Session Number: Parallel Session 8B
Session Title: Contributed Micro Issues in Income Distribution
Paper Number: 15
Session Organizer: Edward Wolff
Discussant:

Paper prepared for the 28th general Conference of
The International Association for Research in Income and Wealth
Cork, Ireland, August 22 – 28, 2004

Title:

Ethnic Economic Disparities in New Zealand 1983-97: Application of a New Method for Analysing Subgroup Inequalities

Authors

Nripesh Podder
and
Srikanta Chatterjee

For additional information please contact:

Author Name: Professor Srikanta Chatterjee
Dept of Applied and International Ecdonomics
Massey University
Palmerston North, New Zealand
Email: S.Chatterjee@massey.ac.nz
Fax: +64 6 350 5660
Telephone: + 64 6 350 5799, Ext 2315

This paper is posted on the following websites: http://www.iariw.org
http://www.econ.nyu.edu/iariw
http://www.cso.ie/iariw/iariwhome.html

Ethnic Economic Disparities in New Zealand 1983-97: Application of a New Method for Analysing Subgroup Inequalities

Nripesh Podder

University of New South Wales

Sydney, NSW, Australia

Email address: N.Podder@unsw.edu.au

and

Srikanta Chatterjee

Massey University

Palmerston North

New Zealand

Email address: S.Chatterjee@massey.ac.nz

Abstract

This paper addresses some ethnic dimensions of inequality in the distribution of income amongst New Zealanders over the period 1983/84 – 1997/98, a period characterised by wide-ranging economic social reforms in New Zealand. The principal method used in the study is a new technique of decomposition of the Gini coefficient of inequality by subgroups of population where the incomes of individuals in the subgroups overlap. In addition to enabling the measurement of within-group and between-group inequalities, this method, recently developed by Podder, can provide answers to policy questions such as whether the existence of income of a particular (ethnic) subgroup raises or reduces the overall inequality; and whether a one-percent rise in income of a particular (ethnic) group increases or decreases the overall inequality and, if so, by how much. New Zealand's indigenous Maori inhabitants constitute over ten percent of the population, but are often represented disproportionately highly in the nationwide statistics on poverty and unemployment. The economic distance between Maori and the majority European population has always been large. In recent years, new migrants to New Zealand from 'non traditional-source' countries have helped increase the ethnic diversity, and raised questions about the economic distances between these groups and New Zealand's established European and Maori populations. This paper investigates how the incomes of the various ethnic subgroups have changed over the period of the reforms. It also examines the implications for policy of the observed changes.

JEL Classification D32

1. INTRODUCTION

In New Zealand the Maori[1] population constitutes a small but significant minority. Known as the *tangata whenua* (people of the land), Maori people migrated to New Zealand over one thousand years ago, and remained the dominant population group until the late 1850s. As European colonisation gathered pace in the latter half of the nineteenth century, the number of Maori kept dwindling in both absolute and relative terms. The absolute decline was due largely to the introduction of many European diseases. The Maori also experienced increased poverty and destitution as they were gradually dispossessed of much of their lands, fisheries, forests and other treasures *(taonga*), and the European settlers outnumbered them in a relatively short period of time. The interested reader is referred to Lashley (2001) for a detailed historical account of the European-Maori interactions over the period since European settlement began.

Although currently Maori as an ethnic group is not really destitute, it is a widely held belief in New Zealand (*Te puni koki*ri 1998, for example) that, in economic (and social) terms, the Maori are at a disadvantage relative to the majority European population in the country. However, there have only been a few serious studies examining the nature and extent of such disadvantage and how the situation may have been changing in recent years when the New Zealand economy and society have gone through many reforms. Even fewer of the studies that exist relate the economic plight of the Maori to the overall economic situation of New Zealand. A recent exception is Chapple (2000) which does address the question of Maori disparity in comparative terms. Later in this paper we take a critical look at some of Chapple's contentions. But first we attempt to quantify the degree of inequality in the distribution of gross incomes of all New Zealanders, and that within the different ethnic groups in New Zealand. Thus, the focus of the study is wider than just the Maori ethnic group; it examines the distributional issue as it applies to all the major ethnic groups in New Zealand.

Only in recent years have researchers been able to have access to the micro-data sets of the Household Economic Surveys conducted regularly by Statistics New Zealand. This access has enabled sophisticated methodologies to be applied to New Zealand data as we have done in this paper. The findings of studies using such data are also more reliable, and, potentially, of greater use to policymakers. This study covers the period 1984-98, using relevant data from four household surveys, viz. 1983/84, 1991/92, 1995/96 and 1997/98. This is a period that saw an extensive reform of the New Zealand economy and society the broad object of which was to create conditions conducive to more rapid growth with stable prices so that the living standards of New Zealanders could improve on a sustained basis. The details of the reforms and their outcomes are not the subject matter of this study; the interested reader is referred to the article by Evans et al (1996), the collection of studies edited by Silverstone et al (1996) and Dalziel (1999) for a detailed, critical, overview.

[1] For the unfamiliar reader, they are a Polynesian race with a distinctive culture, and a reputation as fierce warriors.

A major test of any economic policy measure is how it affects the size of the "national cake", i.e. the national real income; a second, related, test is how it affects the manner in which the "cake" gets sliced up amongst different groups in society. As indicated above, it is an aspect of this latter issue that the present paper addresses - the aspect being the ethnic dimensions of income distribution.

The next section discusses the method of analysis. Section 3 deals with the data issues relevant to this study; some definitions and usages adopted in the surveys being used are also gone into in this section. The empirical findings are reported and interpreted in section 4. Section 5 makes some concluding observations including observations on possible policy directions indicated by the findings.

2. THE METHOD

The basic tools used in this study are the Gini coefficient and its alternative decomposition by subgroups of population. We use the conventional decomposition of the Gini coefficient by subgroups of the population, and this results in three components: the weighted sum of the within-group Ginis, the between-group Ginis, and an overlapping term. We also use a new decomposition method, recently developed by Podder (1993), which is capable of giving answers to an important set of questions. For example, suppose one wants to know whether the existence of income of a particular group has an increasing or a decreasing effect on the overall inequality; or whether a one-percent rise in the income of a particular group increases or decreases total inequality and, if so, by how much. The new decomposition method is capable of providing precise answers to such questions, and that is why it is being used here. But, as the method is not yet widely known, we proceed to explain first how it decomposes the overall inequality index by population subgroups.

2.1 The New Method of Decomposition

Consider a society consisting of five people whose incomes are arranged in ascending order in a vector, $\mathrm{y} = [\mathrm{y}_1 \quad \mathrm{y}_2 \quad \mathrm{y}_3 \quad \mathrm{y}_4 \quad \mathrm{y}_5]$. Also, suppose that the society in question consists of two subgroups such that the first subgroup has two members whose incomes are represented by the second and the third elements of the income vector. The remaining elements are the incomes of the three members of the second subgroup. We shall now construct two more vectors, one for each subgroup, and each of these vectors will consist of five elements. The vector for the first group will contain the incomes of its members placed in positions corresponding to those in **y** and the remaining positions will be filled by zeros. A similar vector can be constructed for the second group also. Thus:

$$\mathbf{y}^{(1)} \equiv \begin{bmatrix} 0 \\ y_2^{(1)} \\ y_3^{(1)} \\ 0 \\ 0 \end{bmatrix}, \text{ and } \mathbf{y}^{(2)} \equiv \begin{bmatrix} y_1^{(2)} \\ 0 \\ 0 \\ y_4^{(2)} \\ y_5^{(2)} \end{bmatrix}. \text{ Therefore, } \mathbf{y} \equiv \mathbf{y}^{(1)} + \mathbf{y}^{(2)}$$

The usefulness of such constructions can be captured with the help of an example. Suppose the groups are based on geographical regions within a country. A member belonging to a particular region can potentially receive income from more than one region, although in practice he/she is most likely to receive income only from the region to which he/she belongs. In a similar way, the group income vectors introduced above could be conceived as being similar to vectors of the income components. Thus, corresponding to each subgroup income vector we can construct a vector of the cumulative proportions of income, and construct a curve against cumulative proportions of the total population. Such a curve is called the concentration curve, and one minus twice the area under the concentration curve is called the concentration index. This index lies in the interval [-1, 1], instead of the interval

[0, 1], as is the case with the Gini coefficient. Rao (1967) was the first to establish the relationship between the Gini coefficient of income and the concentration coefficients of income components. Denoting $Y_1, Y_2, \ldots Y_g$ as the total incomes of the *g* groups and *Y* as the total income of the whole society we can write the relationship as:

$$G = \sum_i \frac{Y_i}{Y} C_i \qquad (1)$$

where *G* is the Gini coefficient of total income and C_i is the concentration coefficient of the *i*th group vector. Now suppose n_i represents the number of members of the *i*th group where $n = \sum_{i=1}^{g} n_i$, and $\bar{y}_i$ is the sample mean income of the members of that group, while $\bar{y} = \dfrac{\sum_{i=1}^{g} n_i \bar{y}_i}{\sum_{i=1}^{g} n_i}$.

In that case, we have

$$Y_i = n_i \bar{y}_i \qquad (2)$$

and $$Y = \sum n_i \bar{y}_i$$

Using (2) we can rewrite (1) as

$$G = \sum_i \frac{n_i}{n} \frac{\bar{y}_i}{\bar{y}} C_i \qquad (3)$$

It will be useful to write the population share of the *i*th subgroup as $P_i = n_i / n$, and let us call $\dfrac{\bar{y}_i}{\bar{y}}$ the income differential of that group, D_i. Thus (3) is again rewritten as

$$G = \sum_i P_i D_i C_i \qquad (4)$$

which shows that the overall Gini coefficient is the weighted sum of the subgroup concentration coefficients where the weights are the products of subgroup population shares and subgroup income differentials.

One may be tempted to interpret (4) by considering the quantity $(P_i D_i C_i)/G$ as the contribution of the *i*th subgroup in total inequality. Podder (1993) has shown that this interpretation will be misleading. The correct interpretation of (4) must be in terms of the normalised version of (4) which is

$$\sum_i P_i D_i (C_i - G) = 0 \qquad (5)$$

Thus the sign of the expression $P_i D_i (C_i - G)$ tells us if the existence of income of the members of the *i*th subgroup increases or decreases total inequality. If the sign is positive, the existence of income of the members of the group increases total inequality, while if the sign is negative, then it decreases total inequality; the relative importance of income of a subgroup is indicated by its magnitude. In addition, there is a more important and interesting interpretation of this decomposition. Suppose, in equation (3). $\bar{y}_i$ and $\bar{y}$ are allowed to change. Then the total differential of *G* will be given by

$$dG = \frac{\partial G}{\partial \bar{y}_i} d\bar{y}_i + \frac{\partial G}{\partial \bar{y}} d\bar{y} \qquad (6)$$

Since, any change in $\bar{y}_i$ will necessarily lead to a change in $\bar{y}$, we can obtain the total derivative of *G* with respect to $\bar{y}_i$ as

$$\frac{dG}{d\bar{y}_i} = \frac{\partial G}{\partial \bar{y}_i} + \frac{\partial G}{\partial \bar{y}} \frac{d\bar{y}}{d\bar{y}_i} \qquad (7)$$

Now from (3) we obtain $\frac{\partial G}{\partial \bar{y}_i} = \frac{n_i}{n} \frac{1}{\bar{y}} C_i$, $\frac{\partial G}{\partial \bar{y}} = -\frac{1}{\bar{y}^2} \sum_{i=1}^{g} \frac{n_i}{n} \bar{y}_i C_i$ and $\frac{d\bar{y}}{d\bar{y}_i} = \frac{n_i}{n}$. These derivatives are obtained by assuming that a change in $\bar{y}_i$ is achieved by a proportionate change in the incomes of all members of the *i*th group so that the group concentration coefficient remains unchanged. Also, it is assumed that the change in each member's income is so minute that the member's population ranking remains unchanged. Now using the above derivatives in equation (7) and simplifying, we get

$$\frac{dG}{d\bar{y}_i} = \frac{n_i}{n} \frac{1}{\bar{y}} (C_i - G). \qquad (8)$$

Multiplying both sides of equation (8) by $\bar{y}_i$ we get

$$\bar{y}_i \frac{dG}{d\bar{y}_i} = \frac{n_i}{n} \frac{\bar{y}_i}{\bar{y}} (C_i - G) = P_i D_i (C_i - G) \qquad (9)$$

Thus, equation (9) gives the change in the overall inequality (the Gini coefficient) due to a proportionate change in incomes of the members of the *i*th group. From this it is a simple step to derive the elasticity of the Gini coefficient with respect to the mean income of the ith group as

$$\eta_i = \frac{\bar{y}_i}{G} \frac{dG}{d\bar{y}_i} = \frac{1}{G} \frac{n_i}{n} \frac{\bar{y}_i}{\bar{y}} (C_i - G) = P_i D_i \left(\frac{C_i}{G} - 1\right) \qquad (10)$$

If a policy decision involves identifying specific target groups in society with the objective of reducing inequality by arranging income transfers, the elasticity formula would clearly be a helpful tool. It is important to note that the elasticities for all groups must sum to zero because, if all members of all the subgroups have an increase in income by one percentage point, total inequality must remain unchanged. The idea behind derivative (9) above was inspired by Lerman and Yitzhaki (1985).

Now, let us consider another aspect of the subgroup concentration coefficient. Podder (1998) has shown that the concentration coefficient satisfies the Pigou-Dalton condition of income transfer from the rich to the poor, viz. that a transfer of a small amount of income from a rich (poor) person to a poor (rich) person within the same subgroup, must decrease (increase) the subgroup concentration coefficient. If the transfer is small enough not to change the population rankings of both the transferer and the transferee, the Gini coefficient of the whole population will also change by the same magnitude. Therefore, the derivative of (3) with respect to C_i may be interpreted as the change in the Gini coefficient due to change in the inequality within the subgroup, which is

$$\frac{\partial G}{\partial C_i} = \frac{n_i}{n}\frac{\bar{y}_i}{\bar{y}}. \qquad (11)$$

The elasticity of *G* with respect to C_i is then given by

$$\eta_i^C = \frac{C_i}{G}\frac{\partial G}{\partial C_i} = \frac{C_i}{G}\frac{n_i}{n}\frac{\bar{y}_i}{\bar{y}} \qquad (12)$$

Note that these elasticities must necessarily be positive. Also, note that the sum of all these elasticities must equal unity. This means that a 1% rise in the concentration coefficients of all the subgroups will lead to a 1% increase in total inequality. Later in the paper, we compute these elasticities.

Suppose now that we are interested in studying inter-temporal changes in inequality. If the Gini coefficient changes between two periods, it could be because of changes to one or more of the following components: the relative population shares of the subgroups; the income differentials of the subgroups; and/or the inequality within the groups. Again, let us consider the total derivative of *G* with respect to time, *t*, using equation (4) as

$$\frac{dG}{dt} = \sum_{i=1}^{g} D_i C_i \frac{\partial P_i}{\partial t} + \sum_{i=1}^{g} P_i C_i \frac{\partial D_i}{\partial t} + \sum_{i=1}^{g} P_i D_i \frac{\partial C_i}{\partial t} \qquad (13)$$

Now consider the change in the quantities from period *t* to *t* +1 symbolised as

$$\Delta G_t = G_{t+1} - G_t$$
$$\Delta P_{it} = P_{i,t+1} - P_{it}$$
$$\Delta D_{it} = D_{i,t+1} - D_{it}$$
$$\Delta C_{it} = C_{i,t+1} - C_{it}$$

Using these we can approximate the change in the Gini coefficient over discrete time periods as

$$\Delta G \approx \sum_{i=1}^{g} D_{it} C_{it} \Delta P_{it} + \sum_{i=1}^{g} P_{it} C_{it} \Delta D_{it} + \sum_{i=1}^{g} P_{it} D_{it} \Delta C_{it} \qquad (14)$$

The right hand side of equation (12) tells us that the change in overall inequality is the sum of the contributions of the changes in population shares, group income differentials, and within-group income inequalities. A better approximation of (12) may be obtained by taking two-period averages of population shares, income differentials and concentration coefficients. Thus,

$$\begin{aligned} \Delta G \approx \sum_{i=1}^{g} \frac{D_{it} + D_{i,t-1}}{2} \frac{C_{it} + C_{i,t-1}}{2} \Delta P_{it} + \sum_{i=1}^{g} \frac{P_{it} + P_{i,t-1}}{2} \frac{C_{it} + C_{i,t-1}}{2} \Delta D_{it} \\ + \sum_{i=1}^{g} \frac{P_{it} + P_{i,t-1}}{2} \frac{D_{it} + D_{i,t-1}}{2} \Delta C_{it} \end{aligned} \qquad (15)$$

To find the contribution of a single group, we need to look for each ethnic group, the quantity

$$D_{it} C_{it} \Delta P_{it} + P_{it} C_{it} \Delta D_{it} + P_{it} D_{it} \Delta C_{it} \qquad (16)$$

Similar averaging may be done for (14) as in (13). This extension of the Podder method is largely inspired by the work of Mookherjee and Shorrocks (1982)

2.2 The Conventional Disaggregation of the Gini Coefficient

It is already mentioned that in any attempt to decompose the Gini coefficient by conventional method one normally ends up with three components instead of two. The only case where the Gini decomposes into two components is where the subgroups are hierarchical. By this we mean that if we arrange the groups in order of their mean incomes, then the highest income amongst the members of one group would be lower than the lowest income of next group. In reality, such groupings are likely to be rare. As a result, we will always get three terms, the third of which representing the overlap of income amongst the groups. If we use the symbol, G_i to represent the Gini coefficient of incomes of the *i*th subgroup and G_b to be the Gini coefficient of the group means, then

$$G = \sum_{i=1}^{g} P_i I_i G_i + G_b + R \qquad (17)$$

where $I_i = (n_i \bar{y}_i)/(n\bar{y})$ is the income share of the *i*th subgroup and *R* is the overlapping or residual term.

Some researchers consider the presence of the overlapping term to be a deficiency of the method used for decomposing the Gini coefficient for population subgroups, while others consider it to be providing additional insights into the structure of inequality. For example, Yitzhaki and Larman (1992) considers the size of the residual term to be representing the degree of social stratification among the groups, and Formby, et al (1997) consider the change in the residual term over time to represent the income mobility among the groups. The latter

authors applied this to U.S. data for examining the degree of income mobility of the "non-white" Americans over a selected time period. Since situations of the minority "non-whites" with respect to the "whites" in the U.S. is in many ways similar to the Maori with respect to the Europeans in New Zealand, we are tempted to examine the change in the overlapping term in the Maori-European context. However, we need to solve a technical problem first. This involves normalising the overlapping term, which Formby, et al (1997) did not do.

It is clear that if the overlapping term is zero, stratification among the groups is perfect or mobility is totally absent. On the other hand, consider the opposite case of no stratification, or perfect mobility. Let us suppose that the population is divided into two subgroups. If both the groups are of the same size and they have identical income distributions, i.e. equal means and identical dispersion. Then (15) reduces to

$$G = \left(\frac{1}{2}\right)\left(\frac{1}{2}\right)G + \left(\frac{1}{2}\right)\left(\frac{1}{2}\right)G + R \qquad (18)$$

resulting in

$$R = \left(\frac{1}{2}\right)G . \qquad (19)$$

On the other hand, if the population share of one of the subgroup reduces to (1/4), and that of the other group increases to (3/4), while the mean and dispersion of the two distribution remain the same, it is easy to show that the residual term would be

$$R = \left(\frac{1}{4}\right)G \qquad (20)$$

It is possible that the population shares of the groups change over time due to extraneous reasons. Comparing the two situations one might therefore wrongly conclude that in the latter case mobility has decreased. In order to avoid such mistakes we must normalise the observed overlapping term by deflating it by the maximum possible value of the overlapping terms for given values of subgroup population shares. We may now conclude that, given the population shares of the subgroups, perfect or complete mobility leads to the maximum value of the overlapping term, which is

$$R_c = \left(1 - \sum_{i=1}^{g} P_i^2\right)G . \qquad (21)$$

The overlapping term in expression (19) is for the whole population. Therefore, the normalised overlapping term is

$$R_n = \frac{R}{R_c} \qquad (22)$$

We contend that it is this magnitude that one ought to examine in order to judge if income mobility amongst the groups has changed over time. In our empirical applications reported below, we have used (20) above.

3. SOME ISSUES RELATING TO DATA AND EMPIRICAL PROCEDURES

The present study is based on data on household incomes (and expenditures) made available by Statistics New Zealand, which conducts annual surveys on various aspects of household economic activities. Previously known as the Household Survey (1973-82), or the Household Expenditure and Income Survey HEIS (1983-93), this survey is known since 1994, as the Household Economic Survey (HES). Although a number of such surveys exist, we have used unit record files from the four surveys carried out in 1983/84, 1991/92, 1995/96 and 1997/98. The study period runs from April through March; so the references to the survey years made in this paper are to "study years" rather than calendar or fiscal years.

The sample sizes are 3573, 3018, 2889, and 2876 respectively. The use of the four surveys was decided mainly on two considerations. First, it was thought that these four surveys would be most appropriate for studying the impact of New Zealand's economic reform process since the early 1980s on the distribution of household incomes. Secondly, the inclusion of unit record data files for other years would have involved additional (substantial) financial costs. All of these surveys were designed to obtain details of expenditures, income, and a wide range of demographic characteristics of households. We accessed only a small set of variables mainly, again, on cost considerations. For more details on the surveys the reader is referred to numerous publications of Statistics New Zealand which can be accessed at its website address (http://www.stats.govt.nz).

Like in most other countries, empirical studies of income distribution are based on a variety of different concepts of income, the receiving unit, their weighting scheme and the criteria of ranking. Although most of us would agree that there should be some standard concepts of the entities for empirical analysis, so that alternative studies of income distribution could be compared and evaluated, in reality the situation is one of anarchy. For excellent review of the problems involved, we refer to O'Higgins, Schmaus and Stephenson (1990). Although the following discussion is somewhat general, we do it with reference to the present study.

The first is the concept of the measure of income. Although various measures in the empirical studies of the distribution and redistribution of income have been used, we shall use the concept of gross income that includes incomes accrued from all sources before (income) taxes are paid but excludes income in kind and the employers' contribution to superannuation. Sometimes it is argued that gross income as the starting point is inappropriate to study the economic well-being of a community. However, we were left with no alternative because we did not find the income tax figures reasonably reliable.

The next is the concept of the unit whose income or welfare we are concerned with. The main contenders here are: the individual, the family and the household. Often, the nature of the survey does not give us any choice. In the New Zealand case however there are some choices. We have chosen to use the household as the unit of analysis. The rationale is simply

that the members of the household pool their incomes and spend it for the collective welfare of the household. While a household may contain multiple families, the number of such cases is minuscule in the HES surveys. As a result, for practical purposes, the terms, household and family could be used interchangeably.
Once a composite unit such as the household is chosen, the analyst must face the problem of adjusting household income for the purpose of comparison. As an indicator of welfare, the income of one household cannot be directly compared with that of another unless the two households are identical. In general, households differ in size and composition. Apart from the adjustment problem, the other main problem is the question of weights that should be attached to households with differing size and composition. We do not go into detailed analysis here of issues such as adjusting incomes of households or assigning weights to households of different size and composition for purposes of inter household comparisons on a like-with-like basis. The interested reader is referred to Podder and Chatterjee (2002) where these issues are dealt with at length

In the Surveys being used here, four different ethnic groups have been coded. These are: 1. *Pakeha*; i.e. European, 2. Maori, 3. Pacific Islanders, and 4. Others. The Pacific Islanders are the indigenous people of some of the small Pacific Islands in geographic proximity of New Zealand. For various historical reasons, some of these islanders have enjoyed automatic right of abode in New Zealand. There are others who have migrated to New Zealand in search of work and a better living standard mainly over the period since the 1950s. These people have many similarities in ethnic and cultural terms with the New Zealand Maori, and it would be fair to say that they too have experienced disadvantages similar to those the Maori have in the European-dominated market economy and society of New Zealand. We have therefore merged these two groups into a single group for certain purposes in this study. The category labeled as "Others" comprises, in the main, Asians whose numbers have also been increasing since New Zealand liberalised its immigration policy in the 1990s.

4. EMPIRICAL RESULTS AND THEIR INTERPRETATIONS

In the four samples that we have used there have been irregular variations of the population shares of the ethnic groups, which could mostly be attributed to sampling errors and coverages. Thus, some ethnic groups may have been oversampled while others may have been undersampled. Or it may be that the response rates may have varied significantly among groups. This however is an area fraught with many difficulties, not all of which are of a statistical nature. For an illuminating discussion of the nature of these difficulties regarding the Maori ethnic group, the reader is referred to Chapple (2000).

As a result of these difficulties, however, one cannot discern a trend of population shares over period of the four samples except that the European share of the population has probably been declining slightly. Table 4.1 gives the population shares and income shares of the various ethnic groups. It is easy to see that the sample population shares in the table do not represent the actual population shares of different groups and, therefore, no firm conclusion should be drawn from these as to the trend of the population shares of the groups.

Table 4.1: Population Shares and Income Shares of Ethnic Groups (in %)

	1983/84		1991/92		1995/96		1997/98	
Ethnic Origin	Pop Share	Income Share	Pop Share	Income Share	Pop Share	Income Share	Pop Share	Income Share
Pakeha	85.99	90.44	78.08	85.33	80.94	86.97	79.98	86.64
Maori	8.87	5.92	11.10	7.20	9.34	6.75	10.36	7.47
Islanders	3.01	1.83	7.22	4.03	4.74	2.35	4.23	2.23
Others	2.14	1.81	3.60	3.44	4.98	3.94	5.43	3.66
Maori +Islanders	11.88	7.75	18.32	11.23	14.08	9.10	14.59	9.70
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

However, this table is useful for examining the income shares of the groups with respect to their population shares. A benchmark for such comparisons could be to check how the population shares of a group compare with its income shares over the period: the "ideal" situation being one where these shares are at least roughly equal. Thus, in 1984, when the sample population share of Maori was 8.87 percent, it would have been "fair" for them to receive the same, or a similar, percentage of the total income. In reality, they received only 5.92% of the total income, which is over one-third lower than their population share. As Table 4.2 below reports, Maori average income was just under 67% of the average *pakeha* income in 1984, and the situation has remained virtually unchanged over the period to 1998.

By 1992, the Maori income share had declined further by another 2 percentage points to just over 64%. As already pointed out, the observed irregularities of the ethnic population shares do not affect the income differentials of the ethnic groups; these differentials represent the average household income of an ethnic group as a proportion of the average household income of the population as a whole.

We begin by presenting these differentials for the three samples in Table 4.2. In terms of relative well-being, the Pacific Islanders fare the worst among the groups, closely followed by the Maori at the beginning of the period under study. Several general observations can be made about the figures reported in the Table: the *pakeha* income differential shows a slightly increasing trend over the period; the Maori income differential, while remaining persistently lower than the *pakeha's* , has improved after the initial decline in 1992 by quite a few percentage points, and stabilized at around 72% by 1998; and the Pacific Islanders' income differential, already lower than both *pakeha* and Maori in 1984, declined steadily over the sample period to 1996. It then improved slightly, but still remained lower than in 1984. When the Maori and islanders are taken together as a single group, their relative economic position seems to have remained largely unaltered which is because of the improvement in the Maori differential figures. This group's average income per head is around 65% of the national average and about 60% of *pakeha* average income.

Table 4.2: Income Differentials of Ethnic Groups (as % of the national average))

Ethnic Group	1984	1992	1996	1998
Pakeha	105.17	107.81	107.13	109.94
Maori	66.72	64.05	72.61	72.10
Islanders	61.11	56.21	50.02	52.72
Others	84.57	90.31	77.79	67.40
Maori+Island	65.30	61.23	64.92	66.48
Total	100	100	100	100

The position of the residual, 'Others', group has changed in an interesting way. Thus, between 1984 and 1992, when all groups except the *pakeha* experienced a decline in their income differentials (relative to the population average), the residual group's share not only increased, but did so by a larger proportion than the *pakeha* group's share. However, over the next two periods its share kept falling sharply to end up being lower than the Maori's share by more than four percentage points. And from having the second highest income differential in 1984, its share has, by 1998, fallen to just above the combined share of the Maori and Islanders' share. The group, the others, consists mainly of New Zealand's Asian population. Quite why their share should decline so dramatically is difficult to explain. One possible reason behind this shift of fortune could be related to the change in New Zealand's immigration policy in the early 1990s. A more liberal policy of immigration resulted in an increase in the number of Asian migrants with skills and/or a record of entrepreneurial success. However, anecdotal evidence suggests that many of these new migrants found that their educational or professional qualifications were not acceptable to potential employers in New Zealand. Consequently, they remained either unemployed, or accepted low-paid employment. If true, this would have reduced the average income of the group to which they belonged, causing the observed fall in the income differential noted in Table 4.2. Pending further research, however, such a possibility must remain speculative.

In Table 4.3 we present the concentration coefficients for the various ethnic groups. A negative value of the concentration coefficient, it is useful to note, implies that the incomes of the members of the group in question are mostly less than the median population income. The concentration coefficient for the Islanders has remained negative over the entire period; its magnitude also rose sharply till 1996, then declined by 1998, but still remained much higher in absolute terms than in 1984. These changes suggest that the incomes of more Islanders got concentrated in the lower half of the income distribution for the population as a whole over the dozen years till 1996; even with some improvement in the income concentration, more of them are still on the lower side of the distribution in1998 than was the case in 1984.

For the Maori, the distribution worsened significantly from 1984 to 1992, then improved noticeably by 1996, but declining again by the end of the period. The sign of the coefficient has changed for the Maori from negative to positive, indicating that the concentration of income has shifted, albeit in a modest way, towards the higher side of the distribution.

Taking the Maori and Islanders together, the concentration coefficient had increased between1984 and 1992, while remaining negative, until 1992. By 1996, it became positive; its larger magnitude also indicating a shift towards the higher half of the distribution for the population as a whole. By the end of the period, however, it fell again, but remained positive, the shift toward the higher-income end of the population receding somewhat.

The residual group, the others, has always had a positive concentration coefficient, but its magnitude has fluctuated, rising significantly from 1984 to 1992, but then falling also quite significantly over the next two survey periods. This indicates that beyond 1992, distribution within the group shifted in the direction of the lower-income population. This reinforces the point made earlier about a decline in the income differential of this group relative to the mean income of the population as a whole.

The coefficient for the *pakeha* group is also positive throughout and it has increased steadily till 1996, then fell slightly, indicating a degree of stabilization around the 0.44 mark. Its magnitude is substantially higher than those of the other groups which suggests that more income earners in this group belong in the higher end of the distribution.

The bottom row of Table 4.3 shows that the Gini coefficient of inequality has increased steadily till 1996, but declined slightly over the period 1996-98. Whether this trend has continued beyond 1998 must await further research.

Table 4.3: Concentration Coefficients for the Ethnic Groups

Ethnic Group	**1984**	**1992**	**1996**	**1998**
Pakeha	0.3888	0.4319	0.4487	0.4400
Maori	- 0.0154	- 0.0460	0.1212	0.0974
Islanders	- 0.0493	- 0.1816	- 0.2305	- 0.1385
Others	0.1990	0.4129	0.2328	0.2382
Maori+Island	- 0.0234	- 0.0908	0.0289	0.0042
Total*	0.3534	0.3817	0.4037	0.3941

* This row gives the Gini coefficient for the whole population

Next, the results of the elasticity estimates with respect to the Gini coefficient are presented in Table 4.4.

Table 4.4: Elasticity Estimates of the Gini Coefficient with respect to Groups Means

Ethnic Group	1984	1992	1996	1998
Pakeha	0.0906	0.1122	0.0969	0.1009
Maori	- 0.0618	- 0.0807	- 0.0472	- 0.0564
Islanders	- 0.0209	- 0.0595	- 0.0369	- 0.0301
Others	- 0.0079	0.0028	- 0.0166	- 0.0145
Maori+Island	- 0.0837	- 0.1320	- 0.0841	- 0.0865
Total*	0.00	0.00	0.00	0.00

* The row contains approximations since there may be rounding error in adding up. Note that in adding along a column, we ignore the values corresponding to Maori+Island in order to avoid double counting.

As explained in section 2 above, the elasticity figures give us the percentage change in the Gini coefficient resulting from a percentage change in the mean income of a particular ethnic group. The change in the mean income of the group takes place in such as way that every group member's income changes proportionately. The first observation to be made about these results is that, except for the *pakeha* group, all other groups have negative elasticity. For the *pakeha,* the elasticity value has fluctuated over the period but it is higher at the end of the period than at the beginning.

For the Maori too the elasticity has been fluctuating, but is lower at the end of the period, remaining negative all the time. For the Pacific Islanders, the elasticity is also uniformly negative, and has been declining since 1992, having risen over the period 1984-92.

For the 'others' group, the elasticity is negative in all the years except 1992. Its magnitude too has fluctuated over the period, but is higher at the end of the period than at the start. These findings about the group are intriguing, just as the other findings discussed above.

In interpreting these figures, let us take 1996 as an example. In this year, a one percent rise in the income of the Maori and islanders would have led to a 0.0841% decrease in the Gini coefficient, whereas a one percent increase in *pakeha* income would have led to a 0.0969% increase in total inequality. Note that the cost of increasing the *pakeha* income by one percent is more than 10 times the cost of increasing Maori income by the same percentage as is evident from the income shares of these groups noted above. Notice that the situation has not changed much since 1996. Other things the same, reducing income inequality in New Zealand would require increasing the shares of all groups except the *pakeha,* the sharpest reduction occurring when the mean income of the Maori group increases.

We turn now to the elasticity of the Gini coefficient with respect to the group concentration coefficient. The results are presented in Table 4.5. These figures essentially tell us the percentage change in overall inequality due to a percentage change in the within-group inequality for a specified group. This elasticity is always positive. Since this elasticity is basically determined by the population shares and the income differentials, the reported results are exactly as are to be expected. Since the *pakeha* group constitutes the overwhelming majority of the population and their income differential is greater than a hundred, the elasticity for this subgroup is close to 1, while the elasticities are insignificant for all the other groups. This is a clear indication that a change in inequality overall has to come from a change in the degree of inequality within the *pakeha* group. Interestingly enough, these elasticities have not changed in a significant way over the period.

Table 4.5: Elasticity Estimates of the Gini Coefficient with respect to Subgroup Inequality

Ethnic Group	1984	1992	1996	1998
Pakeha	0.9849	0.9802	0.9713	0.9673
Maori	0.0025	0.0076	0.0193	0.0185
Islanders	0.0025	0.0149	0.0131	0.0078
Others	0.0101	0.0323	0.0224	0.0221
Maori+Island	0.0051	0.0226	0.0062	0.0261
Total*	1.00	1.00	1.00	1.00

* The row contains approximations since there may be rounding error in adding up. Note that in adding along a column we ignore the values corresponding to Maori+Island in order to avoid double counting.

We proceed next to examine how the changes in the concentration coefficients, population shares and income differentials have affected the sharp increase in the overall inequality over the period. We shall ignore the changes between 1996 and 1998 because overall change in inequality in this period was not large. In examining the contributions, we have merged the Maori and Islanders to make up a single group. As a result, we have only three groups. How each group contributed to the overall inequality is also reported in Table 4.6.

Between 1984 and 1992, the effect of inequality changes within ethnic groups on overall inequality has been positive and very high. This has been compensated by the negative effect of the changes in the population shares of the three groups. The impact of the changes in the income differentials is also positive. This shows that the income differentials have worsened during the period to contribute positively to the upward trend in the total inequality. Looking at the individual contributions of various ethnic groups we find that most of the increase in inequality can be attributed to the *pakeha* and Asian groups whereas the Maori and Pacific

Islanders helped to slightly suppress the increasing trend. With some insignificant exceptions, the pattern seems to have continued till 1996 although the contributions of the Maori group became positive, and that of the other group negative by 1996. At this point, it is useful to point out that, over the period of twelve years, the population shares of the *pakeha* and the Maori have declined slightly, while those of the Pacific Islanders and Others have increased.

Table 4.6: Contributions of Subgroup Inequality, Population Share and Income Differential to Temporal Change in Gini

Contribution of	**1984-92**	**1992-96**
$\sum_{i=1}^{g} P_{it} D_{it} \Delta C_i$	0.037	0.019
$\sum_{i=1}^{g} D_{it} C_i \Delta P_{it}$	- 0.019	0.007
$\sum_{i=1}^{g} P_{it} C_i \Delta D_{it}$	0.010	- 0.004
Pakeha	0.026	0.014
Maori+Island	- 0.007	0.011
Other	0.008	-0.003
Total Change in Inequality	0.029	0.022

We turn now to the conventional Gini decomposition discussed earlier. As already mentioned, our main interest lies in examining the degree of mobility amongst the different ethnic groups, or in the degree of segregation amongst the groups as evidenced by the overlapping term of the conventional decomposition. Nevertheless, the other components of the decomposition exercise, namely, the weighted sum of the within-group inequality, and the between-group inequality may be of some sociological interest. Here again we have considered three groups by merging the Maori and the Pacific Islanders into a single group. We start by presenting the within-group Gini coefficients for the three ethnic groups in the four surveys in Table 4.7 in order to examine their changes. In this table, it is interesting to note that, while inequality within the *pakeha* group is steadily increasing, inequality within the Polynesian (Maori+Islander) group is steadily declining. If one considers that the latter

group constitutes a separate societal reference group, it can be concluded that economic cohesiveness within this group is on the increase. While the reducing inequality index may be considered to be a change for the better, given this group's low mean income, however, one may conclude that their cohesiveness represents a kind of low-level equilibrium in which all members of the group are huddled together in a cluster around that low income. It can also be concluded from the figures that economic diversity within the Asians as a single reference group is increasing, i.e. the dispersion around the mean income is larger. This would seem to fit in with the speculation made earlier about the rise in the number of unemployed low-income new Asian migrants contributing to the large decline in their observed income differential (relative to the national average of 100) over the period since 1992. At the same time, there remained within this group some members with a high income. They might quite possibly be those members of the group who were already in New Zealand before the arrival of the new migrants, and whose average incomes compared well with the national average up until 1992, as reported in Table 4.2. While the rise in inequality may thus be explained, the fluctuations in the value of the Gini coefficients of this group however remain difficult to account for.

Table 4.7: Within Group Gini of Three Groups

Ethnic Group	**1984**	**1992**	**1996**	**1998**
Pakeha	0.3436	0.3691	0.3994	0.3794
Maori+Island	0.203	0.1448	0.1181	0.1892
Others	0.2514	0.4814	0.3925	0.5203
Total Population	0.3534	0.3817	0.4038	0.3941

Now let us look into the complete decomposition of the Gini coefficient into three components, which is given in Table 4.8. As might be expected, the element representing the weighted sum of the within-group components for all the different surveys dominates the Table. This is because of the high population and income shares of the *pakeha* group. On the other hand, the between-group component constitutes a small proportion of the total inequality. This component is computed by assuming that the members of each group is assigned the same income which is the subgroup average. In this context, it is interesting to note that this component is on the increase. This is an indication that the economic distance between the groups is increasing. However, our main focus of attention in this table is the normalised overlapping term, which is interpreted as representing the degree of economic segregation among groups.

Let us first look at the raw overlap term in the table. We can see that it has increased over the period, but has remained consistently lower in value than the between-group component. If one concludes from this that the degree of economic segregation among the groups is on the decline, the conclusion would be quite misleading. The adjusted overlap term given in the ratio row indicates better whether in fact the degree of (income-wise) segregation among the groups is on the decline. Clearly, the degree of segregation has remained more or less the same over the period, suggesting that about the same proportion of the different ethnic groups share similar incomes in all four year reported in the Table. Thus, economic reform over fourteen years has not dragged up many more members of the different ethnic groups into

earnings comparable with one another. Nor has the reform programmes dragged many more away from one another! The increase in the raw overlap term noted above is solely due to changes in the population shares of the ethnic groups.

In a significant contribution to the debate on the supposed ethnic economic divide in contemporary New Zealand, Chapple (2000) has made some interesting, if controversial, observations on the nature of the inter-ethnic economic divide, and the factors behind it. While Chapple's research and ours are based on a different set of economic parameters, some comparisons of the findings of the two are still useful. We briefly address these below.

Chapple argues that, not just in terms of their (diverse) ethnic characteristics, in economic terms too, the Maori is not a readily identifiable, distinct, group. In terms of ethnicity as such, the point Chapple has made is valid. Indeed, as Chapple has illuminatingly illustrated, the definition of Maori in particular in the population censuses and in other statistical series in New Zealand is "fuid" and non-uniform. The observed economic outcomes experienced by the different ethnic groups, including Maori, however are rather more clear cut, as our study shows. From Table 4.7 of our study, it is clearly seen for example that inequality among the Maori is significantly lower than that among the *pakeha*. The Maori as an economic group therefore is more cohesive than the *pakeha*, albeit at a much lower level of income than the latter. Chapple also suggests that Maori-*Pakeha* earnings gap is more apparent than real on the ground, *inter alia*, that the hourly earnings distributions of the two ethnic groups overlap considerably. While this phenomenon of overlapping-distributions of different population subgroups is not uncommon to many comparable populations (see Formby et al 1997, for example, for a US perspective), the degree of overlap cannot be accurately and adequately measured just by superimposing two or more distributions in an identical pair of axes, as Chapple has attempted to do.

Our findings suggest that (a) the average incomes of the ethnic groups are strongly dissimilar – the average income of the *pakeha* group being substantially higher than that of each of the other groups; and (b) the intra ethnic-group variations in incomes, as measured by the within-group Gini coefficients, is much smaller for the Maori and Islander group than it is for the *pakeha*. Both of these findings are in sharp contrast to Chapple's contentions. The method we have used to quantify the degree of overlap between population subgroups is, we contend, conceptually more robust insofar as it shows the exact deviation from perfect overlapping. Thus, our Table 4.8 clearly shows that the overlap is consistently less than 50%. Moreover, over the period under study, it has hardly changed and, in times of recession, such as in 1992, the overlap actually declined. This reflects the fact that high-income earners amongst the Maori were more adversely affected than those in the *pakeha* group when the economy was in the recession phase of a business cycle. Thus, being a Maori (or non-*pakeha*) does seem to matter in New Zealand in terms of the income one earns, and how one fares when times are hard in economic terms. It matters adversely in both cases, as our study establishes and quantifies.

This, again, is in contrast to the evidence Chapple adduces to suggest "that we live in a world where being Maori explains little of variances in socio-economic outcomes" (p.108). Chapple is quite right in pointing out that the observed earnings outcomes of the different ethnic groups are rooted in the differences in social, economic and demographic profiles of the

ethnic groups, i.e. the die is evidently loaded against the Maori in society in many ways, and the outcomes are a reflection of that fact. Our findings help quantify the nature of the differences in terms, again, of one major outcome, viz. the total gross incomes (market and transfer incomes) of the ethnic groups. Because we have studied the temporal movements in the relevant components of the different outcomes, the findings, we submit, provide a deeper insight into how the different ethnic groups fared over a period when the economy was subjected to major policy changes. While Chapple's hourly earnings data provide but a snapshot of a single year, our findings map out how things have changed or not changed for the different ethnic populations of New Zealand over a period of fourteen years.

However, as mentioned above, the two studies use very different analytical methods and economic data; the differences in their findings therefore should be treated with caution.

Table 4.8: Intergroup Overlap of Income and Other Components

Gini Components	**1984**	**1992**	**1996**	**1998**
Weighted Sum of Within	0.2691	0.2648	0.2869	0.2720
Between	0.0450	0.0648	0.0590	0.0519
Overlap	0.0392	0.0519	0.0577	0.0602
Max Overlap	0.0869	0.1206	0.1268	0.1325
Overlap Ratio as (%)	45.16	43.10	45.55	45.43
Total Gini	0.3534	0.3817	0.4038	0.3941

5. SOME CONCLUDING OBSERVATIONS

In this study we have attempted to examine some ethnic dimension of income inequality in New Zealand over a period of fourteen years when a multitude of deregulatory measures were introduced in the economy. This is also a period that saw the Maori ethnic minority becoming more conscious and vocal about issues of economic and social justice in New Zealand. The sharp rise in overall income inequality in New Zealand over the period under study could, in many ways, be considered to have been policy-induced (Podder and Chatterjee 1998). Some observers claim that this is an unavoidable short-term toll that the much-needed reform programme had to take. But as this study shows, whatever else the reforms may have achieved, they have clearly failed to reduce economic segregation amongst the ethnic groups. Successful economic reforms must promote greater social cohesion. A major component of such cohesion in a multi-ethnic society such as New Zealand's must be smaller differences in economic outcomes based on ethnicity amongst the groups.

Our findings, reported above, point to several policy directions. Economic policy making must recognize that significant income differences persist amongst the different ethnic groups in New Zealand society. In addition, the differences have not changed for the better over the period 1984 –98 when the economy had undergone significant changes, all in the name of improved economic performance. While reducing income disparities in a society is not an alternative to increasing the levels of incomes of its members, avoiding "excessive inequalities" must be considered to be a desirable policy objective. Even when the "national

cake" is getting bigger over time, how it is sliced for distribution should be a relevant consideration in any society aspiring to be "fair and just" to all its members. Historically, income inequality in New Zealand has been smaller than in some other comparable countries. In recent times however, as several studies including the present one have documented, income inequality has increased significantly in New Zealand although it seems to have stabilized somewhat in the late 1990s. Redistribution can make a difference in the income outcomes of different sections of a population. The ethnic dimensions of the income distribution reported in this study clearly show that redistribution in favour of the minority groups is the only way to reduce the overall, as well as the intra-group, inequalities. In the longer run, policies to improve social and economic opportunities for the groups in society that are perceived to be "disadvantaged" will make a difference to their share of the national cake, but the short term problem of inequality and its related problem of poverty must be addressed through changes to the distributional arrangements.

This study confirms that an "economic gap" along ethnic lines clearly exists in New Zealand. The underlying social and economic factors behind them must be investigated and addressed if the gap is to be narrowed by means of appropriate policies.

REFERENCES

Chapple, S. (2000). "Maori Socio-Economic Disparity", *Political Science*, vol. 52, pp.101-115.

Dalziel, P. (1999). "'Third Way' Economics: What Might This Mean in New Zealand" , in Srikanta Chatterjee et al *The New Politics: A Third Way for New Zealand*. Palmerston North: Dunmore Press.

Formby, J. P., H. Kim, and W. J. Smith (1997). "On Interpreting Gini Decompositions with Applications to While and Nonwhite Populations, 1962-1994" *mimeo*. Department of Economics, Finance and Legal Studies, The University of Alabama.

Lerman, R. and Yitzhaki, S. (1985). "Income Inequality Effects by Income Source: A New Approach and Applications to the U.S." *The Review of Economics and Statistics*, vol. 63, pp.151-156.

Lashley, M. (2001). "Economic and Social Issues Affecting New Zealand's Maori Population", Ch 19 in *The New Zealand Economy: Issues and Policies*, edited by K.S. Birks and S. Chatterjee. Palmerston North: Dunmore Press.

Mookherjee, D. and Shorrocks, A. (1982). "A Decomposition Analysis of the Trend in UK Income Inequality", *Economic Journal*, vol. 92, pp.886-902

O'Higgins, M., Gunther Schmaus, and Geoffrey Stephenson (1990). "Income Distribution and Redistribution: A Microdata Analysis for Seven Countries", in T.M. Smeeding,

M. O'Higgins and L. Rainwater (eds.), *Poverty, Inequality and Income Distribution in Comparative Perspective*. Washington D.C.: The Urban Institute Press.

Podder, N. (1998). "A Method of Analysing Subgroup Poverty Using a New Decomposition of the Gini Coefficient", *Statistica*, vol. 57, pp.21-30.

Podder, N. (1993). "The Disaggregation of theGini Coefficient by Factor Components and Its Application to Australia", *The Review of Income and Wealth*, vol.39, pp.51-61.

Podder, N. (1971). "The Estimation of an Equivalent Income Scale", *Australian Economic Papers*, vol.10, pp.175-187.

Podder, N. and Chatterjee, S. (1998). "Sharing the National Cake in Post Reform New Zealand: Income Inequality Trends in terms of Income Sources", *Journal of Public Economics*, vol. 86, pp.1-27.

Rao, V. M. (1967). "Two Decomposition of Concentration Ratio", *Journal of the Royal Statistical Society*, Series A, 132(3), pp.428-435.

Silverstone, B., Bollard, A. and Lattimore, R. (eds.) (1996). *A Study of Economic Reform: The Case of New Zealand.* Amsterdam: North-Holland.

Te Puni Kokiri (1998). *Progress Towards Closing the Social and Economic Gaps between Maori and non-Maori.* Wellington: Te Puni Kokiri

Te Puni Kokiri (2000). *Progress Towards Closing the Social and Economic Gaps between Maori and non-Maori: A Report to Minister of Maori Affairs.* Wellington: Te Puni Kokiri.

Yitzhaki, S. (1994). "Economic Distance and Overlapping of Distributions" *Journal of Econometrics*, 61, pp.147-159.