IN-WORK POVERTY IN NEW ZEALAND

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The authors would like to thank a number of people who made this research possible. The idea to study in-work poverty in New Zealand came out of an internal workshop that the Human Rights Commission (HRC) led and which was externally facilitated by Jo Cribb, former Chief Executive of the Ministry for Women. The work was initially championed by former Equal Employment Opportunities (EEO) Commissioner, Dr Jackie Blue, and then by the current EEO Commissioner, Saunoamaali'i Karanina Sumeo.

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DISCLAIMER

The results in this paper are not official statistics; they have been created for research purposes from the Integrated Data Infrastructure (IDI), managed by Statistics New Zealand (Stats NZ). The opinions, findings, recommendations, and conclusions expressed in this paper are those of the authors, not Stats NZ.

The results are based in part on tax data supplied by Inland Revenue to Stats NZ under the Tax Administration Act 1994. This tax data must be used only for statistical purposes, and no individual information may be published or disclosed in any other form or provided to Inland Revenue for administrative or regulatory purposes. Any person who has had access to the unit record data has certified that they have been shown, have read, and have understood section 81 of the Tax Administration Act 1994, which relates to secrecy. 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 anonymised data used in this study was provided by Stats NZ in accordance with security and confidentiality provisions of the Statistics Act 1975. Only people authorised by the Statistics Act 1975 are allowed to see data about a particular person, household, business, or organisation, and the results in this paper have been confidentialised to protect these groups from identification. Careful consideration has been given to the privacy, security, and confidentiality issues associated with using administrative and survey data in the IDI.

Further detail can be found in the Privacy impact assessment for the Integrated Data Infrastructure available from www.stats.govt.nz.

FOREWORD

A household's wellbeing, and specifically economic/material wellbeing, is at the crux of ensuring that its members' human rights are protected. Economic wellbeing typically has its foundation in meaningful employment. Having decent work is a human right, and it affects many other human rights such as health, housing, education, food, and safety. Some New Zealand households have one or more working members, yet still are living in poverty (called 'in-work poverty'). They are struggling with these human rights challenges every day.

A household's economic wellbeing is often assessed by its poverty status. New Zealand has a number of measures to monitor poverty and material disadvantage. One measure of poverty, the 50% before housing cost relative measure, shows that 10% of the whole population was in poverty in 2018. This rate is nearly double for Māori and Pasifika households.[1] Disabled people are also overrepresented among low income groups; in June 2019, their median weekly income was $392 (compared with $749 for non-disabled people).[2]

Society has widely believed that employment provides protection from poverty. However, that may not necessarily be the case: for example, from 2007 to 2018, about 40% of children in poverty were living in working households.[1] The Ministry of Social Development (MSD) published in-work poverty rates ranging from 9%-12% for 2018[3].

If New Zealand is to meet its child poverty reduction targets or the United Nations' Sustainable Development Goals, it must do more to support working households that have been unable to escape the poverty trap. Achievement of these domestic and international targets will drastically improve New Zealanders' realisation of their human rights.

The New Zealand Human Rights Commission (HRC) wanted to produce evidence around the prevalence of in-work poverty and the characteristics of in-work poor households, which could help inform the systemic changes needed to reduce poverty rates. The extent of in-work poverty had not been comprehensively assessed in Aotearoa before. As a result, the following research questions comprised a starting point into the investigation of in-work poverty in Aotearoa:

- How do we define and measure in-work poverty in the Aotearoa context?
- How many employed households are in poverty?
- Who has a higher risk of becoming in-work poor?
- What can we learn about other human rights circumstances of employed poor households?
- How has the rate of in-work poverty changed over time?

HRC sought to identify partners on this project and approached MSD and the Ministry of Business, Innovation & Employment (MBIE), who agreed to co-fund this research with HRC. These and other agencies (including Treasury and the Child Poverty Unit in the Department of the Prime Minister and Cabinet) developed the research questions, project scope, and requirements for a research provider and provided feedback on the method and draft reports. This cross-agency approach will hopefully help to ensure that the research lends itself to consideration by end-users during discussions on poverty-reduction policy strategies. The New Zealand Work Research Institute at the Auckland

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[1] Perry (2019).
[2] Stats NZ (2019a).
[3] Perry (2019).

University of Technology was commissioned to independently carry out the work to address the research questions.

We hope that the findings of this research improve our understanding of those households who, although in employment, are still struggling. We also hope that this increased understanding of this group can inform the development of policies to improve the wellbeing of those that are working but remain in poverty.

Saunoamaali'i Karanina Sumeo,
Equal Employment Opportunities Commissioner

EXECUTIVE SUMMARY

This report examines the prevalence of, and characteristics associated with, in-work poverty in New Zealand. It is important to note from the outset that the relevant international literature is characterised by varying definitions and approaches to measurement aspects of in-work poverty, which means that cross-country estimates may not be directly comparable with the findings in this report.

The analysis within this study draws primarily on linked data from Inland Revenue and the 2013 Census, as well as supplementary information provided by the Household Labour Force Survey.

Working status is derived from employment information over the year ending March 2013, and poverty status is derived from income information for March 2013.

Key findings are as follows:

1. **Headline estimate:** Amongst working households, the proportion of households in poverty is 7.0 percent as at March 2013 (based on a 60 percent before housing costs poverty threshold). This is equal to 50,943 households.
2. **Working status:** More than four out of five New Zealand households (82.9 percent) with at least one working-age adult is classified as working (i.e., at least one adult in the household receives positive wages and salaries income for at least seven months in the year).
3. **Poverty rate:** The overall average poverty rate across in-work and non-work households is 17.1 percent, with the rate of poverty close to 66 percent for non-work households.
4. **Definitions and thresholds matter:** Sensitivity analysis illustrates that if the poverty threshold is dropped from 60 percent to 50 percent of median household income, the prevalence of in-work poverty drops to 4.7 percent. Additionally, if the population of interest (working-age households excluding pensioner and self-employed households) is used for the reference income distribution for deriving the poverty threshold, then the prevalence of in-work poverty rises to 12.4 percent.
5. **Role of Working for Families (WfF) tax credits and the Accommodation Supplement (AS):** Inclusion of these two income sources makes a sizable impact on in-work poverty prevalence. Without both income sources, the in-work poverty rate rises from 7.0 percent to 9.2 percent. The impact is largest for single-parent households, where the in-work poverty rate rises from 12.3 to 21.6 percent when WfF and AS are not included in the analyses.
6. **Gender:** 7.7 percent of adult females are associated with an in-work poor household, while for men this number is 6.6 percent. The in-work poverty rate is also substantially higher if the main earner in the household is female (compared to male), regardless of household structure.
7. **Children:** 10.0 percent of children living in working households are poor (compared with 7.2 percent of adults).
8. **Over time:** There has been very little change in in-work poverty rates between 2007 and 2017.
9. **Region:** Canterbury and Nelson exhibit the lowest values for in-work poverty prevalence (at 5.7 and 6 percent, respectively), whereas Northland and Gisborne exhibit the highest values (at 10.2 and 9.3 percent, respectively). There is substantial sub-regional variation in the Bay of Plenty and Wellington.
10. **Ethnicity:** Households with at least one adult with prioritised ethnicity of Māori (8.6 percent), Pacific peoples (9.5 percent), Asian (9.4 percent) and MELAA (9.5 percent) experience an

elevated in-work poverty rate relative to households of New Zealand European ethnicity (5.9 percent).

11. **Migrants:** Households with at least one adult born in New Zealand face the average in-work poverty rate. There is substantial heterogeneity regarding in-work poverty prevalence across households with migrant adults, with those from North-East Asia experiencing one of the highest rates (+7.4 percentage points relative to sample average) and those from the United Kingdom experiencing a lower rate (-1.7 percentage points).
12. **Education:** As expected, the in-work poverty rate is strongly associated with educational attainment of the household. The in-work poverty rate for households without any qualification is 10.7 percent – but it is only 4.9 percent for households with a bachelor's degree as the highest educational level.
13. **Disability and health difficulties:** Households with at least one disabled adult had a higher rate of in-work poverty (9.5 percent) compared to households without a disabled adult (6.6 percent). Health difficulties are also associated with higher rates of in-work poverty, particularly difficulties with learning (10.1 percent) and communicating/socialising (10.1 percent) compared to physical health difficulties (ranging from 7.9 to 8.5 percent).
14. **Household structure:** The lowest in-work poverty rate is observed for households composed of a couple without children (4.8 percent), followed by a couple with child(ren) (6.3 percent) and single adults (6.4 percent). Households which are comprised of two or more families or single-parent households have elevated rates of experiencing in-work poverty (at 9.6 percent and 12.3 percent, respectively).
15. **Additional earner:** Having a second worker in the household reduces the in-work poverty rate substantially. For example, for couples with children and only one adult working, the in-work poverty rate is 13.5 percent; this falls to 1.9 percent if there is more than one adult working.
16. **Occupation and industry:** The in-work poverty rate is negatively associated with occupational hierarchy (an indication of a role's level of educational requirements, social status, and income). The strength of this relationship is stronger if the occupation is associated with the main earner of the household. Furthermore, working in agriculture, forestry and fishing, and in the accommodation and food service industry is associated with elevated in-work poverty rates.
17. **Benefit receipt:** Benefit receipt plays a greater role for single parents with children, for two or more family households and for one-person households relative to couples with or without child(ren). In-work poor households are more likely to be in benefit receipt (at least once in a year) relative to their in-work non-poor counterparts (28.7 versus 10.3 percent).
18. **Home ownership:** The in-work poverty rate for homeowners is 5.2 percent, while this rises to 9.2 percent for renters. Moreover, where working poor households were renting, they spent (on average) every second dollar of their disposable income on rent, compared to every fourth dollar for in-work non-poor households.
19. **After housing costs:** For renters, the in-work poverty rate is 12.8 percent after accounting for housing costs (based on self-reported rent costs in the 2013 Census).
20. **Poverty duration:** Exploring within-year variation in poverty status, we find that as at March 2013, 20 percent experience at least one month of poverty in the twelve months preceding March 2013, and 1 percent experience poverty in all of the twelve months.

CONTENTS

LIST OF TABLES

LIST OF FIGURES

1. INTRODUCTION

"Is Work the Best Antidote to Poverty?" (OECD, 2009, p. 165). This question was the title of an OECD book chapter regarding in-work poverty across the OECD. The analysis that followed illustrated that while employment does reduce poverty risk, there was still a sizable likelihood of experiencing in-work poverty in many OECD economies. In particular, on average in the OECD area, 7 percent of individuals classified as living in working households were identified as poor (OECD, 2009), with it ranging from 2 percent in Norway to more than 10 percent in countries such as Japan (11 percent), United States (12 percent), Mexico (17 percent) and Turkey (17 percent). New Zealand was found to be close to the OECD average at 8 percent.[4]

In general, while awareness of 'in-work poverty' has been increasing in recent years in many Western economies, little is known about this phenomenon in New Zealand. Therefore, the aim of this study is to undertake the first explorative step regarding in-work poverty in New Zealand. It seeks to establish the prevalence of it, as well as characterise the affected populations.

In-work poverty is often associated with wider debates about the declining fortunes of the middle class, or the emergence of a 'gig' economy, or with the rising cost of housing (e.g., NZ Herald, 2018; Guardian, 2018). However, while such debates are prominent in both political life and public discussion more generally, we know less about the actual prevalence of in-work poverty in New Zealand and lack empirical evidence regarding which groups are at greatest risk of experiencing it. The key aim of this study is to fill this evidence gap.

Before outlining the empirical approach undertaken, it is worth first outlining a number of key findings from the international literature on this topic. The first is that the association between low pay and in-work poverty is weaker in practice than is often assumed in public debate. As Maître *et al.* (2018, p. 124) note "low pay for an individual worker may or may not be associated with poverty and disadvantage for the household in which they live". This, they note, is because total household income, and thus the determination of whether a household is in poverty or not, is based on *all* income sources, considering earnings from all members of the household, as well as non-employment income, such as social transfers.[5]

Previous overseas studies have also found a number of characteristics associated with an elevated rate of in-work poverty. These include being a migrant, working in service sector occupations (Crettaz, 2011), single-parent households, and individuals living in rented accommodation (Hick & Lanau, 2017). To the extent that data permits, we have sought to examine whether some of the trends observed in the international literature are also witnessed in New Zealand.

For our study, we make use of linked data both from administrative sources and surveys. The two main sources of information are the 2013 Census (which enables us to identify households and their respective characteristics) and Inland Revenue (which is used to identify the income of the

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[4] A working household was based on whether "at least one adult has a job, at some point during the year" (OECD, 2009, p. 171); the poverty threshold was set at 50 percent of median equivalised disposable income of the whole population; working-age ranged from 15 to 64. The definitions utilised in this report differs, as shown in Section 3. Therefore, comparisons between the OECD statistic for New Zealand and that obtained in this study cannot be reliably undertaken.

[5] According to Eurostat (2016), social transfers "cover the social help given by central, state or local institutional units. They include: old-age (retirement) and survivors' (widows' and widowers') pensions; unemployment benefits; family-related benefits; sickness and invalidity benefits; education-related benefits; housing allowances; social assistance; other benefits."

household). As these are population-wide data, we can provide descriptive statistics in much greater detail compared to survey data, which only captures a sub-sample of the population. We supplement this with analysis utilising the Household Labour Force Survey, which adds value in terms of the coverage of variables of interest as well as providing a longitudinal pattern for the prevalence of in-work poverty.

This report comprises the following sections: Section 2 describes the definitional issues that need to be considered when measuring in-work poverty and highlights benchmarks in the international literature; Section 3 details the approach undertaken in this report and indicates further details regarding relevant data sources; Section 4 presents the key empirical findings; while Section 5 concludes. As this study is the first comprehensive descriptive examination of in-work poverty in New Zealand, we hope that the findings in this report can contribute to a national conversation on this topic.

2. THE DEFINITION AND MEASUREMENT OF IN-WORK POVERTY

How we define and measure in-work poverty matters. Indeed, the measurement issues that arise in relation to in-work poverty are perhaps more significant than for many other social problems. This is for two reasons. The first is that measuring in-work poverty requires a two-part identification strategy, requiring us to define and measure 'work' and 'poverty' respectively. The second follows from the first: the measure that is constructed has proved to be the subject of much confusion in relation to what in-work poverty 'is' (i.e., the nature of the problem) and the possible policy solutions that may be adopted to tackle the problem.

In a survey of international approaches, Lohmann (2018) outlines key differences between the measurement strategy utilised by the Bureau of Labor Statistics (USA), Eurostat (the statistical arm of the European Union) and the International Labour Organization (ILO). Table 1 provides a summary of information contained in Lohmann (2018, p. 12, Table 2.1), highlighting the key differences.

When considering the definition of working, both Eurostat and the ILO focus on workers, while the Bureau of Labor Statistics focuses on those who are active (that is, either in work or looking for a job). In terms of the amount of work that must be performed in order to be classified as 'working', both the Bureau of Labor Statistics and Eurostat set the threshold at more than half of the year (to be precise, for the former it is at least 27 weeks, while for the latter it is seven or more months), while for the ILO the measure of work is broader, capturing anyone who is employed for at least one hour in the last week.

The definition of poverty also varies. For the Bureau of Labor Statistics, it is based on a measure of income *before* taxes are deducted and *before* tax credits are included. This, of course, is particularly problematic given that it ignores the impact of the Earned Income Tax Credit – a prime policy instrument for tackling in-work poverty in the USA. In Europe, the income measure used by Eurostat is on a net basis – that is, *after* taxes have been deducted and social transfers added. In contrast, the ILO prefers a measure of poverty that is based on expenditure rather than income.

One net effect of these different approaches to measurement is that one should not expect estimates which flow from one measure to be directly comparable to those preferred in another jurisdiction.

Table 1. Overview of key differences in how in-work poverty is measured internationally

	Bureau of Labor Statistics (USA)	Eurostat (EU)	ILO
Definition of Working			
Activity Status	Working or looking for work	Worker	Worker
Amount of work	>6 months per year	>6 months per year	At least 1 hour per week
Definition of Poverty			
Income Concept	Income before taxes and tax credits	Net income equivalised by 'modified' OECD scale	Per capita expenditure
Thresholds	Anchored (US Official Poverty Line)	Relative (60% median income)	Absolute ($1.25/day)

Source: Lohmann 2018.

Lohmann (2018) does point to one important commonality between the definitions presented in Table 1: he notes that "all define an in-work poor person as a working person who lives in a poor household" (2018, p. 7). This results in the two concepts of work and poverty having inconsistent units of analysis (that is, the *individual* versus the *household*).

To show the significance of this inconsistency, it is worth illustrating this measurement issue with a specific example. Imagine a family or household comprises one man, one woman and two dependent children. The woman is in employment and the man is not; the children, aged three and seven, are too young to work. The family is living in poverty. In the approaches presented in Table 1 (regardless of definition adopted), only the woman would be counted as experiencing in-work poverty, since only she is working. Her partner and their children are dropped from the enquiry since they do not work. When it comes to thinking about the policy responses to tackle in-work poverty, we are implicitly pushed towards thinking about how to address *her* poverty, rather than trying to assess and ensure income adequacy for the whole household. Proposals to tackle in-work poverty prevalence are therefore likely to focus on her level of pay (hence why the debates regarding in-work poverty and low pay are often conflated) or perhaps on encouraging her to undertake additional hours of paid work. The former is particularly problematic as the international literature demonstrates with great consistency that the relationship between low pay and in-work poverty is weaker than assumed (Marx *et al.*, 2012; Maître *et al.*, 2018; see also Bennett, 2014 for a discussion). The strength of the relationship depends crucially on whether there are other income sources in the household in addition to the earnings of the low paid member and how extensive the household's needs are.

There are other ways the hypothetical household described above may escape poverty besides options focussed solely on the female worker. For instance, her partner might return to work so that there would be two earners in the household. Or, if he were unable to do so because he is taking care of the younger child, the government could help via increasing access to childcare. In short, by focussing solely on the individual worker, we run the risk of ignoring the fact that policy solutions focussed on the non-working members might help the household escape poverty.

Examples of studies that do employ consistent units of analysis in relation to the work and poverty variables are few and far between. Of note are a few recent UK studies (Tinson *et al.*, 2016; McInnes *et al.*, 2013; Hick & Lanau, 2017) that focus on *all* working-age adults living in households (who meet the relevant definition of experiencing poverty and having someone who is in employment), not just the workers. Further, as will be shown in Section 3, our approach also utilises consistent units of

analysis, although not at the individual level; rather, we construct all definitions at the household level.

Finally, it is worth noting the importance of measurement differences in the past literature. Such differences have been argued by Halleröd *et al.* (2015, p. 473) to represent "definitional ambiguity" (similarly termed "definitional chaos" by Crettaz, 2011, p. 189), where the implied policy solutions may not be immediately apparent. Furthermore, as in-work poverty is likely associated with a broad array of factors, understanding the balance of these factors in any one case, such as in New Zealand, requires an in-depth empirical examination.

3. OUR APPROACH

In this study, we rely on consistent units of analysis (at the household level) for defining both 'work' and 'poverty'. The household unit is based on the dwelling unit identified in the 2013 Census and encompasses the following household types: couples without children; couples with child(ren); one parent with child(ren); two or more family households; one-person households; and other multi-person households.[6]

Next, we want to approximate the economic circumstances for each household and condense this information in a binary fashion to classify whether a household is poor or not. The prevailing identification strategy is to generate a poverty threshold based on the income distribution of the *whole* population. This includes households with self-employed individuals and households that include only individuals aged 66 and over (referred to hereafter as pensioner households). We define a household as being in poverty when their monthly net equivalised income (before housing costs) is below 60 percent of the median income poverty line as at March 2013.

To estimate the economic circumstances of a household, the common approach in the economic literature is to account for *all* income sources. For example, when studying British in-work poverty, Bourquin *et al*. (2019) use data from the Family Resources Survey. The survey provides information on income "from employment and self-employment, savings and investments, occupational and private pensions, (…), as well as any state benefits and tax credits (…), including the state pension for pensioners" (Bourquin *et al*., 2019, p. 6). As the aim of our study involves portraying in-work poverty prevalence at a particular point in time (i.e., March 2013) and consequently linking characteristics of individuals at that time point (via the 2013 Census), this requires restriction of our income data sources to those that are available monthly. We have identified suitable income sources in the Inland Revenue data (described in more detail in the following section), as well as the Working for Families (WfF) dataset with information on the WfF tax credit and Accommodation Supplement (AS). It is, however, worth noting that we lack monthly-level information on income from self-employment, private superannuation, and other investments, which can constitute an important income source, especially for households with self-employed individuals and pensioner households. These data are available at an annual level, and using annual income information to link with household characteristics as at March 2013 is deemed not suitable, given the assumptions required. A detailed discussion of the potential impact of not accounting for certain income sources on the approximated household income can be found in the Appendix.

The income variable on which the poverty classification is founded is therefore income (aggregated on the household level) from Inland Revenue, WfF tax credit and AS. We account for deductions and we divide the household-specific monthly net income by the OECD scale on family size to produce equivalised income. The OECD scale gives a weight to each household member which sum to produce the equivalised household income (the weight assigned the first adult is 1.0; each subsequent individual aged 14 or over is 0.5; and each child under age 14 is 0.3). In subsequent tables and figures, we denote households as 'poor' or conversely 'non-poor'.

It is also noteworthy that defining the poverty threshold based on the population-wide income distribution that includes pensioner households can have potential spillover impacts on the estimated in-work poverty prevalence among the population of interest (working-age households). For example,

[6] A group of related (e.g., siblings) or unrelated (e.g., flatmates) people living together who do not form a family.

Bourquin *et al*. (2019) show for the UK that the increase of the in-work poverty rate in the past 25 years is partly due to the "catch up of pensioner incomes (driven by higher state and private pensions)" which "has pushed up median income" (p. 1). The authors conclude that "this highlights one potential oddity of a relative measure of poverty, in which rising pensioner incomes can lead to higher relative poverty for working-age families, as some working-age families subsequently fall behind the rising poverty line" (Bourquin *et al.*, 2019, p. 14).[7] For our circumstances, inclusion of the pensioner households in the overall income distribution to derive the poverty threshold may have the opposite effect. This is because our monthly data for these households does not include income from private superannuation and investments, and we may likely be underestimating income for these housholds, which will pull down the median income threshold and result in a downward bias for in-work poverty prevalence. Therefore, in our sensitivity results in Section 4, we also provide the estimated prevalence of in-work poverty using a poverty threshold that excludes pensioner and self-employed households.[8]

Finally, to generate the population spine for this study, we focus on households where at least one adult in that household is part of the working-age population, i.e., aged 18 to 65 inclusive. We then define a household as 'working' if at least one working-age adult in that household is in employment for seven or more months of the year (April 2012 to March 2013 inclusive), which is identified by the months receiving positive wages and salaries. There is no assumption that the months in employment are consecutive or that they are employed in the final month of the year in question (i.e., March 2013).[9] In subsequent tables and figures, we denote these households as 'working' or 'in-work', and if the converse is true, then the household is denoted as 'non-work'.

Using the above definitions of working and poverty status for the household:

In-work poverty = proportion of *working* households that fall below the poverty threshold

Data

To study in-work poverty in New Zealand, we use several data sources within the Stats NZ framework of the Integrated Data Infrastructure (IDI). The IDI is a large research database containing microdata about individuals and households in New Zealand. It includes Stats NZ surveys as well as information from government and non-government agencies.

The first major dataset is the 2013 Census, which collects information on numerous individual and household characteristics, including the relationship structure of household members. This enables us to identify different types of household structures, such as couples with children or one-person households. The 2013 Census also has a rich set of characteristics, including information on

[7] The former UK Prime Minister David Cameron has pointed at this aspect in a speech by stating that "[B]ecause of the way it is measured, we are in the absurd situation where if we increase the state pension, child poverty actually goes up". See: https://www.gov.uk/government/speeches/pm-speech-on-opportunity

[8] See Bourquin *et al.* (2019), who follow a similar approach by excluding pensioner households.

[9] There is also no minimum threshold regarding the level of wages and salaries required to be considered 'working' in a particular month.

education, ethnicity, occupation, and home ownership. Moreover, the Census is population-wide, which promotes both aggregate and disaggregate analysis.

Table 2 below illustrates the process undertaken in creating our population spine from the 2013 Census. We begin with the full sample of just over 4.3 million individuals in the 2013 Census, before dropping 325,338 individuals without a household identification number (ID). We are then left with a sample of just over 4 million individuals, equating to 1.5 million households. One explanation for an individual lacking a household ID is that the individual was not at home during Census night. This means that for some households, we underestimate household size. The impact of dropping these individuals on the net equivalised household income is not straightforward: the lacking individual might have contributed to the overall household income but may also have elevated the poverty risk by enlarging the respective OECD scale.[10]

The next exclusion is to drop households with no income information (neither from Inland Revenue, WfF tax credit or AS) for the entire year.[11] This trims our dataset to 1.4 million households (3.7 million individuals), as shown in row 3 of Table 2. This is the population that is used to calculate the poverty threshold. This involves linking all individuals (and the associated 1.4 million households) in the population spine with their income information. Using the unique individual identifier that is available in all used datasets, we match individuals with their records from Inland Revenue, WfF tax credits and AS. The Inland Revenue records contain income information at the monthly level from April 1999 across seven different sources: wages and salaries, benefits, pensions, paid parental leave, withholding payments, ACC claims and student loans (as well as the relevant tax deductions for each income source). WfF data also contain information at the monthly level, though this might result in missing households that receive the WfF tax credit at an annual level. Using these income data sources, we are able to identify an individual's income (as well as the income of their associated household unit). Based on the household structure, the equivalised household income distribution is then used to calculate the poverty threshold.

[10] In results not shown here (for brevity sake), we compared individuals dropped due to lack of household ID to those in the reduced sample. In general, we find these individuals are older, have lower levels of income, and are more likely to be New Zealand European. Given these differences, this sub-sample is not a random component of the population, and therefore the loss of these individuals from the sample can potentially bias resulting estimates.

[11] We assume that the three main reasons for the lack of income information are (listed in no specific order): *i*) household members received income from sources that are not covered by the data being used (e.g., self-employment income, overseas income and investment income are filed in IR3 and not captured in the EMS), *ii*) linking issues between household members in the 2013 Census and their income records, and *iii*) members have not received any income. Excluding these households from the sample might bias the income distribution which is used to derive the poverty threshold. However, the direction of the bias is unclear as the listed cases include potentially low- and high-income households.

Table 2. Preparation of the population spine from the 2013 Census

	Individuals	Households
1. Full Census dataset	4,354,686	-
2. Dropping those without household ID	4,029,348	1,549,890
3. Dropping households without any income records for the sample period *→ calculation of the poverty threshold*	3,661,971	1,381,833
4. Dropping households that contain a self-employed member	2,925,468	1,142,634
5. Dropping households where no member is 18 or above	2,924,832	1,142,181
6. Dropping pensioner households	2,609,091	920,823
7. Dropping households where one member was outside of NZ for more than 90 days in the sample period → *population of interest*	2,438,994	874,797

Source: IDI 2019. *Notes:* Sample period: April 2012 – March 2013. Self-employment status is derived from self-reported information in the 2013 Census. Income records refer to income information in the EMS.

We then employ a number of further exclusions to create our population of interest, from which we can separate households into 'work' and 'non-work'. These exclusions are rows 4 to 7 in Table 2, and include dropping: households that have a self-employed member; households containing only individuals aged below 18; pensioner households; and households where a member of the household was out of the country for more than 90 days in our twelve-month period of interest. Our final sample of households is 874,797. We match this sample to Inland Revenue records to identify the employment status of individuals within the household, categorising them as 'in-work' if an individual of working age in the household earned positive wages and salaries for at least seven months (i.e., non-zero earnings for each month) in the year ending March 2013.

We are also interested in investigating how the prevalence of in-work poverty has changed over time. Unfortunately, we cannot follow household units over time in the IDI (via the 2013 Census), and we therefore rely on the Household Labour force Survey (HLFS) for this supplemental analysis. Identification of working households is based on information provided by the HLFS, and income information is derived from matching these individuals and their respective households to their corresponding records available from Inland Revenue. The HLFS is a survey that interviews about 15,000 households (approximately 30,000 individuals) on a quarterly basis and is available in the IDI from 2007 onwards. We also utilise the HLFS to derive some additional labour market related statistics that are not available at the population-level, such as whether the individual working is a union member or on a permanent employment contract. One limitation of the HLFS is that due to its small sample size, descriptives cannot be provided at the same level of disaggregation that is done when using 2013 Census data. Another drawback is that the dataset holding the monthly information on WfF and AS ends in March 2013. Wherever we state in-work poverty numbers that exclude WfF and AS, it is clearly indicated in the report.

Table 3. Summary of the approach to measuring in-work poverty

Item	Detail
Data sources	2013 Census, Inland Revenue Employer Monthly Schedule (IR EMS), Working for Families research data, Person overseas spell, Household Labour Force Survey
Unit of analysis	Households (except where noted)
Working status	Receiving any positive salaries or wages for at least seven months (not necessarily consecutive) between April 2012 and March 2013 (inclusive) for at least one adult household member
Income	Net income including Working for Families (WfF) tax credit and Accommodation Supplement (AS), equivalised by the modified OECD scale
Income sources included	Salaries and wages, government benefits, WfF tax credit, AS, New Zealand Superannuation, withholding payments, student allowance, paid parental leave, and ACC claims
Income sources *not* included	Self-employment earnings not captured by IR EMS, private investment income, private superannuation, rental income, WfF tax credit that is paid on the annual level, income from trusts or non-zero partnerships, any other income not included in the IR EMS
Poverty threshold	Relative: 60 percent of the median equivalised net income (before housing costs but including WfF tax credit and AS) of the whole population, including self-employed and pensioner households
Population of interest (for the measurement and characterisation of in-work poverty)	Working-age (18-65 years) households excluding self-employed and pensioner-only households

Source: Authors' compilation.

4. RESULTS

It is important to note that all descriptives presented below – unless otherwise mentioned – are based on the household unit. For example, when talking about in-work poverty and disability, the descriptives refer to the share of working households that are poor, where at least one member states being disabled.

4.1 In-work poverty prevalence

Table 4 presents data on the working and poverty status of our final sample.

The following aspects are especially noteworthy:

- Based on our definition of working (i.e., one adult member aged 18-65 in the household receiving positive income from wages and salaries for at least seven months in the year), we identify more than four out of five households (82.9 percent) as working households.[12]
- Less than one-fifth of all households fall below the poverty threshold (17.1 percent).[13]
- Amongst working households, the proportion of households in poverty is 7 percent as at March 2013.
- For non-working households, the rate of poverty is close to 66 percent.[14]

Table 4. Working and poverty status, by household unit

	Non-work	In-work	Total
Non-poor			
	34.1%	93.0%	82.9%
	(51,024)	(674,370)	(725,394)
Poor			
	65.9%	**7.0%**	17.1%
	(98,460)	**(50,943)**	(149,403)
Total			
	17.1%	82.9%	100%
	(149,484)	(725,313)	(874,797)

Source: IDI 2019. *Notes:* Absolute numbers of households in brackets. Working and poverty definitions described in Section 3.

[12] For these working households, the median monthly net household income is $5,253.
[13] See the Appendix for an extended discussion on the overall poverty rate.
[14] Note that a non-working household does not necessarily mean that no adult member receives income from wages and salaries: some non-working households still receive income from wages and salaries for some months per year, but they do not meet the threshold of at least seven months of the year for at least one adult member.

Sensitivity Analysis

HLFS compared with Census

It is worth recalling at this point that the figures in Table 4 are based on a poverty threshold set at 60 percent and using the 2013 Census. We move next to HLFS households for the year 2013, where unfortunately, we do not have any information on WfF and AS and therefore can only link households with their respective EMS data. Using the HLFS data, we find an in-work poverty prevalence (excluding WfF and AS) of 9.4 percent. The respective figure when using the 2013 Census for calculating in-work poverty prevalence and excluding WfF and AS is 9.2 percent.

Alternative poverty thresholds

We replicated all figures in Table 4 using the 50 percent threshold – a common alternative poverty threshold – and the respective numbers can be found in Appendix Table A 2. At this lower threshold, the proportion of working households that are classified as poor decreases to 4.7 percent (and the overall poverty rate drops to 12.4 percent).

To identify how the in-work poverty prevalence reacts to changes in the definition of the poverty threshold, we calculated the in-work poverty rate for each percentage point in the range between 30 percent and 90 percent of the median net equivalised household income. The visualisation of these results is shown in Figure 1 (both with and without the inclusion of WfF and AS). The interrelation is not linear, indicating that the in-work poverty rate increases at a slower pace for lower poverty thresholds and faster at a higher poverty threshold. For example, if the poverty threshold moves from 40 to 41 percent, in-work poverty increases by 0.12 percentage points. However, when moving from 80 to 81 percent, in-work poverty increases by 0.48 percentage points.

Figure 1. Interrelation of poverty threshold and in-work poverty rate

Source: IDI 2019. *Notes:* 'WfF' is Working for Families tax credit; 'AS' is Accommodation Supplement.

Alternative population for derivation of poverty threshold

As noted in Section 3, using the full population's income distribution (and thus including groups such as pensioner households) for deriving the poverty threshold may have spillover effects on the estimated prevalence of in-work poverty. We therefore replicate the figures in Table 3 for deriving the poverty threshold based on the income distribution of our population of interest (i.e., working-age households excluding pensioner and self-employed households). For ease of comparison, this alternative poverty threshold is equivalent to 75 percent of the median of the full population. The resulting in-work poverty rate is 12.4 percent (and 14.8 percent when excluding WfF and AS). [15]

Role of Working for Families and Accommodation Supplement

We calculated the in-work poverty rate excluding income from WfF tax credits and AS. For our headline estimate based on a poverty threshold of 60 percent of the median equivalised income, in-work poverty prevalence increases from 7.0 percent to 9.2 percent. This illustrates the marked effect of such welfare policies. The impact is also visually represented by the difference between the two lines portrayed in Figure 1.

Analysis by gender, children, region and time

In-work poverty rate by gender

We next break down the figures in Table 4 to determine the in-work poverty prevalence for adults in general, and separately for each gender. We find that 1,507,986 adults live in the above 725,313 working households. Out of this sample, 107,844 adults live in in-work poor households, which equates to an in-work poverty rate at the adult level of 7.2 percent. Decomposition according to gender reveals heterogeneity in the prevalence: 7.7 percent (59,967 adults) of females are associated with an in-work poor household, while for men this number is 6.6 percent (47,874 adults). [16]

Additional analyses of in-work poverty rates by the gender of the household's main earner can be found in Section 4.6 (Table 9).

In-work poverty rate for children

In terms of deriving the likelihood of children belonging to an in-work poor household, we further disaggregate the numbers in Table 4. Our sample of 725,313 working households translates into 567,069 children aged below 18. Out of these, 10 percent (56,823 children) live in an in-work poor household.

In-work poverty rate over time

To derive changes in the prevalence of in-work poverty over time [17], we use HLFS data over the period 2007 to 2017 to ascertain household units and link with income information from the Inland Revenue and WfF and AS (until 2012) for associated members within each household.

As evident in Figure 2, when using HLFS data, we see an initial in-work poverty rate (including WfF and AS) of 8.2 percent in 2007, after which it rises to its peak (over our sample timeframe) of 9.4 percent in 2009, which coincides with the period post-global financial crisis. Afterward, there was a small

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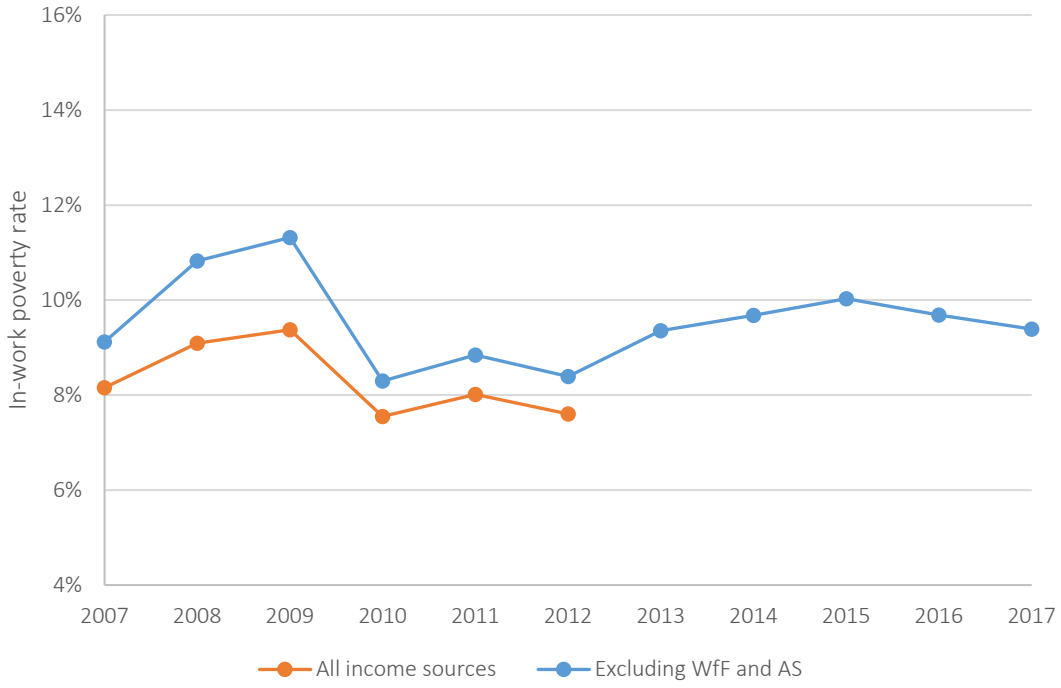
[15] Analysis by Bourquin *et al.* (2019) with the UK income distribution also includes in-work poverty rates when excluding pensioners from calculating the poverty threshold. The authors find a much smaller lift in the in-work poverty rate (the magnitude varies between +1 to +3 percentage points over the period 1994 and 2017).

[16] Note that the 2013 Census did not provide other gender response options apart from male and female.

[17] Note that we use a year-specific poverty threshold for each survey time point over the period 2007 to 2017.

decline in in-work poverty prevalence between 2009 and 2012 (falling to 7.6 percent). The in-work poverty rate when excluding WfF and AS is – unsurprisingly – elevated. Moreover, for the period 2007 to 2012, we can see that the greatest cushioning effect of WfF and AS was in 2009. For the period 2012 to 2017, we find a stabilisation in the in-work poverty prevalence (excluding WfF and AS) to around the level observed in 2007.

Figure 2. In-work poverty rate over time



Source: IDI 2019. *Notes:* 'WfF' is Working for Families tax credit; 'AS' is Accommodation Supplement. September quarter utilised for each yearly calculation of household in-work poverty rate. The thresholds for in-work and household poverty are as defined in Section 3. Total sample = 89,187 working households.

In-work poverty rate across regions

We now turn to the spatial variation of in-work poverty. In order to demonstrate how this varies between regions, we have calculated the distance (in percentage points) between regional in-work poverty rates and the national rate, as shown in Figure 3. Moreover, for further disaggregated findings, we have calculated the respective numbers for territorial authorities (TA) to illustrate the extent of variation within regions. In the Appendix, Figure A 1 depicts the TAs that have in-work poverty rates beyond approximately 2 percentage points of the national mean (7.0 percent), i.e., those with rates above 9 percent or less than 5 percent.

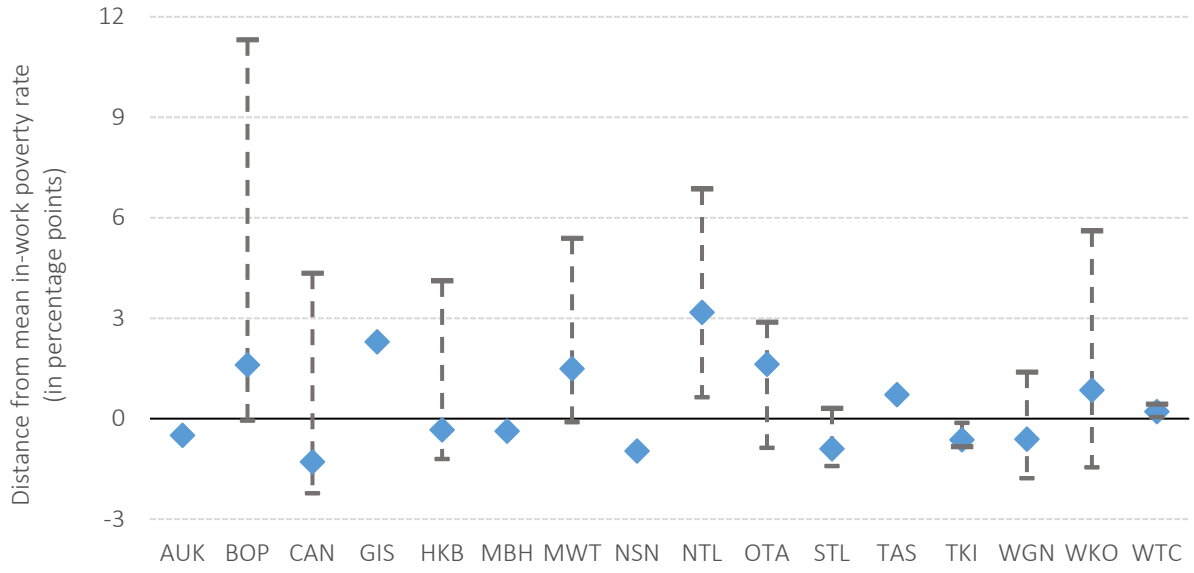
In Figure 3, the diamonds display the regional difference with respect to in-work poverty rates when compared to the national average, whereas the bars refer to the minimum and the maximum rate for each region that has multiple TAs. There are five unitary authorities without any further TA; namely, Auckland, Gisborne, Marlborough, Nelson and Tasman.[18] Therefore, there is no sub-regional

[18] The sixth territorial authority is the Chatham Islands Council and is not included in the regional decomposition.

information for these TAs, and future empirical examination could delve into more disaggregated details for these areas.

At the regional level, we find that Canterbury (-1.3 percentage points) and Nelson (-1 percentage points) exhibit the lowest values for in-work poverty prevalence. At the other end of the spectrum, we find Northland (+3.2 percentage points) and Gisborne (+2.3 percentage points) have particularly high above-average in-work poverty rates. For regions comprising more than one TA, sub-regional variation is evident and substantial in particular regions. This is highlighted with the example of Wellington. This region has an in-work poverty rate below the national average, at 6.4 percent, and ranges from 5.2 percent in Upper Hut to 8.0 percent in the Masterton District. Bay of Plenty also exhibits considerable sub-regional divergence in in-work poverty rates, between 6.9 percent in Tauranga City and 18.3 percent in the Opotiki District.

Figure 3. Region and in-work poverty rate



Source: IDI 2019. *Notes:* AUK = Auckland; BOP = Bay of Plenty; CAN = Canterbury; GIS = Gisborne; HKB = Hawkes Bay; MBH = Marlborough; MWT = Manawatu; NSN = Nelson; NTL = Northland; OTA = Otago; STL = Southland; TAS = Tasman; TKI = Taranaki; WGN = Wellington; WKO = Waikato; and WTC = West Coast. In-work poverty rate as defined in Section 3.

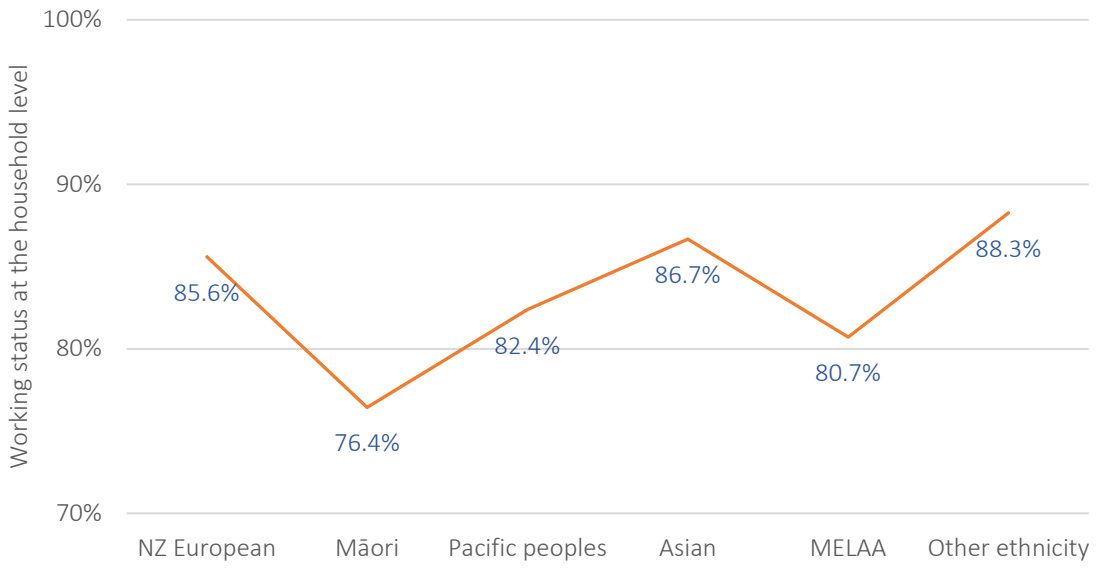
4.2 Ethnicity

We next disaggregate our findings by ethnicity. To do so, we define the ethnicity of a household by looking at the prioritised ethnicity for each adult member in the household, based on 2013 Census data.[19] Households with multiple prioritised ethnicities (e.g., those with two adults of different prioritised ethnicities) are included in multiple categories.

[19] Ethnicity is prioritised based on the ordering of Māori, Pacific peoples, Asian, MELAA (Middle Eastern, Latin American and African), Other, and New Zealand European.

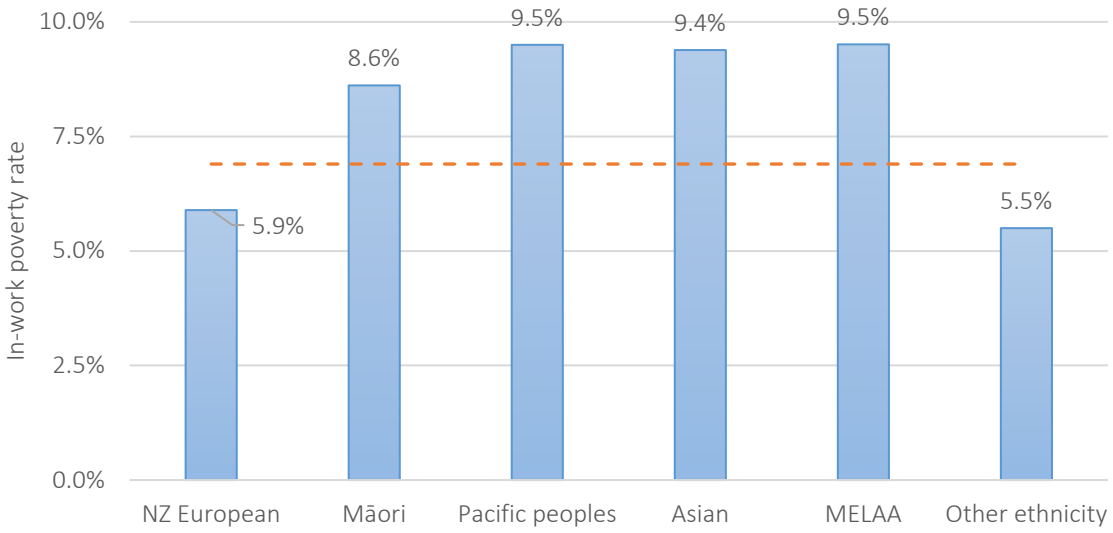
In the figures that follow, we present findings for the following ethnic groups: New Zealand European, Māori, Pacific peoples, Asian, MELAA (Middle Eastern, Latin American and African), and Other ethnicity. First, we illustrate households' working status by ethnicity (Figure 4) and find Māori households have the lowest prevalence of being in-work at 76.4 percent. New Zealand European (85.6 percent), Pacific peoples (82.4 percent) and MELAA (80.7 percent) households have substantially higher and broadly comparable in-work status, while households of Other ethnicity are the most likely to be in-work, at 88.3 percent.

Figure 4. Ethnicity and working status



Source: IDI 2019. *Notes*: Working status as defined in Section 3.

Figure 5. Ethnicity and in-work poverty rate



Source: IDI 2019. *Notes*: In-work poverty rate as defined in Section 3. The dashed line refers to the overall in-work poverty rate (6.9 percent based on 845,244 working household units defined by ethnicity).

When focussing on working households, we can see from Table 4 that there is a total of 725,313 such households in our sample; whereas after summing the different working household units by ethnicity, the total increases to 845,244 households. This indicates that just over 17 percent of working households had more than one prioritised ethnicity for adults in that unit. Here, it is useful to note that the in-work poverty rate based on working household units defined by ethnicity is 6.9 percent and thus very similar to our earlier finding based on the population sample of 725,313 working households.

As shown in Figure 5, we find that Māori (8.6 percent), Pacific peoples (9.5 percent), Asian (9.4 percent), and MELAA (9.5 percent) households have an elevated in-work poverty rate compared with NZ European (5.9 percent) and Other ethnicities (5.5 percent).

One of the several potential explanations for ethnic differences in in-work poverty rates could be differences in household size.[20] As shown in Table 5, New Zealand European households not only have the smallest mean number of individuals in working households relative to the other ethnicities, but this difference also becomes particularly stark for in-work poor households. For example, the average size of in-work poor households of New Zealand European ethnicity is 2.84 individuals, and this number rises to 3.54 for Asian households, 3.68 for MELAA, 3.85 for Māori and 5.14 for Pacific people's households. These differences have important implications as the larger the household, the further the employment earnings are required to stretch to meet the needs of household members.

Table 5. Mean number of individuals in working households

	Non-poor	Poor	Total
NZ European			
	2.70	2.84	2.70
	(1.31)	(1.51)	(1.33)
Māori			
	3.25	3.85	3.30
	(1.63)	(2.02)	(1.68)
Pacific peoples			
	4.15	5.14	4.25
	(2.08)	(2.43)	(2.14)
Asian			
	3.21	3.54	3.24
	(1.42)	(1.60)	(1.44)
MELAA			
	3.07	3.68	3.12
	(1.39)	(1.75)	(1.44)
Other ethnicity			
	2.80	3.04	2.82
	(1.30)	(1.54)	(1.32)

Source: IDI 2019. *Notes:* Std dev in brackets. Working and poverty status as defined in Section 3.

[20] Other potential explanations include ethnic differences in education, occupation, and discrimination in the labour market.

4.3 Birthplace

The existing literature shows that migrants face an elevated in-work poverty rate (Crettaz, 2018; Alvarez-Miranda, 2011). As our data comes from the 2013 Census rather than a survey, the latter of which is what most international analyses are based on, we can disaggregate the birthplace variable to a much greater degree than the binary migrant indicator often utilised in prior literature.

To define the birthplace of a household unit, we classify a household based on the birthplace of each adult in the household. If, for example, there are two adults in the household unit, both born in the same country, they will be counted as one household unit associated with that particular birthplace. If the two adults in the household are born in different countries, then they are counted as a household unit with each of those respective birthplaces. Therefore, the number of working household units by birthplace (865,161) is larger than the initial sample (725,313). The in-work poverty rate of this larger sample, where household units are defined by birthplace, is 6.9 percent.

The in-work poverty rates for different birthplaces, relative to the sample average, are illustrated in Table 5. First, we note that households with at least one adult born in New Zealand face the average in-work poverty rate. With respect to migrants, there is substantial heterogeneity regarding in-work poverty experience based on birthplace location. For example, migrants from Polynesia (+2.3 percentage points) or North-East Asia (+7.4 percentage points) experience a substantially higher in-work poverty rate. In contrast, migrants from the United Kingdom (-1.7 percentage points), Maritime South-East Asia (-1.1 percentage points) or Southern and East Africa (-2.1 percentage points) have a below-average in-work poverty rate.

It is necessary to view the in-work poverty results in Table 6 in conjunction with the share of total household units to gauge the size of the affected population. For instance, Table 6 illustrates that two out of three households have at least one adult member who is born in New Zealand; about 9 percent of households have an adult born in the United Kingdom; and 5 percent are associated with a Polynesian birthplace. Furthermore, for households where one adult was born in Central Asia or Micronesia, their respective in-work poverty rates are 16.1 and 11.2 percentage points higher than the sample average; however, each of these birthplace sub-groups only accounts for 0.1 percent of the total sample. This means that caution should be taken when interpreting the results relating to groups with a very small representation in New Zealand, as the sub-sample size may be too small to provide statistically valid estimates.

Table 6. Birthplace and in-work poverty rate

	In-work poverty rate (percentage points relative to sample average)	Share of sample
New Zealand	-0.2 pp	67.7%
Australia (incl. External Territories)	-0.3 pp	2.4%
Melanesia	+2.1 pp	0.1%
Micronesia	+11.2 pp	0.1%
Polynesia (excludes Hawaii)	+2.3 pp	4.9%
United Kingdom	-1.7 pp	9.1%
Ireland	-3.6 pp	0.4%
Western Europe	-0.2 pp	1.4%
Northern Europe	-1.8 pp	0.1%
Southern Europe	-0.7 pp	0.1%
South Eastern Europe	-1.5 pp	0.3%
Eastern Europe	-0.7 pp	0.4%
North Africa	+4.4 pp	0.1%
Middle East	+5.0 pp	0.4%
Mainland South-East Asia	+6.7 pp	0.6%
Maritime South-East Asia	-1.1 pp	2.2%
North-East Asia	+7.4 pp	2.8%
Southern Asia	+0.9 pp	2.3%
Central Asia	+16.1 pp	0.1%
Northern America	-0.1 pp	1.2%
South America	-0.6 pp	0.4%
Central America	-1.4 pp	<0.1%
Caribbean	-1.7 pp	<0.1%
Central and West Africa	+2.0 pp	0.1%
Southern and East Africa	-2.1 pp	2.6%

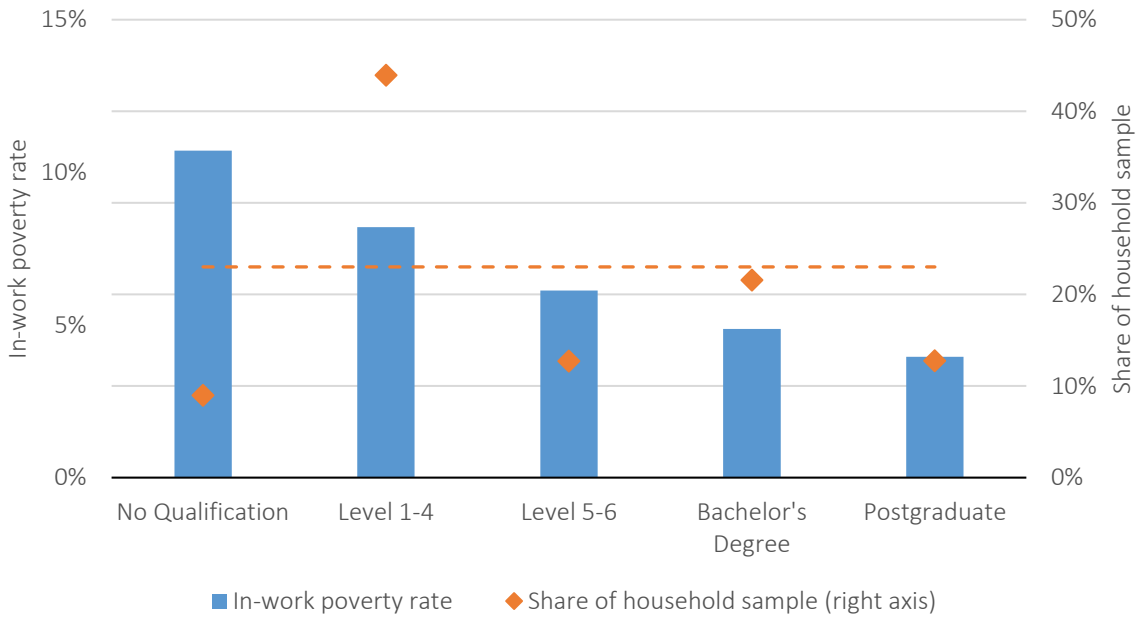
Source: IDI 2019. In-work poverty rate as defined in Section 3 and presented relative to the sample average (6.9 percent for a sample of 865,161 working household units defined by birthplace). See Stats NZ (2018a) for the full list of countries under each category. pp = percentage point.

4.4 Educational attainment

We next turn to educational attainment of the household, which is captured by the highest level of attainment of any household member. The association between this variable and in-work poverty is illustrated in Figure 6 and is remarkably strong and linear.

The in-work poverty rate for households with any postgraduate degree is about 4 percent. Households where the most educated member has a bachelor's degree face an average in-work poverty rate of 4.9 percent. This pattern of increasing likelihood of experiencing in-work poverty as educational attainment declines holds throughout the educational spectrum. The highest rate is associated with households that have no school qualified individuals, at 10.7 percent.

Figure 6. Educational attainment and in-work poverty rate



Source: IDI 2019. *Notes*: In-work poverty rate as defined in Section 3. Dashed line refers to national in-work poverty rate (7.0 percent across 725,313 working households).

4.5 Disability status and health difficulties

Turning to disability-related characteristics (Table 7), we find that the in-work poverty rate for those households with at least one adult with a disability[21] is more than 40 percent higher than those who do not report a disability (9.5 percent versus 6.6 percent). This is consistent with international research which has observed a strong association between disability and poverty in general (e.g., Tinson *et al.*, 2016).

We also focus on several health difficulties in Table 7 and present the differential rate of experiencing in-work poverty by type of health difficulty. All of the health difficulties asked about in the 2013 Census are associated with an in-work poverty prevalence that is higher than the national average. One interesting result is that the health difficulties associated with the highest in-work poverty rate encompass the experience of cognitive difficulties (learning, concentrating or remembering) and social interaction (communicating, mixing with others). The in-work poverty rate for these households is about two percentage points higher compared to households experiencing more physical-related health difficulties.

[21] This is based on respondents saying yes to having a "long-term disability (lasting 6 months or more) that stops you from doing everyday things other people can do" as asked in the 2013 Census (Stats NZ, 2018b).

Table 7. Disability status and in-work poverty rate

	In-work poverty rate	Total
Disability		
No Disability	6.6%	86.9%
Disability	9.5%	13.1%
Difficulties		
Seeing, Even When Wearing Glasses or Contact Lenses	8.4%	6.1%
Hearing, Even When Using a Hearing Aid	7.9%	3.1%
Walking, Lifting or Bending	8.3%	11.7%
Using Your Hands to Hold, Grasp or Use Objects	8.5%	4.6%
Learning, Concentrating or Remembering	10.1%	4.8%
Communicating, Mixing with Others, or Socialising	10.1%	3.8%

Source: IDI 2019. *Notes:* In-work poverty rate as defined in Section 3.

4.6 Household structure

Table 8 presents the in-work poverty rate differentiated by household structure.[22] The lowest rate is observed for households composed of a couple without children (4.8 percent), followed by a couple with child(ren) (6.3 percent) and single adults (6.4 percent). Households which are comprised of two or more families or single-parent households have elevated rates of experiencing in-work poverty (at 9.6 percent and 12.3 percent, respectively). It is necessary to point out that while the in-work poverty rate is high for two or more family households, this type of household structure only accounts for 6.6 percent of all working households. In contrast, single-parent households make up one-tenth of all working households. A high in-work poverty rate for single parents (relative to other forms of household structure) is consistent with the experience in other countries (e.g., Nieuwenhuis & Maldonaldo, 2018).

Intuitively, it is expected that the number of workers in a household will have some impact on the likelihood of experiencing in-work poverty for the household. Therefore, we further break down the in-work poverty prevalence for couples (with and without children) and two or more family households. The effect is substantial: while the in-work poverty rate for couples with children and only one adult working is 13.5 percent, this number drops to 1.9 percent when there is more than one adult working. Here, it is necessary to remember that working status is still defined as in Section 3, where the threshold is based on whether the adult is earning positive wages or salaries for at least seven months of the year. A similar result is evident when viewing the same sub-group analysis for couples without children (11.6 percent versus 1.2 percent, respectively). Finding a substantive impact on the likelihood of experiencing in-work poverty if a household has more than one adult working is also consistent with the international literature on the topic (Gutiérrez *et al.*, 2011).

One explanation for having only one worker in a household with children might be the presence of small children. This finds some support in the data: for single-parent households and two or more family households with children, we find that the in-work poverty rate is elevated when there is a child under the age of five compared with these household types that do not have a child under age

[22] For completion, we also included households with related and unrelated people ('Other multi-person household') but do not discuss their findings further.

five (by around 1 to 3 percentage points in the case of two or more family households with children, and substantially more for single-parent households).

Table 8. Household structure and in-work poverty rate

	In-work poverty rate	Share of households	Share of group
Couple without children	**4.8%**	**25.7%**	**100%**
One working	11.6%		34.0%
>1 working	1.2%		66.0%
Couple with child(ren)	**6.3%**	**36.8%**	**100%**
One working	13.5%		37.8%
(One working + child below 5)	(9.9%)		(19.4%)
>1 working	1.9%		62.2%
(>1 working + child below 5)	(1.8%)		(17.2%)
One parent with child(ren)	**12.3%**	**9.6%**	**100%**
(child below 5)	(21.2%)		(10.2%)
Two or more family household	**9.6%**	**6.6%**	**100%**
One working	19.9%		38.4%
(One working + child below 5)	(22.1%)		(15.9%)
>1 working	3.1%		61.6%
(>1 working + child below 5)	(3.8%)		(22.8%)
One-person household	**6.4%**	**15.3%**	
Other multi-person household	**11.6%**	**6.0%**	**100%**
One working	19.2%		41.0%
>1 working	6.3%		59.0%
Total	**7.0%**		

Source: IDI 2019. *Notes:* Working status and in-work poverty rate as defined in Section 3 (average in-work poverty rate of 7.0 percent for the sample of 725,313 working households).

As illustrated in Figure 1, we find that in-work poverty prevalence increases when increasing the poverty threshold and that the relationship is non-linear. To further decompose this relationship, we calculate the in-work poverty rate for different levels of poverty thresholds (again ranging from 30 to 90 percent of the median equivalised income) for each household type and also differentiate the prevalence by accounting for all income sources and excluding WfF and AS (see Figure 7). We can see that each household type reacts differently to a change in the poverty threshold. For example, the in-work poverty rate of couples without children and one-person households increases at a much slower pace compared to single-parent and two or more family households. Of particular note is the key differences in the re-distributional effect of WfF and AS across household types. In particular, WfF and AS make a sizable impact on the prevalence of in-work poverty for single-parent households: at the poverty threshold of 60 percent of median equivalised income, the in-work poverty rate is 12.3 and 21.6 percent (with and without WfF and AS, respectively). The comparable figures for couples with child(ren) illustrate a smaller impact: with figures of 6.3 and 9.2 percent (with and without WfF and AS, respectively).

Figure 7. Interrelation of poverty threshold and in-work poverty rate, by household structure

Source: IDI 2019. *Notes:* 'WfF' is Working for Families tax credit; 'AS' is Accommodation Supplement. Working status and in-work poverty rate as defined in Section 3 (average in-work poverty rate of 7.0 percent for the sample of 725,313 working households).

We also differentiate the household structure according to the gender of the main earner. Main earner is identified as the adult with the highest income from wages and salaries in March 2013. Since the definition of an in-work household only requires that at least one adult household member was working a minimum of seven months in the time period April 2012 to March 2013, there are some working households where no adult received income from wages and salaries in the month of March 2013. This shrinks the sample to 715,713 working households and produces an in-work poverty rate of 6.2 percent.[23] Table 9 shows gender-related in-work poverty rates for different household types. Independent of the household structure, it can be seen that working households with a female main earner face an elevated in-work poverty rate compared to working households with a male main earner. The difference becomes most apparent for couple with child(ren) households, where this household type experiences an in-work poverty rate of 12.3 percent if a female is the main earner, compared to 3 percent if a male is the main earner. However, it is also worth noting from Table 9 that only one fourth (24.2 percent) of couple households with child(ren) has a female main earner.

Table 9. Gender of main earner and in-work poverty rate

	Main earner: *male* In-work poverty rate	Main earner: *female* In-work poverty rate	Share of households with female main earner
Couple without children	2.0%	6.6%	37.1%
Couple with child(ren)	3.0%	12.3%	24.2%
One parent with child(ren)	7.8%	13.3%	73.3%
Two or more family household	5.9%	11.2%	46.8%
One-person household	5.7%	7.1%	52.6%
Other multi-person household	8.6%	13.7%	44.3%
Total	**3.7%**	**10.0%**	**39.4%**

Source: IDI 2019. *Notes:* Working status and in-work poverty rate as defined in Section 3 (average in-work poverty rate of 7.0 percent for the sample of 725,313 working households).

4.7 Job characteristics

Occupation

Next, we examine the in-work poverty rate based on occupation. Identification is based on whether at least one adult member of the working household states their respective occupation type. The sample size of working households defined by occupation is 1,141,926 and the corresponding average in-work poverty rate is 4.3 percent.[24] The triangular markers in Figure 8 shows the occupation-related relative distance in percentage points to this mean household in-work poverty rate.

Households with professionals (-1.8 percentage points) and managers (-1.5 percentage points) face a below-average in-work poverty rate. The occupational groups with the highest likelihood of belonging

[23] We excluded households where both adults were earning the exact same amount.

[24] Note that households are counted according to their number of working adults and therefore over represents households with more than one adult worker compared to households with only one working adult. Consequently, this lowers the in-work poverty rate.

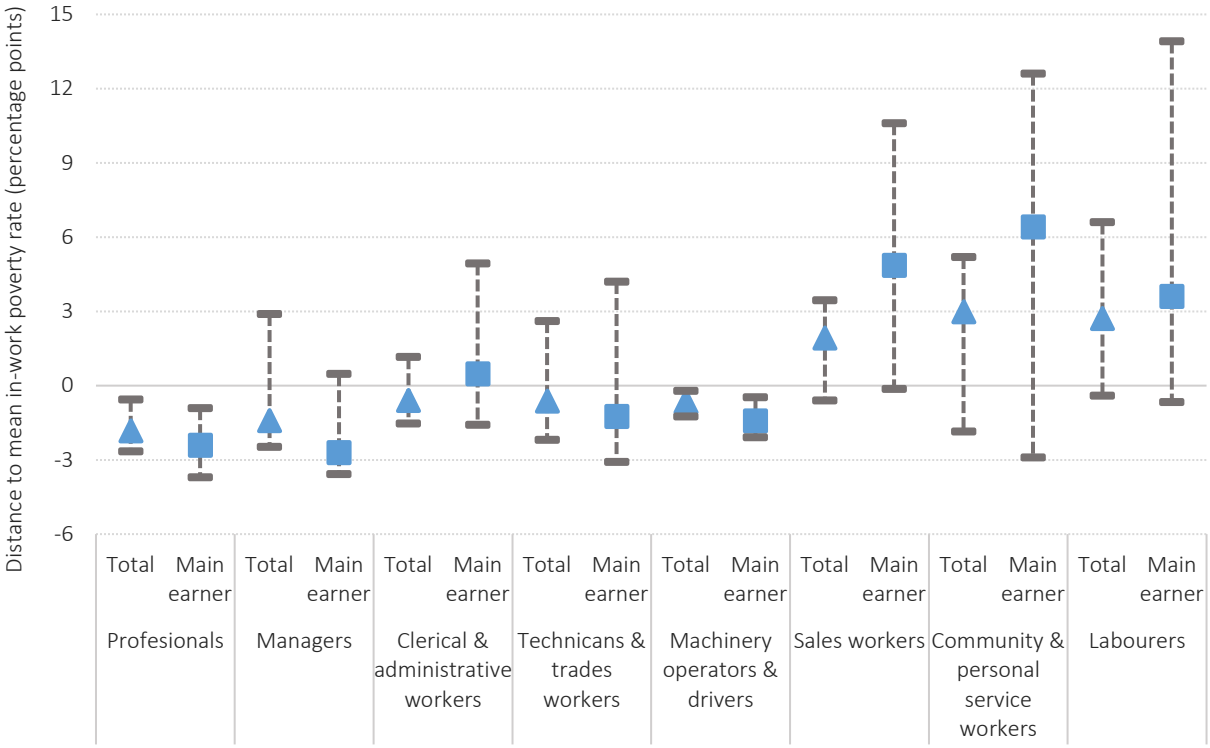
to a household that experiences in-work poverty are labourers (+2.7 percentage points) and the group encompassing community and personal service workers (+3 percentage points).

When we further break down the type of occupation (see Appendix Table A 3), we find that some groups are rather homogeneous: for example, among the different types of machinery operators and drivers, the in-poverty rate relative to the sample average ranges between -0.2 percentage points for road and rail drivers and -1.3 percentage points for machine and stationary plant operators. However, substantial heterogeneity can be found among most other groups: e.g., among labourers, households with an adult working as a factory process worker experience an in-work poverty rate of -0.4 percentage points lower than the sample average, while the respective statistic for households with cleaner and laundry workers is +6.6 percentage points. These examples suggest that understanding the relationship between occupation and in-work poverty prevalence requires examination of occupational categories in disaggregated detail.

However, one drawback of this approach is that it is not clear whether the wage received from the occupation stems from the main or (if present) the secondary earner in the household. We therefore also identify for each household the individual with the highest monthly earnings from wages and salaries and consider the relationship between their occupation and in-work poverty. The sample size of households in this set-up (i.e., defined by occupation of main earner) is 698,628 observations, [25] and the average in-work poverty rate is 4.9 percent. The square markers in Figure 8 illustrates respective distributional numbers relative to the sample average. At the upper end of the occupational hierarchy, we find that the mean in-work poverty rate is lower when considering the particular occupation of the main household earner, relative to considering that occupation for any household earner. For example, this is the case for the categories of both professionals and managers. However, at the other end of the occupational spectrum (i.e., sales workers, community and personal service workers, and labourers), we find the opposite effect. The in-work poverty rate is higher if these occupations are associated with the main earner, relative to any earner in the household. For example, according to the first definition, community and personal service workers have an in-work poverty rate of 3 percentage points higher compared to the mean – and when this occupation was associated with the main earner in the household, the in-work poverty rate rose to 6.4 percentage points higher than the respective mean.

[25] Note this sample is lower than the full sample of 725,313 working households due to missing information and/or the identified main earner was working earlier in the year, but not during March 2013 when the Census was conducted, and hence had no occupation to report.

Figure 8. Occupation and in-work poverty rate



Source: IDI 2019. *Notes:* In-work poverty rate as defined in Section 3 and presented relative to the sample average (4.3 percent for the sample of 1,141,926 working household units defined by occupation; and 4.9 percent for the sample of 698,628 working household units defined by occupation of main earner). See Stats NZ (2018c) for more information about the Australian and New Zealand Standard Classification Occupations (ANZSCO) system.

Industry

In a similar vein to the method undertaken with occupation, industry identification is based on whether at least one adult of the working household works in the respective industry. The sample size of working households defined by industry is 1,089,360 and the average in-work poverty rate is 4.2 percent. As shown in Table 10, the two industries with the highest rates of in-work poverty are: accommodation and food services (+4.7 percentage points compared to the mean) and agriculture, forestry and fishing (+2.8 percentage points). The association between service sector employment and poverty is, in general, well documented. The three (major) industries with the lowest in-work poverty rates are the financial and insurance industry (-2.4 percentage points), the public administration and safety sector (-2 percentage points) and professional, scientific and technical services (-1.6 percentage points).

Table 10. Industry and in-work poverty rate

	In-work poverty rate (relative to sample average)	Share of industry
Agriculture, Forestry and Fishing	+2.8 pp	4.3%
Mining	-1.7 pp	0.4%
Manufacturing	-1.5 pp	11.1%
Electricity, Gas, Water and Waste Services	-2.1 pp	0.9%
Construction	-1.0 pp	6.6%
Wholesale Trade	-1.6 pp	5.7%
Retail Trade	+1.7 pp	10.0%
Accommodation and Food Services	+4.7 pp	5.2%
Transport, Postal and Warehousing	-0.9 pp	4.6%
Information Media and Telecommunications	-1.2 pp	1.9%
Financial and Insurance Services	-2.4 pp	4.1%
Rental, Hiring and Real Estate Services	+0.6 pp	1.9%
Professional, Scientific and Technical Services	-1.6 pp	7.7%
Administrative and Support Services	+2.0 pp	3.1%
Public Administration and Safety	-2.0 pp	6.1%
Education and Training	+0.4 pp	9.7%
Health Care and Social Assistance	+0.3 pp	11.3%
Arts and Recreation Services	+1.8 pp	1.8%
Other Services	+0.8 pp	3.7%

Source: IDI 2019. In-work poverty rate as defined in Section 3 and presented relative to the sample average (4.2 percent for the sample of 1,089,360 working household units defined by industry). See Stats NZ (2018e) for more information about the Australian and New Zealand Standard Industrial Classification. pp = percentage point.

Other job characteristics

A final set of job characteristics described with respect to in-work poverty prevalence is illustrated in Table 11. These results rely on data from the HLFS and are therefore based on smaller sample sizes, relative to the population-level information presented in the majority of tables and figures thus far. The statistics provided in Table 11 relate to 2017 (September quarter) and a sample size of 7,836 working households.

We find that mean hours by a worker in an in-work non-poor household is 39.3 hours per week, whereas the comparable figure for in-work poor households is 29.7 hours per week. Next, we look at the main earner's[26] full-time status (working at least 30 hours per week). While the overwhelming majority of in-work non-poor households (92.8 percent) have a full-time main earner, only six out of every tenth main earner of an in-work poor household works full-time (58.6 percent). This suggests that number of hours worked may play a role in explaining the poverty status of these households. In line with this finding, we find that in-work poor households report an underemployment rate (working part-time and wanting to work additional hours) that is more than double that of in-work non-poor households.[27]

Table 11 also illustrates that the share of working households where at least one working member has a permanent employment contract is much higher among the in-work non-poor (97.2 percent) compared to the in-work poor households (84.6 percent). Likewise, the share of working households

[26] Based on the highest income from wages and salaries in the 2017 September quarter.

[27] "Underemployed people are those who are employed part-time (working less than 30 hours a week) and have both the desire and availability to increase the number of hours they work." (Stats NZ, 2018d).

with at least one member being a union member (31.5 percent versus 17.1 percent, respectively) is higher among the in-work non-poor compared with the in-work poor households.

Table 11. Additional labour market characteristics and in-work poverty rate

	In-work non-poor	In-work poor
Mean weekly hours	39.3	29.7
	(9.4)	(13.8)
Main earner works full-time (≥ 30 per week)	92.8%	58.6%
Underemployment	6.4%	14.4%
Permanent contract	97.2%	84.6%
Union membership	31.5%	17.1%

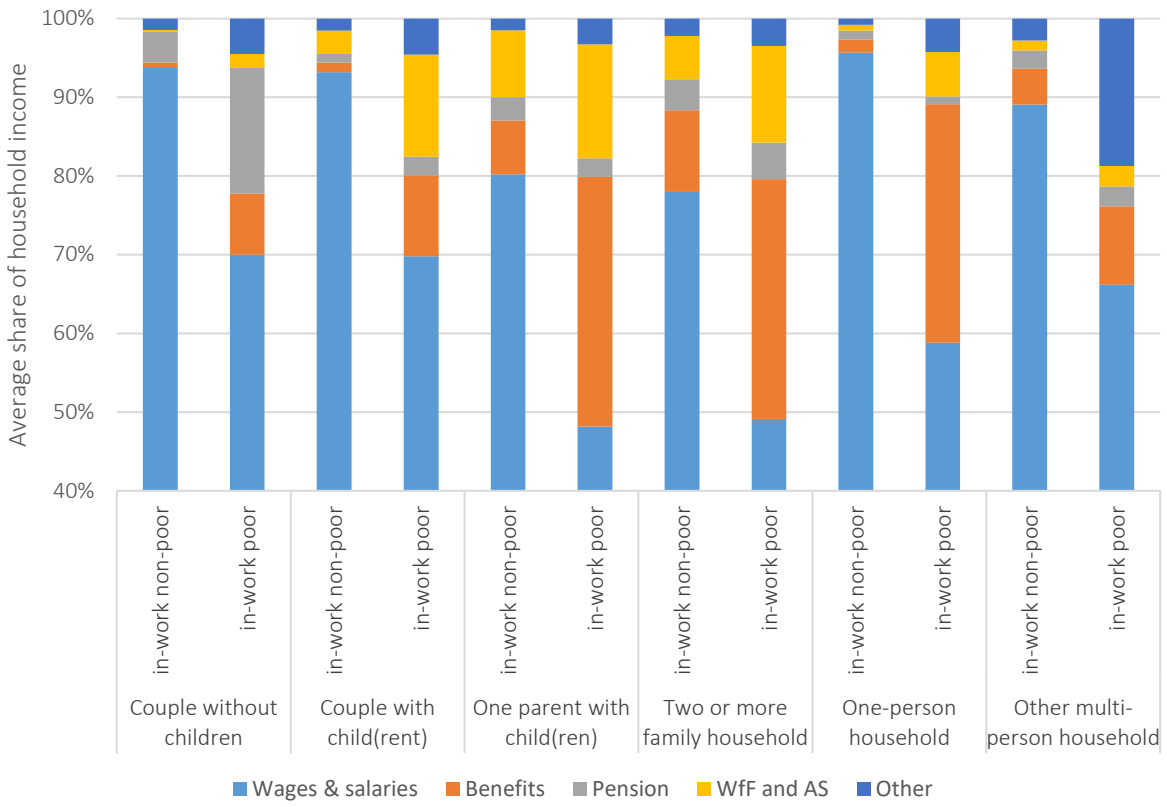
Source: HLFS 2017 September quarter. *Notes:* Std dev in parenthesis. Sample size of 7,836 working households.

4.8 Income sources

Here we look at the main income sources for working households (poor and non-poor) and present these disaggregated by household structure. Figure 9 shows the mean proportion of total household income that stems from wages and salaries; benefits; pensions (superannuation); WfF and AS; and other sources (which encompass withholding payments, student allowance, paid parental leave and ACC claims). We find that independent of household structure, on average 90 percent of household income is generated by wages and salaries for households that are in-work non-poor (the two exceptions are single-parent households (at 80 percent), and two or more family households (at 78 percent)). This share declines substantially for in-work poor households: for example, 48 percent of household income for in-work poor single-parent households comes from wages and salaries compared to an average of 80 percent for their non-poor equivalents (a difference of 32 percentage points). The difference in income sources between in-work poor households and in-work non-poor households has also been explored using UK data by Hick and Lanau (2018b).

Noticeably, Figure 9 shows that the prominence of alternative sources of income for in-work poor households is heterogeneous across different household structures. Benefit receipt plays a greater role for single-parent households, for two or more family households and for one-person households, relative to couples with or without child(ren). Pensions play an important role in couple without children households. Furthermore, we find that income from WfF and AS are especially relevant for couple with child(ren), single-parent and two or more family households: in all three cases, the share exceeds 10 percent.

Figure 9. Income sources by working and poverty status



Source: IDI 2019. *Notes:* 'WfF' is Working for Families tax credit; 'AS' is Accommodation Supplement. Other sources of income = withholding payments, student allowance, paid parental leave and ACC claims.

Benefit receipt

In this sub-section, we examine the relationship between benefit receipt (accounting for all benefits paid by Ministry of Social Development) and in-work poverty. Table 12 shows that 66.1 percent of non-work households have at least one adult member who receives benefits. This figure falls to 11.6 percent of in-work households. When we divide the latter group between poor and non-poor households, we see that about 28.7 percent of in-work poor households have at least one member who receives benefits – substantially above the figure for in-work non-poor households (10.3 percent).

Table 12. Benefit receipt by working and poverty status

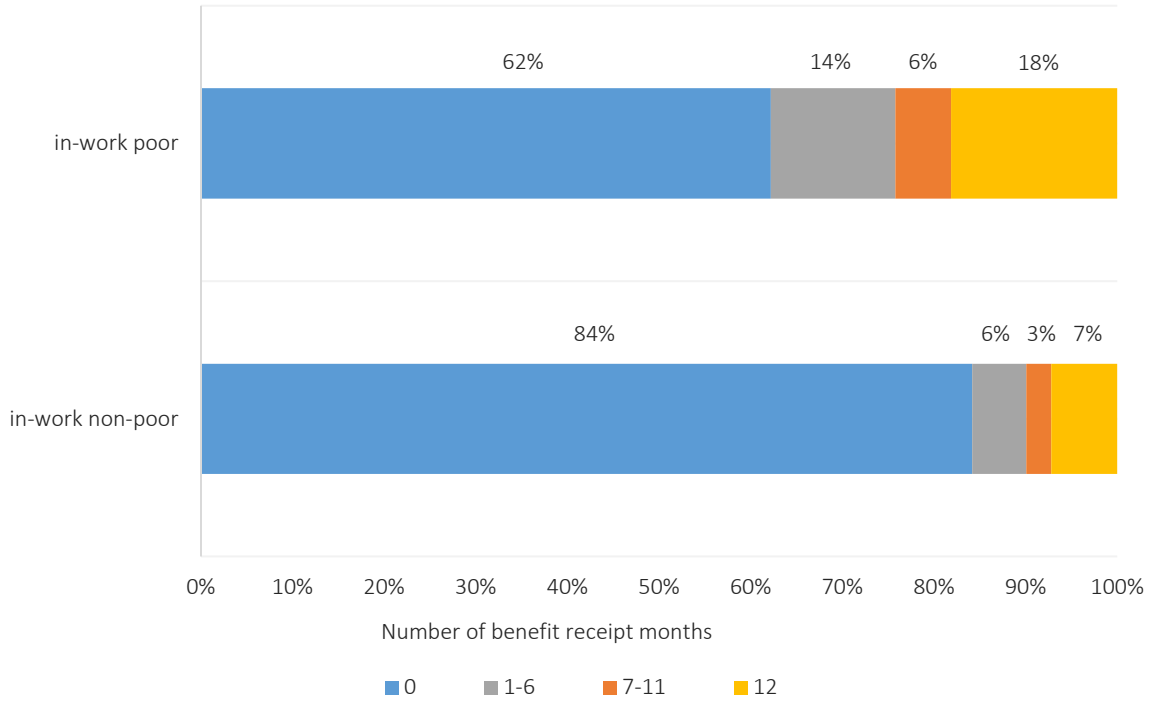
	Non-work	In-work
Non-poor	57.2%	10.3%
Poor	70.7%	28.7%
Total	**66.1%**	**11.6%**

Source: IDI 2019. *Notes*: Working and poverty status as defined in Section 3 (sample of 874,797 households).

We next analyse benefit duration based on the number of months (in the time period April 2012 to March 2013) where at least one adult member of the household received benefits (Figure 10). While 84 percent of in-work non-poor households do not receive any benefits at all within the year, this is

the case for 62 percent of in-work poor households. Furthermore, 18 percent of in-work poor households have a member who receives benefits in each of the twelve months, and 24 percent are in receipt of benefits for at least six months.

Figure 10. Benefit duration for working households

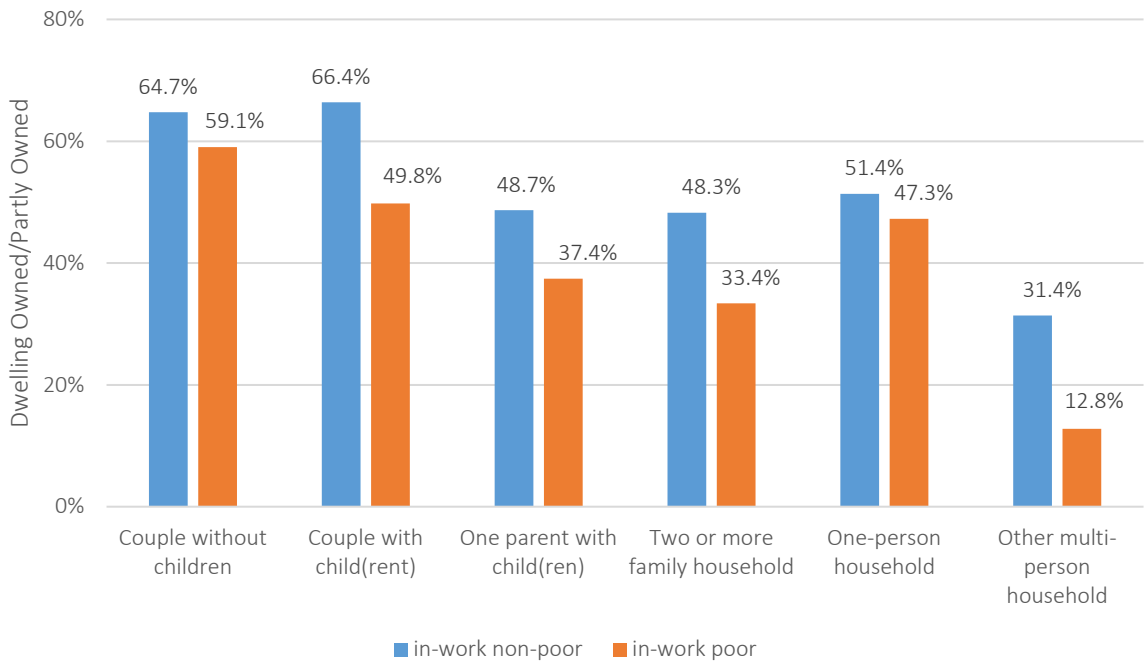


Source: IDI 2019. *Notes*: Timeframe = April 2012 to March 2013. Working and poverty status as defined in Section 3 (based on 725,313 working households). Benefit receipt = at least one adult member in household receiving an MSD benefit in the respective month.

4.9 Home ownership and housing costs

Next, we look at the relationship between home ownership and in-work poverty. Figure 11 shows that in-work poor households are less likely to own their own homes than in-work non-poor households (where home ownership is derived from 2013 Census information regarding whether any household member owned or partly owned the dwelling). There are also differences in ownership rates by household structure: while the share of ownership for the in-work poor and in-work non-poor is close (within 5 percentage points) for both couples without children and one-person households, the gap is especially apparent for couples with children (49.8 percent versus 66.4 percent) and single-parent households (37.4 percent versus 48.7 percent).

Figure 11. Home ownership by household structure



Source: IDI 2019. *Notes:* Working and poverty status as defined in Section 3.

Table 13 shows the in-work poverty rate in relation to both home ownership and household type. Here we observe sharply contrasting rates of in-work poverty. The in-work poverty rate for home owners is 5.2 percent, while for renters it is 9.2 percent. A further decomposition according to household structure uncovers that the gap in in-work poverty rates for homeowners and tenants is especially wide for couples with children (4.6 percent versus 8.8 percent) and single parents with children (9.7 percent versus 14.5 percent). The strong association between housing tenure and in-work poverty is consistent with previous research in the UK by Hick and Lanau (2017).

Table 13. Home ownership and in-work poverty rate

	In-work poverty rate	
	Dwelling not owned*	Dwelling owned*
Total	9.2%	5.2%
Couple	5.2%	4.1%
Couple with child(ren)	8.8%	4.6%
One parent with child(ren)	14.5%	9.7%
Two or more family household	11.7%	6.7%
One-person household	6.7%	5.7%
Other multi-person household	14.4%	5.1%

Source: IDI 2019. In-work poverty as defined in Section 3 (average in-work poverty rate is 7.0 percent based on sample of 725,313 working households).

*refers to dwelling owned/not owned in whole or in part by the usual resident(s).

Rent expenditure

For this analysis, we restrict our sample to renters who provided information about rental expenditure in the 2013 Census and have a positive income in March 2013 (239,610 working households). We have compared rental expense to households' monthly net income (which includes AS) and presented the proportion spent on rent for groups disaggregated by poverty status and household structure.[28]

Table 14 shows that, for working households, the share of monthly rent expenditure ranges between, on average, 25.1 percent for couples without children and 35.3 percent for single parents with children. However, the gap between poor and non-poor working households is substantial: for example, while in-work non-poor couples without children spend about one quarter, on average, on their rent, this number increases to 59.1 percent on average for their poor counterparts.

Table 14. Monthly share of rent costs for working households

	Non-poor	Poor	Total
Couple without children			
	24.1%	59.1%	25.1%
	(0.123)	(0.219)	(0.140)
Couple with child(ren)			
	24.6%	44.9%	26.0%
	(0.113)	(0.222)	(0.135)
One parent with child(ren)			
	33.2%	50.2%	35.3%
	(0.149)	(0.222)	(0.169)
Two or more family household			
	22.3%	40.3%	24.2%
	(0.118)	(0.225)	(0.144)
One-person household			
	30.3%	56.1%	31.2%
	(0.141)	(0.233)	(0.153)
Other multi-person household			
	27.5%	64.7%	30.2%
	(0.150)	(0.227)	(0.184)

Source: IDI 2019. *Notes:* Std dev in parenthesis. Working and poverty status as defined in Section 3 (average in-work poverty rate of 6.5 percent based on sample of 239,610 working households).

In-work poverty after housing costs

Next, we construct in-work poverty rates for renting households. This permits analysis of changes in the in-work poverty rate pre- and post-accounting for housing costs. As we learned from Table 14, the share of monthly rent expenditure is substantially higher for low-income households. If the share of monthly rent expenditure declines with increasing household income, we expect an increase in the in-work poverty rate when moving from a before housing cost (BHC) calculation to an after housing cost (AHC) calculation. To derive the AHC in-work poverty rate, we trim our full sample (which includes pensioner households and households with self-employed individuals) to households that only contain renters. The net equivalised household income is derived by deducting renting costs from the

[28] Additional decomposition according to the number of workers in the household did not provide any further insights and was dropped for brevity.

net household income and adjusting this figure by the OECD scale. The new poverty rates are now calculated on a reduced sample that only consists of renting in-work and non-work households.

We know from Figure 11 that the share of homeowners is especially low among single parents with child(ren), two or more family households, and other multi-person households. Unsurprisingly, the share of these groups in the restricted sample (with only renters) increases compared to our initial full sample, as shown in Table 15. For example, while about 9.6 percent are one parent with children households in the full sample, this share increases to 12.3 percent in the restricted sample.

The BHC in-work poverty rate for the restricted sample of renters equates to 8.1 percent. When accounting for housing costs, the AHC in-work poverty rate for the restricted sample increases to 12.8 percent, which is a lift of about 50 percent. This is a common finding when examining AHC measures of in-work poverty (McGuinness, 2018, p. 7). For example, Bourquin *et al.* (2019) find for the UK that in 2018 the BHC in-work poverty rate was 13 percent, and this figure rose to 18 percent after housing costs (+38 percent). Furthermore, this increase is reasonably equally distributed across different household structure types.

Table 15. Before and after housing costs and in-work poverty rate, for renters

	Restricted sample			Full sample (from Table 8)	
	Before housing costs	After housing costs	Share	Before housing costs	
	In-work poverty rate	In-work poverty rate		In-work poverty rate	Share
Couple without children	4.5%	8.3%	21.5%	4.8%	25.7%
Couple with child(ren)	7.6%	10.4%	30.1%	6.3%	36.8%
One parent with child(ren)	12.7%	23.2%	12.3%	12.3%	9.6%
Two or more family household	10.3%	12.1%	8.4%	9.6%	6.6%
One-person household	5.7%	11.0%	17.1%	6.4%	15.3%
Other multi-person household	14.0%	20.7%	10.6%	11.6%	6.0%
Total	**8.1%**	**12.8%**	**100%**	**7.0%**	**100.0%**

Source: IDI 2019. *Notes:* In-work poverty as defined in Section 3. Full sample = 725,313 working households. Restricted sample = renters with information on rental expenditure = 244,854 working households. Share = proportion of respective household type from sample of working households.

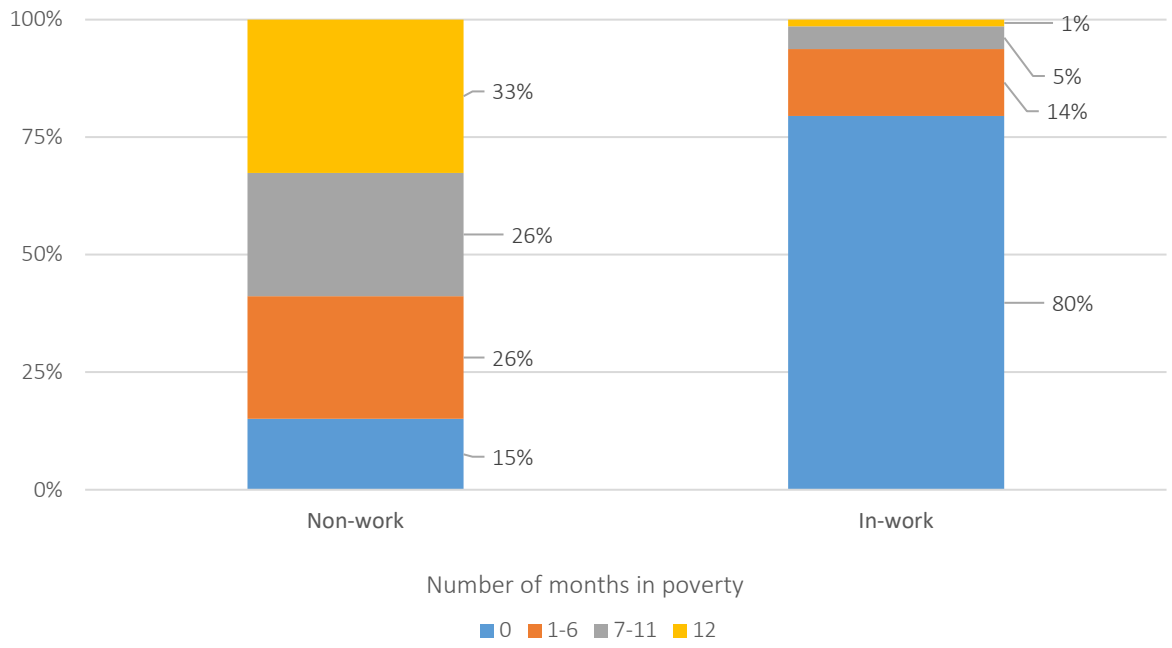
4.10 Poverty duration

The current definition to determine where a household sits in relation to the poverty threshold is based on information in the month of March 2013 when the Census was conducted. To investigate poverty duration within a year for both in-work and non-work households, we present data on the number of months that a household is poor in the preceding year. The literature on poverty over time focusses largely on annual observations of poverty over a multi-year period (e.g., Vandecasteele & Giesselmann, 2018; Buddelmeyer & Verick, 2008); in this analysis we go further to examine the within-year duration of poverty, as shown in Figure 12.

We find that one-third of non-work households are poor in all twelve months of the year and that 59 percent experience poverty in more than six months of the year. Thus, the duration of poverty for non-working households is very high (see left bar in Figure 12). In contrast, for in-work households, the picture is very different (see right bar in Figure 12): just 1 percent of these households experience poverty in all twelve months of the year (>6 months: 6 percent), while 14 percent of the in-work households experience poverty between one and six months. Furthermore, four out of five working households (80 percent) do not experience any spell of poverty during the year, a circumstance shared by just 15 percent of non-work households.[29]

Another noteworthy finding is that while in March 2013 7.0 percent of in-work households were identified as poor, 20 percent had to deal with poverty for at least for one month in the preceding year. This indicates that for a significant share of households, income is not persistently high enough to keep them above the poverty threshold throughout the year. This finding is mirrored in a study by Pacheco and Plum (2019) on the New Zealand low pay sector: the authors show that the share of workers affected by low pay for at least one month in the year is substantially higher compared to the share of low-paid worker in a specific month.

Figure 12. Poverty duration



Source: IDI 2019. Working threshold as defined in Section 3. Poverty duration based on number of months below the threshold (as defined in Section 3) over the period April 2012 to March 2013 (inclusive).

[29] These findings are in line with the international literature. For example, Halleröd *et al.* (2015) construct monthly employment profiles over a three-year observation window for 22 European countries, using survey data from the Study on Income and Living Conditions, and then explore the relationship between these 36-month observation profiles with the in-work poverty rate in the third observation year. Their conclusion is that: "All over Europe, the poverty risk among the core labour force – that is, individuals who were full-time employed without interruption during the whole 36-month observation window – is very low" (2015, p. 482).

5. CONCLUSION

In this report we have explored a strategy for deriving the prevalence of in-work poverty in New Zealand, as well as provided an in-depth descriptive empirical examination of the affected groups and related characteristics. The unique nature of the linked administrative and survey data in the IDI has afforded this research the opportunity to extend analysis in areas that have not previously been fully examined in the international literature. In particular, the population-wide data has allowed disaggregation of information at a finer level relative to prior studies.

We find an in-work poverty rate of 7.0 percent as at March 2013. Of substantive policy interest is that both Working for Families tax credits and the Accommodation Supplement make a sizable difference to the in-work poverty rate. Without these two income sources, the rate rises to 9.2 percent. Additionally, this rise is markedly greater for single-parent households, where the in-work poverty rate rises from 12.3 to 21.6 percent.

With respect to gender, we find that females have an elevated in-work poverty rate compared to males (7.7 percent versus 6.6 percent, respectively). Additionally, one out of ten children living in working households is poor. The relevant in-work poverty rate also varies substantially across regions: Canterbury and Nelson experience below-average in-work poverty prevalence; Gisborne and Northland experience above-average prevalence; and the Bay of Plenty and Wellington exhibit large sub-regional divergence.

The in-work poverty rate has been relatively stable between 2007 and 2017. In terms of characterising working households that are more likely to experience poverty, several expected patterns emerge from the empirical analysis. These include a negative relationship between in-work poverty prevalence and educational attainment, as well as the occupational hierarchy. In-work poor households were also more likely to work in agriculture, forestry and fishing, and in the accommodation and food service industries; to receive income from a benefit; to rent their home; to be disabled; and to have health difficulties (particularly around learning and communicating), all relative to their in-work non-poor counterparts.

The importance of disaggregating findings at a finer level is evident in the majority of the empirical analysis. A useful example to illustrate this is migrant status. While, on average, having a migrant adult in the household is associated with the average rate of in-work poverty prevalence for New Zealand, individuals born in North-East Asia experienced a rate that was 7.4 percentage points higher relative to sample average, and in contrast, those from the United Kingdom experienced a rate that was 1.7 percentage points below the sample average.

Two characteristics that stood out in terms of strong disparities across disaggregate sub-groups were ethnicity and household structure. Households with at least one adult with prioritised ethnicity of Pacific peoples (9.5 percent) or Māori (8.6 percent) experienced a substantially elevated in-work poverty rate relative to households of New Zealand European ethnicity (5.9 percent). This outcome is likely the result of a variety of factors: these households are underrepresented in occupations associated with low rates of poverty; they also have lower educational attainment relative to NZ European households; and they are, on average, larger households so earnings from employment must, in many cases, stretch further than for households with fewer members.

In terms of household structure, the lowest in-work poverty rate is observed for households comprising couples without children (4.8 percent), couples with child(ren) (6.3 percent), and one-person households (6.4 percent). In contrast, households with two or more families and single-parent

households experience elevated in-work poverty rates of 9.6 and 12.3 percent, respectively. For these latter household types, it was also evident that if at least one child in the household was under five, the in-work poverty rate was higher relative to similar household types without this circumstance. This further demonstrates the strong inter-relationship between child poverty and in-work poverty and signals that tackling one will likely result in improvements in the other.

Relatedly, the number of workers in a household also has an important bearing on a household's in-work poverty rate. Amongst households comprising a couple with children, the in-work poverty rate for those with only one adult working was 13.5 percent; and this falls to 1.9 percent when both adults in the household meet the working threshold. This is a substantial difference. These findings converge with the international literature which finds that the number of workers in a household is a very strong predictor of in-work poverty.

With recent examples in the international literature giving prominence to the role of housing costs, and constructing in-work poverty prevalence pre- and post-housing costs (see for instance Hick & Lanau, 2017), we also examined the relationship between home ownership and housing costs to in-work poverty in New Zealand. We observed a strong relationship between home ownership status and in-work poverty, with renters facing an in-work poverty rate of 9.2 percent while those who own their own home (in whole or in part) have a lower rate of 5.2 percent. Furthermore, for renters we found an average BHC in-work poverty rate of 8.1 percent, which rises to 12.8 percent after accounting for housing costs.

The empirical analysis in this report concluded with an investigation of within-year variation in poverty duration for both in-work and non-work households. We found that while 7.0 percent of working households are poor based on information for March 2013, just 1 percent of these households experience poverty in all twelve months (and 6 percent for at least seven months) of the preceding year. These sub-populations, particularly those that experience being below the poverty line every month in a twelve-month timeframe, are the most vulnerable with respect to ensuring their income meets the basic needs of the household.

Finally, there are a few caveats of our analysis that are worth discussing. This report provides an exploratory understanding of measuring in-work poverty with administrative data in New Zealand. Due to requiring monthly income information, we may potentially be underestimating self-employment income, as well as income from private superannuation and investments, which are only available at the annual level. Of note is that the sensitivity analysis indicated that if, when deriving the poverty threshold, the income distribution used as the reference excluded self-employed households and pensioner households (the two groups most likely affected by this missing income), then the in-work poverty prevalence rose to 12.8 percent. Another caveat to note is that our descriptive profile was hampered by lack of data in some domains, such as housing costs and hours worked. Our analysis also relied on the assumption that household composition remains unchanged in the year ending March 2013. We were also not able to follow population-wide patterns of in-work poverty over time. Future research could follow individuals from the 2013 Census to future Census waves to assess longitudinal changes in in-work poverty status.[30] Further empirical analysis could also model accumulated in-work poverty rates from multiple risk factors, as well as delve into a qualitative examination of households that are most vulnerable in this respect.

[30] It is important to note here that the signal from Stats NZ is household information may be of poor quality in the 2018 Census, so linking between 2013 and 2018 Census will potentially be problematic.

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7. APPENDIX

Potential caveats regarding income sources

To construct our population of interest, we use 2013 Census information that enables us to identify New Zealand households for March 2013. This enables analysis at a very granular level (i.e., comparing differences across a wide range of variables, as shown in the sub-sections of the results, such as birthplace, educational achievement, household structure, occupation, industry, *etc*.), which has often been lacking in past literature, due to usually relying on survey data. Importantly, this means that we require income information also on a granular level (specifically for the month of March 2013) to determine poverty status of a household.

The standard approach for deriving the poverty threshold (which then determines the in-work poverty rate) is to account for all income sources for the whole population. The Integrated Data Infrastructure (IDI), which is the gateway to the administrative data we use, hosts several datasets on different income sources. Some information is provided on the monthly level and some on the annual level. For instance, on the one hand, the employer monthly schedule (EMS) provides monthly information on taxable income where PAYE is deducted at source. This includes wages and salaries, New Zealand superannuation, government benefits, paid parental leave, *etc*. on the monthly level. On the other hand, data within the IR3 which includes income from "non-zero partnership, self-employment, or shareholder salary income, as well as rental income"[31] is available at the annual level. It would not be suitable to simply convert these annual figures to a monthly (March) figure (e.g., by dividing the annual figure by 12), so these annual sources are not counted in the income calculation.

By restricting our focus to data available at the monthly level, we expect to underestimate the importance of income from self-employment and from investments. Potential effects therefore include:

- Overestimating the number of households without any income. According to Table 2, we exclude 168,057 households (the difference between the second and third line) that do not have any income records for the sample period. This will potentially include households that receive income solely from self-employment or investments.
- Underestimating the income of households where one or more members are self-employed.
- Underestimating the income of households that receive income from investments and those receiving private superannuation.

The distribution of the net equivalised income for the whole population can be found in Table A 1. According to the income distribution, we find for our whole population that 19.9 percent of the households are identified as poor when setting the poverty threshold at 60 percent of the median. Interestingly, despite the caveats described above, our overall poverty rate is comparable to OECD estimates. The OECD database finds the share of poor households after taxes and transfer (using a 60 percent poverty threshold) was 19.1 percent in 2012 and 19.6 percent in 2014 (no numbers were available for 2013).[32]

Another dimension to test the comparability of the income distribution utilised is the overall child poverty rate. According to Stats NZ (2019b), the child poverty rate (children living in households below 60

[31] See: http://archive.stats.govt.nz/methods/research-papers/topss/comp-income-info-census-idi/data-sources.aspx
[32] Numbers were retrieved from https://stats.oecd.org (25 September 2019).

percent of the median equivalised disposable household income before housing costs) was 23.6 percent in 2013 (equating to approximately 255,000 children). In our study, we estimate a child poverty rate of 21.4 percent.

Table A 1. Net equivalised monthly household income distribution across deciles

	Whole population		Population of interest	
Decile	Net equivalised income	Ratio to median	Net equivalised income	Ratio to median*
1	$820	0.38	$995	0.30
2	$1,297	0.60	$1,396	0.48
3	$1,396	0.65	$1,836	0.52
4	$1,670	0.78	$2,271	0.62
5	$2,154	1.00	$2,707	0.80
6	$2,671	1.24	$3,168	0.99
7	$3,247	1.51	$3,696	1.20
8	$3,963	1.84	$4,352	1.46
9	$5,051	2.35	$5,385	1.87

Source: IDI 2019. *Notes:* Working definition described in Section 3. * Ratio is taken to the median of the full Census sample ($2,154).

Table A 2. Working and poverty status, by household unit (50 percent threshold)

	Non-work	In-work	Total
Non-poor			
	50.1%	95.3%	87.6%
	(74,847)	(691,290)	(766,137)
Poor			
	49.9%	**4.7%**	12.4%
	(74,640)	**(34,023)**	(108,663)
Total			
	17.1%	82.9%	100%
	(149,484)	(725,313)	(874,797)

Source: IDI 2019. *Notes:* Absolute numbers of households in brackets. Working definition as described in Section 3. Poverty threshold definition = 50 percent of median equivalised household income.

Table A 3. Occupation and in-work poverty rate (level 2 disaggregation)

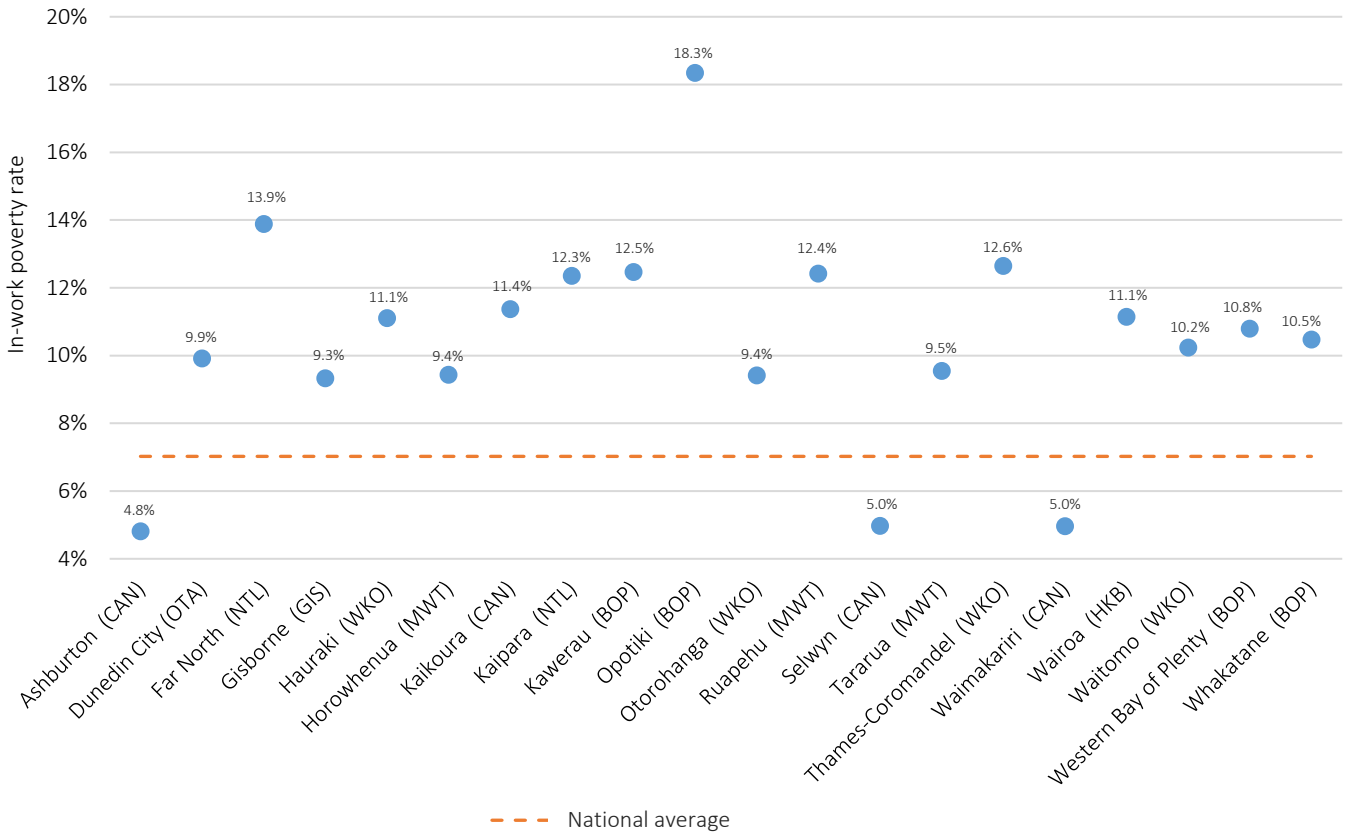
	In-work poverty rate (relative to sample average)	Share of sample	Share of group
Managers	-1.5 pp	14.8%	100%
Chief Executives, General Managers and Legislators	-1.7 pp		14.6%
Farmers and Farm Managers	+2.9 pp		9.5%
Specialist Managers	-2.5 pp		55.2%
Hospitality, Retail and Service Managers	-0.7 pp		20.6%
Professionals	-1.8 pp	22.2%	100%
Arts and Media Professionals	-0.6 pp		2.3%
Business, Human Resource and Marketing Professionals	-2.3 pp		22.1%
Design, Engineering, Science and Transport Professionals	-2.5 pp		12.9%
Education Professionals	-1.1 pp		26.6%
Health Professionals	-2.2 pp		17.0%
ICT Professionals	-2.7 pp		10.0%
Legal, Social and Welfare Professionals	-0.9 pp		9.2%
Technicians and trades workers	-0.6 pp	11.7%	100%
Engineering, ICT and Science Technicians	-2.0 pp		18.3%
Automotive and Engineering Trades Workers	-1.8 pp		24.5%
Construction Trades Workers	-0.4 pp		14.0%
Electrotechnology and Telecommunications Trades	-2.2 pp		10.2%
Food Trades Workers	+2.5 pp		14.3%
Skilled Animal and Horticultural Workers	+2.6 pp		7.2%
Other Technicians and Trades Workers	-0.5 pp		11.6%
Community and personal service workers	+3.0 pp	10.1%	100%
Health and Welfare Support Workers	+0.6 pp		11.1%
Carers and Aides	+4.8 pp		39.5%
Hospitality Workers	+5.2 pp		20.7%
Protective Service Workers	-1.9 pp		16.3%
Sports and Personal Service Workers	+2.2 pp		12.5%
Clerical and administrative workers	-0.6 pp	13.0%	100%
Office Managers and Program Administrators	-1.3 pp		22.0%
Personal Assistants and Secretaries	-1.4 pp		7.7%
General Clerical Workers	±0.0 pp		18.4%
Inquiry Clerks and Receptionists	+1.1 pp		13.4%
Numerical Clerks	-1.5 pp		16.4%
Clerical and Office Support Workers	+1.6 pp		6.1%
Other Clerical and Administrative Workers	-1.4 pp		16.1%

Table A 3. Occupation and in-work poverty rate (level 2 disaggregation) (continued)

	In-work poverty rate (relative to sample average)	Share of sample	Share of group
Sales workers	+1.9 pp	10.1%	100%
Sales Representatives and Agents	-0.6 pp		29.7%
Sales Assistants and Salespersons	+2.9 pp		56.2%
Sales Support Workers	+3.4 pp		14.1%
Machinery operators and drivers	-0.6 pp	6.3%	100%
Machine and Stationary Plant Operators	-1.3 pp		27.5%
Mobile Plant Operators	-0.6 pp		15.6%
Road and Rail Drivers	-0.2 pp		37.0%
Store persons	-0.7 pp		19.9%
Labourers	+2.7 pp	11.7%	100%
Cleaners and Laundry Workers	+6.6 pp		19.5%
Construction and Mining Labourers	+0.2 pp		7.3%
Factory Process Workers	-0.4 pp		21.5%
Farm, Forestry and Garden Workers	+3.7 pp		17.1%
Food Preparation Assistants	+5.8 pp		7.7%
Other Labourers	+1.6 pp		26.9%

Source: IDI 2019. *Notes:* In-work poverty rate as defined in Section 3 and presented relative to the sample average (4.3 percent for the sample of 1,141,926 working household units defined by occupation). See Stats NZ (2018c) for more information about the Australian and New Zealand Standard Classification Occupations (ANZSCO) system.

Figure A 1. Territorial authority and in-work poverty rate



Source: IDI 2019. *Notes:* In-work poverty as defined in Section 3 (the average in-work poverty rate across NZ is 7.0 percent based on a sample of 725,313 working households). While there are 75 TAs, only those that have in-work poverty rates beyond 2 percentage points of the national mean (above 9 percent or less than 5 percent) are provided in the figure above. The region associated with each TA is given in parenthesis, as specified in Figure 3.

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