

DECOMPOSING ETHNIC DIFFERENCES IN THE INCIDENCE OF EMPLOYER-PROVIDED TRAINING IN NEW ZEALAND

John Gibson

Department of Economics

University of Waikato

Private Bag 3105

Hamilton

NEW ZEALAND

fax: 64-7 838-4331

e-mail: jkgibson@waikato.ac.nz

Running Title “Ethnic differences in employer-provided training”

ABSTRACT: Minority workers in New Zealand are significantly less likely to receive employer-provided training. The contribution of differences in average characteristics and differences in the returns to those characteristics across ethnic groups are highlighted in this paper. The decomposition used in this paper deals with the index problem that results from the choice of a base group whose coefficients are used for predicting the probability of training. The results show that the gap in training probabilities, and the part of this gap due to differences in the returns to characteristics, differs widely between specific minority groups.

DECOMPOSING ETHNIC DIFFERENCES IN THE INCIDENCE OF EMPLOYER-PROVIDED TRAINING IN
NEW ZEALAND

I. INTRODUCTION

The disadvantaged position of many ethnic minorities in the labour markets of industrialised countries is well known. One possible cause of this disadvantage is difficulties experienced by minorities in obtaining work-related training (Shields and Wheatley Price, 1999a). Training may improve earnings, occupational status and job security (Blundell, *et al.*, 1999) so lack of training may contribute to continued labour market disadvantage. However, the existing literature on training is inconclusive, with, for example, some U.S. studies showing that blacks have a lower probability of receiving training (Duncan and Hoffman, 1979) while others show no difference between groups (Veum, 1996) or even suggest that blacks receive more training than whites (Altonji and Spletzer, 1991). Similar ambiguity comes from Britain, where Booth (1991) finds no significant ethnic differences while Arulampalam and Booth (1997) find significant differences.

One factor that may explain the ambiguity in the literature is that most studies just use intercept dummy variables to control for ethnic effects. This ignores differences across ethnic groups in the returns to various characteristics (where returns are in terms of an improved probability of receiving training). A more general approach, used by Shields and Wheatley Price (1999a&b), allows all slope and intercept variables to differ between ethnic groups, with the ethnic gap in training probabilities decomposed into a part due to differences in observable characteristics and a part due to differences in the returns to those characteristics.¹ But this decomposition is subject to an index problem that results from the choice of the base group whose coefficients are used for predicting the probability of training (Miller, 1994).

This paper uses an improved decomposition analysis to see whether the lower incidence of employer-provided training for ethnic minorities in New Zealand is due to differences in their observable characteristics or differences in the returns to those characteristics. There are three contributions of the paper. The first is to illustrate the index problem that results when only the coefficients for the majority group are used to decompose differences in training probabilities across ethnic groups. The second contribution is to present disaggregated results for minority groups, which show that the overall gap in training probabilities and the part of this gap due to coefficients, differs widely between specific minority groups. Finally, the paper is one of the few to provide evidence on the determinants of training outside of Britain and the U.S.²

II. METHODS AND DATA

The model follows Shields and Wheatley Price (1999b) but with an extension to deal with the index problem. Although there are supply and demand factors affecting training (Osterbeek, 1998), the available cross-sectional data allow only a reduced form model which is based on the assumption that the receipt of training by an employee is the joint outcome of optimizing behaviour by workers and employers. Let T^* be the unobserved net benefit to the individual and employer from providing training, then if $T^* > 0$, a training spell will be observed for the individual worker. Hence the model is:

$$T^{*W} = \mathbf{a}^W \mathbf{X}^W + \mathbf{m}^W \quad (1)$$

$$T^{*EM} = \mathbf{a}^{EM} \mathbf{X}^{EM} + \mathbf{m}^{EM} \quad (2)$$

$$T^p = 1 \text{ iff } T^* > 0, T^p = 0 \text{ otherwise}$$

where T^p is a dummy variable indicating the receipt of employer-provided training, \mathbf{X} is a vector of worker and job-characteristics, \mathbf{m} is an error term, and the superscripts refer to White and Ethnic Minority sub-samples.

The difference in the predicted mean incidence of training across the ethnic groups can be decomposed as:

$$\hat{T}^W - \hat{T}^{EM} = [\ddot{P}(\hat{\mathbf{a}}^W, \mathbf{X}^W) - \ddot{P}(\hat{\mathbf{a}}^W, \mathbf{X}^{EM})] + [\ddot{P}(\hat{\mathbf{a}}^W, \mathbf{X}^{EM}) - \ddot{P}(\hat{\mathbf{a}}^{EM}, \mathbf{X}^{EM})] \quad (3)$$

where \hat{T}^W and \hat{T}^{EM} are the averages of the predicted training probabilities for white and ethnic minority workers and $\hat{\mathbf{a}}^W$ and $\hat{\mathbf{a}}^{EM}$ are the estimated coefficients (from a probit model in this study). The term in the first square bracket on the right hand side measures the difference between the mean incidence of training for majority (i.e., white) workers and the mean incidence of training that minorities would achieve if they were allocated to training opportunities in the same way as white workers. This first term accounts for differences in average group characteristics, while the term in the second bracket indicates differences due to coefficients (i.e., in the returns to characteristics) evaluated using the characteristics of the minority group. The index problem results from using only the coefficients for the majority ethnic group to remove the component of the difference in training incidence that is ‘explained’ by differences in average characteristics across ethnic groups. One may get a different estimate of the ‘explained’ component if the coefficients for the minority group were used. Therefore, an alternative decomposition is given by:

$$\hat{T}^W - \hat{T}^{EM} = [\ddot{P}(\hat{\mathbf{a}}^{EM}, \mathbf{X}^W) - \ddot{P}(\hat{\mathbf{a}}^{EM}, \mathbf{X}^{EM})] + [\ddot{P}(\hat{\mathbf{a}}^W, \mathbf{X}^W) - \ddot{P}(\hat{\mathbf{a}}^{EM}, \mathbf{X}^W)] \quad (4)$$

and averaging the results of the two decomposition formulas may give the most reliable inferences (Miller, 1994).

The data come from the Education and Training Survey (ETS), conducted by Statistics New Zealand as a supplement to the September 1996 Household Labour Force Survey (HLFS). The ETS was the first major survey of job-related training in New Zealand, and it asked respondents aged 15-64 about their participation in various forms of training and study during the previous 12 months. Although the ETS has a sample of over 22,000, not

all of these observations are available for the current study because data on employer-provided training and job characteristics are only available for the currently employed workers, reducing the sample to $n=11,003$. Although white workers are the dominant group in this sample ($n=8965$), almost one-fifth of the sample come from minority groups. The largest of these minority groups are indigenous Maori workers ($n=1088$), while workers of Pacific Islands origin are the next largest group ($n=538$), while all other ethnic minorities comprise just under four percent of the sample ($n=412$). The explanatory variables used for the probit models capture the demographic characteristics of the workers and the characteristics of the job, occupation and industry. These variables are described in Appendix Table 1.

III. RESULTS

Initial tests indicated that there were no significant differences in the incidence of training between men and women within ethnic groups but there were significant differences across ethnic groups. Therefore, probit models are estimated on pooled male and female samples, separately for each of the four ethnic groups. Although there are significant differences in the coefficients across ethnic groups, the general patterns are in accord with results found previously: training is more likely for full-time workers with more schooling, experience and tenure; for managerial and technical occupations; and in the social and government services sector (Appendix Table 2).

The predicted probability of receiving employer-provided training is highest for white workers, at 28%, and lowest for Pacific Islands workers, at 15% (Table 1). The probabilities for Maori workers and those from 'other' ethnic groups are similar, at 22%.

In addition to the training probabilities predicted from own-coefficients, Table 1 also shows the predicted probabilities resulting from combining one group's characteristics with another group's coefficients – these off-diagonal elements are the ingredients for the decompositions. The standard approach of using just the majority group coefficients for the decomposition would use just the first column of Table 1.

How much of this ethnic differential in the incidence of training can be explained by the different average characteristics of each group? The answer depends partly on the decomposition formula used, especially for the comparison of white workers with those from the 'other' ethnic group (Table 2). If observable characteristics are valued according to the coefficients of the white majority (i.e., using equation (3)), workers from the 'other' ethnic group should be more likely than whites to receive employer-provided training. Hence, the 'unexplained' component due to the coefficients is 119% of the difference in mean probability. But if the observable characteristics are valued according to the coefficients for the 'other' ethnic group (i.e., using equation (4)), the unexplained residual falls to 75% of the difference in the mean incidence of training.

Although estimates of the share of the ethnic gap in training probabilities that is due to characteristics versus coefficients vary, both decompositions give the same ranking across ethnic groups. Differences in average characteristics explain roughly three-quarters of the gap in training probabilities between white and Maori workers, one-half of the gap between whites and Pacific Islanders and almost none of the gap between whites and workers from 'other' ethnic groups. Thus, if these results indicate discrimination on the part of employers when allocating workers to training, such discrimination appears to be worse for certain ethnic minorities. This

unevenness of treatment for ethnic minorities may reflect the fact that many of the workers in the 'other' ethnic group are immigrants, as are some of the Pacific Islanders, who may not be aware of their rights in seeking redress against discrimination. Alternatively, employers may not value worker characteristics as highly when those characteristics (e.g. schooling) relate to overseas conditions because of lack of information about the quality of the characteristic.³

IV. CONCLUSIONS

This paper provides the first econometric investigation of ethnic differences in the incidence of employer-provided training in New Zealand. The results show that minority workers have a significantly lower probability of receiving training and that much of this gap cannot be explained by differences in observable characteristics. The results may also have a broader significance because they illustrate the index problem that could affect previous decomposition analyses, such as that of Shields and Wheatley Price (1999b). The results also highlight the considerable diversity amongst ethnic groups, both in terms of the differential in the incidence of training and in the relative contribution that differences in characteristics and differences in the returns to characteristics make to this differential.

ACKNOWLEDGEMENTS

The financial support of the Department of Labour, Ministry of Education, Treasury and University of Waikato is gratefully acknowledged. Access to the data used in this study was provided by Statistics New Zealand in a secure environment designed to give effect to the confidentiality provisions of the Statistics Act, 1975. I am grateful to Les Oxley and Carolyn Watane for helpful comments and would like to thank the staff of Statistics New Zealand for assistance, whilst noting that the results in this study and any errors contained therein are those of the author, not Statistics New Zealand.

REFERENCES

- Altonji, J. and Spletzer, J. (1991) Worker characteristics, job characteristics, and the receipt of on-the-job training, *Industrial and Labor Relations Review*, **45**, 58-79.
- Arulamplam, S. and Booth, A. (1997) Who gets over the training hurdle? A study of the training experience of young men and women in Britain, *Journal of Population Economics*, **10**, 156-182.
- Blundell, R., Dearden, L., Meghir, C. & Sianesi, B. (1999) Human capital investment: The returns from education and training to the individual, the firm and the economy, *Fiscal Studies*, **20**, 1-23.
- Booth, A., (1991) Job-related formal training: Who receives it and what is it worth? *Oxford Bulletin of Economics and Statistics*, **53**, 281-294.
- Duncan, G., and Hoffman, S. (1979) On-the-job training and earnings differences by race and sex, *Review of Economics and Statistics*, **61**, 594-603.
- Miller, P., (1994) Gender discrimination in training: an Australian perspective, *British Journal of Industrial Relations*, **32**, 539-564.
- Oosterbeek, H., (1998) Unravelling supply and demand factors in work-related training, *Oxford Economic Papers*, **50**, 266-283.

Shields, M., and Wheatley Price, S. (1999a) "Ethnic differences in the incidence and determinants of employer-funded training in Britain" *Scottish Journal of Political Economy* **46**, 523-551.

Shields, M., and Wheatley Price, S. (1999b) Ethnic differences in British employer-funded on and off-the-job training, *Applied Economics Letters*, **6**, 421-429.

VandenHeuvel, A. and Wooden, M. (1997) Participation of non-English-speaking-background immigrants in work-related training, *Ethnic and Racial Studies*, **20**, 830-848.

Veum, J., (1996) Gender and race differences in company training, *Industrial Relations*, **35**, 32-44.

Table 1. Predicted probability of receiving employer-provided training by ethnic group

Predictions based on coefficient from:

<i>Predicted probability for:</i>	<u>White</u>	<u>Maori</u>	<u>Pacific Islander</u>	<u>Other</u>
European/Pakeha	0.2759	0.2612	0.2033	0.2352
Maori	0.2316	0.2155	0.1805	0.2251
Pacific Islander	0.2034	0.1816	0.1461	0.1853
Other	0.2862	0.2586	0.1831	0.2217

Source: Author's calculations from Employment and Training Survey, based on probit models estimated for each ethnic group as reported in Appendix Table 2.

Table 2. *Decompositions of the employer-provided training differentials*

	White vs Maori	White vs Pacific Islands	White vs 'Other'
Difference in mean probability $\hat{T}^W - \hat{T}^{EM}$	0.0604	0.1298	0.0542
<i>Using coefficients for Whites</i>			
Difference due to characteristics $[\ddot{P}(\hat{\mathbf{a}}^W, \mathbf{X}^W) - \ddot{P}(\hat{\mathbf{a}}^W, \mathbf{X}^{EM})]$	0.0443 (73%)	0.0725 (56%)	-0.0103 (-19%)
Difference due to coefficients $[\ddot{P}(\hat{\mathbf{a}}^W, \mathbf{X}^{EM}) - \ddot{P}(\hat{\mathbf{a}}^{EM}, \mathbf{X}^{EM})]$	0.0161 (27%)	0.0573 (44%)	0.0645 (119%)
<i>Using coefficients for own-group</i>			
Difference due to characteristics $[\ddot{P}(\hat{\mathbf{a}}^{EM}, \mathbf{X}^W) - \ddot{P}(\hat{\mathbf{a}}^{EM}, \mathbf{X}^{EM})]$	0.0457 (76%)	0.0572 (44%)	0.0135 (25%)
Difference due to coefficients $[\ddot{P}(\hat{\mathbf{a}}^W, \mathbf{X}^W) - \ddot{P}(\hat{\mathbf{a}}^{EM}, \mathbf{X}^W)]$	0.0147 (24%)	0.0726 (56%)	0.0407 (75%)

Appendix Table 1. *Employee sample characteristics by ethnic group*

	White	Maori	Pacific Islands	Other
<i>Demographics</i>				
Female	0.487	0.457	0.474	0.436
Years of experience ^b	18.891	16.344	16.777	16.558
Years of schooling ^c	5.901	4.835	4.358	7.038
Married	0.652	0.600	0.644	0.718
<i>Job Characteristics</i>				
Tenure ^d	57.447	46.114	48.626	46.946
Usual weekly hours	37.494	37.729	36.111	36.368
<i>Occupation</i>				
Clerical	0.174	0.135	0.162	0.140
Sales and service	0.156	0.179	0.181	0.140
Agriculture and fishery	0.037	0.068	0.016	0.027
Trades	0.098	0.089	0.112	0.086
Plant operators	0.080	0.172	0.238	0.113
Elementary	0.059	0.128	0.165	0.072
<i>Industry</i>				
Mining	0.004	0.004	0.002	0.000
Manufacturing	0.172	0.217	0.371	0.238
Electricity, gas, water	0.011	0.008	0.005	0.010
Construction	0.053	0.067	0.039	0.032
Wholesale/retail trade	0.219	0.169	0.191	0.228
Transport and storage	0.062	0.073	0.077	0.071
Business and finance	0.114	0.049	0.054	0.099
Social services	0.327	0.347	0.244	0.300
Sample size	8965	1088	538	412

Notes: The sample size is 11,003 and the estimates are weighted by the population sampling weights.

^a Includes those who do not specify their ethnic group.

^b This is potential labour market experience calculated as age minus post-primary school years minus 12.

^c Equivalent full-time years of secondary school and post-secondary school educational study.

^d Months with the current employer.

Appendix Table 2. *Probit estimates of the probability of receiving employer-provided training by ethnic group*

	White	Maori	Pacific Islander	Other
	t	t	t	t
<i>Demographics</i>				
Female	0.025 (0.59)	0.100 (0.84)	-0.121 (0.67)	0.007 (0.04)
Years of experience	0.023 (4.02)	0.017 (0.96)	-0.007 (0.26)	-0.093 (2.93)
Experience ² ($\div 100$)	-0.001 (5.14)	-0.001 (1.31)	0.000 (0.23)	0.001 (1.63)
Years of schooling	0.042 (5.67)	0.037 (1.63)	-0.042 (1.08)	-0.078 (2.32)
Married	0.115 (2.77)	0.252 (2.04)	0.076 (0.40)	0.998 (3.91)
<i>Job Characteristics</i>				
Tenure	0.003 (6.82)	0.004 (3.48)	0.001 (0.65)	0.004 (1.94)
Usual weekly hours	0.014 (9.56)	0.019 (4.83)	0.024 (3.17)	0.020 (2.75)
<i>Occupation</i>				
Clerical	-0.173 (3.31)	-0.094 (0.55)	-0.182 (0.67)	-0.198 (0.70)
Sales and service	-0.191 (3.32)	-0.197 (1.08)	-0.275 (0.97)	-0.361 (1.17)
Agriculture and fishery	-0.702 (4.85)	-0.746 (1.94)	-0.662 (1.26)	0.327 (0.47)
Trades	-0.563 (7.78)	-0.445 (1.76)	-1.092 (3.26)	-1.450 (3.84)
Plant operators	-0.393 (5.30)	-0.253 (1.35)	-1.097 (3.51)	-1.339 (3.30)
Elementary	-0.504 (6.12)	-0.875 (3.96)	-0.823 (2.54)	-1.201 (2.98)
<i>Industry</i>				
Mining	0.260 (0.93)	-0.525 (0.90) ^a ^a ...
Manufacturing	0.008 (0.06)	-0.716 (1.95)	0.695 (1.23)	0.913 (1.20)
Electricity, gas, water	0.363 (1.75)	-0.492 (0.65)	1.535 (1.51)	1.863 (1.80)
Construction	-0.062 (0.39)	-0.849 (2.05) ^a ...	1.183 (1.44)
Wholesale/retail trade	0.015 (0.11)	-0.869 (2.27)	0.019 (0.03)	0.170 (0.23)
Transport and storage	0.165 (1.07)	-0.556 (1.36)	0.175 (0.27)	0.943 (1.21)
Business and finance	0.126 (0.85)	-0.418 (1.09)	0.480 (0.77)	0.564 (0.73)
Social services	0.338 (2.39)	-0.267 (0.75)	0.882 (1.62)	0.930 (1.25)
Constant	-1.704 (9.75)	-1.476 (3.22)	-1.838 (2.71)	-1.259 (1.48)
Pseudo- R^2	0.097	0.144	0.138	0.205
Wald test (slopes = 0)	$\chi^2_{(21)} = 703.1$	$\chi^2_{(21)} = 129.9$	$\chi^2_{(19)} = 53.0$	$\chi^2_{(20)} = 68.5$

Note: Numbers in () are *t*-statistics, calculated from heteroscedastically-robust standard errors. The excluded occupation group is managerial and technical while the excluded industry is agriculture and fishing.

^a Variable dropped from the model because of multicollinearity problems.

Notes

¹ This second component is also known as the difference due to coefficients. Discrimination is one possible cause of these differences.

² VandenHeuvel and Wooden (1997) provide another example, for Australia.

³ There is anecdotal evidence of this, with doctors and other foreign trained professionals being restricted to unskilled jobs or unemployment because their overseas qualifications and experience are not recognised.

See, for example, "Overseas doctors to get registration help" *The Evening Post*, March 9, 2000, p. 3.