90)	(4.98)	(9.23)	(16.88)	(27.00)	(5.66)	(10.96)
Bursary	0.0656	0.0885	0.1521	0.0458	0.0366	-0.0706	-0.0320	-0.0210
	(1.28)	(2.52)	(2.63)	(1.74)	(3.53)	(9.31)	(0.78)	(0.79)
Diploma	0.2524	0.2703	0.2308	0.2528	0.1614	0.1788	0.1308	0.1696
	(16.15)	(14.42)	(8.26)	(14.01)	(36.55)	(37.26)	(6.95)	(8.73)
Bachelor's degree	0.4269	0.4903	0.4490	0.3553	0.2832	0.2853	0.2175	0.2103
	(7.48)	(12.46)	(7.24)	(11.87)	(32.81)	(42.13)	(5.70)	(9.03)
Postgraduate qual.	0.3189	0.7290	0.4159	0.5229	0.3688	0.4371	0.3163	0.3488
	(2.85)	(13.54)	(5.81)	(12.12)	(35.34)	(52.18)	(5.71)	(10.57)
Hours worked (per week)	0.0189	0.0141	0.0208	0.0170	0.0224	0.0206	0.0198	0.0179
	(31.74)	(31.54)	(21.29)	(36.93)	(136.66)	(165.75)	(30.02)	(37.67)
Managerial/administrative occupation	0.0366	0.0805	0.2223	0.1074	0.2748	0.1692	0.1672	0.0976
	(0.60)	(2.84)	(3.64)	(4.62)	(28.64)	(31.30)	(2.41)	(3.84)
Professional	-0.0158	0.0525	0.0917	0.0852	0.1108	0.1708	0.1102	0.2541
	(0.70)	(2.29)	(2.68)	(4.11)	(22.85)	(34.50)	(4.43)	(12.09)
Service	-0.3270	-0.2607	-0.2102	-0.2886	-0.3373	-0.2879	-0.3209	-0.2820
	(19.08)	(13.28)	(7.29)	(16.04)	(69.34)	(61.39)	(15.86)	(14.68)
Agricultural	-0.4316	-0.3653	-0.3126	-0.2013	-0.4204	-0.2218	-0.4278	-0.2286
	(10.73)	(8.49)	(3.76)	(4.13)	(30.68)	(17.45)	(5.62)	(3.40)
Product./transport workers	-0.2971	—	-0.2047	—	-0.2682	—	-0.2537	—
	(18.25)		(6.28)		(49.30)		(10.71)	
Sales	-0.3018	—	-0.2228	—	-0.2038	—	-0.2999	—
	(10.63)		(6.04)		(37.50)		(9.57)	
Trade orientated	—	-0.2276	—	-0.2415	—	-0.2021	—	-0.1635
		(4.82)		(4.95)		(15.47)		(3.89)
Plant and machine operator	—	-0.2162	—	-0.2875	—	-0.3223	—	-0.2630
		(8.55)		(10.18)		(37.89)		(10.39)
Elementary/low-skilled	—	-0.3577	—	-0.3285	—	-0.3666	—	-0.3226
		(17.02)		(14.13)		(50.08)		(14.17)
Technical	—	0.0218	—	0.0280	—	0.0505	—	0.1296
		(1.02)		(1.51)		(15.91)		(6.09)

Dependent variable: The natural logarithm of annual income

Least squares regression (t-ratios based on White consistent standard errors, in parentheses)

Table C.2 continued: Income effects of secondary and tertiary education of females: 1986 and 1996

	Maori females		Part-Maori females		European females		Other females	
	1986	1996	1986	1996	1986	1996	1986	1996
Mining industry	0.2301 (2.74)	0.6455 (4.10)	0.3797 (3.15)	0.7021 (3.19)	0.1150 (3.49)	0.1007 (1.79)	0.1116 (0.56)	0.4539 (2.83)
Manufacturing	0.2211 (6.00)	0.2998 (7.32)	0.3100 (3.76)	0.2578 (5.34)	0.1508 (11.84)	0.0965 (7.68)	0.0044 (0.06)	0.2311 (3.71)
Electricity	0.2577 (3.01)	0.4976 (6.91)	0.3837 (3.23)	0.3934 (3.63)	0.2470 (11.42)	0.2017 (8.21)	0.0309 (0.21)	0.4829 (5.07)
Construction	0.0141 (0.22)	0.1370 (1.97)	0.0917 (0.82)	0.1166 (1.76)	0.0198 (1.17)	0.0438 (2.63)	-0.1552 (1.63)	0.1986 (2.10)
Wholesaling	0.0266 (0.70)	0.0259 (0.63)	0.1796 (2.23)	0.0370 (0.78)	0.0275 (2.19)	-0.0784 (6.44)	-0.0866 (1.26)	0.0010 (0.02)
Transportation	0.1572 (3.95)	0.2836 (6.18)	0.3491 (4.23)	0.3239 (6.26)	0.1917 (14.60)	0.1613 (11.89)	0.0323 (0.46)	0.3238 (4.90)
Finance	0.1084 (2.59)	0.2899 (6.64)	0.3273 (4.06)	0.3098 (6.41)	0.1746 (13.82)	0.1663 (13.53)	0.1074 (1.55)	0.3357 (5.32)
Social services	0.0739 (2.03)	0.0889 (2.23)	0.1917 (2.47)	0.1079 (2.30)	0.0715 (5.79)	-0.0658 (5.50)	-0.0479 (0.71)	0.1388 (2.23)
Married	-0.1436 (12.25)	-0.1069 (8.45)	-0.2083 (9.88)	-0.1480 (11.90)	-0.1983 (63.36)	-0.1677 (55.60)	-0.1047 (7.83)	-0.1212 (9.72)
Major Urban	0.0675 (5.21)	0.1043 (6.99)	0.0497 (2.08)	0.1488 (9.67)	0.0788 (19.16)	0.1208 (29.61)	0.0642 (2.38)	0.0832 (3.34)
Rural	-0.0545 (2.83)	-0.0495 (2.37)	-0.0476 (1.33)	0.0383 (1.73)	-0.0423 (6.78)	0.0378 (6.43)	-0.0615 (1.27)	0.0309 (0.63)
Experience	0.03044 (124.84)	0.05259 (25.79)	0.04108 (15.24)	0.05432 (28.94)	0.02375 (55.83)	0.04219 (89.15)	0.02733 (13.29)	0.04930 (24.39)
Experience ²	-0.00047 (12.30)	-0.00089 (20.47)	-0.00073 (11.04)	-0.00095 (21.95)	-0.00032 (33.42)	-0.00068 (65.94)	-0.00041 (8.47)	-0.00081 (17.82)
F	213.81	203.44	86.98	276.80	3687.49	4764.87	126.78	274.08
Sample Size	16,898	13,241	6,007	15,136	228,523	234,079	12,031	16,156

Dependent variable: The natural logarithm of annual income

Least squares regression (t-ratios based on White consistent standard errors, in parentheses)

Appendix D Alternative Decompositions

Table D.1 Decompositions of income differentials based on alternative specifications: all employed males and females

Income differential explained by:	1986			1996		
	$\overline{\ln Y_E} - \overline{\ln Y_M}$	$\overline{\ln Y_E} - \overline{\ln Y_P}$	$\overline{\ln Y_E} - \overline{\ln Y_O}$	$\overline{\ln Y_E} - \overline{\ln Y_M}$	$\overline{\ln Y_E} - \overline{\ln Y_P}$	$\overline{\ln Y_E} - \overline{\ln Y_O}$
Males						
Overall difference	0.25064	0.16121	0.22514	0.35388	0.23317	0.31301
Alternative weights:						
Effect of characteristics	0.16509	0.13680	0.09981	0.22114	0.17654	0.13153
$\sum_{i=1}^k b_{iM P O} (\bar{X}_{iE} - \bar{X}_{iM P O})$	(65.9%)	(84.9%)	(44.3%)	(62.5%)	(75.7%)	(42.0%)
Effect of coefficients	0.08542	0.0244	0.12533	0.13274	0.05663	0.18148
$(b_{0E} - b_{0M P O}) + \sum_{i=1}^k \bar{X}_{iE} (b_{iE} - b_{iM P O})$	(34.1%)	(15.1%)	(515.7%)	(37.5%)	24.3%)	(58.0%)
Equation 2 weights, reported in Table 3:						
Effect of characteristics	0.18199	0.14181	0.04331	0.23184	0.18064	0.04812
$\sum_{i=1}^k b_{iE} (\bar{X}_{iE} - \bar{X}_{iM P O})$	(72.6%)	(88.0%)	(19.2%)	(65.5%)	(77.5%)	(15.4%)
Effect of coefficients	0.06865	0.0194	0.18183	0.12204	0.05253	0.26489
$(b_{0E} - b_{0M P O}) + \sum_{i=1}^k \bar{X}_{iM P O} (b_{iE} - b_{iM P O})$	(27.4%)	(12.0%)	(80.8%)	(34.5%)	(22.5%)	(84.6%)
Females						
Overall difference	0.09795	0.04198	0.00642	0.15531	0.10585	0.08972
Alternative weights:						
Effect of characteristics	0.08997	0.03045	0.00590	0.13769	0.08893	0.04932
$\sum_{i=1}^k b_{iM P O} (\bar{X}_{iE} - \bar{X}_{iM P O})$	(91.9%)	(72.5%)	(91.9%)	(88.7%)	(84.0%)	(55.0%)
Effect of coefficients	0.00798	0.01153	0.00052	0.01762	0.01692	0.0404
$(b_{0E} - b_{0M P O}) + \sum_{i=1}^k \bar{X}_{iE} (b_{iE} - b_{iM P O})$	(8.1%)	(27.5%)	(8.1%)	(11.3%)	(16.0%)	(45.0%)
Equation 2 weights, reported in Table 3:						
Effect of characteristics	0.09007	0.02963	-0.00510	0.11610	0.08367	0.02149
$\sum_{i=1}^k b_{iE} (\bar{X}_{iE} - \bar{X}_{iM P O})$	(92.0%)	(70.6%)	(-79.5%)	(74.7%)	(79.0%)	(24.0%)
Effect of coefficients	0.00788	0.01235	0.01152	0.03921	0.02218	0.06823
$(b_{0E} - b_{0M P O}) + \sum_{i=1}^k \bar{X}_{iM P O} (b_{iE} - b_{iM P O})$	(8.0%)	(29.4%)	(179.5%)	(25.3%)	(21.0%)	(76.0%)