DISPARITIES AND DESPAIR: CHANGES IN REGIONAL INCOME DISTRIBUTIONS IN NEW ZEALAND 1981-1996

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ABSTRACT Among developed economies, New Zealand shares with the United States and the United Kingdom a rapid increase in personal income inequality since the 1980s. This paper focuses on changes in the New Zealand regional income distributions by means of 1981, 1986, 1991 and 1996 census data. This time frame encompasses an era of major deregulation and reform. Real male average personal income declined in all regions except in Auckland. The dispersion of average regional income also grew sharply, but there is unconditional beta convergence in average income when Auckland and Wellington are excluded. There is also persistence in regional rankings with respect to income. A growth in intra-regional income inequality, as measured by Gini coefficients, is evident in all regions, but is particularly pronounced in the Auckland and Wellington metropolitan regions. Labour market trends have played an important role and have led to a disproportionate growth in the number of low and high income persons, i.e. a "vanishing middle class". Nonetheless, because Auckland and Wellington had traditionally lower inequality, there is evidence of spatial convergence in intra-regional income inequality.

1. INTRODUCTION

Ever since the formal articulation of the objectives of economic policy in the middle of the last century by economists such as Tinbergen (1952), a high level of real income per capita and a fair distribution of national income have been among the ultimate goals countries have aspired to. For about three quarters of the 20th century New Zealanders could pride themselves on scoring highly on both counts: a standard of living well above the average of developed economies and a narrow dispersion of this income across the population. This fortuitous combination was not coincidental: it was the result of a natural comparative advantage secured by guaranteed markets and a strong sense of social responsibility that found its roots in the social structures emerging in late 19th century settlement in the colony. New Zealand took the first initiative in many social policy developments that much later became commonplace throughout the

world. With a small population, spread at least initially fairly evenly across the length of the country, there was no rationale for devolution of governance and the egalitarian principle flowed from the geographical and political centre to all corners of the Dominion. Thus, the Industrial Conciliation and Arbitration Act 1894 and the adoption of uniform pricing by natural state-owned monopolists led to small dispersion of nominal and real incomes across the regions.

It is therefore not surprising that there was little academic interest in differences in the economic well being of regions, at least until a major turning point in New Zealand's economic development. Economic historians such as Hawke (1985, p. 322) identified this turning point as the 1967 economic recession, due to a collapse of wool prices and government policies that aimed at stemming balance of payments problems (see also Gould, 1982). It became apparent in the new era that emerged since then that external shocks had affected the regions differentially. This was first noted by Jensen (1969), who concluded that, while mean incomes differed traditionally little between New Zealand regions, dispersion had increased somewhat during the 1950s and 1960s. Jensen also noted that the main spatial phenomenon was a so-called "Drift North", which was the term used for a disproportionate growth of employment in the Auckland, Waikato and Bay of Plenty regions.

The problems emerging in the late 1960s, such as unemployment, inflation, external imbalances, emigration, rural depopulation, etc. provided the impetus for the first serious consideration by government of regional problems and policies. The evolution of thinking and policy in this area is briefly reviewed in the next section.

The policy response to the external shocks of the late 1960s and 1970s tended to be one of tight regulation and control, particularly during the Muldoon Government years (1975-1984). However, a major determinant of subsequent regional outcomes has been a package of wide and deep economic reforms that commenced in 1984 and extended to well into the 1990s (see Evans *et al*, 1996 and Silverstone *et al*, 1996 for extensive surveys). The idea that there could be a regional dimension to the variation in economic outcomes did not fit in well with the new policy agenda and regional disparities were largely ignored despite reports such as Population Monitoring Group (1989) signalling a growing regional diversity. The accepted wisdom was that market mechanisms would appropriately distribute the gains of aggregate growth across regions. With the election of a left of centre coalition government in 1999, regional differences finally attracted the attention of central government and researchers duly responded with new analyses to better inform debate in this area.

In this paper we focus on changes in the income distribution within and between regions over the period 1981-1996. There have been a relatively large number of studies that examine changes in the New Zealand distribution of personal or household income and the incidence of poverty at the national level.[1] However, few studies have examined the spatial dimension of income inequality.

[1] For a good review of these studies, see O'Dea (2000).

Two recent exceptions are Chapple (2000) and Smith (2000)[2].

Chapple (2000) took a micro perspective and studied income inequality across about one thousand small geographical areas that can be referred to as "neighbourhoods" over the same period as this paper, namely 1981-96. He found that the distribution of income between these neighbourhoods widened significantly between 1986 and 1991, and this widening continued to a lesser extent between 1991 and 1996. He also concluded that there was a considerable persistence in neighbourhoods being either "work rich" or "work poor".

Smith (2000) focussed on intra-regional income inequality over the period 1986-96 in large geographical areas that coincided with the territories of 16 Regional Councils. She found that income inequality (as measured by the Gini coefficient) increased sharply between 1986 and 1996. At the same time, regions with the least inequality in 1986, experienced the largest increase in inequality.

Smith also found that poverty increased in all regions. A headcount measure of poverty (i.e. the proportion of the population with an income below an absolute poverty line) increased nationally from one quarter to almost 30 percent of the population aged over fifteen.[3] At the same time there was considerable spatial variation in poverty and the depth of poverty (i.e. the average income of the poor relative to the poverty line) was by 1996 the greatest in Auckland and Wellington.

In this paper we adopt Smith's approach, but also discuss changes in the distribution of average income per head across regions and the relationship between shifts in the national and regional income distributions. We shall show that convergence in dispersion (measured by Gini coefficients) is quite consistent with divergence in mean income of regions and that the main cause of both is a dichotomy in the labour market outcomes of the Auckland and Wellington metropolitan areas as compared with the rest of New Zealand.

Section 3 focuses on the interregional dispersion in average incomes, while the shifts in the intra-regional income distributions – and a comparison with changes in the national distribution – are discussed in Section 4. Section 5 sums up.

2. REGIONAL POLICY IN NEW ZEALAND

New Zealand's economic and social policy during the 1980s and much of the 1990s gave primacy to the pursuit of allocative efficiency. This implied a strong reliance on harnessing market mechanisms to achieve government objectives. In recent years, distributional issues have received increasing attention. Sixteen years after the reform process got into full swing in the mid-1980s, New Zealand's distribution of income across individuals and across regions is much

[2] There has also been some research on material and social disadvantage at a sub-national level by means of a so-called deprivation index. This index combines low income with a range of other statistical indicators of disadvantage (see Crampton *et al*, 2000).

[3] The absolute poverty line was defined as the real value of the 1996 single person Unemployment Benefit, with the inclusion of an accommodation allowance.

more unequal than it was before.

Before providing empirical evidence on the regional changes in the income distribution, it is useful to briefly outline the history of the regional development debate. As noted in Section 1, traditionally New Zealand was seen as too small and too homogeneous to separate national and regional policy. Spatial differences in the cost-of-living were small, while the national Award system that set the wages of most workers reduced the likelihood of sharp income differences between regions. Local authorities had limited powers and the range of services for which rates could be levied was restricted.

However, the government became concerned with the regional dimension of the economy after the first major post-war recession in 1967/68 led to increasing regional differences. At the same time, regional policy had also become a respectable issue abroad, particularly in western Europe, and there was a diffusion of regional policy ideas to countries such as Australia and New Zealand. In 1969 the New Zealand Government commissioned the NZ Institute of Economic Research to produce a report on regional development (McDonald, 1969). This report concluded that

(i) the future spatial pattern of industrial development should be determined by market forces with minimum state intervention;
(ii) government should try to remove barriers to population mobility (which is popularly referred to as a "move workers to the jobs" policy);
(iii) prices should reflect the cost of delivery to consumers (e.g. differential pricing of power supply in the North Island versus the South Island).

The National Development Council (1971) reviewed this report and took a far more interventionist stance. They argued that "all regions should be able to share the fruits of national development" and advocated a more pro-active role for government with respect to regional development in the following circumstances:

(i) When regions suffered from substantial net out-migration;
(ii) When the existing infrastructure in certain regions was clearly underutilised;
(iii) When low density regions could not reap economies of scale in the provision of non-tradeables and, for example, local public or private services could only be supplied at high prices;
(iv) When a case could be made for government to kickstart the exploitation of underutilised resources.

Further debate followed (see Town, 1972 and McDonald, 1972) and some forms of regional assistance became entrenched, although the thought that any policy initiatives might be best taken at a devolved level clashed with a tradition of a firmly top-down approach to government, particularly during the Muldoon Government years. The fourth rationale for regional policy listed above, that of unexploited resources, was a major justification for Muldoon's "Think Big"

projects.[4] Their subsequent failure provided *prima facie* evidence that governments would be wise not to step in where the private sector feared to tread. While there are rational arguments in favour of government taking the initiative in regional investment when the amount of venture capital required may be too large for any private investor, when there are important external benefits to the project and when public intervention may be needed to resolve a stalemate of objections to development by competing interests, the experience with the "Think Big" projects demonstrated that such arguments themselves provided no guarantee of success.

However, during the Muldoon years little attention was paid to regional differences per se, except for Scott's (1980) review. Once the era of fundamental economic liberalisation and reform commenced in 1984, there was little room for something that sounded as interventionist as regional development policy. As in other areas, the main concern became the enhancement of efficiency of the institutions of governance.

At first, small local authorities were made to amalgamate in a process of local government reform that commenced in 1988 (see Dixon, 1989 and Pawson, 1992 for reviews). While the Labour Government continued to have a ministerial portfolio of regional development, there was much emphasis on devolution and regional and local authorities were encouraged to set up structures to facilitate local development. These included Business Development Units of city councils and Regional Enterprise Boards.

The 1988 local government reform generated a policy environment in which regional government had been empowered to pursue much broader objectives than previously was the case with United Councils, which had a narrow range of functions and only such power as their constituent local authorities would permit them to exercise. Regional Councils could extend their activities beyond provision of e.g. water supply, parks and transportation infrastructure to a concern about broader issues such as economic growth, employment and welfare, which were traditionally the preserve of Central Government. At the same time, reports such as by the Population Monitoring Group (1989) provided the evidence that the regional distribution of people and jobs had become far more diverse and complex than before. The main reasons were the removal of protection from the tradable sector, patterns of internal migration (a drift north) and immigration policies that impacted primarily on the metropolitan areas. Economic restructuring affected particularly rural regions and regions that relied heavily on a narrow range of processing of agricultural output and on manufacturing. A high exchange rate, sustained by tight monetary policy, accentuated the impact on rural areas of the removal of generous levels of subsidy and protection.

Yet the Regional Council's power to address regional issues at the "intermediate level" of government turned out to be short-lived. The election of a

[4] Another perceived benefit was that the energy-intensive projects could lessen the impact of adverse terms of trade shocks and ameliorate the perennial balance of payments problems.

liberal government in 1990 led to the complete removal of "regional" as an adjective for policy structures. A network of Regional Enterprise Boards was replaced by a network of "Business Development Boards". The Resource Management Act of 1991 restricted the mandate of regional councils to the management of natural resources only and the impact of private sector development on the environment. The Minister of Regional Development became the Minister of Business Development.

Regional problems remained a neglected policy issue for much of the 1990s until the election of the Fifth Labour Government in 1999. This government reintroduced the position of a Cabinet Minister of Regional Development – a portfolio that had not existed for many years. The stated aim of the current regional development programme is to "facilitate and promote sustainable regional development to help regions respond to local opportunities" (Ministry of Economic Development 2000). As in the case of the Muldoon years, the underlying logic of the policy appears to be that there are market failures that have led to underutilised resources in regional economies that can be unlocked with government support. However, in contrast with the 1980s, and following the supply-side local level approaches to regional policy that are now also commonplace abroad (see e.g. Armstrong and Taylor, 2000), the emphasis at present is on a bottom-up micro-level approach. The government plans to work in partnership with local interests to foster local initiatives. Government regional development assistance is to be targeted to areas with "acute needs" on the basis of indicators that encompass poverty, deprivation and arrested development.

An understanding of the patterns and causes of inter- and intra-regional income distributions is needed to support the identification of target areas. It is also needed for developing assistance measures that are appropriate for ameliorating the poverty, deprivation and arrested development that appear to be the problems that the policy is aiming to address. We turn to interregional income differences in the next section and differences in intra-regional income distributions in the section thereafter.

3. REGIONAL CONVERGENCE AND DIVERGENCE

A recent compilation of statistics on the incomes of New Zealanders stressed that changes in income distribution are a consequence of many social, demographic and economic factors (Statistics New Zealand, 1999). A popular perception is that the dramatic and radical economic reforms since 1984 have been the prime cause of a sharp increase in income inequality in New Zealand. However, the mechanisms which generated the inequality are somewhat more complex than this popular view articulates (Easton, 1996). For example, Dixon (1998) concluded that the Employment Contracts Act 1991, which limited collective bargaining to the level of individual enterprises and shifted bargaining power from workers to employers, was not a major source of inequality. Indeed, earnings and income inequality grew faster before the ECA than after. Dixon (1999) points out that the increases in the dispersion of earnings were largely due to increased inequality *within* groups of workers with similar observed levels of education, age and potential experience. Statistics New Zealand (1999) found a

similar trend, whether referring to personal income, gross income or disposable income.

However, as noted in the introductory section, much of the literature on growing income inequality takes a national perspective. The issue has not been widely covered at regional level. The observation of growing interregional dispersion by Jensen (1969) was subsequently reconfirmed for the 1976-81 period by Frankel (1984). Britton *et al* (1992) conjectured that the economic reforms led to growing regional inequalities.

To analyse the changes in the average income in New Zealand regions, as well as intra-regional inequalities, we use data from the Census of Population and Dwellings on gross incomes received by males in 1981, 1986, 1991 and 1996. Total annual income is a function of hours worked and we expect a greater variation across regions and time in hours worked by women so that we restrict the analysis to males only. Although our primary data refer to gross (before tax) income from all sources (including interest, dividends and social security transfer payments), the results should still be informative regarding changes in the distribution of labour market earnings. Wages and salaries remain the dominant form of income, with their contribution to overall income being in excess of two thirds (Statistics New Zealand, 1999, p.46). To ensure that our data reflect primarily wages and salaries, we obtained frequency distributions of gross income of males in receipt of income of $1 or more per annum for the four censuses. Hence cases of zero or negative gross income were not taken into account. Persons with zero income are unlikely to have participated in the labour market. Negative income is likely to have been reported by self employed persons. Their negative income is indicative of an operating loss rather than labour earnings. All dollar amounts were converted to 1996 prices, using the Reserve Bank's adjusted CPI.[5]

A problem with published data on regional income distributions is that the regional boundaries have changed frequently over time. Hence, special tables were requested for this research. These reported the income data of the 1981, 1986 and 1991 censuses according to the regional boundaries adopted for the 1996 census. The definition of a regions used here is that of the territory of a Regional Council. Sixteen such regions can be identified. These are depicted in Figure 1.

An important issue with grouped income data is the calculation of mean income in the open-ended upper income bracket. Pareto distributions were fitted to the top quartile of the frequency distributions. That is, it was assumed that for that end of the distribution the number of persons *N(Y)* with income greater than or equal to *Y* is given by $AY^{-\alpha}$ where *A* and α are constants, which can be estimated by means of OLS of the equation $\ln N(Y) = \ln A - \alpha \ln Y$ for the top

[5] An adjustment was made for the introduction of a 10% Goods and Services Tax (GST) in 1986, that coincided with a reduction in income tax.

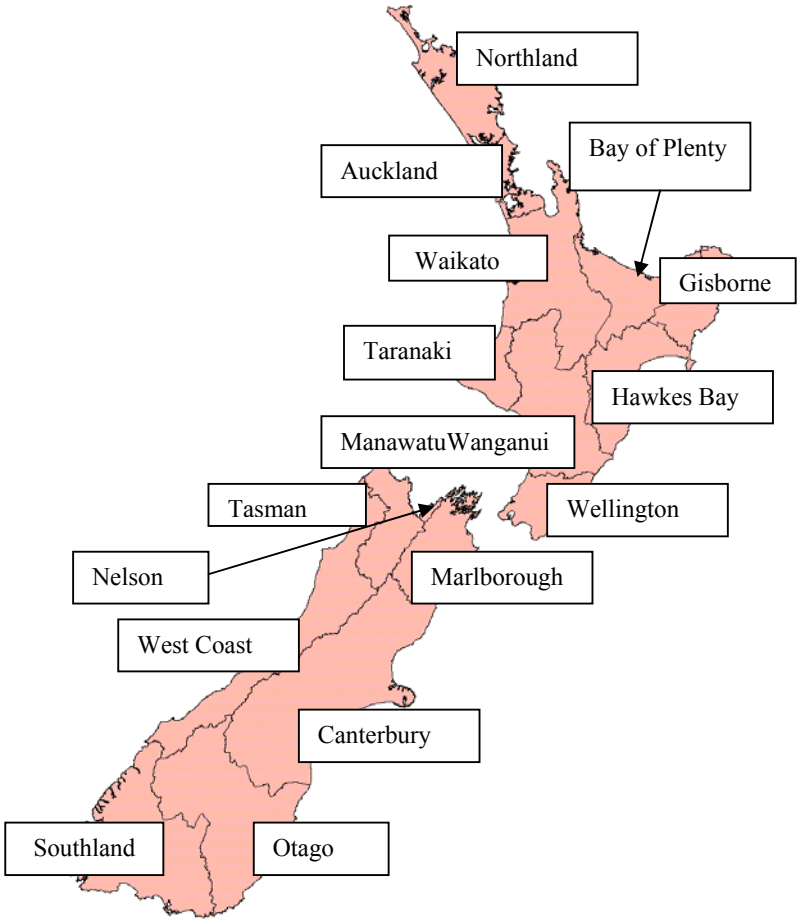

Figure 1. Regional Council Regions in New Zealand.

Table 1. Estimating Mean Income in the Upper Income Bracket

	1981	1986	1991	1996
Estimated Alpha Coefficients				
Northland Region	2.35	3.25	2.77	2.28
Auckland Region	2.91	3.00	2.57	2.08
Waikato Region	2.45	3.21	2.73	2.22
Bay Of Plenty Region	2.60	3.36	2.85	2.47
Gisborne Region	2.14	3.08	2.72	2.25
Hawke's Bay Region	2.36	3.38	2.90	2.42
Taranaki Region	2.52	3.20	2.88	2.29
Manawatu-Wanganui Region	2.50	3.37	2.83	2.48
Wellington Region	2.52	3.12	2.50	2.11
West Coast Region	2.79	3.91	3.41	2.39
Canterbury Region	2.61	3.29	2.79	2.33
Otago Region	2.44	3.19	2.74	2.37
Southland Region	2.15	3.55	2.92	2.45
Tasman Region	2.28	3.53	2.87	2.39
Nelson Region	3.17	3.34	2.89	2.51
Marlborough Region	2.63	3.31	2.95	2.27
Lower bound of the open bracket	60,000	50,000	70,000	100,000
Lower bound in 1996 dollars	169,492	82,102	76,670	100,000
% of NZ population in the top bracket	0.64	2.30	3.34	2.77

quartile of the distribution. It can be shown that the average income of those in the range Y and above is always $\alpha/(\alpha-1)\times Y$ (Atkinson, 1983, p.102). The estimates of α are reported in Table 1.

The values of α vary between about two and four. Table 1 shows that no attempt was made in the census definitions to make the lower bound of the upper income bracket comparable across censuses. In 1996 dollar terms, the lower bound was as high as $169,492 in 1981 and as low as $76,670 in 1991. The relatively high α values for 1986 can therefore by explained by two effects, which take into account that the fatter the right hand tail of the income distribution, the lower the estimated value of α. Consequently, the low value of the lower bound in 1986 leads to a high value of α. Had the income distribution remained the same, we would have expected even higher values for α in 1991 (as the real lower bound declined further). However, in that year the right hand tail of the distribution had grown much fatter (the proportion of males on very high incomes had increased disproportionately), leading to a lower α. The upper bracket ($100,000 or more) accounted for 2.77 percent of males in receipt of positive income in 1996, while the equivalent bracket in real terms (earning $35,400 or more) accounted for 2.28 percent of males in 1981.

Table 2. Real Average Gross Income of Males in New Zealand and Inter-Regional Dispersion

Census Year	Number of Males in Receipt of Positive Income	Average Income in 1996 Dollars	Weighted CV 16 Regional Council Regions
1981	998,703	$34,289	6.0
1986	1,122,102	$29,305	8.2
1991	1,160,355	$27,519	12.9
1996	1,184,739	$30,177	13.0

A comparison of the changes in α across regions provides useful information about which regions have seen the greatest widening towards the upper end of the income distribution. In 1981, based on the estimated α, the mean income in the top group was relatively low in Auckland and Nelson, but high in the rural economies of Southland and Gisborne. The shift in the relative fortunes of rural areas and the main cities is clear from the reversal by 1996: Auckland and Wellington have then the highest average incomes in the top bracket, while Manawatu-Wanganui and Nelson have the lowest.

Table 2 reports the estimated New Zealand male mean income (i.e. the weighted average of regional mean incomes, weighted by the number of males with reported positive incomes), the corresponding population and the coefficient of variation (CV) of average income across the 16 regions. The first point to note is that male real income in New Zealand declined 14.5 percent between 1981 and 1986, and a further 6.1 percent between 1986 and 1991, before recovering 9.7 percent between 1991 and 1996. Overall, New Zealand males were 12 percent worse off in 1996 than in 1981. Statistics New Zealand (1999, p.46) reports similar trends based on Household Economic Survey (HES) data.

The data reported here are not inconsistent with positive growth in real GDP over the same period, as much of the economic expansion during the period was financed by an inflow of foreign capital rather than domestic saving. Hence the trends reported in Table 2 are closer to the fluctuations in real GNP rather than GDP per capita. At the same time, there are various offsetting factors that may soften the implied decline in New Zealand's standard of living. Firstly, the CPI growth overestimated the growth in the cost of living by inadequately accounting for technological changes (e.g. information technology developments). Secondly, the variety of goods and services available expanded greatly and tariff reductions led to sharply reduced prices for major consumer durables such as cars and appliances. It is also possible that unreported income was of greater significance in 1996 than in 1981.

The weighted CV of average income across Regional Council regions increased by 37 percent over the 1981-86 period, 57 percent over the 1986-91 period, but only 0.8 percent over the 1991-96 period. Consequently, the greatest

Table 3. Interregional Income Inequality in Selected Countries 1990-1997

	Number of Regions	Coefficient of Variation		
		1990	1995	1997
Australia	8	4.7	5.6	4.5
Canada	10	4.7	6.7	7.1
Western Germany	11	3.6	3.9	3.6
Eastern Germany	6	4.1	5.0	5.1
New Zealand	12	5.7	6.6	7.1
United States - 1	50	13.7	14.2	14.2
United States - 2	172	15.5	16.7	17.1

Source: OECD (2000), p. 51.

interregional inequality growth occurred during the first stages of the economic reforms. This was the period of financial and product market reform in which subsidies for the primary sector were abolished, tariff reductions led to a hollowing out of manufacturing, much public sector activity became corporatised or privatised, and in which interest rates and exchange rates increased due to tight monetary policy. It is noteworthy that Cashin and Strappazon (1998) observed similar growth in cross-state dispersion of per capita income in Australia, in their case for the period 1976-91.

Table 2 suggests that there has been little change in interregional inequality since 1991. OECD (2000) provides an international comparison of interregional earnings inequality that suggests that there had been further increases in inequality in New Zealand during the 1990s. Information for selected countries is given in Table 3. The table reports that the weighted CV increased between 1990 and 1997 in New Zealand from 5.7 to 7.1. The numbers are somewhat lower than in our calculation because the CV is calculated over fewer regions, which lowers the numerator while the denominator (national average income) is a weighted index unaffected by the number of regions. The lower CV for the United States in Table 3 when calculated over 50 regions (States) rather than 172 regions also illustrates this. Another reason for the difference between Table 2 and Table 3 is that the CV for New Zealand in the latter refers to hourly earnings as obtained from the Quarterly Employment Survey (QES). Hourly earnings have a smaller variance than annual earnings due to interregional variation in average hours worked. Furthermore, the CVs in Table 2 refer to males only, while Table 3 is not gender specific.

Interregional inequality increased in all countries included in Table 3 between 1990 and 1995, but inequality decreased in Australia and Western Germany between 1995 and 1997.

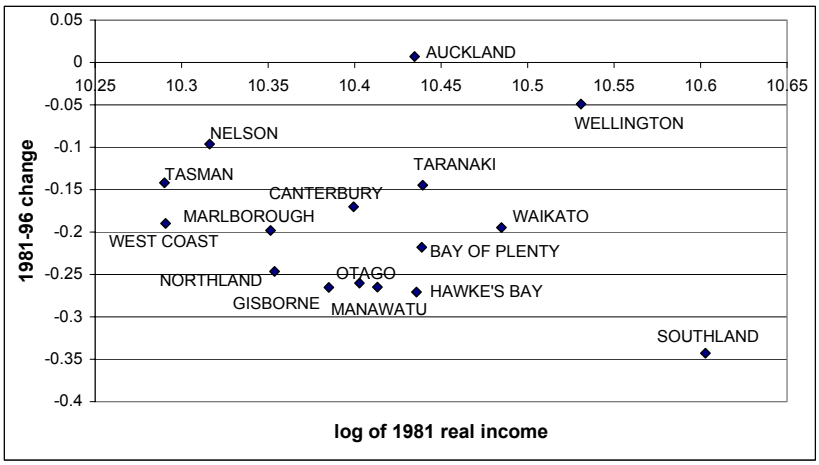

Figure 2. Levels and Change in Real Male Average Income across Regional Council Regions, 1981-96

Neoclassical growth theory suggests that diminishing returns to capital, combined with a reallocation of labour and capital, growing interregional trade and the diffusion of technological change would lead to interregional income convergence. However, this is a long-term process and occurs at a slow rate. Barro and Sala-i-Martin (1992) calculated by means of data for U.S. states that only about 2 percent of an income gap between regions is removed annually. Does the convergence story also apply to the case of declining real incomes? For the New Zealand case, this can be assessed by means of Figure 2.

Figure 2 does give the impression that regions with the high real incomes in 1981 did suffer the greatest decline. However, Auckland and Wellington, are clear outliers. Auckland was the only region that recorded an increase in real income over the period, while Wellington was the region with the smallest decline.

The region with the greatest real income decline was Southland (dlny = -0.34, which is equivalent to a decline of about 29 percent). Other regions recording a real income decline of more than 20 percent were Northland, Gisborne, Hawkes Bay, Manawatu-Wanganui and Otago. The correlation coefficient between the level of income and the change is insignificant when Auckland and Wellington are included, but when these two regions are excluded we find that $R^2 = 0.39$ with a slope coefficient of –0.4936 with t statistic 2.77. Consequently, excluding Auckland and Wellington there is evidence of so-called unconditional beta convergence (see also Sala-i-Martin, 1996) at a rate of –0.4936 / 15 = -0.033, i.e. about 3.3 percent. The observation of a growing regional divide between the metropolitan cities of Auckland and Wellington versus the rest of New Zealand is similar to what has been found in Australia by Lloyd *et al* (2000). These authors noted a growing gap between the incomes of those Australians living in the capital cities and those living in the rest of Australia.

The above suggests that we can dichotomise New Zealand into the modern service sector oriented cities Auckland and Wellington that are part of the Asia-Pacific city system that is resulting from globalisation processes (see e.g. Poot, 2000), while the remainder are rural heartland and peripheral regions that have found real incomes eroded during the period of economic reform. This dichotomy explains why there is, using Sala-i-Martin's (1996) terminology, no σ convergence (the CV is increasing) but there is unconditional β convergence among the non-metropolitan regions.

In addition to the dispersion of average income across regions, it is also useful to consider the relative ranking of regions. Table 4 ranks the regions in terms of income expressed in 1996 dollars from high to low in the four census years. Particularly striking is the decline in rank and average income in Southland. The predominantly rural economy in this region generated the highest average income in 1981 and the sharpest 1981-96 decline (29 percent, as noted earlier). Other heartland regions with relatively large income declines were Hawke's Bay, Manawatu-Wanganui, Otago and Gisborne (each experiencing declines in real average income between 1981 and 96 of about 23 percent). Income in the public and private service oriented economy of Wellington was the second highest in 1981 and became the highest subsequently. Nonetheless, real average income declined by about 4.8 percent over the 1981-96 period. Auckland's relative ranking improved from 7th place in 1981 to the second highest place subsequently (and, as noted earlier, this was the only region recording positive real income growth).

The table shows that there is considerable persistence. Regional incomes are highly correlated over time. The Pearson correlation coefficient varied between 0.949 (for a comparison of 1986 and 1991) and 0.590 (comparing 1981 and 1996). The corresponding Spearman rank correlation coefficients are 0.903 and 0.738 respectively. All are significant at the 1 percent level.

4. SHIFTS IN INTRA-REGIONAL INCOME DISTRIBUTIONS

Many measures have been proposed to characterise the dispersion of incomes across individuals in countries or regions (see e.g. Jenkins, 1991). The Lorenz Curve is the most commonly used graphical way to display inequality. It shows the cumulative percentages of total income earned by cumulative percentages of the population. The Gini coefficient is a summary measure of the degree to which an obtained Lorenz curve deviates from the 45 degree line that would be obtained given a state of perfect equality. The Gini coefficients have here been computed by using the approximation method for grouped data proposed by Darden and Tabachneck (1980).

Table 4. Real Average Income of Males in Regional Council Regions, 1981-1996

1981		1986		1991		1996	
Southland	$40,247	Wellington	$33,441	Wellington	$33,639	Wellington	$35,664
Wellington	$37,452	Auckland	$31,460	Auckland	$30,657	Auckland	$34,259
Waikato	$35,768	Taranaki	$29,119	Taranaki	$26,362	Taranaki	$29,572
Taranaki	$34,177	Waikato	$28,354	Waikato	$26,328	Waikato	$29,438
Bay Of Plenty	$34,159	Southland	$28,275	Southland	$25,725	Southland	$28,560
Hawke’s Bay	$34,055	Bay of Plenty	$28,200	Canterbury	$25,651	Canterbury	$27,697
Auckland	$34,020	Hawke's Bay	$27,792	Bay of Plenty	$25,033	Bay of Plenty	$27,469
Manawatu-Wanganui	$33,297	Northland	$27,665	Manawatu-Wanganui	$24,527	Nelson	$27,442
Otago	$32,950	Nelson	$27,511	Hawke's Bay	$24,403	Hawke's Bay	$25,974
Canterbury	$32,840	Canterbury	$27,397	Otago	$24,293	Marlborough	$25,669
Gisborne	$32,374	Manawatu-Wanganui	$26,983	Nelson	$22,658	Manawatu-Wanganui	$25,543
Northland	$31,371	Otago	$26,648	Gisborne	$22,543	Tasman	$25,542
Marlborough	$31,300	Gisborne	$26,075	Northland	$22,243	Otago	$25,401
Nelson	$30,215	Marlborough	$25,594	West Coast	$22,139	Gisborne	$24,829
West Coast	$29,457	West Coast	$24,909	Marlborough	$21,773	Northland	$24,520
Tasman	$29,436	Tasman	$24,240	Tasman	$20,662	West Coast	$24,362

Table 5. Gini Coefficients of Intra-Regional Income Inequality, Males 1981-1996

	Gini Coefficients				% Change	
	1981	**1986**	**1991**	**1996**	**81-86**	**86-96**
Northland	0.3976	0.3574	0.3989	0.4467	-10.1	25.0
Auckland	0.3560	0.3534	0.4120	0.4641	-0.7	31.3
Waikato	0.3777	0.3481	0.3958	0.4526	-7.8	30.0
Bay of Plenty	0.3666	0.3389	0.3963	0.4326	-7.6	27.7
Gisborne	0.3841	0.3371	0.3954	0.4399	-12.2	30.5
Hawke's Bay	0.3905	0.3473	0.3817	0.4216	-11.1	21.4
Taranaki	0.3710	0.3388	0.3927	0.4349	-8.7	28.4
Manawatu-Wanganui	0.3751	0.3381	0.3886	0.4227	-9.9	25.0
Wellington	0.3409	0.3476	0.4158	0.4649	2.0	33.8
West Coast	0.3397	0.3108	0.3720	0.4096	-8.5	31.8
Canterbury	0.3623	0.3405	0.3892	0.4265	-6.0	25.3
Otago	0.3765	0.3480	0.3992	0.4396	-7.6	26.3
Southland	0.3835	0.3170	0.3728	0.4090	-17.3	29.0
Tasman	0.3887	0.3383	0.3717	0.4090	-13.0	20.9
Nelson	0.3612	0.3420	0.3846	0.4113	-5.3	20.2
Marlborough	0.3615	0.3267	0.3665	0.4008	-9.7	22.7
NATIONAL	0.3652	0.3453	0.3959	0.4474	-5.4	29.6

Table 5 reports the Gini coefficients for the sixteen regions and the nation. Although the national Gini coefficients here refer to males only, the changes over the 1981-96 period are similar to those reported in Statistics New Zealand (1999, p. 49) for both genders combined.[6] All regions but Wellington saw a decline in male personal income inequality between 1981 and 1986. Nationally, the Gini coefficient declined by 5.5 percent. Between 1986 and 1996, the Gini coefficient increased in all regions. Nationally, the greatest increase occurred during the period 1986-91 (14.7 percent, as compared with 13.0 percent for 1991-96). This reconfirms Dixon's (1999) finding that inequality in New Zealand increased most during the years of financial and product market deregulation, not following the labour market deregulation brought about by the Employment Contracts Act (ECA) 1991.

[6] Statistics New Zealand (1999) reports generally higher Gini coefficients because females are included and female income inequality is greater than male income inequality.

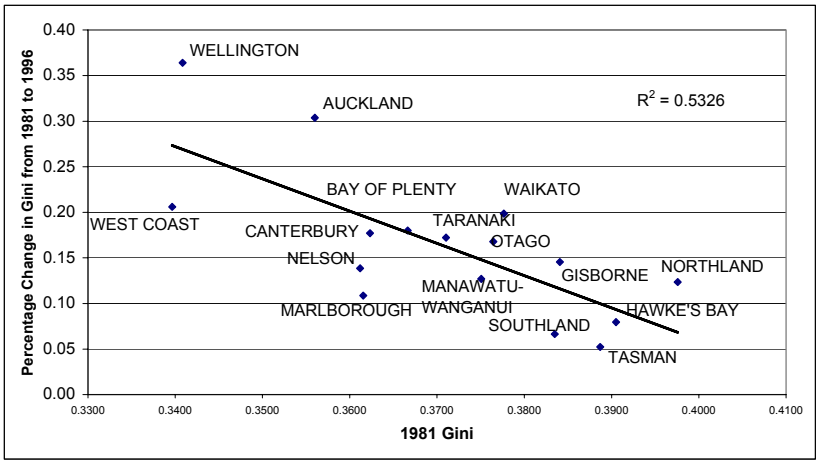

Figure 3. Convergence of the Gini Coefficients of Intra-Regional Income Inequality 1981-96.

In 1981 income inequality was particularly low in Auckland and Wellington, but also in the small West Coast region (of the South Island). Inequality in this forestry and mining-oriented region remained low subsequently. Northland was the region with the highest income inequality in 1981. Auckland and Wellington experienced the greatest increase in inequality over the 1981-96 period. These metropolitan regions had the greatest income inequality in 1996. Besides the West Coast region, inequality was also relatively low in the 1990s in several other South Island regions, namely Southland, Tasman and Marlborough.

The data reported in Table 5 confirm the regional convergence in dispersion noted by Smith (2000) for the 1986-96 period. Figure 3 plots the 1981-96 percentage changes in Gini coefficients in regions against the 1981 values. The downward sloping relationship is indicative of convergence over the 15 year period. It can be shown that this is also true for the sub-periods 1981-86 and 1986-91, but not for the period 1991-96.

Much of the change in regional Gini coefficients is driven by what is happening to the upper tail of the regional income distributions. It can be shown that the distribution of the estimated parameter α for the Pareto distribution of the upper tail is an effective indicator of differences between regions in intra-regional inequality. Regions with relatively high values of α have a low Gini coefficient. The correlation coefficient is about -0.79.

Hence the remarkable growth in inequality in the Auckland and Wellington regions can be partly explained by the widening of the upper-end of the income distribution. We expect that globalisation has played an important role (see also Poot, 2000). Auckland and Wellington have become part of a system of world cities which are highly interconnected by means of modern information technologies and between which capital and professional labour flow freely. Thus, the earnings of professionals in Auckland and Wellington are driven by

global trends, not New Zealand conditions, and this has led to rapid increases in top incomes relative to local mean earnings. "Winner take all phenomena", payment in the form of stock options and growth in the professional services have also contributed to greater gross earnings inequality (see e.g. Frank and Cook, 1995). Finally, after the introduction of a fringe benefit tax on benefits in kind (company car, health care, meal allowance, etc.) in 1985, employers passed on this tax to employees by removing the benefits and increasing gross taxable income to compensate.

Changes at the lower tail of the income distribution have undoubtedly also had an impact on the change in regional Gini coefficients. New Zealand has been deindustrialising faster than the OECD average (Easton 1999). Employment in manufacturing declined from 24.2 percent of the total in 1981 to 15.2 percent in 1996. We would expect the decline in manufacturing to have particularly affected low paid blue collar workers. Consequently, a decline in manufacturing employment may be expected to increase the Gini coefficient. We test the effect of changes in the occupational and industrial composition of employment on the Gini coefficients by means of a simple pooled cross-section time series regression model. The model includes time and region fixed effects that are not further investigated here. The result, estimated by means of Weighted Least Squares, is:[7]

$$\begin{aligned} \text{Gini}_{it} = {} & 0.302 + 0.0068\ \text{D91} + 0.0029\ \text{D96} + 0.643\ \text{PROF}_{it} - 0.162\ \text{MANUF}_{it} \\ & \quad (9.86) \qquad (4.67) \qquad (2.01) \qquad (2.13) \\ & + \text{ regional dummies} \qquad \overline{R}^2 = 0.987,\ \text{n} = 48 \end{aligned}$$

In this equation, Gini_{it} refers to the Gini coefficient in region i in year t, D91 and D96 are time dummies for 1991 and 1996 respectively, PROF_{it} is professional employment as a percentage of the male labour force and MANUF_{it} is the percentage of male employment in manufacturing. t-statistics are given in parentheses.

The equation confirms that a decline in manufacturing employment would have had an upward effect on intra-regional income inequality, while growth in professional employment would have also increased inequality. The time dummies confirm the underlying trend of growing inequality, with inequality growth being faster during the 1986-91 intercensal period than during 1991-96. The regional dummies (not reported individually above) were indicative of greater inequality in North Island regions than in South Island regions.

In summary, we see that shifts in labour demand and changes in the occupational composition of the labour force have been important determinants of intra-regional income inequality. The regional outcomes are consistent with the spatial distribution of what Callister (1998) calls "work rich" and "work

[7] Regional information on employment by occupation and industry in 1981 was incompatible with the corresponding information in the more recent censuses. Consequently, the model was estimated with data for 1986, 91 and 96 only.

poor" households. The former had the "right" professional qualifications and found those qualifications in growing demand in the globalised and services-oriented economy. The latter were likely to be unskilled blue collar workers who disproportionately bore the burden of the decline in manufacturing activity in New Zealand and who were restricted to taking insecure low paid positions. The regions with the greatest decline in manufacturing employment and the largest increases in professional employment experienced the greatest increases in personal income inequality.

In the remainder of this section we explore the regional income distributions in some greater depth. Table 6 reports the deciles of the regional income distributions in 1996 dollars for selected regions. To provide information on the deciles of the income distribution in all 16 Regional Council regions would have been unwieldy and we focus therefore on what were in 1996 representative high income (Wellington), middle income (Southland) and low income (Gisborne) regions. For example, 10 percent of Wellington males in receipt of income earned less than $8953 in 1981. The lowest decile, referred to as y10 hereafter, increased by 9 percent over the 1981-86 period to $9718. However, in the subsequent decade y10 decreased by 39 percent. The national deciles are also reported in Table 6 and provide a benchmark for the regional changes.

The regional changes are not dissimilar from the national ones. Between 1981 and 86 there was a decline in real income in all deciles except the lowest one. Nationally, real income of y10 increased by 15 percent over the 1981-86 period. Except for a so-called wage and price freeze between 1982 and 1984, this was a period of relatively rapid inflation. However, social security benefits (including a generous national pension) were indexed. This may have contributed to the absolute and relative gain in real income of the lowest decile, which was observed in most regions (but not in Southland). The 1981-86 increase in y10 may also have contributed to the decline in the national and regional Gini coefficients that was noted for this period earlier.

The relationship between the changes in the Gini coefficients and the decile incomes is depicted in Figure 4. The Gini coefficients are measured on the vertical axis and the natural logarithm of real income on the horizontal axis. Consequently, a horizontal shift measures a percentage change in real income. When greater income inequality results from changes at the bottom and the top end of the distribution, this leads to a "fanning out" of the graphs. This is particularly clear in the case of Wellington. A fanning out of the graphs is also consistent with the idea of a "vanishing middle class", as observed in Australia by Lloyd *et al* (2000).

The graphs for Southland and Gisborne have the shape of a "backwards tick" because the Gini coefficients declined between 1981 and 1986. Subsequently, real incomes declined further while the Gini coefficients increased. Figure 4 also clearly depicts the worsening of the income position of the lower deciles in all three regions after 1986. Real social security cuts implemented in 1991 and real wage declines for unskilled workers would have been major contributing factors.

At the other end of the distribution, both y80 and y90 increased nationally between 1986 and 1996, but much more so in Wellington, and y80 in fact

Table 6. Income Deciles (in 1996 dollars) in Selected Regional Council Regions of New Zealand, 1981-96

			y10	y20	y30	y40	y50	y60	y70	y80	y90
Wellington		1981	8953	17763	24450	29489	30879	38686	44169	52168	64412
		1986	9718	14955	20147	24833	29613	34221	39807	46839	58008
		1991	7549	10778	16321	21719	26942	32099	39075	47690	64907
		1996	5911	10073	14692	20832	26324	31847	38769	48334	67851
	Change	*81-86*	*9%*	*-16%*	*-18%*	*-16%*	*-4%*	*-12%*	*-10%*	*-10%*	*-10%*
		86-96	*-39%*	*-33%*	*-27%*	*-16%*	*-11%*	*-7%*	*-3%*	*3%*	*17%*
Southland		1981	9856	21826	23853	28994	33126	37886	43283	50721	64201
		1986	9362	13536	18023	22144	26107	30186	34491	39783	47546
		1991	7416	10134	13563	17532	21466	25807	30578	37410	47592
		1996	6392	10191	13463	18510	23224	27612	32885	38988	51563
	Change	*81-86*	*-5%*	*-38%*	*-24%*	*-24%*	*-21%*	*-20%*	*-20%*	*-22%*	*-26%*
		86-96	*-32%*	*-25%*	*-25%*	*-16%*	*-11%*	*-9%*	*-5%*	*-2%*	*8%*
Gisborne		1981	7859	14676	18448	22730	27305	31282	35728	41968	54079
		1986	8649	12242	15974	19276	22660	26453	30808	36663	45410
		1991	6462	8769	10630	14024	17827	21777	26342	32041	42940
		1996	5180	7986	10935	14245	18745	23428	28077	35006	46101
	Change	*81-86*	*14%*	*-17%*	*-13%*	*-15%*	*-17%*	*-15%*	*-14%*	*-13%*	*-16%*
		86-96	*-42%*	*-35%*	*-32%*	*-26%*	*-17%*	*-11%*	*-9%*	*-5%*	*2%*
New Zealand		1981	7923	14237	20662	25924	30383	34552	39729	44030	59251
		1986	9095	12848	17364	21497	25714	30184	35067	41031	51217
		1991	7019	9730	12992	17525	22143	26903	32017	39907	51912
		1996	5640	9149	12981	17691	23003	27879	33839	41383	57542
	Change	*81-86*	*15%*	*-10%*	*-16%*	*-17%*	*-15%*	*-13%*	*-12%*	*-7%*	*-14%*
		86-96	*-38%*	*-29%*	*-25%*	*-18%*	*-11%*	*-8%*	*-4%*	*1%*	*12%*

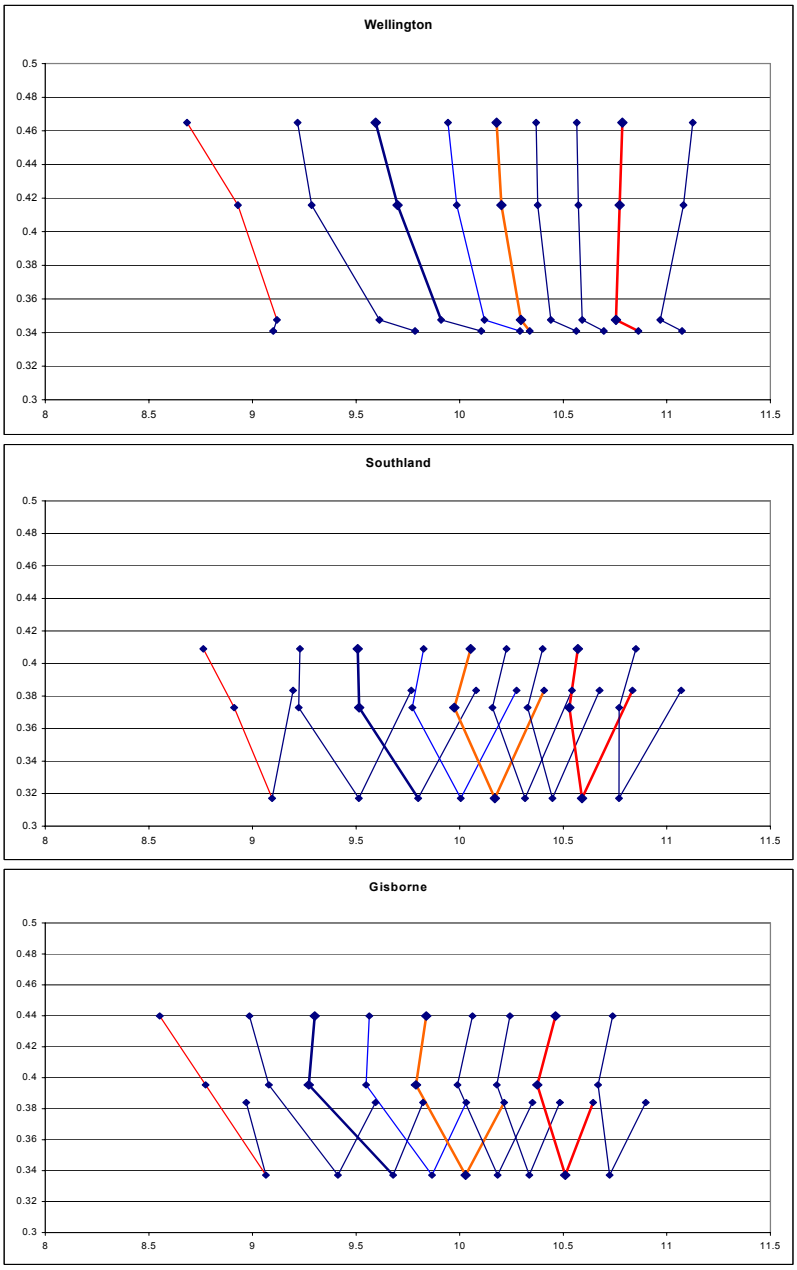

Figure 4. The Relationship between Changes in Income Deciles and Gini Coefficients for Selected Regions, 1981-96

Table 7. A Comparison of Selected Regional Cumulative Income Distributions with the National One

		y10	y20	y30	y40	y50	y60	y70	y80	y90
Wellington	1981	0.085	0.160	0.239	0.348	0.421	0.518	0.620	0.697	0.864
	1986	0.087	0.164	0.244	0.328	0.418	0.513	0.615	0.722	0.837
	1991	0.089	0.165	0.242	0.322	0.408	0.499	0.603	0.730	0.854
	1996	0.093	0.178	0.263	0.349	0.444	0.531	0.629	0.731	0.852
Change	*81-86*	*2%*	*2%*	*2%*	*-6%*	*-1%*	*-1%*	*-1%*	*4%*	*-3%*
	86-91	*2%*	*1%*	*-1%*	*-2%*	*-2%*	*-3%*	*-2%*	*1%*	*2%*
	91-96	*5%*	*8%*	*9%*	*8%*	*9%*	*6%*	*4%*	*0%*	*0%*
Southland	1981	0.073	0.155	0.247	0.359	0.434	0.532	0.637	0.713	0.871
	1986	0.093	0.185	0.285	0.383	0.491	0.600	**0.711**	**0.824**	**0.923**
	1991	0.090	0.183	0.286	0.400	**0.517**	**0.626**	**0.736**	**0.852**	**0.941**
	1996	0.080	0.172	0.276	0.384	**0.502**	**0.606**	**0.715**	**0.821**	**0.919**
Change	*81-86*	*28%*	*19%*	*15%*	*7%*	*13%*	*13%*	*12%*	*15%*	*6%*
	86-91	*-3%*	*-1%*	*0%*	*4%*	*5%*	*4%*	*4%*	*3%*	*2%*
	91-96	*-11%*	*-6%*	*-4%*	*-4%*	*-3%*	*-3%*	*-3%*	*-4%*	*-2%*
Gisborne	1981	**0.101**	**0.217**	**0.345**	**0.493**	**0.577**	**0.679**	**0.771**	**0.827**	**0.924**
	1986	**0.105**	**0.216**	**0.341**	**0.467**	**0.582**	**0.686**	**0.777**	**0.863**	**0.935**
	1991	**0.122**	**0.252**	**0.372**	**0.492**	**0.608**	**0.715**	**0.806**	**0.889**	**0.957**
	1996	**0.116**	**0.241**	**0.362**	**0.478**	**0.597**	**0.696**	**0.786**	**0.868**	**0.941**
Change	*81-86*	*3%*	*0%*	*-1%*	*-5%*	*1%*	*1%*	*1%*	*4%*	*1%*
	86-91	*17%*	*16%*	*9%*	*6%*	*4%*	*4%*	*4%*	*3%*	*2%*
	91-96	*-5%*	*-4%*	*-3%*	*-3%*	*-2%*	*-3%*	*-3%*	*-2%*	*-2%*
New Zealand	All years	0.100	0.200	0.300	0.400	0.500	0.600	0.700	0.800	0.900

declined in Gisborne and Southland (see Table 6).

A final way of comparing the national income distribution with the regional ones is to contrast the national and regional cumulative distribution functions (cdfs). Nationally, 10 percent of the male population in receipt of positive income has an income below y10, 20 percent has an income below y20, etc. The corresponding percentages for Wellington, Gisborne and Southland can be found in Table 7. For example, in 1981, 8.5 percent of Wellington males earned an income below the national y10 of 1981. In 1996, 11.6 percent of Gisborne males earned an income below the national y10 of 1996. The points at which the regional cumulative distribution functions are *above* the national one, are given in bold-type.

Table 7 shows that at all nine deciles y10 to y90, the cdf in Wellington lies below the national cdf. This is due to the relatively high income levels among the top 10 percent in the income distribution. In Southland, the upper end of the distribution has been falling away since 1986. This can be seen from Table 7 because in 1986 the Southland cdf shifted above the national one for y70 and higher deciles, and from 1991 onwards for y50 and higher deciles. The decline in average income in Southland at the top end of the distribution is probably related to the lower profits in farming activity during this period, due the removal of subsidies and lower international competitiveness resulting from a high value of the New Zealand dollar.

In Gisborne, the cdf lies entirely above the national one. This is due to the relatively depressed economic conditions in this region (with high regional unemployment) and the composition of the population, with an, on average lower skilled, Maori population representing a relatively large proportion of the work force. Nonetheless, there appears to be in all three regions considered in Table 7 a growth in the proportion of the population in the lower deciles. Future research will investigate more systematically, by means of econometric modelling, how different quantiles of the regional income distributions have been affected by the range of factors that have been posited in the literature to be responsible for the growing income inequality.

5. CONCLUSION

The study of the distribution of income at the regional level in New Zealand has been a rather neglected research topic. However, there has been a revival of interest in regional issues in recent years. This paper has attempted to shed some light on the extent to which shifts in the regional income distributions mirror changes in the national one or, alternatively, exhibit diverse patterns.

We found that real average income of males in New Zealand declined over the 1981-96 period nationally and regionally, except in Auckland. Taking all regions into account, there was evidence of divergence in mean income levels across the regions. However, among the non-metropolitan "heartland" regions there was convergence in income at a rate of 3.3 percent, as compared with the 2 percent "rule" suggested internationally by Barro and Sala-i-Martin (1992). Nonetheless, there was significant persistence in the ranking of regions in terms of real income levels.

There appears to exist a dichotomy between income trends in metropolitan Auckland and Wellington on the one hand, and the rest of New Zealand on the other. It appears that Auckland and Wellington have become winners in the "New Economy", with rapid real income growth in the upper end of the distribution, and relatively smaller declines in the middle of the distribution. In all New Zealand regions, however, real incomes of those at the lower end of the distribution declined sharply over the 1981-96 period.

All regions experienced a growth in intra-regional income inequality over the 1981-96 period. Because regions with low initial levels of inequality had the fastest inequality growth, there is clear evidence of convergence in dispersion. The sharply growing inequality in Auckland and Wellington plays an important role. In most regions, but particularly in Auckland and Wellington, the income distribution became wider due to a growth in both high income earners and low income earners. Consequently, the middle income group became relatively less numerous.

We provided some evidence to suggest that labour market trends had a role to play in these trends. Inequality grew faster, ceteris paribus, in regions where professional employment grew stronger and where the greatest job losses in manufacturing occurred. However, there are many further labour market influences that ought to be explored. On the supply side, it would be of interest to study the role of regional trends in education and training, the unemployment rate and the incidence of long-term unemployment, cohort effects and migration flows, both internally and internationally. On the demand side, one would focus *inter alia* on skill-biased technical change, the regional impact of deregulation and the growth in non-standard employment. Finally, the question also arises to what extent economic growth in recent years which has been at a lower, but probably more sustainable rate than during the 1991-96 period, has modified the changes in the income distribution reported in this paper. New data will become available when the 2001 census results are released in 2002. At that stage, formal econometric modelling may also shed some light on the various forces that shape the quantiles of regional income distributions.

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