Ethnic gaps and ethnic ratios

W Robert J Alexander¹
Department of Economics
School of Business
University of Otago

Abstract

In the December 2000 issue of Political Science Gould argues that the method chosen by Te Puni Kokiri for measuring ethnic ‘gaps’ leads to serious distortion. Gould claims that his alternative, a ratio of percentages, is conceptually superior. It fact, it is not at all clear what such a ‘ratio of ratios’ means, nor are changes in it easy to interpret.

¹ Thanks for useful comments or discussion are due to John Gibson, Stuart McDougall and Ian Pool, as well as to an anonymous referee and the editors of this journal. The usual disclaimer applies.
1. Introduction

As Gould\(^2\) points out there has been a long history of interest in New Zealand in the existence of perceived ‘gaps’ between Maori and Pakeha. More recently, Government has charged Te Puni Kokiri with monitoring the progress of Crown Agencies in addressing ‘closing the gaps’. The reports entitled *Progress Towards Closing Social and Economic Gaps Between Maori and non-Maori*\(^3\) highlight the continuing disparity in income levels, and employment, educational and health status between Maori and non-Maori. These reports suggest that, although some positive gains have been made, particularly in education, the gaps between Maori and non-Maori are not closing. Statistics New Zealand\(^4\) documents the same sort of facts in one of a series of reports based on the 1996 census. Gould draws attention to the wide range of previous work in this area.

The essence of Gould’s paper is to challenge Te Puni Kokiri’s ‘methodology in handling the data’. He proposes an alternative; the use of ratios as opposed to arithmetic differences. The problem with Gould’s approach is that he has over-generalised. Ratios have their place, but Gould extends the use of ratios to the


calculation of a ratio of ratios. It is not at all clear what such a quantity means, nor is it clear how to interpret changes in it.

The outline of this paper is as follows. Section 2 discusses the appropriate use of ratios. Section 3 outlines, using the example of qualification ‘gaps’, why Gould’s use of a ratio of ratios is flawed. Section 4 draws attention to Gould’s inappropriate calculations of ‘rates of improvement’. Section 5 concludes.

2. The appropriate use of ratios

The most obvious appropriate use of a ratio is precisely in making comparisons of different groups’ experiences when those groups differ in size. For example, Gould’s statement that ‘there are many more Pakeha than Maori … who are poor, unemployed, or unqualified’ is, at once, both obviously accurate and of very little interest. The reason that it is accurate is that there are simply many more Pakeha than there are Maori. The reason it is of little interest is that it is not the absolute numbers that are of concern, but whether one group, having taken its relative size into account, is disadvantaged compared to another. That is, we need to calculate two ratios, such as Maori ‘poor’ as a proportion of Maori and Pakeha ‘poor’ as a proportion of Pakeha and then compare these ratios directly. By directly, I mean ask the question: Is there a significant difference between the two ratios?
In the case where we have calculated these ratios based on a sample, we have two measures of the significance of the difference. One is the ‘statistical’ measure of significance, which takes into account not just the arithmetic difference in the proportions but a measure of dispersion as well\(^5\). The other is the economic, social or ‘everyday’ significance. For example, if we were to find that Maori ‘poor’ make up 12.3% of Maori and Pakeha ‘poor’ make up 11.8% of Pakeha and that the difference is statistically significant, we might still question whether this difference is important or significant in an everyday sense. By contrast, if we find that Maori ‘unqualified’ make up 59.8% of Maori while ‘unqualified’ Pakeha make up 28.2% of Pakeha and that the difference is statistically significant, we will almost certainly regard this as significant, or important, in the everyday sense of the word.

Te Puni Kokiri’s preference for data that is more regular than the five-yearly census suggests the use of samples, such as the Household Labour Force Survey and its supplement the Income Survey. Strictly, then, the level of statistical significance of any ‘gap’ ought to be reported but, given the magnitude of some of the gaps Te Puni Kokiri identifies and the large sample sizes involved, the gaps are almost certainly statistically significant.

In the case where proportions are derived from a census, the issue of statistical significance does not arise, since given a large enough ‘sample’ almost any difference

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will be significant in the statistical sense\(^6\). That still leaves the everyday sense of
significant and that will always be a matter of personal judgement.

Ratios are also useful under many other circumstances. For example, they would be
appropriate in making inter-country comparisons of the magnitudes of current account
or budget deficits, for the dollar values of such items (even in the same currency) are
affected by the size of the different national economies under consideration. There
would be no point at all in comparing the size of the United States’ current account
deficit with New Zealand’s and concluding that New Zealand’s was much smaller.
The relevant comparison is the size of each country’s current account deficit relative
to its GDP. A further example involves regional variations. It is evident that the
number of reported crimes on the West Coast is lower than the number in Auckland,
but that does not make the West Coast a safer place to live. Crime rates (per capita)
need to be presented, that is, the ratio of crimes to population.

Gould is right to say that it is not correct to compare income gaps across time if the
measures of income are not comparable in the sense of having been adjusted for
inflation. Comparing income differences is, however, conceptually most easily and
appropriately resolved by converting incomes from nominal to real terms, a procedure
that is always required when dealing with inter-temporal comparisons of dollar

amounts. The real income ‘gap’ then conveys much the same information as the ratio of Maori to non-Maori real income.

3. The inappropriate use of ratios

Appropriateness of ratios in some circumstances does not mean that the ratio is always appropriate. Table 1 is adapted from Gould’s table 1 (Percentages of school leavers having obtained 6th or 7th form qualifications). I have added to Gould’s columns (1) to (4) the columns labeled (1*) to (4*). Column (1*) shows the percentage of Maori school leavers who have not obtained 6th or 7th form qualifications, while column (1) retains Gould’s figures on the percentage of Maori school leavers who have obtained 6th or 7th form qualifications. Columns (2*) to (4*) bear similar relationships to Gould’s columns (2) to (4).

We observe that whether we look at the ‘gap’ between Maori and non-Maori in terms of the differences between the percentages qualified (3) or unqualified (3*) the ‘gap’ is the same, which accords with common sense, since the figures in columns (1) and (1*) represent the same ‘fact’.

If we consider (as Gould would) the ratios to be the appropriate measure, we are then faced with interpreting:

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7 The ratio of nominal Maori income to nominal non-Maori income will, of course, be the same as the ratio of the two real quantities since the same deflator appears in the
(1) A change over the years 1977 to 1997 in the Maori:non-Maori qualified ratio from 0.310 to 0.560, which makes things look distinctly **better** for Maori.

(2) A change over the years 1977 to 1997 in the Maori:non-Maori unqualified ratio from 1.60 to 2.12, which makes things look distinctly **worse** for Maori.

Thus, the use of a ratio of ratios is quite unhelpful and confusing.

### 4. Rates of improvement

There is also a problem with Gould’s idea of ‘rate of improvement’. Extrapolating an x% improvement in what is already a percentage, which by definition cannot exceed 100% (qualified), leads inevitably (and in this case quite quickly) to an impossibility. By Gould’s method of extrapolating the rates of improvement, he arrives at more than 100% qualified in both Maori and non-Maori groups within 20 years. A more appropriate analysis of this situation would be to see ‘improvement’ as a reduction in the proportion **not** qualified. Such an improvement can be extrapolated without the inconvenience of impossible situations arising.

The best analogy is with a process of radioactive decay and can be illustrated with reference to the Maori group in Gould’s table 1 as follows. In 1977, the percentage of unqualified Maori was 85.6; by 1997 this had reduced to 59.8, or about 0.699 of what it was. If this rate of progress (multiplying the ‘unqualified’ by 0.699 every 20 years)
continues, we end up with the extrapolated values given in table 2. The table shows calculations of the remaining ‘gap’ and even the ‘ratio’ as far as 2057 and in the limit.

Notwithstanding the dangers of extrapolation, the picture, even by Gould’s (ratio) measure, is not as rosy as Gould suggests when he says (p. 119): ‘Were the same rates of improvement to continue after 1997 … in less than another 20 years … both ethnic categories would be enjoying 100 per cent successes.’ If we grant that by 2017 all school leavers will have such a qualification, what then will be its value, either in the labour market or for comparing performance? There is ample long-term international evidence that, throughout the twentieth century, higher and higher levels of credentials have increasingly been required for less and less skilled occupations.

5. Conclusion

If we were examining data from a sample there would be no doubt that a difference in percentages (proportions) would be presented as precisely that: an arithmetic

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8 In the case of non-Maori the fraction to multiply by every 20 years is 28.2/53.5 = 0.527

difference. It would be tested for by means of a standard statistical test of its
difference from zero. That is, a given ‘gap’ can only be judged ‘statistically’
significant if it is large enough in relation to a measure of dispersion of the data. If we
are dealing with population (census) data then any observed difference will be
‘statistically’ significant.

The issue of economic (or social) significance comes down to a judgement call, but I
would call a virtually unchanged 32% ‘gap’ over 20 years (as indicated by Te Puni
Kokiri’s figures) pretty strong evidence that Maori are not making much headway.
Relative to the average standard of education, they may even be going backwards. A
greater proportion of Maori do now have school qualifications than in the past but, by
virtue of the fact that so too do a much greater proportion of the population as a
whole, these qualifications are now worth less.

The issue of Maori (or other minority ethnic group) disadvantage is a serious one for
public policy. Without considerable care in their presentation, statistics can distort the
picture in ways that, at worst, run the danger of allowing a real problem to be ignored
or even of reinforcing prejudice.
Table 1: Gould’s table 1 with non-qualified percentages added

<table>
<thead>
<tr>
<th>Year</th>
<th>Maori (1)</th>
<th>Maori (1*)</th>
<th>Non-Maori (2)</th>
<th>Non-Maori (2*)</th>
<th>(3)= (2)–(1)</th>
<th>(3*)= (1*)–(2*)</th>
<th>(4)= (1)/(2)</th>
<th>(4*)= (1*)/(2*)</th>
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</thead>
<tbody>
<tr>
<td>1977</td>
<td>14.4</td>
<td>85.6</td>
<td>46.5</td>
<td>53.5</td>
<td>32.1</td>
<td>32.1</td>
<td>0.310</td>
<td>1.60</td>
</tr>
<tr>
<td>1997</td>
<td>40.2</td>
<td>59.8</td>
<td>71.8</td>
<td>28.2</td>
<td>31.6</td>
<td>31.6</td>
<td>0.560</td>
<td>2.12</td>
</tr>
</tbody>
</table>

Note: Q is the percentage holding qualifications, NQ the percentage not holding qualifications.
Table 2: Extrapolated improvements

<table>
<thead>
<tr>
<th>Year</th>
<th>Maori</th>
<th>Non-Maori</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NQ</td>
<td>Q</td>
<td>NQ</td>
<td>Q</td>
<td>Qgap</td>
<td>Qratio</td>
</tr>
<tr>
<td>1977</td>
<td>85.6</td>
<td>14.4</td>
<td>53.5</td>
<td>46.5</td>
<td>32.1</td>
<td>0.310</td>
</tr>
<tr>
<td>1997</td>
<td>59.8</td>
<td>40.2</td>
<td>28.2</td>
<td>71.8</td>
<td>31.6</td>
<td>0.560</td>
</tr>
<tr>
<td>2017</td>
<td>41.8</td>
<td>58.2</td>
<td>14.9</td>
<td>85.1</td>
<td>26.9</td>
<td>0.684</td>
</tr>
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<td>2037</td>
<td>29.2</td>
<td>70.8</td>
<td>7.8</td>
<td>92.2</td>
<td>21.4</td>
<td>0.768</td>
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<tr>
<td>2057</td>
<td>20.4</td>
<td>79.6</td>
<td>4.1</td>
<td>95.9</td>
<td>16.4</td>
<td>0.830</td>
</tr>
<tr>
<td>etc</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>limit</td>
<td>0</td>
<td>100</td>
<td>0</td>
<td>100</td>
<td>0</td>
</tr>
</tbody>
</table>

Note: Q is the percentage holding qualifications, NQ the percentage not holding qualifications.