Dynamics of Income in Children in New Zealand, 2002-2009

A descriptive analysis of the Survey of Family, Income and Employment (SoFIE)

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Summary

Study of the distribution of incomes, and how the incomes of individuals change over time, is integral to the understanding of changes in the economic situation and poverty in New Zealand children over time. Research of temporal dynamics presents a more comprehensive understanding of poverty than point-in-time (multiple cross-sectional) studies. Longitudinal (dynamics) research shows that people can experience different patterns of poverty over time, that the majority of people who experience poverty at least one year out of several years move in and out of poverty, and that many more people experience poverty in at least one year over a period of time that they do at any one moment of time. There is also evidence for the adverse impact of long periods in low income on health, employment and other outcomes – exposure to chronic low income or accumulated periods of low income is detrimental for children [1-9].

We utilise the recent release of seven years of data from the Survey of Family, Income and Employment (SoFIE) to examine cross-sectional prevalence and dynamics of income, low income and deprivation for New Zealand children from 2002 to 2009. The objective of this report is to provide relevant and timely information for current policy discussions on poverty being undertaken by the Treasury, a Ministerial Committee on poverty and the Children's Commission, which is investigating evidence for interventions to reduce poverty in children and making recommendations about the measurement of child poverty, including the adoption of a set of official poverty measures.

The Survey of Family, Income and Employment

The report uses seven waves of data from SoFIE, which was an annual panel survey administered by Statistics New Zealand. SoFIE gathered detailed annual information on income such as employment and education experiences, household and family status and changes, demographic factors and health status, from over 18,000 individual sample members, including 4,930 children for seven years from 2002 to 2009. Attrition (drop out of respondents) over the seven years was around 37% which is similar to comparable panel surveys internationally. Note that the sample of children in this analysis were aged 0-17 at wave 1 (the beginning of the survey) and hence the sample would include people aged up to 23 years by the end of the seven years (as the teenage children become older). However, excluding these older individuals (perhaps surprisingly) made little difference to the low income prevalence rates or income transition probabilities. Therefore, we included them, and did separate analyses by age group, commenting on differences as they arose.

Income

The main measure of income used in this report was total household (gross) income derived by totalling adult annual personal income (before tax) from all sources received within a household and equivalised for household size. In the SoFIE data 10% of individuals had a missing component of personal income, which may have led to an underestimation of household income. However, annual measures of personal and household income in SoFIE have been found to follow similar income trajectories as other national cross-sectional surveys.

The measure of low income used in this analysis of SoFIE was less than 60% of median equivalised gross household income at each wave. This meant that around 28% of children were classified as being in low income. We also used <50% of median income to define low income, which identified around 19% of the child sample as being in low income. This is close to the New Zealand 'child poverty' rate found in New Zealand and OECD literature. Duration of low income is the number of waves the child was in a low income household over the survey period. The measure of chronic low income compares permanent household income (smoothed) over the study period with the average low income line, using CPI adjusted equivalised household income data. This average low income line was used to divide households into those that were in chronic versus transitory low income – if the permanent household income fell below the average low income line, the household was

defined as being in chronic low income. A household might dip below the average low income line on occasion but *not* be in chronic low income overall – this would be transitory low income.

Deprivation

The measure of deprivation used in this report was taken from an individual-level index of socioeconomic deprivation (NZiDep), which was asked as part of the SoFIE-Health module in waves 3, 5 and 7. The NZiDep is a tool used for measuring deprivation for individuals and is a composite score based on eight simple questions ranging from whether the respondent had to buy cheaper food so they could pay for other things to whether the respondent had to make use of food banks over the past 12 months. For children (less than 15 years), who did not report an individual score, we calculated an average NZiDep across adults within their household and applied this rounded average score to the children in the household. Respondents were classified as being in deprivation if they reported three or more measures at each wave. The duration of deprivation was calculated by adding up the number of waves the respondent was classified as being in deprivation.

Results

Low income

- The cross sectional prevalence of low income (<60% of the median household equivalised before tax household income) over the seven waves was between 26-30%, for children aged 0-17 at wave one. This compared to 23-25% for the whole SoFIE sample, including adults. If <50% of the median income threshold was used, the prevalence was between 18-21%.
- Low income rates (for both <60% and <50% median income thresholds) were higher for Māori and Pacific children and for children younger than 10 years of age.
- More than half of children experienced low income (<60% of the median income) for one or more years of the study, 24% were in low income for over half of the study period (four or more years) and 6% for all seven years. For the <50% low income threshold, just under half experienced low income for at least one year, 16% of children were in low income for four or more years, 3% for all seven years.
- Māori and Pacific children experienced more time in low income (for both <60% and <50% median income thresholds), as did children living in sole parent families and in more deprived neighbourhoods.
- Persistence and/or recurrence of low income (<60% of the median income) was also high. Of those children who were in low income at wave 1, 71% remained in low income at wave 2 and 46% were in also low income in wave 7. In addition, 20% of children who were in low income households at wave one were in low income for all seven waves.
- Entry rates into low income (<60% of the median income) over two years were around 8% and exit rates were 9%.
- Chronic low income (where permanent income over the seven waves was below the average low income line) was 24% overall but higher in Māori children (37%), using the <60% of median income threshold; using <50% of median income, the overall chronic low income rate was 16%.
- Of those who were in low income at each wave, around two thirds were chronically in low income (the remainder were in transitory low income), using the <60% of median income threshold (60% using the <50% of median income threshold).

Deprivation

- Approximately 14-18% of children were living in households reporting deprivation (defined as a score of two or more measures on the NZiDep) at the three time points at which deprivation was measured.
- About 28% of children were living in deprivation at least once over the three waves and 13% experienced persistent deprivation (2-3 waves in deprivation). Children at higher risk of

persistent deprivation included children aged 0-4 (20%), Māori and Pacific children (22%), those living in the most deprived neighbourhoods (21%) and children living in sole parent families (a third).

Severe poverty

- A measure of severe or extreme poverty combines both a low income and a deprivation measure, to identify those who are both in low income and in deprivation as individuals who are most deprived. Depending on the low income and deprivation measure used, between 5-10% of children were identified as being in severe poverty. Māori and Pacific children were approximately twice as likely to be living in severe poverty.
- Increasing duration of low income was correlated with increasing levels of deprivation.

Income mobility

- There was evidence of both stability and mobility in income between waves in households of children aged 0-17.
- From year to year, there was relative stability in income at the upper and lower income quintiles, with those in the highest quintile having a 68% probability of remaining there in the next year; this was 65% for the lowest quintile.
- Around 50% of the middle income quintiles experienced year on year mobility.
- Income mobility occurred in both directions – households moved into higher and lower quintiles, but a shift beyond one quintile in any direction was uncommon.

Key messages

- Cross-sectional rates of low income and deprivation tend to understate the experience of low income and deprivation in children over a period of time.
- Where cross-sectional low income (<50% of median household equivalised income) rates were around 19%, using the longitudinal data found that over the seven years of the survey nearly half of children experienced one or more years of low income.
- While 16% of children experienced low income (<50% of median household equivalised income) for more than half the study period (four or more of seven years), this rate was higher for Māori and Pacific children, children living in sole parent families and in the most deprived neighbourhoods.
- Where cross-sectional deprivation (New Zealand Individual Deprivation Index score of two or more) rates were 14-18%, from the longitudinal perspective, 28% of children experienced deprivation at some point over three time periods and this was higher for Māori, Pacific and young children and children living in sole parent families and the most deprived neighbourhoods.
- Around 5-10% of children were found to be in 'severe' poverty (living in both low income and deprived households) but twice as many Pacific and Māori children were living in severe poverty.
- Approximately two thirds of children who were in households with low income at any one point in time were chronically in low income over the study period.
- There is both stability and mobility in the income of New Zealand children's households, and the mobility occurring each year is both upwards and downwards.

Table of Contents

List of Tables

List of Figures

List of Appendix Tables

Acknowledgements

Statistics New Zealand Security Statement

Access to the data used in this study was provided by Statistics New Zealand in a secure environment designed to give effect to the confidentiality provisions of the Statistics Act, 1975. The results in this study and any errors contained therein are those of the authors, not Statistics New Zealand.

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Background

Study of the distribution of incomes, and how household incomes affecting children change over time, is integral to the understanding of changes in the economic situation and poverty in New Zealand children over time. Research of temporal dynamics presents a more comprehensive understanding of poverty than point-in-time (multiple cross-sectional) studies [10]. While point-in-time studies provide a static 'snap shot' of the population at a given time period, dynamics or longitudinal research traces the same individuals and households over time and so is able to record stories of change. Longitudinal (dynamics) research shows that people can experience different types of poverty (e.g. living in low income households, experiencing material deprivation or low living standards, or both), that many people who experience poverty move in and out of poverty, that many more people experience poverty over a period of time than they do at any one moment in time and that a significant proportion experience prolonged periods of poverty (low income and/or deprivation) [11, 12]. Chronic and transitory poverty most likely have different causes and have different policy responses so it is important to tease them apart where possible [12, 13].

We have previously used seven years of longitudinal data from the Survey of Families, Income and Employment (SoFIE) to examine the dynamics of economic life in New Zealand [14]. We build on this report to examine the dynamics of income and poverty in more detail in the child population of SoFIE. One of the original objectives of the SoFIE study was to identify patterns of income experiences over time for individuals and families [15, 16]. SoFIE gathered detailed annual income information from over 18,000 individual sample members for seven years from 2002 to 2009, therefore we can examine changes in income and poverty for children over time. This report provides additional information to the regular point-in-time income reports which provides evidence about *current levels* and *recent trends* in income or poverty [17, 18]. However, these cross-sectional reports cannot provide information on income mobility (how children move in and out of higher and lower income groups), poverty duration (how long children remain in poverty over time), poverty persistence (the proportion of children who are still in poverty at one or more years after experiencing poverty), poverty recurrence (how many children exit and re-enter poverty) and chronic poverty (the proportion of children whose average household income over a given time period is below the average poverty line of that same time period). Therefore, the examination of longitudinal dynamics of income and poverty will complement these cross-sectional studies [17, 18] and provide more information to the understanding of child poverty in New Zealand.

The objective of this report is to provide relevant and timely information on the dynamics of income, low income and deprivation in children over time, for current policy discussions on child poverty being undertaken by the Treasury, a Ministerial Committee on poverty and the Children's Commission Child Poverty Expert Advisory Group, which is investigating evidence for interventions to reduce poverty in children. This group is also making recommendations about definitions of child poverty and targets to be reached in the reduction of child poverty, which require regular monitoring of child poverty and longitudinal data.

Methods

Data

We used seven waves of data from the Survey of Family, Income and Employment (SoFIE), an annual longitudinal survey administered by Statistics New Zealand (SoFIE data waves 1-7 version 2). SoFIE was a fixed household panel survey that began in 2002 and finished in 2010, with the first wave of data collection continuing over the period of October 2002 to September 2003 and the final (eighth)

wave from October 2009 to September 2009 to October 2010. Information from the first seven waves was used in this analysis.

Population

The sample population used for the analyses in this paper was SoFIE children who were eligible and aged 0 to 17 years at wave 1, and also responded in all seven waves, giving a sample size of 4,930. The individual child was the unit of observation for this analysis, so if there were two or more children in a household then their household income was represented two or more times in the analysis population.

Eligible participants included the usually resident population of New Zealand living in permanent, private dwellings on the main islands in the North and South Islands (including Waiheke Island), and excluded overseas visitors resident in NZ for <12 months and who intend to stay in NZ for <12 months; non-NZ diplomats and diplomatic staff and their dependants; members of non-NZ armed forces stationed in NZ and their dependants; and people living in institutions or in other non-private dwelling establishments such as boarding houses, hotels, motels and hostels, as well as people living on offshore islands [15, 19]. Children (those aged less than fifteen years) were not asked specific survey questions, but demographic information (age, sex and ethnicity) on all children in the household was collected from the respondent in the household who answered the household questionnaire.

Sampling for SoFIE was by a three stage stratified cluster approach, by selecting a random sample of primary sampling units (a group of around 70 dwellings) stratified according to socioeconomic and other variables, then a random sample of dwellings within these units [15]. The initial SoFIE sample comprised approximately 11,500 responding private households (response rate of 77%) with over 29,000 respondents (over 22,000 adults) included in wave 1, reducing to over 18,000 in wave 7 (63% of wave 1 responders), 13,850 adults (aged 15 years and older; 66% of Wave 1). This rate of attrition is similar to other international longitudinal surveys (HILDA 69%, 67% BHPS) [10, 20].

Appendix Table A: 1 presents the Wave 1 characteristics of the original Wave 1 SoFIE population and the balanced panel (for all ages). This table shows that respondents reporting Māori or Other ethnicity, low income and sole parents were more likely to drop out over the seven waves of the study. This may have led to an over-estimation of income in the balanced panel and an underestimation of those respondents classed as in low income.

Measures

In SoFIE, face-to-face interviews were used to collect information annually on income levels, sources and changes, and on the major influences on income such as employment and education experiences, household and family status and changes, demographic factors and health status. The SoFIE-Health module was comprised of 20 minutes of questionnaire time in waves 3 (2004-05), 5 (2006-07) and 7 (2008-09), in the following health-related domains: health status (SF36 & Kessler scale), perceived stress, chronic conditions (heart disease, diabetes, and injury-related disability), tobacco smoking, alcohol consumption, health care utilisation, and an individual deprivation score [15].

Income

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 2001-2002 financial period. This was equivalised for household economies of scale using the 1988 Revised Jensen Scale [21] which is very close to the widely used modified OECD scale. Most analyses– unless otherwise noted – used (nominal) equivalised

household income calculated before housing costs and *did not* adjust for changes in Consumer Price Index (CPI). Equivalised household income calculated after housing costs was used to compare rates of low income to other surveys. Housing costs included: rents, mortgage payments (principal and interest), and rates (land and water). Equivalised household income adjusting for changes in the CPI from October 2001 (the first income reference period quarter) was used as a measure of "real" income over the time period. The CPI adjustment for income was mapped to the four quarters of the year, as SoFIE data is collected throughout a 12 month calendar period. This means that for data in one wave that was collected over different reference periods had slightly different CPI adjustments made (e.g. a wave 1 respondent interviewed in October 2002 compared to someone interviewed in August 2003).

The SoFIE survey collects both point-in-time data and time-spell data. Annual personal income was derived by adding together the following: Employee earnings were the 'usual/regular' pay received in a spell with an employer, government transfer income referred to gross as well as non-taxable income received from government transfers within the reference period, income from self-employment, interest from bank accounts, income from other investments, income from private superannuation and pension schemes, other income received as regular payments and other irregular income. In the SoFIE data 10% of respondents had a missing component of personal income, which may be only a small component over their overall income across the wave (e.g. missing the dollar amount of employee earnings or benefit for a short spell over the 12 months). Missing data was more common in respondents who reported multiple spells and components of income over the annual reference period, who were also more likely be in lower income groups. Therefore the household income may be slightly underestimated leading to a small overestimation of those in low income. However, annual personal income in SoFIE has been found to follow income trajectories from the NZ Income Survey closely [SoFIE User Network meeting February 2012]. Also a comparison of the median and mean gross equivalised household income of the SoFIE (balanced panel) with a comparable household income from the Household Economic Survey found very similar results across the study period (see Table A: 2 in the Appendix).

Income mobility is presented as transition tables of quintiles of equivalised household income summing transitions from wave (i) to wave (i+1) across the seven waves.

Low income

The measure of low income used in this analysis of SoFIE was less than 60% of the median gross equivalised household income at each wave. This may not be comparable to measures of 'poverty' in other surveys, for the following reasons: these tables were not weighted to the New Zealand population; the main measure of income used was before tax; and as discussed above there was measurement error in income specific to SoFIE data. Therefore, the measure of low income in this report should not be interpreted as poverty as defined in other surveys. We have previously investigated dynamics in low income using gross equivalised household income after housing costs and found similar relationships in the data. We also investigated a lower cut-point for low income (<50% median gross equivalised household income), which reduced the number and proportion of children experiencing low income.

The measure of low income in this research is a measure of *relative* deprivation or socioeconomic disadvantage, which measures poverty in terms of inadequacy of *income* in the SoFIE population. This approach sets the low income (poverty) line as 60% of the median income at each wave of the survey so the threshold changes with the incomes of those in the middle of the income distribution at each wave. Each household was classified as low income, or not, at each wave and this was applied to every respondent in that household. Therefore, this approach provides an indication of changes in income within households relative to the SoFIE population, not the general population.

Duration of low income

We calculated the duration a child was classed as being in low income over the seven waves of the survey period by adding up the number of waves the child was in a low income household (range: 0 = never to 7 = always).

Chronic low income

As discussed above, chronic and transitory low income most likely have different causes and have different policy responses [12, 13]. The calculation of chronic income compares the (smoothed) permanent household income with the average low income line ($27,337), over the seven waves, using CPI adjusted equivalised household income data to give a measure of chronic low income (C). If a child had a permanent household income below the average low income line then they were classed as being in chronic low income (chronically poor). If they were in low income in any one wave, but not chronically in low income, they were in 'transitory' low income (T). Therefore, the average low income rate (A) can be decomposed into those in chronic (C) versus transitory (T) low income, where the proportion in transitory low income,

$$T = \frac{1}{nW} \sum_{i=1}^{n} \sum_{w=1}^{W} a_{iw} - \frac{1}{n} \sum_{i=1}^{n} c_i = A - C$$

Where w = wave, i = respondent, a_{iw} = average of the proportion of cross sections in low income over the study period (or average annual low income rates over the seven years), c_i = proportion of people with chronic low income (permanent income less than the average low income line) over the study period.

In any given year a respondent could be chronically in low income and cross-sectionally in low income, one or the other, or neither. Therefore, we also examined the contribution of those who were chronically in low income to the proportion who were in low income at each year/wave (w) of the survey. This provides information on how much cross-sectional rates of low income are made up from those chronically in low income and those in transitory low income.

Deprivation (NZiDep)

As part of the health module asked in waves 3, 5 and 7 an individual-level index of socioeconomic deprivation (NZiDep) was included. The NZiDep is a tool used for measuring deprivation for individuals and is a composite score based on eight simple questions [22]:
- Whether the person had been forced to buy cheaper food in the 12 months before the interview date, so that they could pay for other things needed
- Whether the person has been unemployed for 4 or more weeks during the last 12 months
- Whether the person had put up with feeling cold in the 12 months before the interview date, to save on heating costs
- Whether the person has received help in the form of clothes or money from a community organisation in the 12 months before the interview date
- Whether the person had gone without fresh fruit and vegetables in the 12 months before the interview date, so that they could pay for other things needed
- Whether the person continued wearing shoes with holes in them in the 12 months before the interview date, because they could not afford to replace them
- Whether the person received an income tested benefit, in the last 12 months
- Whether the person has made use of special food grants or food banks in the 12 months before the interview date, because they did not have enough money for food.

We created a binary measure of whether an individual had evidence of living in deprivation based on a score of three or more reported measures of deprivation (and for validation/comparison purposes,

we also repeated this for a score of two or more). For children (less than 15 years), who did not report an individual score, we calculated an average NZiDep across adults within their household and applied this rounded average score to the children in the household. The analysis does not control for clustering of multiple children in a household.

Duration of deprivation
We calculated the duration a child or household was in deprivation over waves 3, 5 and 7 by adding up the number of waves the child was classified as being in deprivation (indicated by three or more measures at each wave, or as a sensitivity analysis 2 or more measures at each wave). The range of duration of deprivation over the three health waves of SoFIE was: 0 = never to 3 = always.

Descriptive variables

All of the descriptive factors were taken from the wave 1 interview.
- **Sex** : Male and female
- **Age** : Analyses were done for all children (0-17 years) and also by 0-4, 5-9 and 10-17 year age groups.

Age used in this report is usually age at wave 1, therefore in tables where age is used a descriptive characteristic by wave of low income, it is important to understand that by wave 7 the age groups will have increased by seven years (e.g. age 0 to 17 at wave 1 will increase to age 6 to 23 at wave 7). It is important for longitudinal analyses looking at the experiences of the same individuals over time to keep the same cohort of people, even as they age.
- **Ethnicity**: Māori, Pacific and Other, which includes NZ European, Asian and Other ethnic groups. Ethnicity is taken as the most often reported ethnicity across the seven waves of SoFIE and prioritised into Māori, Pacific, Asian, Other, NZ European.
- **Family structure**: Sole parent families, couples with children, and not in a family nucleus.
- **Location** (standard localities): Auckland, Wellington, Waikato, Rest of North Island (such as Northland, the east coast), Canterbury, and Rest of South Island.
- **Main urban/other** : Main urban area: Centres with populations of 30,000 or more; other
- **Household composition** : Describes the living arrangements of the household, with categories of one family, two or more families or household not elsewhere classified.
- **Area deprivation** : Based on New Zealand Index of Deprivation 2001 , which assigns small geographic areas a ranking based on the average deprivation characteristics of people living there (Salmond & Crampton, 2002). This was categorised into a five level variable where five was the most deprived area and one was the least deprived area

Caveats of the results
Results were not weighted to the New Zealand population and relate only to the SoFIE survey balanced panel sample. The numbers presented in the tables were rounded to base five due to Statistics New Zealand confidentiality protocols. Therefore, in some cases, numbers between tables may not be the same.

This report is a simple descriptive analysis of cross-sectional trends and dynamics in income and deprivation in children using the SoFIE data. No statistical tests for differences between groups or trends over time were conducted.

Although the sample size of children for this analysis is moderate (over 4,000), any proportions or percentages that were based on cell numbers of 10 or less are highlighted in bold in the tables, and these should be interpreted with caution.

This is a descriptive report only and the results presented in this report do not control for changes in demographic characteristics or socioeconomic circumstances [12], such as changes in parental employment status or marital status. Therefore, associations between demographic characteristics

and income cannot be interpreted as causal relationships, as confounding and other biases were not controlled for.

The results may have been affected by attrition bias, as we know that attrition was greater amongst young people, Māori and those with low income. This means that the 'true' low income rates in these groups in the general population may actually be higher than what was found in the analysis of this sample. Although longitudinal weights (weighting the SoFIE population back to the original sample) were provided as part of the SoFIE data, they did not (currently) take into attrition by key sub-groups of the population such as income, so we have not used these weights. An investigation of income using the longitudinal weights, showed that the mean and median income was grossly overestimated compared to national level data. New longitudinal and cross-sectional weights that may be used in future work are in development. As discussed previously, there may be some measurement error in the income data due to missing components of personal income and regression to the mean in longitudinal changes in income. However the gross income in SoFIE compares reasonably well to the Household Economic and NZ Income Surveys over similar time periods.

Results

Baseline demographics

Table 1 and Table 2 present descriptive tables of the demographic characteristics of the sample of the 4,930 children included in the analysis. There was a similar proportion of Māori to the NZ population in the NZ Census 2001 [23]. In this analysis sample the Māori and Pacific populations were younger than the NZ European/Other children. The majority of children in the sample lived in a couple parent family at wave 1 and nearly 20% lived in sole parent families.

Table 1. Baseline sample characteristics by age

| | | | Age of the person at wave 1 (years) | | | | | |
| | | | 0 to 4 | | 5 to 9 | | 10 to 17 | |
	Total N	Col%	N	Col%	N	Col%	N	Col%
Sex								
Male	2495	50.6	715	52.8	780	50.8	1005	49.1
Female	2435	49.3	640	47.2	755	49.2	1040	50.9
Ethnicity								
Māori	1045	21.2	310	22.9	365	23.2	370	18.1
Pacific	295	6.0	85	6.3	100	6.5	110	5.4
Other	3590	72.8	960	70.8	1070	69.7	1560	76.5
Family type								
Couple with children	3965	80.4	1140	84.1	1220	79.5	1600	78.2
Sole parent	920	18.7	210	15.5	310	20.2	400	19.6
Not in a family nucleus	40	0.1	**5**	**0.4**	**5**	**0.3**	35	1.7
Geographic region								
Auckland	1225	24.8	325	24.0	375	24.4	525	25.7
Waikato	460	9.3	135	10.0	145	9.4	175	8.6
Wellington	655	13.3	170	12.5	210	13.7	275	13.4
Rest of North Island	1210	24.5	330	24.4	400	26.1	480	23.5
Canterbury	715	14.5	210	15.5	230	15.0	280	13.7
Rest of South Island	670	13.6	185	13.7	175	11.4	305	14.9
Indicator of Urban Area								
Main Urban	3590	72.8	980	72.3	1135	73.9	1480	72.4
Other	1340	27.2	375	27.7	400	26.1	565	27.6
Household composition								
One Family	4680	94.9	1285	94.8	1465	95.4	1930	94.4
Two or more families	150	3.0	40	3.0	55	3.6	60	2.9
Household not elsewhere classified	95	1.9	30	2.2	20	1.3	45	2.2
Area deprivation								
NZDepQ1(least)	865	17.5	215	15.9	255	16.6	390	19.1
NZDepQ2	900	18.3	230	17.0	275	17.9	395	19.3
NZDepQ3	985	20.0	260	19.2	320	20.8	405	19.8
NZDepQ4	1105	22.4	340	25.1	330	21.5	435	21.3
NZDepQ5(most)	1075	21.8	305	22.5	360	23.5	415	20.3
Total	**4930**	**100.0**	**1355**	**100.0**	**1535**	**100.0**	**2045**	**100.0**

Cells highlighted in bold are based on small numbers and should be interpreted with caution

Table 2. Baseline sample by age and ethnicity

	Māori		Pacific		Other		
			Ethnicity				
Age at wave 1 (years)							
	N	Col%	N	Col%	N	Col%	Total
0 to 4	310	29.7	85	28.8	960	26.7	1355
5 to 9	365	34.9	100	33.9	1070	29.8	1535
10 to 17	370	35.9	110	37.3	1560	43.5	2040
Total	**1045**	**100.0**	**295**	**100.0**	**3590**	**100.0**	**4930**

Other ethnicity includes NZ European, Asian and Other ethnicities

Cross-sectional low income

Table 3 presents cross-sectional rates of low income for each wave for children aged 0 to 17 years. As discussed in the Methods section above, the low income measure used in this report (below 60% of equivalised median gross household income, before housing costs are deducted) was not directly comparable with the common income poverty measure which uses a threshold of 60% of median equivalised disposable (i.e. after tax) household income. Between 26 and 30% of the child SoFIE population were in low income across the seven waves, so the 'low income' population can be characterised as the lower quartile. This is higher than the prevalence of low income that was found using the whole SoFIE population (between 23 and 25%) [14].

Table 3. Percentage of the population in low income at each wave

	Total	W1	W2	W3	W4	W5	W6	W7
	N	**% in low income (<60% of median income)**						
All	4930	29.6	29.0	27.5	25.7	26.1	25.5	26.0
Age at wave 1								
0 to 4	1355	31.4	30.6	31	27.7	28.4	26.2	27.3
5 to 9	1535	31.3	32.6	28.7	26.4	24.4	24.1	25.1
10 to 17	2040	27.2	25.2	24.3	23.8	25.7	26.0	25.7
Ethnicity								
Māori	1045	43.1	41.1	38.3	36.4	35.4	33.0	35.4
Pacific	295	44.1	42.4	47.5	39	37.3	37.3	30.5
Other	3590	24.7	24.7	22.7	21.6	22.4	22.4	22.8
	N	**% in low income (<50% of median income)**						
All	4930	21.0	20.1	19.9	18.3	18.3	18.3	19.2
Age at wave 1								
0 to 4	1355	20.7	20.7	22.1	20.3	19.6	17.0	19.2
5 to 9	1535	23.8	22.1	19.9	17.6	16.0	16.6	17.6
10 to 17	2040	19.1	18.1	18.4	18.4	19.1	20.3	20.3
Ethnicity								
Māori	1045	32.1	31.6	29.2	26.8	23.9	24.4	25.4
Pacific	295	37.3	30.5	33.9	25.4	25.4	27.1	27.1
NZ European/ Other	3590	16.6	15.7	16.0	15.7	15.9	15.7	16.7
	N	**% in low income (<60% of median income)**						
Age at wave 1 ≤11 years	3455	31.0	30.5	28.2	26.2	25.6	24.2	25.2

Using a threshold of <50% of gross median household income produced a low income prevalence of between 18% and 21%. This was closer to the usual New Zealand child poverty rates found in the New Zealand and OECD literature (around 20%, using a threshold of <60% of *disposable* income). Although using a different cut-point to define low income impacts the size of the sample classified as being in low income, the pattern over time was similar. There were decreases in the proportion of the child population who were in low income over the study period (between 2002 and 2010), which was consistent across all demographic groups.

The low income rates were higher in the younger age groups and Māori and Pacific children. The higher rates for children and Māori are consistent with higher rates of poverty for these groups, as found in other research [17]. Due to the ageing of the sample over time, the '0-17' age group (which was age at wave 1) by the end of the study will include 8-23 year olds. Therefore the rates of low income for children aged 0-11 at wave one were also presented (as this group of children will be aged 6-17 at the end of the study). However, the rates of low income in these children were similar to those of the children aged 0-17 at wave 1.

Table 4 presents the proportion of children by age and ethnic group who were living in low income households at wave 1. Over 45% of Maori children aged 0-4 years were in low income compared to 26.6% of children of the same age of NZ European/Other ethnicity.

Table 4. Proportion of sample in low income (<60% of median) at wave one by age and ethnicity

	Ethnicity					
	Māori		**Pacific**		**NZ European/Other**	
	N	**%**	**N**	**%**	**N**	**%**
Age at wave 1						
0 to 4	140	45.2	35	41.2	255	26.6
5 to 9	165	46.3	45	45.0	270	25.2
10 to 17	145	39.2	50	45.5	360	23.1
Total	**450**	**43.1**	**130**	**44.1**	**885**	**24.7**

Income based on equivalised household income (not CPI adjusted and before housing costs)

Dynamics of low income

The next section presents analyses of low income which show the experiences of low income in children over time. This expands upon the cross-sectional estimates by showing how some children can spend long periods of time in low income. Without longitudinal data, estimates of chronic low income and persistence in low income cannot be made.

Duration of low income

Table 5 presents the number of waves the children were in low income (<60% of median income) across the study period. This shows that over half of the child study population experienced low income at least once during the study period, and almost a quarter were in low income for over half of the study period (four or more years). Around 6% of the study child population were in low income at all-time points in the study period. Those at higher risk of spending over half the study period in low income included Māori and Pacific children (37%), children living in sole parent families (51%), living in the Rest of the North Island (32%) and in more deprived neighbourhoods (40%). Around 20% of children who were in low income households at wave one were in low income for all seven waves.

Table 5. Characteristics of respondents by number of waves the population experiences low income (<60% of median income)

Characteristics		Waves in low income							
		0	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Overall age 0-17	4930	44.0	14.1	10.0	7.5	6.7	6.2	5.7	5.9
Age at wave 1 (years)	N				Row%				
0-4	1355	44.3	12.2	8.5	7.0	7.7	6.6	6.3	7.4
5 to 9	1535	47.9	11.1	8.5	6.5	6.2	5.5	6.8	7.2
10 to 17	2040	40.9	17.6	12.3	8.6	6.4	6.4	4.2	3.9
Sex									
Male	2495	44.3	13.6	11.0	7.6	6.4	6.2	5.6	5.4
Female	2435	43.9	14.6	9.2	7.4	6.8	6.2	5.7	6.2
Ethnicity									
Maori	1045	34.4	10.0	9.6	9.1	9.6	8.6	7.7	11.5
Pacific	295	30.5	13.6	8.5	6.8	6.8	10.2	10.2	10.2
NZ European/Other	3590	47.9	15.2	10.3	7.1	5.8	5.0	4.7	3.9
Family type									
Couple with children	3965	50.3	14.9	10.2	6.6	6.1	4.4	4.2	3.3
Sole parent	920	17.9	10.9	9.8	11.4	8.7	13.6	12.0	16.8
Not in a family nucleus	40	25.0	**12.5**	**12.5**	**12.5**	**12.5**	**12.5**	**12.5**	**12.5**
Geographic region									
Auckland	1225	47.3	14.7	8.6	6.5	6.1	6.9	4.9	5.3
Waikato	460	41.3	14.1	10.9	9.8	6.5	6.5	**1.1**	8.7
Wellington	655	55.7	13.0	8.4	3.8	5.3	4.6	5.3	3.8
Rest of North Island	1210	33.5	14.5	11.6	9.1	7.9	7.0	9.1	7.9
Canterbury	715	47.6	13.3	10.5	7.0	5.6	5.6	5.6	5.6
Rest of South Island	670	42.5	14.9	10.4	9.7	8.2	5.2	4.5	3.7
Indicator of Urban Area									
Main Urban	3590	46.9	13.6	9.6	6.3	6.4	5.8	6.0	5.6
Other	1340	36.2	15.3	11.6	10.8	7.5	7.1	4.9	6.7
Household composition									
One Family	4680	44.3	14.0	10.0	7.5	6.4	6.2	5.8	5.8
Two or more families	150	46.7	13.3	**6.7**	**6.7**	10.0	**3.3**	**3.3**	10.0
Household not elsewhere classified	95	26.3	15.8	15.8	**10.5**	15.8	**5.3**	**5.3**	**5.3**
Area deprivation									
NZDepQ1(least)	865	56.1	17.3	8.7	6.9	2.9	2.3	2.9	**1.2**
NZDepQ2	900	53.9	14.4	12.2	5.6	5.0	2.8	4.4	2.2
NZDepQ3	985	46.7	13.7	10.2	8.1	7.1	5.1	4.6	4.6
NZDepQ4	1105	37.1	11.8	11.3	8.6	9.0	9.0	6.8	6.3
NZDepQ5(most)	1075	30.7	13.5	7.9	7.9	7.9	9.8	8.8	13.5
Low income status at wave 1									
Not in low income	3470	62.5	15.0	9.1	5.6	3.5	2.9	1.6	
In low income	1460		12.0	12.7	12.0	14.4	13.7	15.4	19.9

Income based on equivalised household income (not CPI adjusted and before housing costs)

Bold values are row percentages based on cell numbers of 10 or less

Table 6 shows the number and proportion of children who were in low income using the definition of low income of <50% of median income. This shows that 15.5% of children overall (aged 0-17 at wave 1) were in low income for four or more waves . This was higher for Maori children (22.9%), Pacific children (28.9%), children of sole parents (33.8%) and children living in the most deprived areas (27.9%).

Table 6. Characteristics of respondents by number of waves the population experiences low income (<50% of median income)

Characteristics		Waves in low income							
		0	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Overall age 0-17	4930	53.3	14.9	9.2	7.3	5.7	4.3	2.8	2.7
Age at wave 1 (years)	**N**				Row%				
0-4	1355	55.4	12.9	7.7	6.6	5.9	4.8	3.7	3.0
5 to 9	1535	57.3	13.0	6.8	7.2	5.2	4.2	2.9	3.9
10 to 17	2040	49.0	17.6	12.0	7.8	5.9	3.9	2.2	1.7
Sex									
Male	2495	53.3	15.4	9.6	7.4	5.2	4.4	2.4	2.4
Female	2435	53.2	14.2	9.0	7.2	6.0	4.1	3.3	2.9
Ethnicity									
Maori	1045	42.1	12.4	12.0	11.0	6.7	5.7	4.8	5.7
Pacific	295	40.7	15.3	6.8	8.5	10.2	8.5	**3.4**	6.8
NZ European/Other	3590	57.7	15.5	8.8	6.1	4.9	3.5	2.1	1.5
Family type									
Couple with children	3965	59.9	14.6	8.3	5.9	4.3	3.4	2.0	1.4
Sole parent	920	26.1	15.8	12.5	12.5	10.9	8.2	6.5	8.2
Not in a family nucleus	40	**25.0**	**12.5**	**25.0**	**25.0**	**12.5**	**12.5**	**12.5**	**12.5**
Geographic region									
Auckland	1225	55.5	14.3	8.2	6.5	5.7	4.5	2.9	2.9
Waikato	460	48.9	17.4	7.6	7.6	7.6	3.3	**2.2**	4.3
Wellington	655	64.9	11.5	7.6	6.9	3.1	3.8	**0.8**	1.5
Rest of North Island	1210	43.4	15.7	11.6	9.9	5.8	5.4	4.1	4.1
Canterbury	715	58.0	15.4	7.7	4.2	6.3	4.2	3.5	**1.4**
Rest of South Island	670	53.7	14.9	11.2	8.2	5.2	3.7	2.2	**1.5**
Indicator of Urban Area									
Main Urban	3590	56.0	13.9	8.1	7.0	5.3	4.5	2.8	2.4
Other	1340	45.9	17.2	12.3	8.2	6.3	3.7	3.0	3.4
Household composition									
One Family	4680	53.5	14.9	9.1	7.3	5.6	4.3	2.9	2.7
Two or more families	150	56.7	10.0	10.0	**6.7**	**3.3**	**3.3**	**3.3**	**3.3**
Household not elsewhere classified	95	36.8	21.1	15.8	**10.5**	**10.5**	**5.3**	**5.3**	**5.3**
Area deprivation									
NZDepQ1(least)	865	64.7	16.2	8.1	4.0	2.3	2.9	**1.2**	**0.6**
NZDepQ2	900	62.2	15.0	7.8	6.1	5.6	2.2	**1.1**	**0.6**
NZDepQ3	985	56.3	15.2	9.1	7.6	5.1	3.0	2.5	**1.0**
NZDepQ4	1105	46.6	14.9	10.9	9.0	7.2	5.4	3.2	2.7
NZDepQ5(most)	1075	40.5	13.5	9.8	8.8	7.0	7.0	6.0	7.9
Low income status at wave 1									
Not in low income	3470	67.3	14.2	8.1	4.9	2.4	2.2	0.8	
In low income	1460		16.9	13.5	16.4	17.4	12.1	10.6	13.0

Income based on equivalised household income (not CPI adjusted and before housing costs)
Bold values are row percentages based on cell numbers of 10 or less

As shown in Table 3, there was a small decline in the proportion of children living in low income households over the study period. Therefore, we investigated how long children were in low income over the last four years of the study period (2005/06 to 2008/09). This period also covered the introduction of a significant social policy aimed at reducing poverty in low income households, the Working For Families tax credit package [24]. Note that Tables 7 and 8 used 'age at wave 4' as the baseline age.

Table 7 shows that over 40% of the overall child population still experienced low income (<60% of the median income) at least once, with 19-21% experiencing low income three or four years between 2005/06 and 2008/09. However, over 50% of Māori children and 60% of Pacific children experienced low income at least once over the four years. The proportion of children experiencing three or more years of poverty in a four year period has been proposed as an indicator of child poverty by the Expert Advisory Group on Solutions to Child Poverty sponsored by the Children's Commission.

Table 7. Number of waves in low income (<60% of median income) by age and ethnicity, using four waves of SoFIE (waves 4-7)

	Number of waves in low income (<60% of median income)						
	Total	0		1 to 2		3 to 4	
Age at wave 4*	N	N	Row%	N	Row%	N	Row%
Overall							
0 to 4	525	300	57.1	115	21.9	110	21.0
5 to 9	1485	810	54.5	360	24.2	310	20.9
10 to 15	1570	935	59.6	335	21.3	300	19.1
Total	3580	2045	57.1	815	22.8	725	20.3
Māori							
0 to 4	120	50	41.7	30	25.0	40	33.3
5 to 9	355	160	45.1	85	23.9	110	31.0
10 to 15	360	170	47.2	85	23.6	105	29.2
Total	835	380	45.5	205	24.6	255	30.5
Pacific							
0 to 4	30	**10**	**33.3**	**5**	**16.7**	**10**	**33.3**
5 to 9	105	40	38.1	25	23.8	40	38.1
10 to 15	105	45	42.9	30	28.6	30	28.6
Total	235	95	40.4	60	25.5	80	34.0
NZ European/Other							
0 to 4	375	240	64.0	75	20.0	60	16.0
5 to 9	1025	605	59.0	250	24.4	165	16.1
10 to 15	1105	720	65.2	220	19.9	165	14.9
Total	**2505**	**1570**	**62.7**	**550**	**22.0**	**390**	**15.6**

Income based on equivalised household income (not CPI adjusted and before housing costs)
Cells highlighted in bold are based on small numbers and should be interpreted with caution
*Age restricted to those aged less than 15 at wave 4

Table 8 shows the numbers and proportion of children by duration of low income using less than 50% of the median household income as the definition of low income (instead of less than 60% of median income, as in the previous table). This gives an indication how many children experience a greater depth of low income and shows that around a third of children experienced one or more years of low income, and 13% experienced 3-4 years in low income, using this stricter definition of low income.

Table 8. Number of waves in low income (<50% of median) using four waves of SoFIE (waves 4-7)

	Total	0		1-2		3-4	
Age at wave 4*	**N**	**N**	**Row%**	**N**	**Row%**	**N**	**Row%**
0 to 4	525	355	67.6	105	20.0	70	13.3
5 to 9	1485	970	65.3	320	21.5	195	13.1
10 to 17	1570	1080	68.8	305	19.4	185	11.8
Total	**3580**	**2400**	**67.0**	**730**	**20.4**	**450**	**12.6**

The header "Number of waves in low income (<50% of median income)" spans the table above.

*Age restricted to those aged less than 15 at wave 4

Persistence and recurrence of low income

We next examined entry rates into- and exit rates out of- low income and the persistence of low income beyond one year in the child SoFIE population. Table 9 presents changes in income status over two year periods and highlights the significant proportion of children (aged 0 to 17 years at wave 1) who remained in low income (<60% of median income) in two consecutive years (17-21%). Table 9 also shows that between 7 to 8% of children not in low income in one year entered into low income in the next year and about 9% of children in low income in one year exited in the next year.

Table 10 presents the persistence of low income (<60% of median income) from one year to the successive years. There is a high degree of persistence and/or recurrence of low income in this sample. Of those children who are experiencing low income in wave 1, 70% remained in low income in wave 2 and 46% were also in low income in wave 7. However, this table does not show how people enter and exit low income states over the study period (i.e. does not tell us the full story behind the 46% who were in low income in both waves 1 and 7 – how many were in low income for all seven waves, how many exited and re-entered, and how often, etc) . Similar analyses based on HILDA data show high re-entry rates into poverty (low income) even six years after the initial measurement of poverty [10].

Table 9. Entry and exit to and from low income over two years, for children aged 0-17 at wave one

	Wave 1-2	Wave 3-4	Wave 5-6
Two-year low income status		Col%	
Not in low income either year	62.2	65.3	65.8
Low income both years	20.9	18.4	17.3
Out of low income the first year and in the second (entry)	8.2	7.3	8.1
Low income first year and out the second (exit)	8.8	9.1	8.7

Income based on equivalised household income (not CPI adjusted and before housing costs)

Table 10. Persistence of low income beyond one year, for children aged 0-17 at wave one

	In low income w1	In low income w2	In low income w3	In low income w4	In low income w5	In low income w6
			% in low income from one year to the next			
In low income w2	70.5					
In low income w3	61.3	69.6				
In low income w4	54.1	59.1	67.0			
In low income w5	52.4	55.9	61.1	69.2		
In low income w6	46.6	50.3	54.4	59.7	66.5	
In low income w7	46.2	49.7	52.6	55.3	60.3	66.1

Income based on equivalised household income (not CPI adjusted and before housing costs)

Chronic low income

We can also examine the difference between cross sectional and longitudinal estimates of the percentage of the sample experiencing low income by assessing those who were chronically in low income over the study period. This method compares permanent (smoothed) income (using the mean CPI adjusted equivalised household income data over waves 1 to 7) with the average low income line ($27,337) based on all respondents in the SoFIE sample, over the study period. If a child had permanent household income below the average low income line then they were classed as being chronically in low income. Therefore, the overall rate of low income in the data can be decomposed into those in chronic versus transitory low income, where the percentage in transitory low income is (T = A − C).

Over the study period, 24% of children (aged 0 to 17) were chronically in low income and 37% in Māori children. We estimate that the transitory low income rate is about 5%, by subtracting the chronic low income rate from the average low income rate over the study period [13]. This indicates that the majority of people that were low income were chronically in low income over the study period. However, there was a much lower contribution of transitory low income in Māori, reflecting the rate of chronic low income in this population.

Table 11 and Figure 1 present how much chronic low income was captured by the cross-sectional rates of low income over the study period. It can be seen that of those children living in low income at any given wave, between 64 and 70% were classified as chronically in low income. Therefore, more than 30% were transitorily poor at any given wave. This table also highlights the percentage of children who were not classified as low income in any given wave but were chronically in low income, between 5% and 9% over the waves. This shows the importance of using longitudinal data to gain a deeper understanding of the cross-sectional rates of low income.
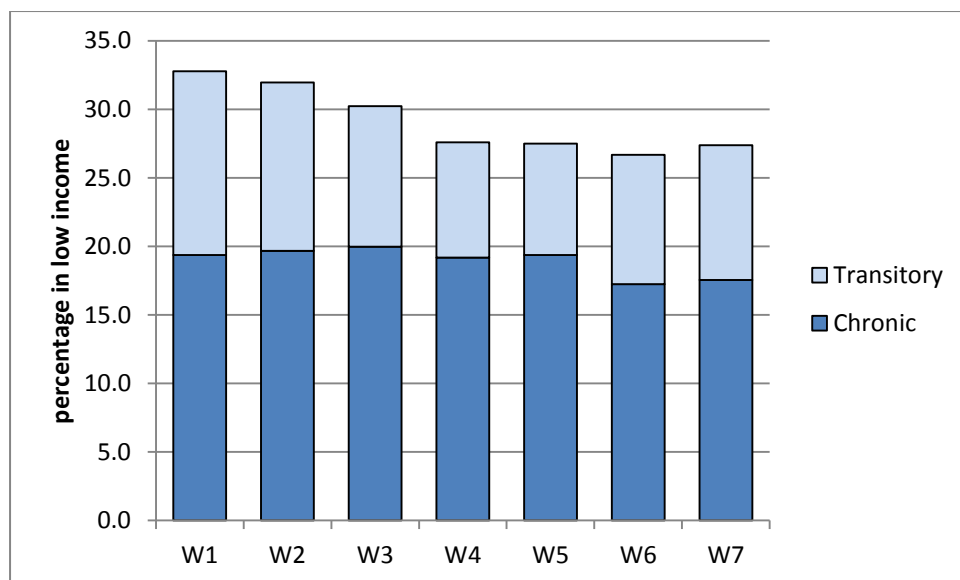

Figure 1. Breakdown of cross-sectional low-income rates by chronic and transitory low income

Table 11. Percentage of children in cross-sectional low income (CPI adjusted) by chronic low income at each wave.

	% low income	P(chronic low$\|$Low$t)	P(chronic low$\|$NOT Low$t)
W1	32.8	59.1	6.8
W2	31.9	61.6	6.3
W3	30.2	66.1	5.7
W4	27.6	69.5	6.6
W5	27.5	70.5	6.3
W6	26.7	64.6	9.1
W7	27.4	64.1	8.8

Income based on equivalised household income (CPI adjusted and before housing costs)

All of the figures and percentages above on chronic income are based on the low income threshold of <60% of gross median household income. However, if the threshold of <50% of median income was used to define low income, then 16% of children (aged 0-11 at wave 1) were found to be in chronic low income. Of those children who were in low income at any wave (using the <50% of median income threshold), around 60% were in chronic low income (40% in transitory low income).

Income mobility

While many households experience increases in their income over time, some experience declines in income, or at least only small increases. The longitudinal structure of the SoFIE data allows us to examine respondents' experiences of income changes over the study period.

Table 12 presents income mobility in the SoFIE sample of children through transition probability tables which maps the income quintile a respondent is in at wave i (1) to their income quintile in wave i+1 (2) and sums the transition probabilities over the six wave combinations. These transition tables used household equivalised (not CPI adjusted and before housing costs) income. The transition tables reveals the amount of movement that is hidden in the cross sectional descriptions of income. Table 12 shows that there is some stability in income between waves i.e. 65% of children living in income quintile 1 households in wave 1 were also in income quintile 1 in wave 2, indicating that children are much more likely to remain in the same quintile in the next wave. Similarly, 68% of those in quintile 5 households remain in this quintile in the next wave. However, Table 12 also shows that there was some mobility in income, but most of the movement was to an adjacent quintile (up or down) rather than moving two or more quintiles between waves.

Tables 13 to 15 present income transition probabilities in the three main age groups. The lowest income quintiles in the youngest (age 0 to 4 years) group shows some higher stability (Table 13). There appears to be more mobility in income in the older (age 10 to 17 years) group, which may reflect changes in the living and economic situations of this group.

Table 12. Income transition probability table w(i) to w(i+1) for ages 0-17 at wave 1

Income quintile w(i)	Income quintile w(i+1)				
	Q1 (low)	Q2	Q3	Q4	Q5 (high)
Q1 (low)	**0.652**	0.232	0.065	0.033	0.019
Q2	0.191	**0.517**	0.224	0.048	0.020
Q3	0.076	0.156	**0.529**	0.197	0.044
Q4	0.060	0.060	0.180	**0.533**	0.166
Q5 (high)	0.055	0.039	0.062	0.165	**0.678**

Income based on equivalised household income (not CPI adjusted and before housing costs)

Income mobility and stability per se are not 'good' or 'bad' – it depends on the origin and destination, and upward mobility is usually considered desirable. For example, of those who started in quintile 3 in wave 1, 37% moved up into a higher income quintile, but 32% moved into a lower quintile (and 31% stayed in quintile 3). However, a limitation of such transition tables is that they only examined one metric (income) without reference to other dimensions that income and income mobility may affect (e.g. health, wellbeing, quality of life). For example, a respondent in the 10 to 17 year age bracket at wave 1 may leave home over the study period and experience a decline in household income, but if this is related to pursuing higher education or job training, this may not correspond to a decline in quality of life.

Table 13. Income transition probability table w(i) to w(i+1) for children aged 0-4 at wave 1

	Income quintile w(i+1)				
Income quintile w(i)	Q1 (low)	Q2	Q3	Q4	Q5 (high)
Q1 (low)	**0.680**	0.242	0.048	0.020	0.015
Q2	0.196	**0.556**	0.199	0.043	0.014
Q3	0.063	0.168	**0.577**	0.163	0.031
Q4	0.047	0.060	0.210	**0.511**	0.163
Q5 (high)	0.037	0.032	0.069	0.165	**0.702**

Income based on equivalised household income (not CPI adjusted and before housing costs)

Table 14. Income transition probability table w(i) to w(i+1) for children aged 5-9 at wave 1

	Income quintile w(i+1)				
Income quintile w(i)	Q1 (low)	Q2	Q3	Q4	Q5 (high)
Q1 (low)	**0.668**	0.238	0.057	0.023	0.016
Q2	0.179	**0.549**	0.219	0.037	0.016
Q3	0.069	0.157	**0.560**	0.178	0.042
Q4	0.038	0.057	0.178	**0.570**	0.162
Q5 (high)	0.031	0.031	0.057	0.170	**0.707**

Income based on equivalised household income (not CPI adjusted and before housing costs)

Table 15. Income transition probability table w(i) to w(i+1) for children aged 10-17 at wave 1

	Income quintile w(i+1)				
Income quintile w(i)	Q1 (low)	Q2	Q3	Q4	Q5 (high)
Q1 (low)	**0.616**	0.221	0.085	0.048	0.028
Q2	0.198	**0.456**	0.256	0.060	0.032
Q3	0.087	0.148	**0.474**	0.240	0.052
Q4	0.080	0.062	0.167	**0.518**	0.173
Q5 (high)	0.080	0.043	0.065	0.160	**0.655**

Income based on equivalised household income (not CPI adjusted and before housing costs)

Table 16 presents the probability of changing income quintile over the entire seven year study period by crossing income quintile at wave 1 (origin) with income quintile at wave 7 (destination). This shows that about 44% of children who started out in income quintile 1 (the lowest income quintile) at wave 1 remained in income quintile 1 at wave 7 and 53% of children who started out in income quintile 5 (the highest quintile) were still there at the end of the survey. There is more off-

diagonal movement in Table 16 compared to Table 1213, indicating that over a seven year period people are more likely to move (both up and down) income quintiles.

Table 16. Income transition probability table wave 1 to wave 7 for children aged 0-17 at wave 1

	Income quintile (W7)				
Income quintile (W1)	Q1 (low)	Q2	Q3	Q4	Q5 (high)
Q1 (low)	**0.442**	0.302	0.153	0.074	0.029
Q2	0.217	**0.312**	0.285	0.140	0.050
Q3	0.136	0.162	**0.333**	0.263	0.110
Q4	0.132	0.108	0.186	**0.341**	0.234
Q5 (high)	0.133	0.070	0.109	0.148	**0.531**

Income based on equivalised household income (not CPI adjusted and before housing costs)

Tables 17 to 19 present transition probabilities in and out of low income between waves (for all sample members aged 0 to 17 at wave 1) by ethnic group. Table 17 and 18 shows that 74% of Māori and Pacific children who are in low income in one waves are still in low income in the next wave. This percentage is lower in NZ European and Other children. The percentage of children moving into low income in the next wave ranges from 10% (Other ethnicity) to 15% (Pacific).

Table 17. Transitions in and out of low income in Māori children aged 0-17 at wave 1

	Low income (<60% of median) w(i+1)	
Low income w(i)	Not in low income	In low income
Not in low income	0.861	0.139
In low income	0.264	0.736

Income based on equivalised household income (not CPI adjusted and before housing costs)

Table 18. Transitions in and out of low income in Pacific children aged 0-17 at wave 1

	Low income (<60% of median) w(i+1)	
Low income w(i)	Not in low income	In low income
Not in low income	0.854	0.146
In low income	0.264	0.736

Income based on equivalised household income (not CPI adjusted and before housing costs)

Table 19. Transitions in and out of low income in children of Other ethnicity aged 0-17 at wave 1

	Low income (<60% of median) w(i+1)	
Low income w(i)	Not in low income	In low income
Not in low income	0.899	0.101
In low income	0.350	0.650

Income based on equivalised household income (not CPI adjusted and before housing costs)
Other ethnicity includes NZ European, Asian and Other ethnic groups

Cross-sectional deprivation

The first examination of deprivation is cross-sectional rather than dynamic, to give a snapshot of deprivation at several points in time. Table 20 and Figure 2 present the percentage of SoFIE children who were in households reporting three or more measures of deprivation (from the New Zealand Individual Deprivation Index, NZiDep) at the three waves that information about deprivation was collected (waves 3, 5 and 7) at each wave.

Table 20. Percentage of children in deprivation (based on 3 or more items of NZiDep)

		W3		W5		W7	
	Total N	**N**	**Row%**	**N**	**Row%**	**N**	**Row%**
Overall	4930	470	9.5	330	6.7	430	8.7
Age							
0 to 5	1355	175	12.9	145	10.7	170	12.5
5 to 10	1535	180	11.7	110	7.2	130	8.5
10 to 17	2040	115	5.6	75	3.7	135	6.6
Ethnicity							
Māori	1045	185	17.7	135	12.9	140	13.4
Pacific	295	45	15.3	30	10.2	40	13.6
NZ European/Other	3590	240	6.7	165	4.6	250	7.0
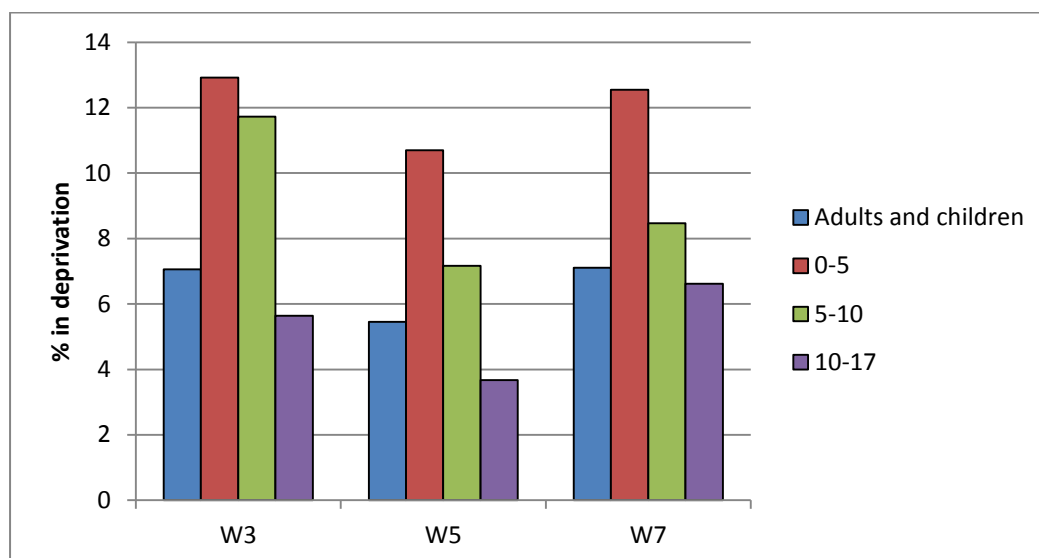
Figure 2. Proportion in deprivation (3 or more indices) at three waves of SoFIE by age

Around 7-10% of children were in deprivation, which was higher than the proportion in deprivation using the total SoFIE population (6 to 7%) [14]. Around twice as many Māori than NZ European/ Other children were in deprivation at any of the three waves. When a lower cut-point of two or more items on the deprivation scale was used (Table 21), a higher proportion of children were found to be in deprivation at each wave (14-18%), and higher proportions of Māori and Pacific children. This proportion was closer to the child deprivation rates seen when using the Economic Living Standards Index (19%) or a European Union index (18%) in New Zealand [25]. The NZiDep has not been calibrated against other deprivation measures with regards to children but was the only measure of deprivation available in the SoFIE dataset. The choice of threshold for deprivation

appears to matter significantly when describing deprivation prevalence and dynamics (using NZiDep as a measure of deprivation in children)). The threshold of two or more items may be preferable, given that this results in a cross sectional prevalence similar to that found in other New Zealand surveys. Future surveys should include a deprivation measure that has been validated for use in children.

Table 21. Percentage of children in deprivation (based on 2 or more items of NZiDep)

	W3			**W5**		**W7**	
	Total N	**N**	**Row%**	**N**	**Row%**	**N**	**Row%**
Overall	4930	790	16.0	685	13.9	870	17.6
Age							
0 to 5	1355	290	21.4	260	19.2	305	22.5
5 to 10	1535	285	18.6	245	16.0	235	15.3
10 to 17	2040	215	10.5	185	9.1	330	16.2
Ethnicity							
Māori	1045	280	26.8	255	24.2	290	27.8
Pacific	295	75	25.4	65	22.0	80	27.1
NZ European/Other	3590	435	12.1	395	11.0	500	13.9

Dynamics of deprivation

Deprivation duration

Table 22 and Table 23 show the characteristics of children by the number of waves in deprivation (zero to three). In Table 22, the threshold of 3 or more items on the NZiDep scale was used. Approximately 16% of children experienced deprivation at least once over the study period but 7% were in deprivation in 2 to 3 waves (persistent deprivation). However, some differences by characteristics were notable. Younger (age 0 to 4), Māori and Pacific children were more likely to experience persistent deprivation. Children in sole parent families were also much more likely to experience persistent deprivation (20%) as well as at any wave (41%). Children living in the most deprived neighbourhoods were also more likely to experience persistent deprivation (11%).

Using the lower cut-point of deprivation (scoring 2 or more items on the NZiDep index), 28% of children overall spent one or more time points in deprivation and 13% experienced persistent deprivation (2-3 waves in deprivation). Children at higher risk of persistent deprivation included children aged 0-4 (20%), Māori and Pacific children (22%), those living in the most deprived neighbourhoods (21%) and children living in sole parent families (a third) (Table 23).

Deprivation mobility

Table 24 shows the probabilities of children moving between different deprivation states, starting from an initial wave and moving to the next time they were asked about deprivation. Not surprisingly, those who started out in a household reporting no deprivation (0) had a higher probability of staying in a household reporting no deprivation at the next wave (82%). However, the transition table reveals movement that was hidden in the cross sectional rates. Of those who were classed as having 3-4 measures of deprivation at the initial wave, only a third still remained in this category at the next time point, with 9.4% becoming more deprived but the remainder moving into a less deprived category. Similarly, only 27% were consistently in the most deprived category.

Table 22. Number of waves in deprivation (3 or more measures of NZiDep)

Characteristics		Number of waves in deprivation			
		0	**1**	**2**	**3**
	N	Row %			
Overall	4930	84.1	9.2	4.5	2.2
Age at wave 1					
0 to 4	1355	79.3	9.2	6.6	4.4
5 to 9	1535	83.1	9.4	4.9	2.6
10 to 17	2040	88.0	8.8	2.7	**0.5**
Sex					
Male	2495	84.4	9.0	4.2	2.4
Female	2435	83.8	9.4	4.7	2.1
Ethnicity					
Maori	1045	74.6	12.9	7.7	5.3
Pacific	295	71.2	18.6	8.5	**1.7**
NZ European/Other	3590	87.9	7.4	3.2	1.4
Family type					
Couple with children	3965	89.9	6.4	2.6	1.0
Sole parent	920	59.2	20.7	12.5	7.6
Not in a family nucleus	40	75.0	**25.0**	-	-
Geographic region					
Auckland	1225	85.3	9.4	4.1	1.2
Waikato	460	87.0	6.5	4.3	**1.1**
Wellington	655	83.2	9.2	3.8	3.1
Rest of North Island	1210	81.4	10.7	4.5	3.3
Canterbury	715	82.5	9.1	5.6	2.8
Rest of South Island	670	85.8	8.2	4.5	**1.5**
Indicator of Urban Area					
Main Urban	3590	83.6	9.6	4.7	2.1
Other	1340	85.4	8.2	3.7	2.6
Household composition					
One Family	4680	84.2	9.2	4.4	2.2
Two or more families	150	83.3	10.0	**6.7**	**3.3**
Household not elsewhere classified	95	84.2	**10.5**	**5.3**	**5.3**
Area deprivation					
NZDepQ1(least)	865	93.6	4.0	1.7	**0.6**
NZDepQ2	900	90.6	6.7	1.7	**1.1**
NZDepQ3	985	86.3	8.1	4.1	1.5
NZDepQ4	1105	79.2	10.9	6.3	3.6
NZDepQ5(most)	1075	74.0	14.9	7.9	3.3

Percentages in bold are based on cells with numbers of 10 or less

Table 23. Number of waves in deprivation (2 or more measures of NZiDep)

Characteristics		Numbers of waves in deprivation			
		0	1	2	3
	N		Row%		
Overall	4930	71.9	14.5	7.7	5.5
Age at wave 1					
0-4	1355	67.2	13.3	8.9	10.7
5 to 9	1535	72.3	12.4	8.5	6.8
10 to 17	2040	74.8	16.9	6.4	2.0
Ethnicity					
Maori	1045	57.4	20.1	11.5	11.0
Pacific	295	55.9	22.0	13.6	8.5
NZ European/Other	3590	77.3	12.4	6.3	4.0
Sex					
Male	2495	73.7	13.2	7.0	6.0
Female	2435	70.0	16.0	8.4	5.5
Family type					
Couple with children	3965	79.1	12.0	5.8	3.2
Sole parent	920	41.3	25.5	16.3	17.4
Not in a family nucleus	40	62.5	**25.0**	**12.5**	**12.5**
Geographic region					
Auckland	1225	74.7	14.3	6.5	4.5
Waikato	460	75.0	14.1	6.5	3.3
Wellington	655	71.8	15.3	7.6	5.3
Rest of North Island	1210	66.9	15.3	9.5	8.3
Canterbury	715	71.3	14.7	7.0	7.0
Rest of South Island	670	73.9	13.4	8.2	4.5
Urban Area					
Main Urban	3590	71.4	15.0	7.8	5.7
Other	1340	72.8	13.4	7.5	6.3
Household composition					
One family	4680	72.2	14.1	7.8	5.8
Two or more families	150	63.3	23.3	**6.7**	10.0
Household not elsewhere classified	95	63.2	26.3	**10.5**	**5.3**
Area deprivation					
NZDepQ1(least)	865	85.5	9.2	2.3	2.3
NZDepQ2	900	80.6	11.1	5.0	3.3
NZDepQ3	985	74.6	12.7	8.6	4.6
NZDepQ4	1105	64.7	17.6	10.4	7.7
NZDepQ5(most)	1075	58.6	20.5	11.2	9.8

Percentages in bold are based on cells with numbers of 10 or less

Table 24. NZiDep transition table – w(i) to w(i+1) age 0-17

NZiDep - mean household for children							
Overall (w 3-7) for 0-17 ages				**W(i+2)**			
		0	**1**	**2**	**3 to 4**	**5+**	**Totals**
	0	<u>0.821</u>	0.126	0.037	0.014	0.002	6725
	1	0.473	<u>0.307</u>	0.147	0.060	0.013	1500
	2	0.276	0.284	<u>0.209</u>	0.187	0.030	670
W(i)	**3 to 4**	0.188	0.162	0.231	<u>0.333</u>	0.094	585
	5+	0.098	0.122	0.171	0.341	<u>0.268</u>	205
	Totals	6545	1620	780	580	160	9680

'Severe' poverty

Deprivation and low income

As a measure of socioeconomic disadvantage, NZiDep differs from low income in that it directly reflects material deprivation. We interacted measures of low income and individual deprivation to create a measure of 'severe' poverty, where the most severe poverty is those children experiencing both low income and individual deprivation. However, the measure of 'severe' poverty is somewhat sensitive to the choice of low income measure (<60% or <50% of the median income) and the threshold used to define deprivation, using the NZiDep score (2 or 3 items). We present a range of 'severe' poverty figures, as an exploratory analysis of what severe poverty may mean, using different definitions of low income and deprivation.

Table 25 presents the proportion of children living in low income and high deprivation households by ethnicity (at wave 3 only), where low income is <60% of the median household income and deprivation is three or more items on the NZiDep scale. Overall, around 7% of children were in 'severe' poverty (experiencing both deprivation and low income). Māori and Pacific children were almost twice as likely to be in severe poverty (live in low income and high deprivation households), with a high proportion also living in low income but not high deprivation households.

Table 25. Severe poverty (3 items of NZiDep and <60% of median income) at wave 3 by ethnicity for children aged 0-17 at wave 1

				Ethnicity				
	Total		**Māori**		**Pacific**		**Other**	
Severe poverty status (wave 3)	**N**	**Col%**	**N**	**Col%**	**N**	**Col%**	**N**	**Col%**
In low income and in deprivation	340	6.9	135	12.9	40	13.6	165	4.6
In low income but not in deprivation	985	20.0	260	24.9	95	32.2	635	17.7
Not in low income but in deprivation	130	2.6	45	4.3	5	**1.7**	75	2.1
Not in low income and not in deprivation	3480	70.6	605	57.9	155	52.5	2720	75.8
Total	4930	100.0	1045	100.0	295	100.0	3590	100.0

Income based on equivalised household income (not CPI adjusted and before housing costs)
Other ethnicity includes NZ European, Asian and Other

Using a definition of severe poverty of two items of NZiDep (rather than three) as well as being in low income (<60% of median income), 10% of children were in severe poverty (Table 26). Twice as many Māori and Pacific children were in severe poverty, using this definition. If the definition of 'severe' poverty is 3 items on the NZiDep scale and <50% of median income, then 5% of children were in severe poverty (Table 27). However, twice as many Māori and Pacific children were still in severe poverty using this indicator of severe poverty. Regardless of which definition of severe poverty was used, Māori and Pacific children were much more likely to be identified.

Table 26. Severe poverty (2 items of NZiDep and <60% of median income) at wave 3 by ethnicity for children aged 0-17 at wave 1

| | Ethnicity | | | | | | | |
| | Total | | Māori | | Pacific | | Other | |
Severe poverty status (wave 3)	N	Col%	N	Col%	N	Col%	N	Col%
In low income and in deprivation	515	10.4	200	19.1	65	22.0	250	7.0
In low income but not in deprivation	810	16.4	190	18.2	75	25.4	540	15.0
Not in low income but in deprivation	275	5.6	80	7.7	**5**	**1.7**	185	5.2
Not in low income and not in deprivation	3330	67.5	570	54.5	150	50.8	2610	72.7
Total	4930	100.0	1045	100.0	295	100.0	3590	100.0

Income based on equivalised household income (not CPI adjusted and before housing costs)
Other ethnicity includes NZ European, Asian and Other

Table 27. Severe poverty (3 items of NZiDep and <50% of median income) at wave 3 by ethnicity for children aged 0-17 at wave 1

| | Ethnicity | | | | | | | |
| | Total | | Maori | | Pacific | | Other | |
Severe poverty status (wave 3)	N	Col%	N	Col%	N	Col%	N	Col%
In low income and in deprivation	250	5.1	110	10.5	35	11.9	110	3.1
In low income but not in deprivation	700	14.2	190	18.2	65	22.0	445	12.4
Not in low income but in deprivation	215	4.4	75	7.2	5	1.7	130	3.6
Not in low income and not in deprivation	3765	76.4	670	64.1	185	62.7	2905	80.9
Total	4930	100.0	1045	100.0	295	100.0	3590	100.0

Income based on equivalised household income (not CPI adjusted and before housing costs)
Other ethnicity includes NZ European, Asian and Other

Duration of low income and duration of deprivation

We averaged the NZiDep score over the three waves, to examine whether there was a trend of increasing NZiDep (worsening deprivation) with increasing number of waves in low income (Table 28). The absolute means were greater in younger people compared to the whole sample but the overall trends were the same [14] – i.e. mean deprivation increased with the length of time spent in low income.

Table 28. Mean deprivation score (over waves 3, 5 and 7) by duration of low income

	N	Age 0 to 17 years Mean NZiDep	StdErr
Total	4930	0.70	0.01
		Waves in low income	
0	2170	0.27	0.01
1	695	0.47	0.03
2	495	0.70	0.04
3	370	1.02	0.06
4	330	1.20	0.07
5	305	1.44	0.07
6	280	1.59	0.07
7	290	1.81	0.08

Conclusions

This report is an exploratory and descriptive analysis of the dynamics of low income and deprivation in New Zealand children using SoFIE data [14]. The results were based on unweighted survey estimates and thus are not directly generalisable to the New Zealand population. However, the cross sectional prevalence of low income using <50% of the median gross household income in children around 19%, which is close to the estimates of child poverty found in New Zealand and OECD literature [26-28].

The value of longitudinal compared to cross sectional data is that longitudinal data provides information on changes and trajectories occurring in low income and deprivation that cross-sectional data cannot give. For example, the cross sectional low income (<60% of median household equivalised income) rates in children are around 24%. However, when a longitudinal perspective was taken, over the seven years of the survey more than half of the children experienced one or more years of low income. The proportion experiencing low income (using either the <60% or <50% of median income thresholds) for one or more years over the study period was much higher in Māori and Pacific children and those living in sole parent families. The rate of deprivation (NZiDep score of two or more) at any one time point was 14-18%, but from the longitudinal perspective, 28% of children experienced deprivation at some point over the three time periods. Longitudinal data can identify how much time children spend in low income and deprivation, which are important factors of poverty that cannot be measured by cross-sectional surveys.

Using longitudinal data, we can also examine measures of chronic low income. In this report, chronic low income was defined as where the permanent income (smoothed average household income over the seven years) fell below the average low income line (over the seven years). Approximately two thirds of children who were living in low income households at any one point in time were chronically in low income, but this proportion was higher for Māori children. Conversely, this meant that around 30-40% were in transitory low income, meaning that their low income state was not persistent. However, we also found that approximately 5% of children who were not in low income households at any one point in time were chronically in low income over the study, indicating again that cross-sectional measures of low income may underestimate the number of children in the population who are living in poverty.

Persistence, recurrence, exit and entry rates into low income can only be examined using longitudinal survey data. We found high persistence of low income (<60% of median income) with about 20% of children who were in low income households at wave one being in low income for all seven waves. Two-year entry rates into low income were around 8% and exit rates around 9%.

We have shown annual mobility in the incomes of households where children live, which is similar to other recent studies [10, 12, 29]. The mobility that we observed was both upward and downward, although the most common transition was to the adjacent income quintile. However, the results do not take into account changes in demographic events, which have been shown to have an impact on income mobility and transitions in and out of low income over time [12]. Future longitudinal modelling of income dynamics using the SoFIE data will have to take into account changes in family structure and employment over time. Looking at income mobility in isolation from causes and effects gives only a small piece of the picture.

When combining low income and deprivation into a measure of severe poverty, we could identify a group of children experiencing both high deprivation and low income. Between 5-10% of children were in severe poverty, depending on the definition of low income or deprivation used, but twice as many Māori and Pacific children (regardless of which definition). We also found that those children

who experienced a longer duration of low income also lived in households with a higher mean deprivation.

Future analyses

This report used gross household income, as a tax model had not been applied to the SoFIE data to provide an estimate of disposable income. Most analyses of poverty use disposable income, therefore, future research, using disposable income, would enable us to make more direct comparisons with the international literature on poverty dynamics and chronic poverty. We did find that the prevalence of low income using the <50% of median gross household income corresponded fairly well to other estimates of child poverty in New Zealand.

We envisage that future research would look further at entry, re-entry (recurrence) and exits from low income and predictors of these transitions. Markov models can also examine poverty persistence and poverty transition probabilities, and how these probabilities differ for different types of individuals [30]. These types of models are important to control for biases present in crude descriptive analyses. Māori and Pacific children and children of sole parents are at higher risk of deprivation and low income and further examination of these subgroups is required. All of this work will help identify those individuals who are at risk of persisting in disadvantage over time, the reasons for the persistence and adverse outcomes associated with such persistence.

Data limitations

The dynamics in income, low income and deprivation seen in this report are crude and no statistical tests for differences between groups or trends over time were conducted. Descriptive characteristics (such as family structure) were presented at baseline (wave 1) and the results do not take into account changes in important characteristics that are likely to have an impact on changes in income such as changes in family and household structure and employment (of parents).

The deprivation variable used in this report has not been specifically validated for children but was the only deprivation measure available in the SoFIE dataset. It would be helpful if future surveys of this type could include a deprivation or living standards measure, repeated over time, that is specifically relevant for children.

The results in this report may have been affected by a number of biases. Firstly, the measure of income used, was gross (before tax) household income equivalised for household composition. Therefore, the results are not directly comparable with other longitudinal analyses that used disposable household income (after tax). Secondly, attrition bias may be present, as we know that attrition (sample drop out) was greater amongst young people, Māori and those with low income. This means that the 'true' low income rates in these groups may actually be higher in the general population than what is seen in this analysis sample. The third bias, as discussed in the methods section, is measurement error in the income data due to missing components of personal income and regression to the mean in longitudinal changes in income. Therefore, the analyses in this report cannot be interpreted as causal relationships.

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Appendix

Table A: 1 Baseline characteristics of the full and the balanced panel samples.

	Full Panel		Balanced Panel			Attrition Panel		
	N	**col%**	**N**	**col%**	**row%**	**N**	**col%**	**row%**
All	29,795		18,785			10,990		
Age at Wave 1								
0-17	8,865	29.8	4,930	26.3	55.6	3,930	35.7	44.3
18-24	2,550	8.6	1,105	5.9	43.3	1,445	13.1	56.7
25-44	8,270	27.8	5,610	29.9	67.8	2,655	24.1	32.1
45-64	6,660	22.4	5,105	27.2	76.7	1,550	14.1	23.3
65+	3,450	11.6	2,030	10.8	58.8	1,415	12.9	41.0
Ethnicity								
NZ European	19,970	67.0	14,250	75.9	71.4	5,725	52.1	28.7
Māori	5,205	17.5	2,450	13.0	47.1	2,755	25.1	52.9
Other	4,595	15.4	2,085	11.1	45.4	2,510	22.8	54.6
Highest education at Wave 1								
Degree or Higher	2,875	9.6	2,010	10.7	69.9	865	7.9	30.1
Post school qualification	7,125	23.9	4,980	26.5	69.9	2,150	19.6	30.2
School Qualification	6,190	20.8	3,920	20.9	63.3	2,270	20.6	36.7
No Qualification	6,055	20.3	3,610	19.2	59.6	2,445	22.2	40.4
Std family type at Wave 1								
Couple only	6,430	21.6	4,555	24.3	70.8	1,870	17.0	29.1
Couple with children	14,540	48.8	9,645	51.4	66.3	4,895	44.5	33.7
Sole parent family	4,335	14.5	2,100	11.2	48.4	2,235	20.3	51.6
Not in a family	4,480	15.0	2,485	13.2	55.5	1,995	18.1	44.5
Geographic region at Wave 1								
Auckland	8,540	28.7	4,595	24.5	53.8	3,950	35.9	46.3
Waikato	2,750	9.2	1,695	9.0	61.6	1,055	9.6	38.4
Wellington	3,665	12.3	2,470	13.2	67.4	1,195	10.9	32.6
Rest of North Island	6,795	22.8	4,315	23.0	63.5	2,480	22.6	36.5
Canterbury	4,250	14.3	3,000	16.0	70.6	1,250	11.4	29.4
Rest of South Island	3,790	12.7	2,710	14.4	71.5	1,080	9.8	28.5
Urban Area at Wave 1								
Main Urban	22,170	74.4	13,655	72.7	61.6	8,510	77.4	38.4
Other	7,620	25.6	5,130	27.3	67.3	2,490	22.6	32.7
Household income at Wave 1 (full panel)								
Q1 (low)	5,960	20.0	2,790	14.9	46.8	3,170	28.8	53.2
Q2	5,955	20.0	3,415	18.2	57.3	2,535	23.1	42.6
Q3	5,955	20.0	3,885	20.7	65.2	2,070	18.8	34.8
Q4	5,960	20.0	4,240	22.6	71.1	1,720	15.6	28.9
Q5 (high)	5,960	20.0	4,450	23.7	74.7	1,505	13.7	25.3

Table A: 2 presents the median and mean equivalised household income across the seven waves of SoFIE using different measures of household income [14]. As discussed in the Methods section, the main income measure used in this report was the equivalised gross household income (before tax). The trends show that the median and average household income increased over the seven waves, even after adjusting for effects of inflation (consumer price index). As expected the median and mean income was lower after taking into account housing costs in the equivalised household income. The difference between the before and after housing costs incomes increased over the seven waves from around $7,000 to $10,000, reflecting increases in housing costs over the time period. Comparing the results (columns 1 and 2) to gross income before housing costs in the Household Economic Survey (columns 5 and 6) the median and means were similar over time. This provides confidence in the measure of equivalised gross household income from the SoFIE data. The equivalised household (real) income adjusted for changes in the CPI still show increases in the median and mean income across the seven waves.

Table A: 2. Median and mean equivalised gross household income by wave

	Median	Mean	Median AHC	Mean AHC	Median HES *	Mean HES *	Median CPI adj	Mean CPI adj
W1	$43,060	$55,484	$36,115	$48,318			$41,485	$53,377
W2	$44,898	$58,564	$37,314	$50,528	$44,248	$53,894	$42,014	$54,890
W3	$46,926	$62,216	$38,868	$53,318			$42,690	$56,515
W4	$49,612	$65,400	$41,254	$56,702			$43,740	$57,603
W5	$52,728	$68,505	$43,535	$58,233	$50,523	$62,174	$45,240	$58,810
W6	$55,356	$72,430	$45,408	$61,891	$54,758	$68,343	$45,819	$59,878
W7	$56,590	$72,369	$46,977	$62,357	$58,977	$72,535	$45,869	$58,722
W1-2							$42,476	$54,133
W6-7							$46,566	$59,300

* Equivalised Gross Household Income from the Household Economic Survey [personal communication Bryan Perry]

Table A: 3 Household equivalised income quintile boundaries used for transition tables

Wave	Quintile	Boundaries
W1	Q1	low - 23432
	Q2	23432 -< 35913
	Q3	35913 -< 50781
	Q4	50781 -< 75351
	Q5	75351 - high
W2	Q1	low - 24927
	Q2	24927 -< 37643
	Q3	37642-< 53863
	Q4	53863-<78475
	Q5	78474 -high
W3	Q1	low -< 25891
	Q2	25891-< 39026
	Q3	39026-< 55700
	Q4	55700-< 81191
	Q5	81191 - high
W4	Q1	low 0 -< 27854
	Q2	27854-< 41193
	Q3	41193-< 58538
	Q4	58538-<86612
	Q5	86612- high
W5	Q1	low -< 28761
	Q2	28761-< 43702
	Q3	43702-< 61804
	Q4	61804-<90519
	Q5	90519- high
W6	Q1	low -< 30711
	Q2	30711 -< 46503
	Q3	46503 -< 65578
	Q4	65578 -< 95941
	Q5	95941 to high
W7	Q1	low -< 31283
	Q2	31283 -< 47667
	Q3	47667 -< 67768
	Q4	67768 -< 97585
	Q5	97585 to high

Income based on equivalised household income (not CPI adjusted and before housing costs)