

Changing Family Incomes in New Zealand 2007–20

Abstract

This article describes income mobility patterns in New Zealand over the short to medium term. It uses a special dataset which tracks the Household Labour Force Survey over the period from 2007 to 2020, using 2013 census data. The measure of income is total family taxable income per adult equivalent person. The income unit is the individual. Just below half of those initially in the bottom decile remained either there or in the second-lowest decile over seven years, while about two-thirds of those initially in the top decile remained either there or in the second-highest decile. Income mobility was least for those in the top and bottom deciles. People also move below or above a low-income threshold over time. Of those who initially had incomes less than half of the median income per adult equivalent person, about half remained in that category after six to seven years. Unemployment and single parenthood were closely associated with longer-term low income. Policies that promote employment and education may be effective, yet not necessarily sufficient, in reducing low income and low-income persistence.

Keywords income dynamics, income distribution, low income, mobility

The vast majority of studies of income inequality report measures of annual incomes, using cross-sectional data. Nevertheless, individuals experience relative income changes from year to year, some of which are associated with systematic life-cycle variations. A concern for inequality therefore needs to consider incomes over a longer accounting period, along with the precise nature of the income changes.²

The present article provides a description of some features of income mobility in New Zealand over the short to medium term (up to eight years). It uses a special dataset, made possible by the ability to link sources within the Integrated Data Infrastructure managed by Statistics New Zealand. The dataset links individuals in the Household Labour Force Survey (HLFS) with those in the 2013 census, over the period 2007–20. Importantly, a rich amount of information about the households in which individuals live is available. The results complement previous studies, which have used Inland Revenue administrative data and which necessarily relate only to individual taxpayers, and contain little information about the characteristics of those individuals.³

An advantage of the data used here is that they make it possible to include non-

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Figure 1: The datasets – HLFS data linked to census 2013



taxpayers, by allowing for the fact that income sharing inevitably takes place within families or households. However, no information is available about the precise nature of such sharing. Furthermore, difficulties arise when discussing households or families, since there are no ideal or universal definitions of these terms. The question of how a family is defined has to depend on the context. The approach taken here is based on the assumption that sharing is most important within families living together at the same address, rather than within households. The income concept is the resulting total taxable income per adult equivalent person in that family group, and this is assigned equally to each member: the basic ‘income unit’ is always the individual. Between two years, individuals may move between family units, so that the relevant income depends on both their individual income and the family unit to which they belong.⁴

The next section briefly describes the dataset and adult equivalent scales used. The third section examines relative income mobility in New Zealand, in terms of inter-decile and inter-quintile movements of individuals over time. The emphasis of section four is on the mobility characteristics of low-income groups, defined as those with income per adult equivalent person of less than half the median value in the relevant year. The fifth section concludes.

The data and income concept

The income and demographic data were obtained from the New Zealand Household Labour Force Survey for the years 2007–20. Sample calibration weights, produced by Statistics New Zealand, are used to ensure that grossed-up values match a range of population characteristics. The HLFS follows participants for eight consecutive quarters on a rotating basis and asks about income only in the June quarter, providing a maximum of two data points over two consecutive years. Therefore, people from each HLFS wave are matched with their records in the 2013 census, using unique anonymous identifiers, in order to examine income mobility beyond two consecutive years.⁵ Income data for both the HLFS and the census are from Inland Revenue and make use of the more accurate administrative data on taxable income. Income includes wages and salaries, self-employment and investment earnings, pensions, and taxable benefits like jobseeker support, sole parent support and the young parent payment. However, the income data do not reflect the complete tax and transfer system, as they exclude non-taxable benefits.

This process generates a series of pairings between the census and the HLFS, from 2007 to 2020, which are between two and seven years apart. The datasets are outlined in Figure 1. Effectively, there is a pairing for each different HLFS sample, linked to the 2013 census, so that they differ according to

the relevant time intervals. There are therefore two points in time for each panel, and in most cases the years are not consecutive. Each sample contains about 20,000 adults and 7,500 children, with an 80% match between the HLFS and the census. The possibility of sample selection bias was investigated by comparing the sample income distributions with the full HLFS data for each year: the differences in the density functions are minor.⁶

As mentioned above, the income concept is total family taxable income per adult equivalent person. The family is regarded as consisting of an adult, or adult partners, and dependent children who live at the same address. Adult children in the same household are treated as separate adult family units. The income measure is assigned to each person in the family. The analysis uses a two-parameter expression for the adult equivalent size of a family, which allows for a difference between children and adults, and economies of scale within the family.⁷ This allows sensitivity analyses to be carried out easily. Furthermore, the form closely approximates many alternative, and often more complex, scales (see Creedy and Sleeman, 2005). A child is classified as a dependent if that person is under 18 years of age.

Relative income changes

The transition matrix summarises movements between specified segments of the distribution between two years.⁸

Table 1: Inter-decile transition matrices

A. Period 2007-2013											
	Decile in 2013										± 1 decile
	Bottom	2	3	4	5	6	7	8	9	Top	
Bottom	32.6	19.8	9.0	6.6	9.9	6.3	4.4	4.5	3.6	3.2	52.4
2	15.9	26.0	14.7	11.4	10.0	7.3	5.3	4.3	2.7	2.2	56.6
3	6.5	11.5	37.5	17.2	9.2	6.1	4.4	3.1	1.9	1.1	66.2
4	7.4	10.7	10.8	31.1	14.4	11.3	6.8	4.5	3.3	1.6	56.3
5	7.9	9.3	8.6	9.3	17.3	17.4	15.1	7.7	5.8	1.8	44.0
6	6.6	7.1	6.4	6.9	12.8	15.9	17.5	14.6	8.6	3.6	46.2
7	6.6	4.9	4.0	5.4	9.8	12.7	19.8	18.4	12.7	5.9	50.9
8	5.3	4.5	4.2	5.3	7.3	10.1	13.1	20.0	19.9	10.5	53.0
9	4.0	3.9	2.4	4.8	5.7	8.0	8.6	15.1	25.9	21.9	62.9
Top	7.3	2.3	2.6	2.1	3.8	4.9	5.2	7.8	15.7	48.3	64.0

B. Period 2013-2019											
	Decile in 2019										± 1 decile
	Bottom	2	3	4	5	6	7	8	9	Top	
Bottom	31.9	14.4	8.1	8.3	8.4	8.2	6.7	5.9	4.8	3.6	46.3
2	19.8	26.1	11.2	11.6	10.0	6.3	5.5	4.9	2.7	1.9	57.1
3	7.7	18.2	32.0	14.4	9.3	6.5	4.6	3.0	3.2	1.2	64.6
4	8.1	10.1	15.7	28.1	12.7	10.3	6.0	4.1	3.4	1.6	56.5
5	7.7	7.8	9.3	13.1	18.1	18.4	11.4	7.8	4.1	2.3	49.6
6	4.9	7.2	6.4	7.9	15.4	17.2	17.1	13.0	8.2	2.8	49.7
7	5.4	5.7	4.4	6.5	10.6	14.7	19.1	15.9	13.0	4.9	49.7
8	4.8	4.4	4.9	4.3	7.7	8.9	16.1	20.9	18.5	9.5	55.5
9	5.2	3.2	2.8	4.5	4.7	6.5	8.4	17.3	26.3	21.2	64.8
Top	4.5	2.2	3.6	2.9	3.5	3.7	5.2	7.35	15.8	51.3	67.1

Note: The final column is the percentage of individuals who in 2019 remained in the same decile or the decile immediately above or below their decile in 2013.

Figure 2: People moving at least two deciles from their initial decile

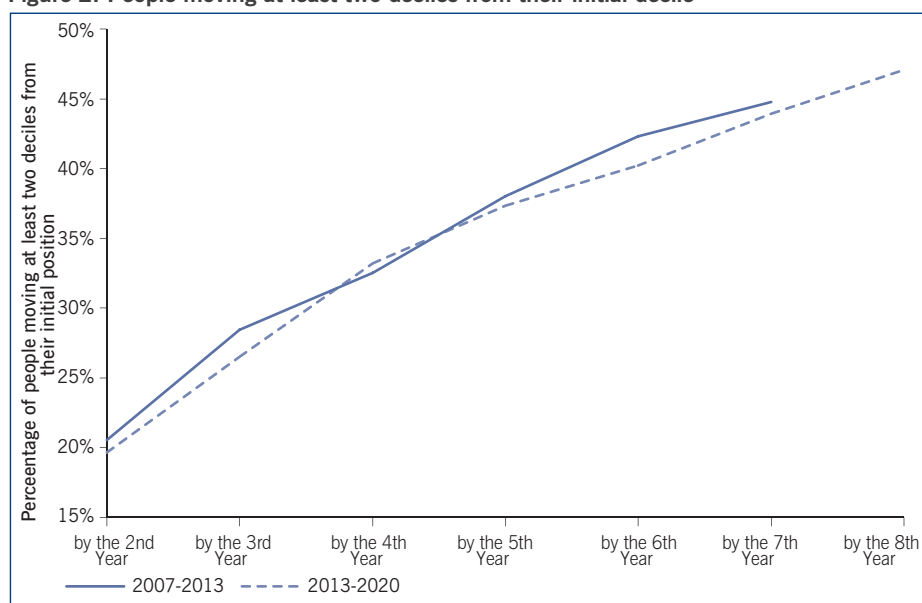


Table 3 shows transition matrices for movements between deciles from 2007 to 2013 and from 2013 to 2019, for all individuals combined: movement is from rows to columns of the matrix.⁹ For each

matrix, the final column is the percentage of individuals who in the second year remained in the same decile, or the decile immediately above or below their decile in the first year. The matrices necessarily

ignore income changes that do not move the individual into a different decile.

This demonstrates substantial mobility in terms of differential income growth. However, just over half the people in the bottom decile in 2007 were in the lowest two deciles in 2013. Of those initially in the top decile, 64% were in the highest two deciles in 2013. Over the period 2013–19, 46.3% of those initially in the bottom decile remained either there or in the second-lowest decile in 2019. Furthermore, 67.1% of those in the top decile in 2013 remained either there or in the second-highest decile in 2019.

Figure 2 shows the proportion of individuals (starting in any of the deciles) who moved by two or more deciles over the relevant periods. Separate results are shown for the years 2007–13 (where data are linked ‘moving forward’ to the census) and 2013–20 (where the individuals are linked by ‘moving backward’ to the census from a later HLFS). Not surprisingly, the

number moving by two or more deciles increases as the time interval increases. Around 20% changed by at least two deciles after a year. Over eight years, 47% changed by two deciles or more. The results are similar for the periods 2007–13 and 2013–20.

Figure 3 reports the proportion of individuals who stayed in the same quintile, for each quintile group and for a number of time intervals. There is more stability for people in the two bottom quintiles and even more for those in the top quintile. After 2013 medium-term mobility was slightly greater for those in the second-bottom quintile compared with the pre-2013 periods.

Results relating to quintile movements for all individuals and separately for those of ‘working age’ are shown in Figure 4. There are almost no differences between groups for the top and bottom quintiles. However, there is somewhat greater mobility for the working-age people in the second-bottom quintile when compared to the entire population. This reflects the importance of retired people, who typically are in the second-bottom quintile: that is, about 60% of those in that quintile in 2020 are aged 65 or over, and 70% were not in the labour force. For the entire population, almost 43% of those in the bottom income quintile in 2013 remained there in 2020, while 55% of those in the top quintile stayed there after seven years. Income mobility is higher for those in the middle group: 30% of those who stayed in the middle quintile in 2013 remained there and 38% moved up at least one quintile in 2020.

Figure 5 shows that people who stayed in lower income quintiles were more likely to experience real income increases over time compared to those in higher quintiles. This may partly be due to income transitions over the life cycle.¹⁰ Of those in the bottom quintile in 2013, 83% experienced an increase or no changes in real income in 2020, while about 44% of the richest quintile increased their real income or remained in the previous real income levels.

Direct international comparisons are difficult to make. However, based on information about movements from the top and bottom quintiles over four years, data suggest that New Zealand is in the

Figure 3: People staying in the same income quintile over different time intervals

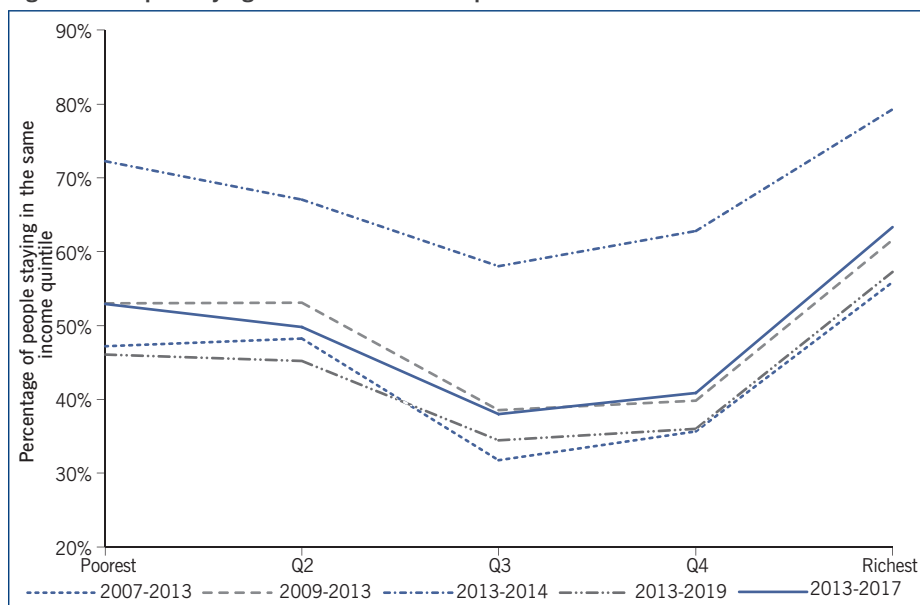


Figure 4: Quintile movements from 2013 to 2020 by initial income quintile

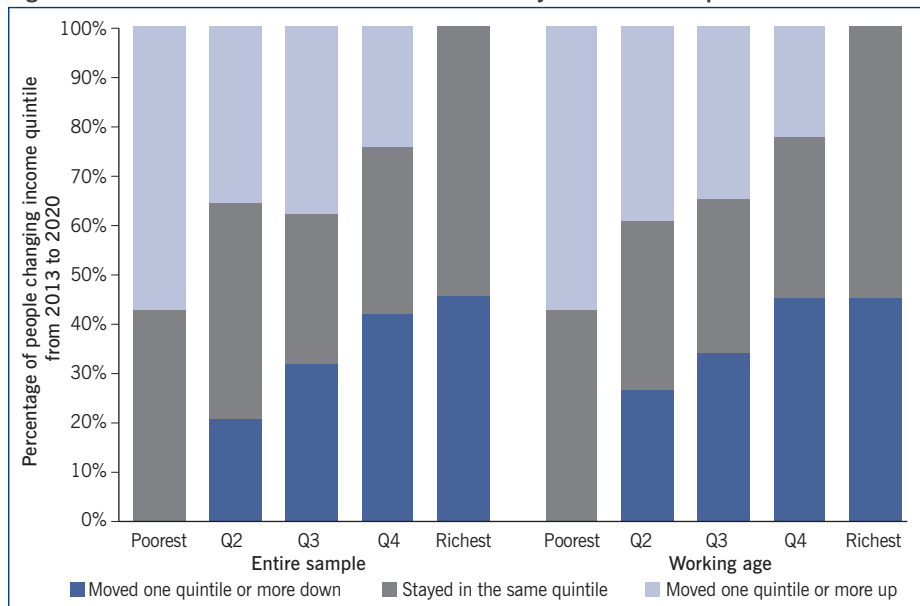


Figure 5: Trends in income mobility by initial quintile over eight years

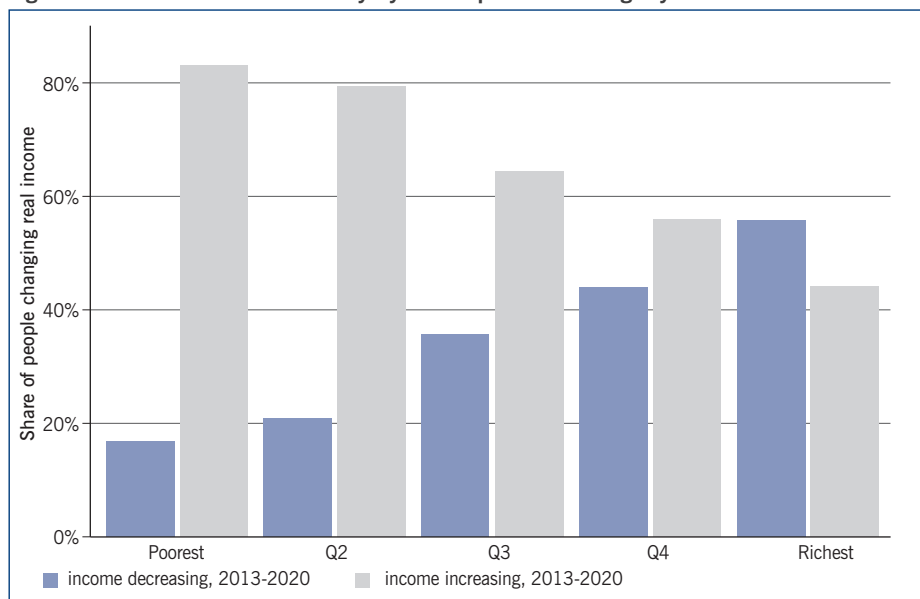


Figure 6: New Zealand low-income FGT measures decomposed – incidence measure ($\alpha = 0$)

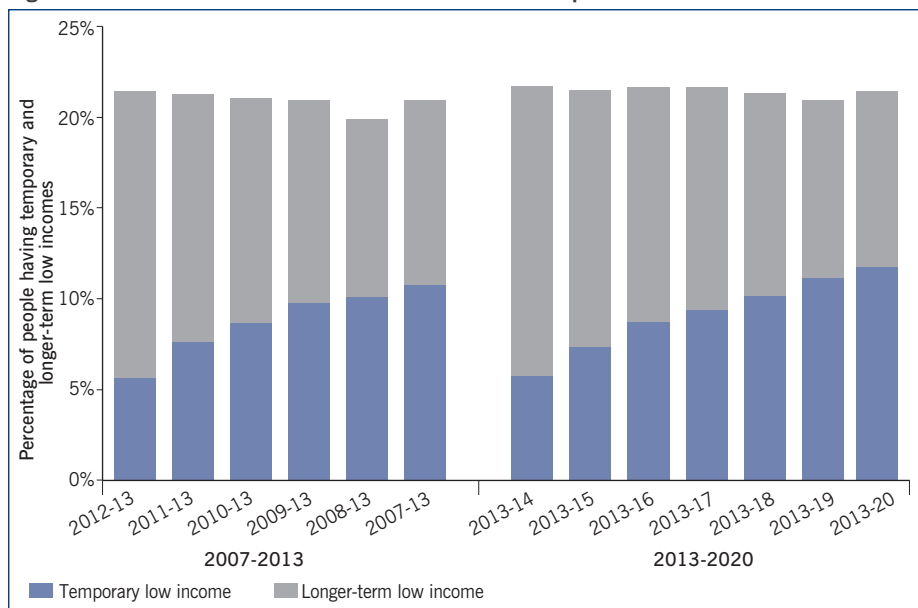
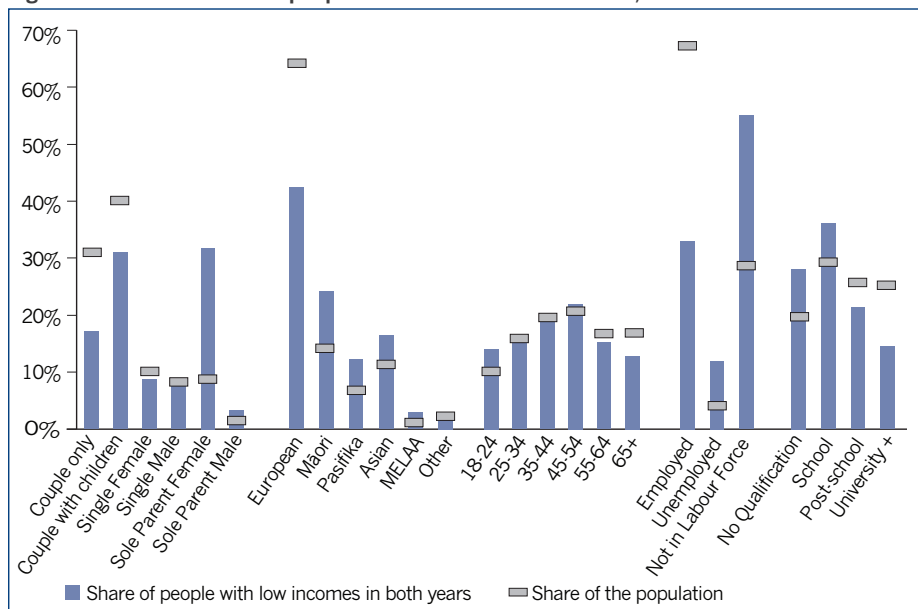


Figure 7: Characteristics of people with low-income incidence, 2013 and 2020



‘middle’ of OECD countries (see Creedy and Ta, 2022).

Low incomes and mobility

This section concentrates on the income changes of low-income individuals, defined as those below a threshold value set in relation to the median income per adult equivalent person. The analysis uses a class of poverty measures introduced by Foster, Greer and Thorbecke (1984). While these measures are applied in the present context, care must be taken to avoid referring to them as ‘poverty’ measures, given the use of gross taxable income. The Foster–Greer–Thorbecke, or FGT, measures are denoted LT_α , and are based on the sum of powers, α , of the individual

low-income gaps, defined (for those below a specified low-income threshold) as the relative difference between income y_i and the threshold y_p . Hence:

$$LT_\alpha = \frac{1}{n} \sum_{y < y_p} \left(\frac{y_p - y_i}{y_p} \right)^\alpha \quad (1)$$

For $\alpha = 0$, this is the proportion of people below the low-income threshold, and hence measures the *incidence* (conventionally referred to as the ‘headcount’ measure). For $\alpha = 1$, it depends on LT_0 and the average low-income gap per capita, and reflects *intensity*. For $\alpha = 2$, LT_2 depends on the average squared low-income gap per capita, which is related to the standard deviation of low incomes, and

reflects *inequality* among the low-income group.

Given incomes in two years, and dropping the α subscript, define LT as the arithmetic mean of the measures for each year. Borooah and Creedy (1998) show that it is possible to decompose LT into two components. A temporary or short-term component, LT^T , relates to those with low income in one period only, and a longer-term component, LT^L , relates to those with low income in both periods. The low-income threshold was set at 50% of median income. This is of course an arbitrary setting, but it also allows comparisons to be made with other countries.

Figure 6 presents the low-income prevalence of different HLFS samples, in terms of the proportion of people having low incomes over two years. Average low-income measures, LT , are reflected by the height of the bars. The blue bars reflect the proportion of people with low income in one of the years. The grey bars show the proportion of people with low income in both years. Given the dataset used here, consecutive years are not used in most cases.

The average low-income measures, LT , are similar for different time intervals. On average, just over a fifth of the New Zealand population had income per adult equivalent person below 50% of the median value. For decompositions between two consecutive years, around 6% of the population had low income in either 2012 or 2013, and 16% had low income in both years. As the interval of time expands, the temporary component increases, while the longer-term component decreases. For decompositions between two non-consecutive years, one in ten New Zealanders had low income in either 2007 or 2013, and the same rate for those who had low income in both years. The two sets of results for two periods before and after 2013 are similar.

Figure 7 displays the characteristics of people who experienced longer-term low income. In particular, the height of the vertical bar represents the proportion of people with the characteristic who have a longer-term low income. The horizontal bars show the value that would be reached if people with that characteristic were to match the average for the whole population.

That is, the horizontal bars represent the share of each demographic group in the entire population. Where the vertical bar is significantly higher than the horizontal bar, a person with that characteristic is more likely to have a longer-term low income than the population as a whole; these include sole parents, people not working, and those without qualifications. The analysis was replicated for different cohort groups over different time intervals: there were similar patterns across samples, with the exception of some differences for young people as they transitioned from study to work.

Figure 8 provides an alternative way to identify people who are more likely to have a longer-term low income, applied for the low-income measures: it shows low-income people in 2020 who were also below the relevant low-income threshold in 2013. For instance, regarding the incidence measure, each number represents the proportion of people with a certain characteristic having a longer-term low income compared with the corresponding population. The average measures (derived for the entire population) are used as the benchmark to identify those with significantly higher longer-term low-income measures than the average values.

The following characteristics were found to be associated with a higher likelihood of having a longer-term low income than the average population: for the incidence measure, sole parent female, unemployed people, MELAA (Middle Eastern, Latin American and African), sole parent male, Pasifika, Māori, Asian, people not in the labour force, and those without qualifications. For example, among all sole-parent-female families in 2013, 32% had low income in both 2013 and 2020.

For the intensity measure they are: sole parent female, sole parent male, unemployed people, Asian, MELAA, Pasifika, people not in the labour force, Māori, and those without qualifications. Asians were found to have slightly higher longer-term low-income rates than Māori or Pasifika people, according to this intensity measure. The latter populations were younger, had a higher proportion of sole-parent families and had lower qualifications than the average population, while the Asian respondents had a higher share of couple-parent families.¹¹

Figure 8: Longer-term measures of low income, 2013 and 2020

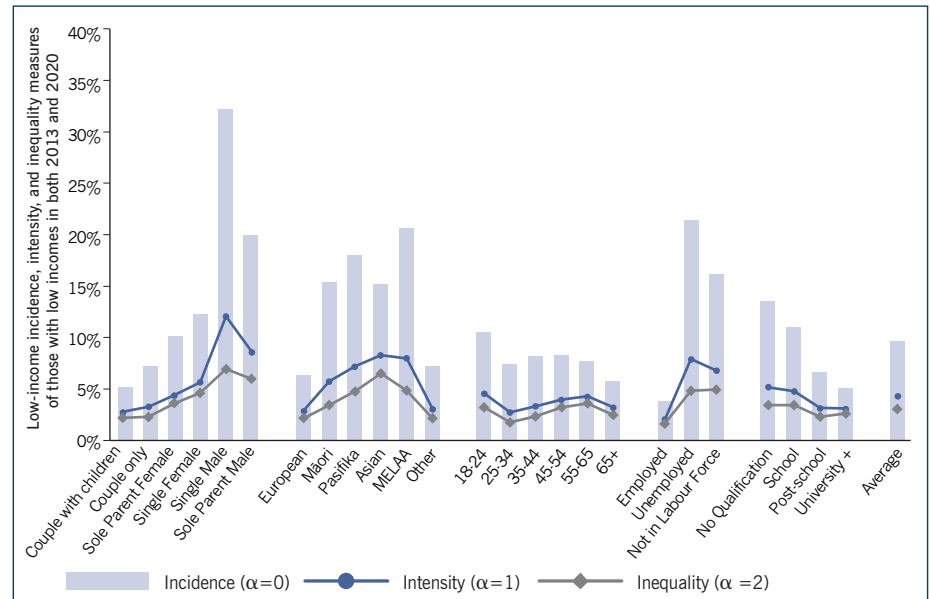


Figure 9: Temporary and longer-term low-income incidence, 2013 and 2020

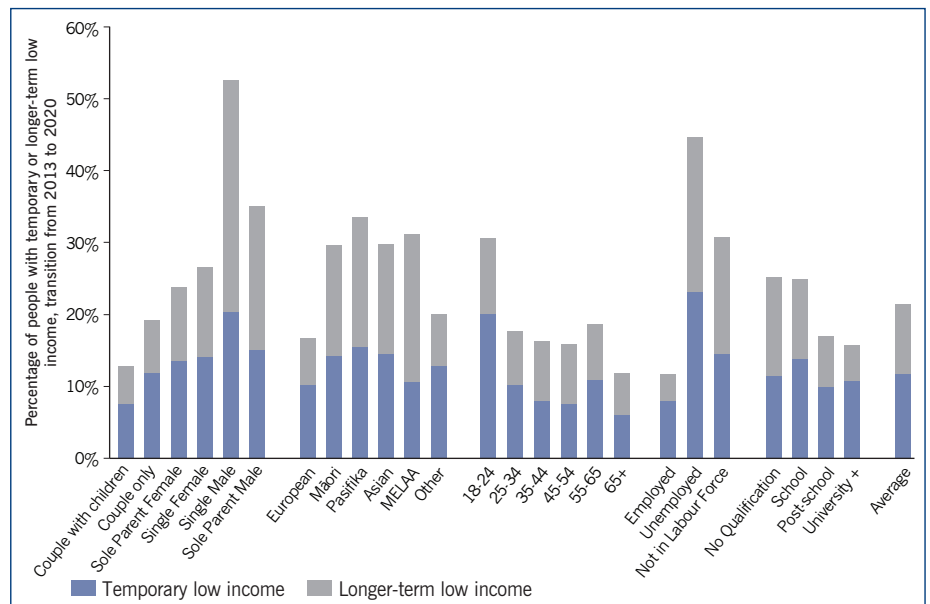


Figure 9 depicts decompositions of temporary versus longer-term low-income incidence across demographic groups, for the HLFS sample in 2020 who were traced back to the 2013 census. For those with low incomes at one point in time, the probability of having a longer-term low income increases. An exception is those aged 18–24 as they transfer from study to work. Again, not all people who were below the low-income threshold in one period also had low income in both periods, as there were substantial differences between the longer-term components and average low-income measures.

Figure 10 illustrates the longer-term measures of low income, decomposed by two characteristics for the HLFS sample in

2020. These decompositions help to identify the characteristics of people who were more likely to experience a longer-term low income compared with the population as a whole. They include non-European sole parents and non-working sole-parent families (whose low-income measures are far higher than the averages of the entire population).

Figure 11 shows low-income exits (movement from below to above the low-income threshold) over the medium term for the entire population and by demographic groups, observed in the initial years (computed as the proportion of people who exited low income in the second period, conditional on having a low income in the first period, divided by the

Figure 10: Longer-term components of low-income measures, 2013 and 2020

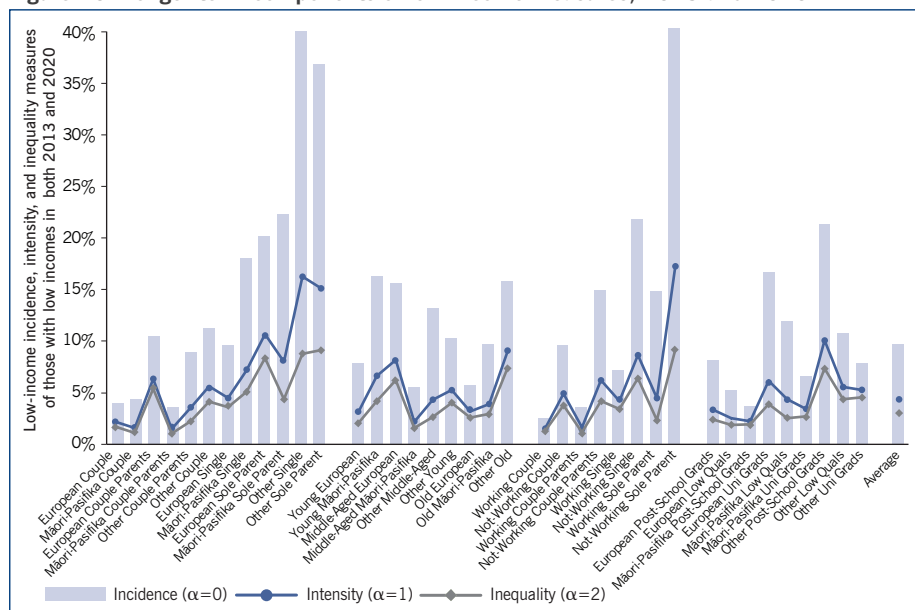
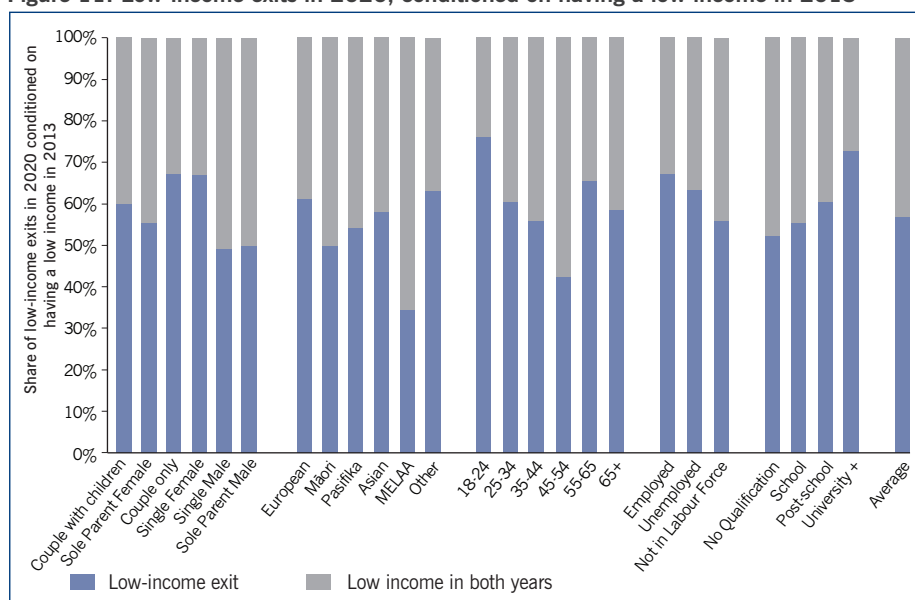


Figure 11: Low-income exits in 2020, conditioned on having a low income in 2013



total number of people with low income initially). For New Zealanders as a whole, of those who were below the threshold initially, just under half were below or had returned to being below the relevant threshold after six to seven years.¹²

Those aged 18–24 and single people were more likely to move above the low-income threshold over the medium term, compared to the entire population. Three-quarters of young people who initially had low incomes exited after six to seven years; the rate was two-thirds for single people. These groups were more likely to transition from study to work and thus more likely to move above the threshold over the medium term compared with the overall sample. For instance, for the transition

from 2013 to 2020, 26% of those aged 18–24 studied in 2013 compared with 6% of those aged 25 or above. Similarly, workers and people with university education were more likely to rise above the low-income threshold over the medium term, as these groups were more likely to achieve labour market success. Interestingly, people aged 55–64 were also more likely to exit low income than the average, due to their significant increase in non-labour income during their transition to retirement.¹³

Table 2, following the approach of Jenkins and Schluter (2003), presents the relative importance of different events, the probability of the event happening, and the proportion of those subsequently

exiting the low-income group. As with other results, the individual is the unit of analysis. The exit rate is the number of individuals whose income is at least half of median equivalised income as a percentage of the total number of those initially being below the threshold. Percentages do not add to 100 because transitions out of low income can happen when none of the identified triggered events occurs, and they are not mutually exclusive. Most events are based on family changes.

For example, consider the exit event ‘fall in number of children, same family type’. Among all individuals having a low income in 2013, 4.3% experienced a fall in family size without changing family type in 2014. Among those who experienced that event, 31.3% exited low income, accounting for 4.5% of low-income exits. Overall, these events are more likely to occur, and people are more able to exit low incomes, over a longer term.

The following features of Table 2 are noteworthy.

- Labour market events were more likely to occur than family changes over the short to medium term. Likewise, low-income exits were more frequently associated with the former (share of exits). Among the low-income people in 2013, less than a quarter gained one or more workers in 2014, while half of them exited low income after the event, making up more than a third of the total exits.
- Among low-income individuals from sole-parent families in 2013, a quarter of them were no longer in a sole-parent family in 2014 and half of them in 2020, given the over-representation of these people in the initial low-income population.¹⁴ Following this event, two-thirds of them moved above the low-income threshold.
- Low-income people from a working family were more likely to exit the low-income category over the short to medium term compared with those from a non-working family. For example, 32.3% of those from a working family had at least 20% income gain in 2014 given no changes in the number of workers in the family, compared with 19.5% of those in the entire population.

Table 2: Low-income exits over the short to medium term

Event	2013 to 2014			2013 to 2020		
	Pr(event)	Pr(exit event)	Share of exits	Pr(event)	Pr(exit event)	Share of exits
Among all individuals in 2013 at risk of low-income exit: Pr(exit in 2014 or 2020)		30.0			57.0	
Fall in family size, same family type	4.3	31.3	4.5	9.2	54.8	9.2
Fall in No. of children, same No. of adults	6.8	35.8	8.1	21.0	56.5	21.0
Fall in No. of children, same No. of workers	5.4	39.2	7.1	13.9	50.2	13.9
No longer in a sole parent family (for sole parent)	25.1	66.7	62.1	51.8	66.3	69.5
Rise in No. of workers	23.6	49.2	38.9	37.5	75.1	37.5
Rise in real labour income by 20% or more, same No. of workers	19.5	45.7	29.9	19.1	69.0	19.1
Rise in real labour income by 20% or more, same No. of workers (for working family)	32.3	55.0	46.8	31.6	77.7	39.8
Gain higher individual qualification (adults only)	15.4	31.9	16.4	21.1	65.6	21.1
Gain higher family qualification	26.4	33.3	29.4	35.0	60.0	35.0

Note: Pr(event) represents the chance (probability) of the event happening. Pr(exit|event) represents the probability of a move out of low income if the individual experiences the particular event.

Table 3: Low-income exits from 2013 to 2020 for selected demographics

Group	Rise in labour income by 20% or more, same number of workers		Increase in family qualification	
	Pr(event)	Pr(exit event)	Pr(event)	Pr(exit event)
1. All	19.1	69	35	60
2. Sole parent	9.3	46.3	23.5	30.4
3. Couple family	31	74.9	86.5	68.9
4. Young 18-24	81.7	89.7	46.9	78.1
5. Low-qualification family	18.4	64.7	79	57

Notes: For young people, events are: (1) rise in real labour income by 20% or more, and (2) increase in qualification. Couple families include those with and without children.

- An improvement in the family education level was associated with a transition of about a third of those low-income families above the low-income threshold.

In addition, a positive and statistically significant correlation was found between the age of the youngest child and the likelihood of the jobless parent(s) in 2013 entering the work force in the second year: the correlation coefficient is 0.32 for the transition from 2013 to 2020. Parents with younger children were therefore less likely to enter the labour force over the period. Comparing those jobless parents who entered the labour force in 2020 with those who did not enter, the former group had older children on average (8.5 versus 5 years of age).

People from different demographic groups respond to a specific event in various ways, as indicated in Table 3, which considers two typical events, a rise in real labour income and an increase in the

highest family qualification. These estimates indicate that the five selected demographic groups differ both in their likelihood of experiencing the event and in their likelihood of exiting low income after the event.

Table 4 presents the relative importance of different events, the probability of the event happening, and the proportion of those entering low income following the particular event. Again, percentages do not add up to 100. The population includes all individuals with equivalised income at least half of the median income in 2013. Key messages from the table include:

- Labour market events were more likely to occur than family changes over the short to medium term. Low-income entries were more frequently associated with the former (share of entries). However, people were less likely to enter low income after experiencing a labour

market event rather than family changes.

- A small proportion of 2013 partners separated by 2014 or 2020. However, following this event, a substantial proportion entered low income (almost half in 2014 and 40% in 2020).
- Low-income people from a working family were less likely to enter low income over the short to medium term, compared to those from non-working family. For example, 4.8% of those from a working family entered low income in 2014 after losing 20% or more of family income, given no changes in the number of workers in the family. This compares with the equivalent rate of 6.5% for the entire population.

Conclusions

This article has used a special dataset to examine income mobility in New Zealand. The data were obtained by

Table 4: Low-Income Entries Over the Short to Medium Term

Event	2013 to 2014			2013 to 2020		
	Pr(event)	Pr(enter event)	Share of entries	Pr(event)	Pr(enter event)	Share of entries
Among all individuals in 2013 at risk of low-income entry: Pr(exit in 2014 or 2020)		6.0			12.7	
Rise in family size, same family type	3.8	13.8	12.5	6.5	15.0	7.7
Rise in No. of children, same No. of adults	6.0	13.9	13.8	11.6	14.5	13.2
Rise in No. of children, same No. of workers	4.4	12.6	9.2	8.7	14.8	10.1
Be part of a sole parent family (for non-sole parent)	3.0	48.1	26.6	4.8	39.3	15.1
Fall in No. of workers	14.0	19.8	46.0	26.2	25.4	52.1
Fall in real labour income by 20% or more, same No. of workers	25.2	6.5	27.1	16.0	16.7	21.1
Fall in real labour income by 20% or more, same No. of workers (for working family)	28.0	4.8	23.4	16.6	16.0	21
Fall in real labour income by 20% or more, same No. of workers, same family type	22.4	5.2	19.4	10.5	12.7	10.5

Note: Pr(event) represents the chance (probability) of the event happening. Pr(enter|event) represents the probability of a move to low income if the individual experiences the particular event.

linking a number of Household Labour Force Survey with the census for 2013, in order to obtain information about families and individuals in two different years. The income concept used was total family taxable income per adult equivalent person. Hence, in comparing incomes in two different years, the income measure depends on the family to which the person belongs, and this may differ between years.

In examining relative income mobility, transition matrices were used to measure inter-decile and inter-quintile movements. Typically, over all quintiles and population groups, about half of the individuals moved into another quintile over a four-year period, with about 40% remaining in the same decile over a period of seven years. However, more stability was found for those initially observed in lower and upper quintiles.

The article also examined the characteristics of individuals observed to be below a relative low-income threshold, set at 50% of the median income per adult equivalent person in each relevant year. Adopting a class of three poverty measures, which reflect the incidence and intensity of low income and inequality among those with low incomes, differences among demographic groups were examined. The

evidence suggests that many people enter and exit low income over time, while some demographic groups are more likely to remain in or have returned to low income over the medium term, most notably sole-parent families. Several factors were found to be related to low-income entry and exit: changes in family structure over the life cycle, labour market events and educational attainment. Though it is hard to separate or account for all possible trigger events, labour market events seemed to be more relevant in explaining low-income entry and exit. The findings are, to some extent, suggestive that policies aiming at promoting employment and education might be effective in reducing low income and low-income persistence: those unlikely to be attached to the labour market or pursue educational achievement are more likely to end up with low-income persistence. The question arises of what kinds of employment and educational initiatives are most cost-effective in reducing low-income persistence.

However, such policies necessarily exclude those who, often through no fault of their own, are unable to enter the labour market (for example, because of significant physical or intellectual disabilities) or can only participate to a modest and perhaps

episodic degree (for example, because of significant health problems). In addition, policies need to account for the fact that people at different stages of their lives appear to experience different trigger events, and respond in different ways.

The present article has provided an initial exploratory analysis of a new dataset, using descriptive measures, to explore differences between demographic groups in their mobility and low-income characteristics. It is hoped that this can contribute to informed debate and policy design.

¹ This article results from a partnership between the Chair in Public Finance at Victoria University of Wellington (as part of its project on measuring income inequality, poverty and mobility in New Zealand, funded by an Endeavour Research Grant from the Ministry of Business, Innovation and Employment) and the New Zealand Productivity Commission (as part of its *A Fair Chance for All?* inquiry). The results in this article are not official statistics. They have been created for research purposes from the Integrated Data Infrastructure (IDI), which is carefully managed by Statistics New Zealand. The IDI is a large research database which contains administrative data about people and households. These data come from government agencies and non-government organisations: for example, income and tax records from Inland Revenue and social benefit records from the Ministry of Social Development. For more information about the IDI please visit <https://www.stats.govt.nz/integrated-data/>. The results are based in part on tax data supplied by Inland Revenue to Statistics New Zealand under the Tax Administration Act 1994 for statistical purposes. Any discussion of data limitations or weaknesses is in the context of using the IDI for statistical purposes and is not related to the data's ability to support Inland Revenue's core operational requirements. Access to the survey data used in this study was provided by Statistics New Zealand under conditions designed to give effect to the security and

confidentiality provisions of the Statistics Act 1975. The results presented in this study are the work of the authors, not Statistics New Zealand or individual data suppliers. The datasets used here were initially constructed by Chris Ball.

2 Mobility may reduce longer-period inequality relative to annual incomes, but not all changes are necessarily desired. Mobility may reflect positive opportunities (for example, via education) as well as risks (for example, of job loss or illness).

3 Recent studies of individual mobility include Creedy, Gemmell and Laws, 2021, and Alinaghi, Creedy and Gemmell, 2022b, 2022c, 2022d, 2022e.

4 For detailed discussions of this feature, see Shorrocks, 2004, and for New Zealand comparisons using different units, see Creedy and Sleeman, 2005 and Creedy and Eedrah, 2016.

5 The absence of a match can arise because of international migration, births and deaths, or data problems such as measurement errors.

6 Here, and in subsequent analyses, negative incomes (accounting for about a quarter of 1% in each sample) were converted to zeros. In addition, 0.25% of incomes at the top end of the income distributions were set to a maximum at 99.75%. Further sensitivity checks were carried out by truncating just over 3% of the families in the bottom of the income distribution (retaining those with log-equivalised income of 6 and above), and by not using the sample weights. The results were found to be consistent with the baseline.

7 For all results reported here, the weight attached to a child is 0.6, and the effective number of adults is raised to the power 0.8, to reflect economies of scale.

8 As the datasets consist of constant population groups of individuals, and as decile income groups are used rather than absolute incomes, all row and column sums add to 100%. In the matrices reported here, the use of rounding to one decimal place means that the values do not sum to exactly 100.

9 For all tables and figures reported here, the results are based on the authors' calculations using the dataset described.

10 On the changing distribution of individual incomes with age in New Zealand, see Alinaghi, Creedy and Gemmell, 2022a.

11 Some groups need to be treated with care, as discussed further in Creedy and Ta, 2022. A small proportion of very low-income Māori and Pasifika people and MELAA were omitted, whereas the excluded Asians seemed to have incomes above the low-income threshold. In addition, in linking census respondents to the IDI, the linkage rates for Asians might be slightly lower than for other ethnic groups, possibly due to changing their names or using unofficial names (see Statistics New Zealand, 2019).

12 There was a similar pattern in Australia over the period from 2000/01 to 2015/16, where nearly half of those with income less than half of disposable household equivalised income in one year were also in, or had returned to, below the threshold five years later (see Australian Productivity Commission, 2018, p.127).

13 Those people were mainly either old couples without children or old singles (9/10), those not in the labour force (6/10), and those with low qualifications (7/10) in 2013. Their average non-labour income rose from \$4,500 in 2013 (mostly unemployment benefits) to \$15,900 in 2020 (mostly superannuation or veterans' pensions), in terms of the 2013 dollar (adjusted for CPI in 2013Q1).

14 Being no longer in a sole-parent family includes the case of re-partnering, or the case where a sole parent becomes a single adult without dependent children (for example, all children become adults).

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References

- Alinaghi, N., J. Creedy and N. Gemmell (2022a) *Age–Income Profiles in New Zealand: new estimates based on administrative data*, working paper in public finance WP08/2022, Wellington: Victoria Business School
- Alinaghi, N., J. Creedy and N. Gemmell (2022b) *Differential Income Growth of Individuals in New Zealand: evidence from administrative data*, working paper in public finance WP06/2022, Wellington: Victoria Business School
- Alinaghi, N., J. Creedy and N. Gemmell (2022c) *Income Inequality and the Accounting Period in New Zealand: evidence from administrative data*, working paper in public finance WP05/2022, Wellington: Victoria Business School
- Alinaghi, N., J. Creedy and N. Gemmell (2022d) *Inter-decile Income Movements of Individuals in New Zealand: evidence from administrative data*, working paper in public finance WP04/2022, Wellington: Victoria Business School
- Alinaghi, N., J. Creedy and N. Gemmell (2022e) *Measuring Positional Changes within the New Zealand Income Distribution: evidence from administrative data*, working paper in public finance WP10/2022, Wellington: Victoria Business School
- Australian Productivity Commission (2018) *Rising Inequality? A stocktake of the evidence*, Melbourne: Australian Productivity Commission
- Borooh, V.K. and J. Creedy (1998) 'Income mobility, temporary and permanent poverty', *Australian Economic Papers*, 37, pp.36–44
- Cappellari, L. and S.P. Jenkins (2004) 'Modelling low income transitions', *Journal of Applied Econometrics*, 19, pp.593–610
- Carter, K. and F.I. Gunnasekara (2012) *Dynamics of Income and Deprivation in New Zealand, 2002–2009*, Public Health monograph 24, Dunedin: University of Otago
- Carter, K., T. Le and P. Mok (2014) *Income Mobility in New Zealand: a descriptive analysis*, working paper WP14/15, Wellington: Treasury
- Creedy, J. (2017) 'Alternative distributions for inequality and poverty comparisons', *Australian Economic Review*, 50, pp.484–97
- Creedy, J. and J. Eedrah (2016) 'Income redistribution and changes in inequality in New Zealand from 2007 to 2011: alternative distributions and value judgements', *New Zealand Economic Papers*, 50, pp.129–52
- Creedy, J. and N. Gemmell (2018) 'Income dynamics, pro-poor mobility and poverty persistence curves', *Economic Record*, 94 (306), pp.316–28
- Creedy, J., N. Gemmell and A. Laws (2021) 'Relative income dynamics of individuals in New Zealand: new regression estimates', *New Zealand Economic Papers*, 55, pp.203–20
- Creedy, J. and C. Sleeman (2005) 'Adult equivalence scales, inequality and poverty in New Zealand', *New Zealand Economic Papers*, 39, pp.51–83
- Creedy, J. and Q. Ta (2022) *Income mobility in New Zealand 2007–2020: combining household survey and Census data*, working paper in public finance WP12/2022, Wellington: Victoria Business School
- Foster, J., J. Greer and E. Thorbecke (1984) 'A class of decomposable poverty measures', *Econometrica*, 52, pp.761–2
- Jenkins, S.P. and F.A. Cowell (1994) 'Parametric equivalence scales and scale relativities', *Economic Journal*, 104, pp.891–900
- Jenkins, S.P. and C. Schluter (2003) 'Why are child poverty rates higher in Britain than in Germany? A longitudinal perspective', *Journal of Human Resources*, 38, pp.441–65
- OECD (2008) *Growing Unequal? Income distribution and poverty in OECD countries*, Paris: OECD Publishing
- OECD (2018) *A Broken Social Elevator? How to promote social mobility*, Paris: OECD Publishing
- Shorrocks, A.F. (1976) 'Income mobility and the Markov assumption', *Economic Journal*, 86, pp.566–78
- Shorrocks, A.F. (2004) 'Inequality and welfare evaluation of heterogeneous income distributions', *Journal of Economic Inequality*, 2, pp.193–218
- Statistics New Zealand (2019) 'Linking 2018 Census respondents to the Integrated Data Infrastructure', www.stats.govt.nz
- Treasury (2012) *A Descriptive Analysis of Income and Deprivation in New Zealand*, report T2012/866, Wellington: Treasury