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The Relationship Between Trends in Income Inequalities and Poverty in New Zealand

There has been much discussion recently about poverty, particularly child poverty, and the harmful effects of persistent poverty (Perry, 2012; Expert Advisory Group on Solutions to Child Poverty, 2012a, 2012b; Imlach Gunasekara and Carter, 2012). Children who experience many years of poverty are at higher risk of poor child development, worse health outcomes as children and adults, and lower socio-economic status as adults (Duncan, Ziol-Guest and Kalil, 2010; Evans and Kim, 2007; Malat, Hyun and Hamilton, 2005; Najman et al., 2010; Seguin

et al., 2007; Gibb, Fergusson and Horwood 2012; Poulton et al., 2002). This raises special questions around the role of the state in protecting children from harm (and increasing the chances of a healthy and productive future workforce) through child poverty reduction which New Zealand society has not yet resolved. There is also concern about a high level of income inequality (the gap in income between rich and poor) in New Zealand, and reports of executives' high salaries and generous raises frequently trigger debate. Poverty and income inequality are often assumed to go hand in hand, but this is not always the case.

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We aim to investigate the following questions about poverty and income inequality in New Zealand:

- How do trends in child poverty relate to trends in household income inequality?
- Can poverty only be reduced by reducing income inequality (narrowing the spread of income across all individuals)?
- Can income inequality only be reduced by increasing (lower) incomes through redistribution, which makes the rich poorer and the poor richer?

In this article we focus on income poverty, defined as a household income of less than 60% of median household income, where household income is usually after tax and tax credits to reflect the actual disposable income available to households. This is a relative measure of income poverty, a proportion of the population referenced to the current median household income. An alternative measure is to use a median income that is set at one point in time, providing a measure of income poverty that is referenced to a fixed value. Using these definitions, child income poverty in 2011 was around 25% (using the current

median) or 21% (using median fixed at 2007) after housing costs are taken into account, compared to 19% and 15% before housing costs (Perry, 2012). Other ways of estimating poverty include measuring living standards or individual deprivation, which are more direct measures of hardship and consumption and give a picture of the consequences of poverty. However, in this article we focus on income poverty (as a measure of household resources), as it is more commonly collected in household surveys and is widely used in the literature and for international comparisons.

Table 1: Description of various scenarios of changes in inequalities (using 90:10 and 50:10 ratios) and poverty (less than 60% of median)

Rank in income disribution	Baseline	Scenario 1 ↓inequality** ↓poverty	Scenario 2 ↓inequality** ↓poverty	Scenario 3 <->inequality** ↓poverty	Scenario 4 ↑inequality** ↓poverty
	Baseline				
P90	100,000	105,000	90,000	250,000	500,000
P80	90,000	95,000	80,000	150,000	400,000
P70	80,000	85,000	70,000	100,000	300,000
P60	70,000	75,000	65,000	75,000	200,000
P50 (median)	50,000	50,000	50,000	50,000	50,000
P40	40,000	45,000	45,000	40,000	40,000
P30	30,000*	35,000	35,000	35,000	35,000
P20	20,000*	25,000*	30,000*	30,000*	30,000*
P10	10,000*	15,000*	25,000*	25,000*	25,000*
P90:10	10	7	3.6	10	20
P50:10	5	3.3	2	2	2

	Scenario 5 ↓inequality** ↑poverty	Scenario 6 <->inequality** ↑poverty	Scenario 7 ↑inequality** ↑poverty	Scenario 8 ↑inequality** <->poverty	Scenario 9 ↓inequality** <->poverty
P90	90,000	100,000	500,000	500,000	90,000
P80	80,000	90,000	400,000	400,000	80,000
P70	70,000	80,000	300,000	300,000	70,000
P60	60,000	70,000	200,000	200,000	60,000
P50 (median)	50,000	50,000	50,000	50,000	50,000
P40	30,000*	30,000*	30,000*	40,000	40,000
P30	20,000*	20,000*	20,000*	30,000*	30,000*
P20	15,000*	15,000*	15,000*	20,000*	20,000*
P10	10,000*	10,000*	10,000*	10,000*	10,000*
P90:10	9	10	50	50	9
P50:10	5	5	5	5	5

* Less than 60% of the median ($30,000) = in poverty
** Overall inequality (measured by the 90:10 ratio)

Figure 1: Trends in child poverty and income inequalities from 1980 onwards
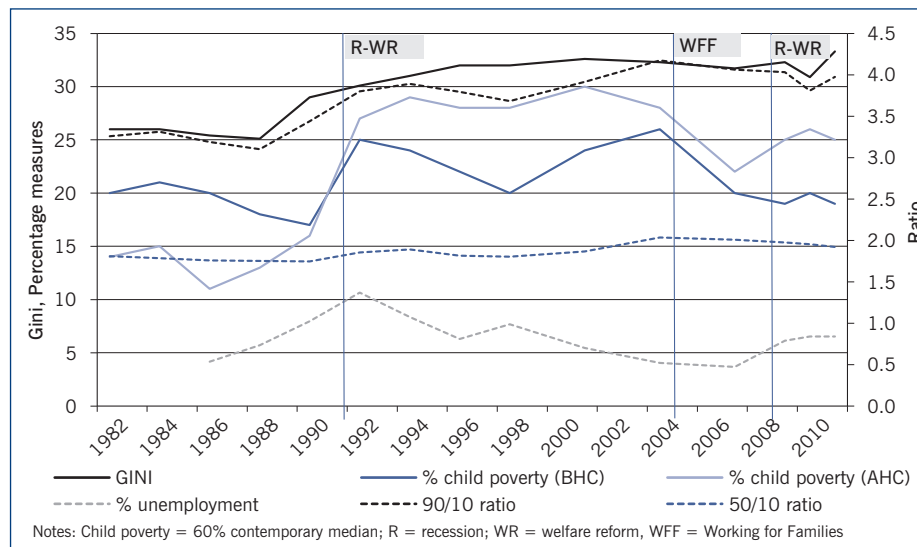
Source: adapted from Perry (2012), and Ministry of Social Development Household Economic Survey data.
Notes: Child poverty = 60% contemporary median; R = recession; WR = welfare reform, WFF = Working for Families

To explore the relationships between income poverty and income inequality, we first present a number of theoretical scenarios which include different combinations of increased, decreased or static income inequality and poverty. We then examine the patterns of income poverty and income inequality (before housing costs) over time, using published data from the cross-sectional Household Economic Survey from 1982 to 2011 (Perry, 2012) and the longitudinal Survey of Family, Income and Employment (SoFIE) from 2002 to 2010 (Imlach Gunasekara and Carter, 2012).

Theoretical scenarios of changing income inequality and income poverty

Table 1 describes nine theoretical scenarios where income inequality and poverty change from a baseline state. In this example overall income inequality is the gap between the 90th and 10th percentile income in the sample (the 90:10 ratio). Different measures of inequality (e.g. Gini) can have subtly varying trends given the same income distribution. However, as evident in Figure 1, the 90:10 ratio usually runs in parallel to the Gini (the Gini coefficient is calculated by ranking individual's incomes from low to high and determining how the share of income is distributed in the population). We also present in Table 1 the level of inequality in the lower half of the income distribution (the 50:10 ratio). In the baseline scenario,

the median or middle value is $50,000. Anyone with an income of less than 60% of the median (or less than $30,000 [0.60 x $50,000]) is classed as being in poverty. The bottom three deciles of households in this baseline sample are classified as being in poverty by this definition (as the 30th percentile income is 60% of the median). Scenarios 1 and 2 give two examples where poverty is reduced by decreasing income inequality through different mechanisms. In scenario 1 all incomes (except the median) increase by $5,000. This reduces relative inequality (as measured by the 90:10 and 50:10 ratios) and poverty (the proportion of households in income poverty), as a small absolute increase in income has a larger (relative) impact on the income of households at the bottom end of the distribution. Scenario 2 describes a situation where the income of the richer deciles is lowered (e.g. through taxes) and the income of the lower deciles is raised (e.g. through redistributive social policy, such as tax credits), which decreases inequality and poverty. Scenario 3 presents a situation where poverty could be reduced without changing the overall level of relative inequality (90:10 ratio) by raising the level of minimum income as well as some incomes above $30,000, thus reducing the inequality in the lower half of the income distribution (the 50:10 ratio). This could be achieved (for example) through education and training coupled with improved employment

opportunities, and allowing incomes to increase. In scenario 4 poverty is reduced by raising the incomes in the lower half of the population, but inequalities are increased with much larger increases in income at the higher levels. Scenarios 5 to 9 show different examples of increasing or stable poverty rates, with an increase or decrease in the level of inequality in the population. Mathematical subtleties noted, the key points are that while relative income inequality (e.g. 90:10 ratio) and poverty (e.g. <60% median) usually travel together, they are not completely in step. Manipulations to the shape of the income distribution at 'sensitive zones' through levers such as tax can decrease or increase relative poverty without exact mirror changes in relative income inequality across the whole distribution.

Trends in changing income inequality and income poverty in New Zealand
Household Economic Survey (HES)
Figure 1 tracks the trends in child poverty and measures of income inequality in New Zealand from 1982 to 2011, using data from the annual Ministry of Social Development report examining trends in household income in New Zealand (Perry, 2012). Figure 1 shows that trends in the Gini and 90:10 ratio run in parallel. Through the 1980s into the early 1990s, overall income inequality (as measured by the Gini and 90:10 ratio) and poverty largely moved in tandem, with a decline in both and then an increase. This was primarily due to larger declines in gross household income in the lower compared to upper income groups (Stillman et al., 2012). After the economic recession and welfare reforms in the early 1990s, child poverty declined while income inequality as measured by the Gini continued to increase gradually (although that measured by the 90:10 ratio was essentially stable). Since then, income inequality (by both measures) has remained approximately stable, with a potential increase since 2010 after the global financial crisis and economic recession. It can be seen that child poverty rates have fluctuated more over time, showing the potential impacts of policy and the economic environment on child

poverty. Figure 1 also suggests that the rise in income inequality (and poverty) in the late 1980s may have been driven by changes in unemployment. However, other major changes occurred within the New Zealand economy and society at the same time, so it is difficult to disentangle these effects.

The period between 1998 and 2004 presents an example of scenario 6 (Table 1), where the rate of poverty is increasing in relation to stable income inequality. The trends after 2004 show a potential effect of the (redistributive) Working for Families package, which included the expansion of family tax credits and the accommodation supplement, and the introduction of the in-work tax credit in 2006. Working for Families was initially targeted at those families on low incomes, and its effect can be seen in the decrease in the 50:10 ratio and the percentage of children in poverty (scenario 3 in Table 1). The trends in the rate of child poverty using the income data after housing costs (AHC) are removed appear to be more sensitive to policy change.

Examining all of this information together, it could be argued that poverty reduction was achieved without narrowing the overall spread of income, because the shifts in income around the poverty line – albeit meaningful and important for families and individuals at this threshold – were not substantial enough to have an impact on the Gini (which measures all points of the income distribution). Similarly, the Working for Families package was more focused on low-income working families, not beneficiary families, meaning that income impacts occurred more above the lowest decile of incomes, resulting in little change in the 90:10 ratio.

As shown in Figure 1, the last decade has been one of significant changes with the potential to affect both income inequality and poverty levels, including the major social policy initiative Working For Families, and the economic downturn, with rising unemployment in the late 2000s. We describe the trends in income inequality and poverty over this time period in more detail, using eight cross-sections of the SoFIE data from 2002 to 2010.

Figure 2: Trends in poverty, child poverty and income inequalities from 2002 to 2010, using SoFIE data

Notes: WFF = Working for Families, R = recession, WR = welfare reform
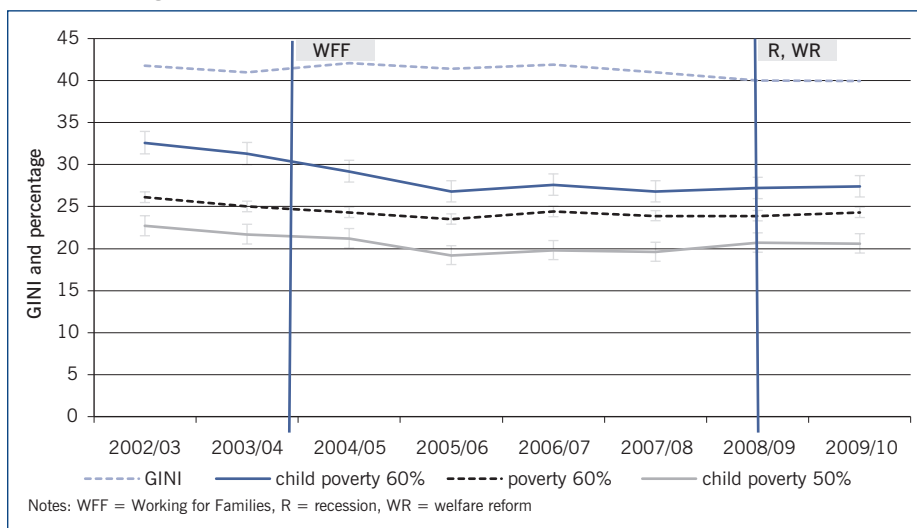
Survey of Family, Income and Employment (SoFIE)

SoFIE is an eight-year longitudinal household panel survey run by Statistics New Zealand (Carter et al., 2010). Face-to-face interviews were used to collect annual information on income levels, sources and changes (including benefits and family tax credits), as well as employment, education, household and family status, self-rated health and demographic factors. The sample population used for the analyses in this paper was SoFIE participants who were eligible at wave 1 and who responded in all eight waves, giving a sample size of 18,220. The individual was the unit of observation for this analysis, so if there were two or more individuals in a household then their household income was represented two or more times in the analysis population. The sample data were weighted to the longitudinal population in 2002.

Household income was derived by totalling adult annual personal income (before tax) from all sources received within a household for the 12 months prior to the interview date. This was equivalised for household economies of scale using the 1988 Revised Jensen Scale (Jensen, 1988). The data presented here is gross household income before tax and housing costs are taken into account, so is likely to overestimate disposable incomes at the lower ends. Note that this is different from the disposable income used in Figure 1 and is likely to show weaker trends over time. The measure
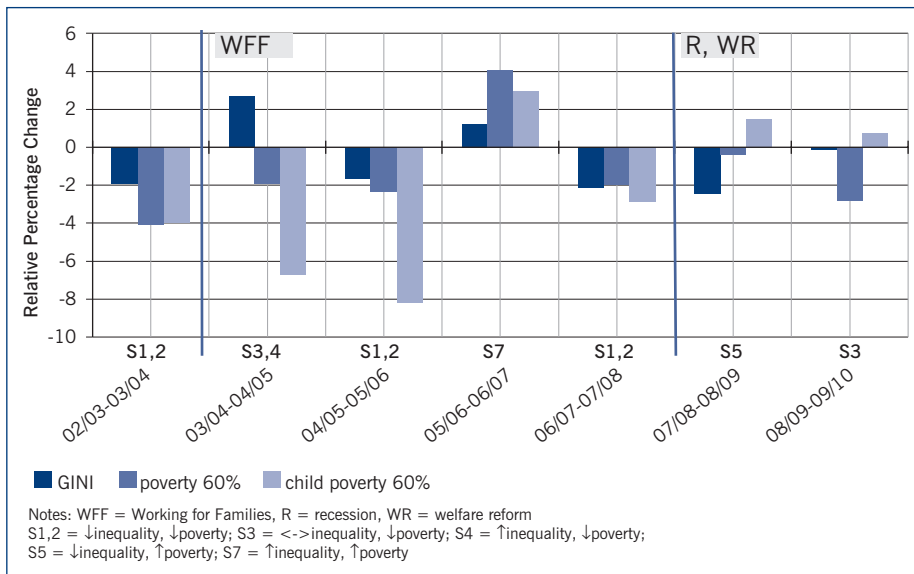
of low income used in this analysis of SoFIE was calculated as less than 60% of the median gross equivalised household income of each wave. Child poverty is the number of children (aged between 0 and 17 in wave 1) living in households below the low-income line in each wave.

Figure 2 presents trends over the eight years of the SoFIE study, and shows that income inequality was relatively stable (as measured by the Gini, using gross household income before housing costs). As shown in Figure 1, the trends in poverty do not exactly mirror the trends in income inequalities over time. Poverty rates declined between 2002 and 2005, then stabilised. The declines in the child poverty rates were steeper than the poverty rate in the overall population, which may be partly explained by the introduction of Working for Families in 2004. Although the rates of inequality and poverty are higher in SoFIE than in the HES data (due to the different income data used), the overall trends are similar over the period from 2002 to 2010. The HES showed a slight increase in Gini from 2010 to 2011.

The overlapping confidence intervals in consecutive years indicate a high degree of internal correlation. However, there are large differences over longer periods of time (with non-overlapping confidence intervals), such as from 2002/03 to 2005/06, for both measures of child poverty (60% and 50% median).

In Figure 3 we present the relative changes between waves of the SoFIE data

Figure 3: Annual changes in percentage in poverty, child poverty and income inequalities from 2002 to 2010, using SoFIE data

Notes: WFF = Working for Families, R = recession, WR = welfare reform
S1,2 = ↓inequality, ↓poverty; S3 = <->inequality, ↓poverty; S4 = ↑inequality, ↓poverty;
S5 = ↓inequality, ↑poverty; S7 = ↑inequality, ↑poverty

in the measures of inequality and poverty and child poverty (calculated by [[X2-X1]/X1]*100). As indicated in Figure 2, the difference in rates of poverty between consecutive waves is small. However, Figure 3 shows that over the period of eight years different scenarios (from Table 1) of increasing or decreasing inequalities and increasing or decreasing poverty can occur. Although there was a general downward trend in the early 2000s, there was an increase in income inequality, and a substantial decrease in the rates of child poverty can be seen after the introduction of the Working for Families tax credit package in 2004. The changes over time are variable in the late 2000s, particularly after the global financial crisis in 2008–09 when there were decreases in income inequalities and some increases in poverty.

Discussion

The relationship between income inequality and poverty is not straightforward. Our data shows that trends in child poverty do not exactly mirror trends in household income inequality. Changes can occur in both inequality and poverty, and vary by what measurement is used.

It can be seen from the data used in Figure 1 (based on the Household Economic Survey) and Figures 2 and 3 (using SoFIE) that the measures of income inequality and poverty are higher in the SoFIE data than those presented using the HES data. The HES data in

the Ministry of Social Development reports uses disposable income (after taxes and tax credits have been taken into account). Therefore, they are more likely to reflect the actual income trends in the population. However, the SoFIE data is useful as it allows us to examine annual changes in inequalities and poverty as they coexist in the data. There were also different survey designs and measurement tools used in the two surveys, which may account for any differences. However, data from both surveys were weighted for the sampling design to represent the New Zealand population at the time of the survey (in the case of SoFIE, the New Zealand population as at October 2002).

It is likely that trends in income inequalities measured using disposable income will correlate with measures of income poverty better than will measures using gross income, as policy changes such as the Working for Families tax credit package aim to increase the income available (disposable) in low- to middle-income households. We compared the trends in the Gini using disposable income with those of gross household income from the HES data (Bryan Perry, personal communication, 17 October 2012) and the overall trends are the same; however, the level of inequality is higher using gross household income (as it doesn't take into account tax credits). It can be seen from Figure 1 that measures of poverty that take into account housing costs are

more sensitive to policy change. Previous New Zealand research has also shown that changes in the rates of poverty and income inequality over time are similar regardless of the method used for calculating poverty or deriving income (equivalisation, gross or disposable) (Stillman et al., 2012).

Some of the misconceptions around the relationship between income poverty and income inequality are simplistic, and do not account for significant influences from both the micro- and macro-economic environment, such as unemployment rates, labour force conditions (such as the minimum wage and temporary/insecure employment levels) and government policy (e.g. benefit to work incentives).

It is important to note that interventions to reduce poverty and to reduce inequality are not synonymous. The recent report released by the Children's Commissioner's Expert Advisory Group on Solutions to Child Poverty recommends that policy attention be focused on poverty rather than income inequality to improve the health (and chances) of New Zealanders as a nation (Expert Advisory Group on Solutions to Child Poverty, 2012a).

Appendix

SoFIE information/methods

Household income was derived by totalling adult annual personal income (before tax) from all sources received within a household for the 12 months prior to the interview date, so annual income estimates for wave 1 relate to the 2001–02 financial period (Imlach Gunasekara and Carter, 2012). This was equivalised for household economies of scale using the 1988 Revised Jensen Scale (Jensen, 1988), which is very close to the widely used modified OECD scale. The data presented here is gross household income before tax and housing costs are taken into account, so is likely to overestimate disposable incomes at the lower ends. Disposable (after tax) income was not available from the SoFIE dataset at the time of this analysis.

There are several ways used to summarise the amount of income dispersion or inequality in a single statistic. No one statistic has emerged as the generally accepted way, mainly because each one captures a different aspect of the way the dispersion of incomes changes over time. We use the GINI coefficient as the measure of income inequality. The GINI coefficient is calculated by ranking individuals' incomes from low to high and determining how the share of income (the proportion of the total sum of incomes from all individuals) is distributed across society, from poor to rich. In a totally equal society, where everyone had the same income, the GINI would equal 0, and in the most unequal society, where one person held all the income, the GINI would equal 1, meaning that a higher GINI indicates a less equal (in terms of income distribution) society.

The measure of low income used in this analysis of SoFIE was calculated as less than 60% of the median gross equivalised household income of each wave. We also investigated a lower cut-off point for low income (<50% median gross equivalised household income), which reduced the magnitude of the proportion of respondents with low income, but is more comparable to rates using disposable income data. Child poverty is the number of children (aged between 0 and 17 in wave 1) living in households below the low-income line in each wave.

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