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Underemployment and wage growth during COVID-19

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ABSTRACT

This study provides new insights into the labour market outcomes of underemployed individuals, particularly the full-time underemployed who are often not included in official statistics. Using a difference-in-differences approach, we describe the impact of the COVID-19 pandemic on earnings progression for underemployed individuals in New Zealand relative to their fully-utilised counterparts. We find that both the employment and earnings-growth gap between the underemployed and fully-utilised decreased during the pandemic years. These results highlight the importance of considering the impact of economic shocks on different labour market groups and that while existing literature highlights that more vulnerable groups are less resilient to economic shocks, in line with previous New Zealand research, our results suggest that the COVID-19 pandemic was different.

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1. Introduction

This study aims to capture the effect of COVID-19 on earnings progression for different labour market groups, with a focus on the underutilised. Labour market underutilisation is known to have micro- and macroeconomic implications resulting in losses of human capital, productivity, efficiency and wellbeing (Benigno, Ricci, & Surico, 2015; Dooley & Catalano, 2003; Dooley, Prause, & Ham-Rowbottom, 2000; Eliason & Storrie, 2006; Gordo, 2009; Prause & Dooley, 1997). Underutilisation comprises three distinct groups: the underemployed, the unemployed and the potential labour force. We focus on the labour market outcomes of the underemployed relative to their fully-utilised counterparts. In doing so, we not only analyse the underemployed who are working part-time, we also analyse a sub-set of the underutilised who are not included in official statistics: those working full-time (30 or more hours per week) who want and are available to work more hours. We refer to this group as the full-time underemployed.

We use a difference-in-differences approach to estimate descriptively the impact of the COVID-19 pandemic on the earnings progression of those who are underemployed (relative to fully-utilised workers). To do this, we link data from the New Zealand Household Labour Force Survey (HLFS) to a number of administrative data sources within Stats NZ's Integrated Data Infrastructure (IDI). The IDI holds anonymised data from multiple government and non-government entities and also links individuals across data sources via unique identifiers. The HLFS is used to identify underemployed and fully-utilised workers in the pre-COVID period, while Inland Revenue tax data allows us to track the employment and earnings outcomes of these groups of workers over time, including during the COVID-affected period. We find that both the underemployed and fully-utilised groups

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experienced lower employment levels during the pandemic than before the pandemic, but that this negative employment effect was greater for fully-utilised workers. Moreover, the gap in earnings growth between the underemployed and fully-utilised decreased during the pandemic years.

By examining the effect of economic shocks in NZ on wage progression by labour market status, we add to the limited NZ literature on underemployment and on the labour market effects of COVID-19. Relative to unemployed workers, little research has been undertaken on underemployed workers and, in particular, the potential consequences of underemployment. One question, which the current paper examines is whether underemployed workers fare worse than fully-utilised workers in terms of resilience to economic shocks, such as the COVID-19 pandemic. This adds to existing evidence that shocks have greater negative consequences for more vulnerable groups, such as the young and those of lower socioeconomic status (see, for example, Blanton, Blanton, & Peksen, 2018; Brown, 2010; Horemans, Marx, & Nolan, 2016; Horn, 2010; Kahn, 2010; Mohindra, 2011; Oreopoulos, von Wachter, & Heisz, 2012; Parker, Jerrim, & Anders, 2016). It also adds to the growing literature on the labour market effects of the COVID-19 pandemic and the distribution of these effects across different groups of workers (such as, Demena, Floridi, & Wagner, 2022; Lemieux, Milligan, Schirle, & Skuterud, 2020; Soares & Berg, 2021; von Wachter, 2020). Overall, our study contributes to the small body of literature on underemployment and the labour market effects of COVID-19, while also being the first to examine the effect of economic shocks on wage progression by labour market status in NZ.

The remainder of this paper is structured as follows: Section 2 provides a brief summary of relevant literature; Section 3 details background information on the COVID-19 pandemic in NZ in terms of policy shifts likely to have impacted labour market outcomes; Section 4 covers the administrative and survey data employed; Sections 5 and 6, the difference-in-differences methodology and results; while Section 7 concludes.

2. Literature

The underemployed are working individuals who want and are available to work more hours.¹ The literature on the impacts of labour market underutilisation, including underemployment, often analyses the estimated cost of underutilisation on firms, the economy and the individual (Benigno *et al.*, 2015; Eliason & Storrie, 2006; Gordo, 2009; Prause & Dooley, 1997). In NZ, recent work analysing the underemployed has focused on the characteristics of the aggregated group of underutilised, including the underemployed, and their potential for movement in and out of underemployment (Erwin, Dasgupta, & Pacheco, 2019; Meehan, Pacheco, & Turcu, 2022). However, little evidence exists on the impact of economic shocks on this group, in terms of their earnings trajectory. The literature agrees that the underemployed generally comprise the working poor, discouraged workers and involuntary part-time workers (Baum, Bill, & Mitchell, 2008; Clogg, Sullivan, & Mutchler, 1986; De Jong & Madamba, 2001). Such a marginalised group of the labour market may not have the necessary resources to weather tough economic conditions such as those generated by the COVID-19 pandemic and subsequent lockdowns experienced in NZ and abroad.

2.1. Effects of underemployment

Underemployment is the component of underutilisation often relied upon to give a picture of untapped capacity in the labour market (Stats NZ, 2018). Although most literature agrees that this component is just as important as measures of unemployment, only a small section of underutilisation research focuses on the underemployed. Research on unemployment, however, is abundant and more work is needed to identify other sources of labour market challenges, including underemployment (Jensen, Findeis, Hsu, & Schachter, 1999; Mehran, Bescond, Hussmanns, & Benes, 2008). It is well documented, for example, that long term unemployment has negative effects on future earnings and employment through the depreciation of human capital (Abraham, Haltiwanger, Sandusky, & Spletzer, 2019; Drasch, 2013; Green & Ferber, 2008; Mincer & Ofek, 1982; Sin, Dasgupta, &

Pacheco, 2018), decreases in search intensity (Faberman & Kudlyak, 2019; Krueger, Mueller, Davis, & Şahin, 2011) and employer discrimination (Arulampalam, 2001; Burgess, Propper, Rees, & Sheraer, 2003; Eriksson & Rooth, 2014; Ghayad, 2013; Kroft, Lange, & Notowidigdo, 2013).

Compared to unemployment and its implications, there is less information on underemployment (Pratap *et al.*, 2021). Underemployed workers are defined as not reaching their full potential in the labour market either by way of inadequate hours or a skills mismatch, this paper focuses on the former: time-related underemployment, also referred to in the literature as involuntary part-time work; where individuals are working fewer hours than they wish to. We therefore restrict the following discussion to literature related to time-related underemployment.

Existing research tends to focus on the characteristics and potential causes of underemployment, such as Hernández (2018) who found that having a child under the age of five in the household increases the likelihood of underemployment for women but decreases it for men. Conversely, Reynolds (2003), found that fathers who are the sole or primary breadwinners are more likely to be underemployed, compared to single childless men. In some of the earliest work on underutilisation, Bednarzik (1975), using data from the US, found that underemployed individuals were more likely to have lower education level, be younger and unskilled. Kler, Potia, and Shankar (2017) found males to be over-represented in their Australian panel survey data, as well as young people, immigrant workers, blue-collar workers and those on casual contracts. As it pertains to incomes, Golden (2016) and Bell and Blanchflower (2018) compared workers who wanted more hours to those who were happy with their hours and found underemployed workers to have lower wages than fully-utilised workers. For NZ, Meehan *et al.* (2022) found that the underutilised have lower personal and household incomes, are more likely to be younger, have a larger household size and are less likely to have post-graduate tertiary qualifications or be on a permanent contract compared with fully-utilised workers.

Beyond documenting the characteristics of the underemployed, several studies attempt to measure the effect of being underemployed on a range of different outcomes. At the forefront of this research is evidence of the negative impacts of underemployment on wellbeing, particularly mental health. Early research from the US identifies a relationship between lower self-esteem and underemployment in recent school leavers (Prause & Dooley, 1997), and a link between underemployment and depression (Dooley *et al.*, 2000). Australian survey data also reveals that the underemployed have worse mental health outcomes (Milner & LaMontagne, 2017), and finds a negative relationship between underemployment, income and subjective well-being and a positive relationship with welfare dependence (Wilkins, 2007).

2.2. Economic shocks – the Great Financial Crisis

As this study aims to describe the impact of an economic shock on wage trajectories of the underemployed, a brief foray into the literature of economic shocks is included here. Much of this literature relates to the effects of the Great Financial Crisis of 2008 (GFC). In general, studies have found that economic shocks have a larger effect on young people, women and those of lower socioeconomic status (Blanton *et al.*, 2018; Brown, 2010; Horemans *et al.*, 2016; Horn, 2010; Kahn, 2010; Mohindra, 2011; Oreopoulos *et al.*, 2012; Parker *et al.*, 2016).

NZ data shows that new school graduates affected by the GFC suffered a drop in real earnings relative to graduates who finished school before or after the shock, with the effect taking just shy of a decade to dissipate (Scott, 2020; Smart, 2015). This is consistent with findings from Australia, the UK and the US, where those aged 16 to 24 had larger unemployment rates compared to the rest of the working population as a result of the GFC (Kahn, 2010; Oreopoulos *et al.*, 2012; Parker *et al.*, 2016). While examining the effect of the GFC on the underemployed, Nunley, Pugh, Romero, and Seals (2017), found that underemployed recent college graduates were 30% less likely to receive a call-back when applying for jobs.

As for gender, several studies found that women's participation in the labour force was greatly impacted by the GFC (Blanton *et al.*, 2018; Horn, 2010). Women's wages and labour market

participation fell more than men's, and a report by UN Women (2014) found that in developing and transition economies, women were hardest hit by the crisis, but that in industrialised economies the most affected sectors were male-dominated, taking on the brunt of job losses. Finally, several studies also found women-specific negative-health effects of the GFC (Mohindra, 2011; UN Women, 2014).

The manufacturing and construction industries were the hardest hit by the GFC in NZ. Due to the fact that these and other hard-hit industries are male-dominated, males' labour market outcomes were more adversely affected by the downturn in NZ (Stats NZ, 2014). Also in NZ, research which links individuals' numeracy and literacy skills to their labour market outcomes shows that the adverse impact on wage progression was lower for higher skilled individuals during the GFC, but no differences in wage progression were observed during the first year of the COVID-19 pandemic (Dasgupta & Plum, 2022). Moreover, preliminary analysis by Stats NZ suggests that, in contrast to the GFC, female-dominated industries, such as tourism-related industries, were hardest hit during the COVID-19 pandemic (Stats NZ, 2020). Therefore, there is reason to believe the COVID-19 shock may have been different to shocks resulting from business cycle fluctuations.

2.3. Economic shocks – COVID-19

As it pertains to the COVID-19 pandemic, Australian research finds that self-reported economic well-being was 29% lower for those who experienced an economic shock during the COVID-19 pandemic relative to those who did not, and that financial wellbeing inequality increased as a result of the pandemic (Botha, de New, de New, Ribar, & Salamanca, 2021). Work using UK data shows that the labour market shocks experienced by parents during the COVID-19 pandemic had a greater negative impact on earnings and employment for mothers and fathers that were already disadvantaged (Hupkau, Ruiz-Valenzuela, Ispording, & Machin, 2023). Additionally, evidence from US survey data indicates that the COVID-19 pandemic had a disproportionate effect on mothers' labour market outcomes relative to all other groups, with mothers more likely to exit the labour force compared with fathers and non-mothers (Aaronson, Hu, & Rajan, 2021; Heggeness, 2020; Landivar, Ruppanner, Scarborough, & Collins, 2020). Even in cases where both parents were able to continue working remotely during the pandemic, mothers were more likely to scale back their hours (Landivar *et al.*, 2020). Heggeness (2020) shows that mothers in Australian states with school closures were more likely to take leave compared with any other group, highlighting that mothers disproportionately shoulder the burden of looking after children in the household.

Most relevant to our study, Churchill (2020) found that the economic downturn caused by COVID-19 disproportionately affected young, underemployed women. This is consistent with research from Australia that young women were most at risk of contracting the COVID-19 virus (Australian Department of Health, 2020) and were also more likely to work front-line and essential jobs during the pandemic (Cooper & Mosseri, 2020), further increasing their exposure risk. Young women were also more likely to be on casual contracts and more likely to work in the most impacted industries such as food services and retail jobs (Cassells & Duncan, 2020).

3. The COVID-19 pandemic in NZ

NZ's approach to the COVID-19 pandemic was sharp and strict, with the first major move into a strict (level 4) lockdown implemented on the 25th March 2020. Although the impact on non-essential businesses and their staff was instant, the government implemented mitigating policies, such as a wage subsidy. This scheme reached 1.65 million jobs (58% of jobs, excluding sole-traders) by the end of March 2020 (MSD, n.d.). Despite this, permanent layoffs and increases in job seeker support followed (Fletcher, 2020; Fletcher, Prickett, & Chapple, 2013).

Figure 1 presents the stringency of NZ's COVID-19 policy response compared with the OECD average. The spikes in the NZ series correspond to lockdowns. A tiered alert level system was established in March of 2020, with level 1 indicating the lowest risk to the community and the lowest level of

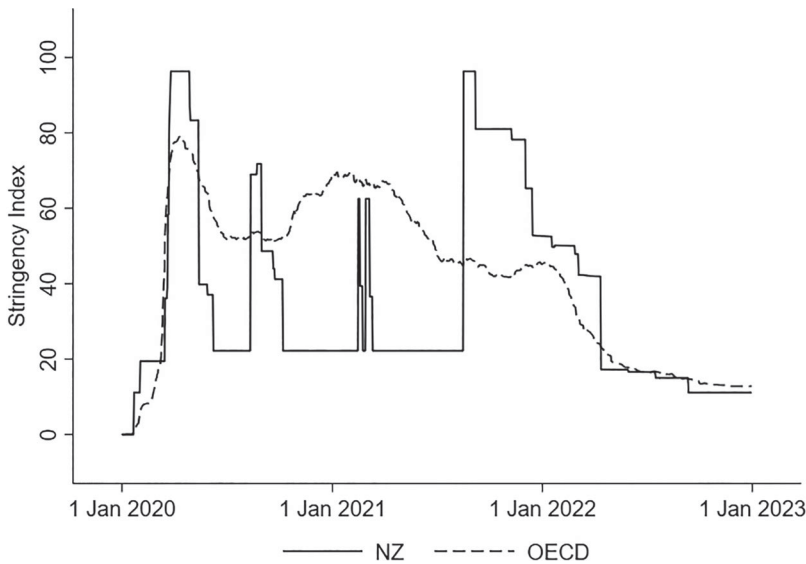


Figure 1. COVID-19 policy response Stringency Index: NZ versus OECD.

Note: OECD is a simple average of OECD countries with available data. Source: Hale *et al.* (2021). Accessed from <https://github.com/OxCGRT/covid-policy-tracker> on 27 January 2023.

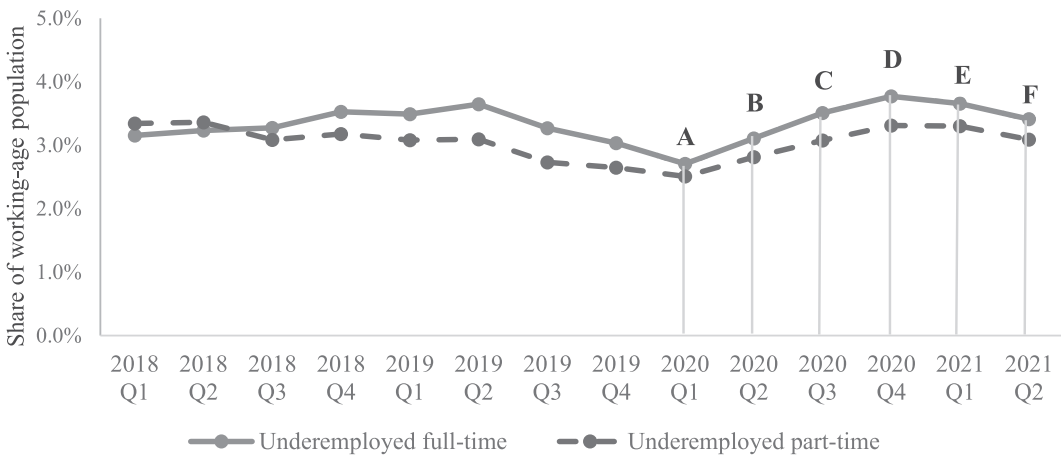


Figure 2. Underemployment and COVID-19 lockdowns in NZ.

Notes: Details of alert level changes A through F can be found in Online Appendix A. Source: NZ HLF5 (2018 Q1 – 2021 Q2), Stats NZ. Authors' compilation.

restrictions, while level 4 indicated the highest risk and thus was accompanied by tough restrictions on movement and gatherings. At level 4, all non-essential businesses were shut,² including schools, universities, gyms, restaurants (including delivery services) and more; individuals were not permitted to mix with other households, were to keep two meters apart from other households when sharing public spaces, keep within 10 km of their residence, and not host any gatherings either in public spaces or in their homes (NZ Government, 2022a). Figure 1 also illustrates that NZ pursued an elimination strategy, with associated lockdowns, longer than other OECD countries. Specific timing details of all alert level shifts, and regions impacted are provided in Online Appendix A.

Figure 2 illustrates the rate of underemployment as a proportion of the working age population (for both groups of full-time and part-time underemployed) over the pre-COVID and COVID-affected

Table 1. COVID-19 wage subsidy payments 2020.

Subsidy	Payment dates	Weeks of pay
Wage subsidy	4 March 2020–9 June 2020	12 weeks
Wage subsidy extension	10 June 2020–1 September 2020	8 weeks
Resurgence wage subsidy	21 August 2020–3 September 2020	2 weeks
Wage Subsidy	28 February 2021–14 March 2021	2 weeks

Source: Work and Income (n.d.a); Work and Income (n.d.b); Ministry of Social Development (n.d.).

time periods. The timing of shifts in alert levels (as detailed in Online Appendix A) are labelled in this figure. NZ experienced two nationwide level 4 lockdowns and two level 3 lockdowns, while the Auckland region experienced two level 4 lockdowns, the second of which lasted longer than for the rest of the country, and four level 3 lockdowns.³ Over this COVID-19 affected period, we see the rate of underemployment rise sharply, before beginning to decrease in the first two quarters of 2021. It appears that the COVID-19 pandemic and the subsequent policy response had a significant effect of the rate of underemployment, especially since the rate was trending down for the three quarters preceding the first quarter of 2020.

One explanation for this trend is the wage subsidy scheme implemented by the NZ Government from the start of the pandemic. The wage subsidy scheme was designed to assist businesses to meet their wage costs during the pandemic, and thus enable businesses to retain workers. The scheme was paid at a flat rate of \$585.80 per week for full-time employees and \$350.00 per week for part-time employees (Work and Income, n.d.a; Work and Income, n.d.b). Since the subsidy was essentially capped, it may have reduced the number of hours workers were paid for, and thus increased the underemployment rate.⁴ The scheme supported 62% of unique jobs in 2020, excluding sole traders, and was paid out in three steps (Ministry of Social Development, 2022). The 2020 wage subsidies covered 22 weeks of pay for eligible businesses, further details on the dates of payments can be found in Table 1.

4. Data

This study uses data from the Household Labour Force Survey (HLFS), which measures a variety of employment statistics and documents a range of individual, household and work characteristics of a representative sample of NZ's working-age population (aged 15 years and over). The survey, administered by Stats NZ, has been conducted quarterly since December 1985. We focus on the period spanning June 2016 to June 2021, as new questions were introduced in June 2016 to identify the underutilised workforce. The HLFS has a rotating panel design in which the same respondents are interviewed over a set number of consecutive quarters and then replaced (on a rotating basis) by a new set of respondents, such that the entire panel is turned over in an eight-quarter period.

4.1. Population of interest

Our population of interest is individuals who are employed (working more than zero hours) but would prefer to work more hours. This group is split into two sub-groups: underemployed full-time, working 30 or more hours per week and underemployed part-time, working less than 30 h per week, as illustrated by Figure 3, below. The underemployed full-time are compared with the fully-utilised full-time, who are full-time workers (working 30 or more hours a week) who are not available to work more hours, or do not want to work more hours, or both. Likewise, the underemployed part-time are compared with the fully-utilised part-time, who are part-time workers (working less than 30 h a week) who are not available to work more hours, or do not want to work more hours, or both. Note that the inclusion of 'underemployed full-time' in the underemployed category is a departure from Stats NZ's official definitions, which categorises those who are 'underemployed full-time' as 'fully

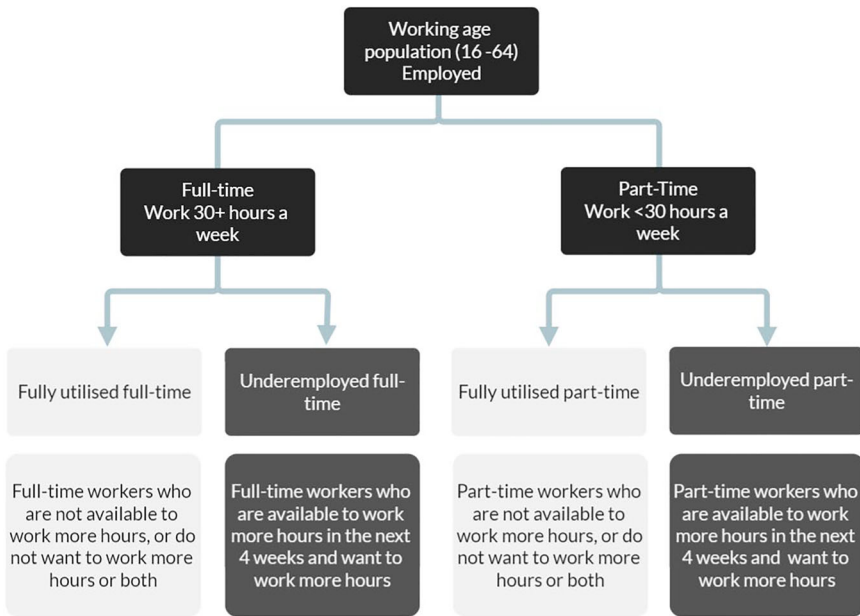


Figure 3. Flowchart of population of interest.

utilised'. We make this departure as an exploratory exercise to understand the nature and prevalence of this labour market group.

The spine of our population of interest is individuals from the HLFS during the pre-COVID period of 2016Q2 to 2019Q4 who were aged 16–64 years. Our focus is on comparing the earnings progression of those who are underemployed relative to those who are fully-utilised. We use a broad definition to capture individuals who have experienced some underemployment. Specifically, an individual is classified as underemployed if they were underemployed in any of the pre-COVID quarters in which they appeared in the HLFS. In comparison, we consider individuals as fully-utilised if they were fully-utilised in every quarter of the pre-COVID period in which they appeared in the HLFS. Individuals who did not fit into either of these categories (i.e. the unemployed, the potential labour force and those not in the labour force) are excluded from the analysis.

We then follow our population of interest in their employment status and wage and salary earnings between January 2018 and June 2021 (explained below). We exclude those who died before the end of this time period (based on Department of Internal Affairs data within the IDI) and individuals who left the country for 90 days or more (based on Ministry of Business, Innovation and Employment border movements data).⁵ Due to data limitations, we exclude those with self-employed income.

As shown in Online Appendix Table B.2., the underutilised workers are younger, on average, than their fully-utilised counterparts, have a lower proportion with a Bachelor's qualification or higher, and have lower employment rates. Part-time workers have a higher proportion of females regardless of underutilisation status, compared to full-time workers, and have a larger household size, with more dependent children on average. Previous research examining HLFS over the same time period also highlights that the number of hours worked by the underemployed are very similar to that of fully-utilised workers (Meehan *et al.*, 2022). Full-time (part-time) underemployed workers have an average usual number of hours per week of 40.1 (15.3) versus 41.0 (16.2) for fully-utilised full-time (part-time) workers. Results for actual hours worked per week are similar – 35.5 (14.0) for full-time (part-time) underemployed workers versus 36.9 (14.8) for fully-utilised full-time (part-time) workers.

4.2. Outcome variables

We use Inland Revenue data to obtain information on individual wage and salary earnings on a monthly level to construct our outcomes of interest. We consider only wage and salary earnings as these are available on a monthly basis, whereas self-employed income is generally only available on an annual basis.

We construct two main outcome variables. First, whether or not an individual is employed in a given month, where employed is defined as having positive wage or salary earnings. Second, earnings progression, which is based on an individual's total wage and salary earnings from all sources in a given month. Earnings progression is defined on an annual basis as the difference between the log of earnings in the reference month relative to 12 months prior, for each individual-month observation. Information on hours worked is not available in IR data for the entirety of our sample timeframe, and we therefore examine total earnings progression rather than hourly earnings progression. Our constructed dataset from the IDI consists of a balanced panel of 42 monthly employment and earnings observations for each individual in our population of interest from January 2018 to June 2021.

We provide means of all outcomes of interest as well as work-related characteristics of the full sample in Online Appendix Table B.2.,⁶ and note that on average, underutilised full-time (part-time) workers make \$1,981.91 (\$222.57) less than fully-utilised workers, have a higher proportion of those who changed employers in the last 12 months, have roughly double the benefit uptake and have lower proportions of Managers, Professionals, Clerical and Administrative Workers, and higher proportions of Technicians and Trade Workers, Sales Workers (especially those working part-time), Community and Administrative Workers, Machine Operators and Drivers, and Labourers.

We include a number of individual and household characteristics for the employment regression (see Equation 1 below), and individual, household and work-related characteristics for the earnings progression regression in (see Equation 2 below). The majority of these are sourced from the HLFS. These variables are taken at one point in time, when the individual first appears in the HLFS in the pre-COVID period. The individual and household characteristics include age as a continuous variable as well as age squared, a gender variable coded as 1 if the individual identifies as female and zero otherwise, dummy variables for regional council area, prioritised ethnicity, highest educational attainment and deprivation decile (all of which are defined in Online Appendix Table B.1.).

A small number of further work-related variables are obtained from Inland Revenue (IR) and linked employee-employer data (LEED) and included in the earnings regression in Equation (2). This includes whether an individual changed primary employers. It is important to capture this movement as the literature consistently finds that movement between employers is associated with increased wages (see for example Johnston & Lee, 2012 and Chadi & Hetschko, 2020). For individuals with multiple employers, we used data on the primary employer from whom the individual was earning the highest level of wages and salaries per month. An individual is deemed to have changed employers when the primary employer changed relative to 12 months prior. We also derive information on the industry of the individual in their role with their primary employer. The final work-related variable that is included is an individual's earnings 12 months prior to the reference month.

5. Method

We use a difference-in-differences empirical strategy to capture the effects of COVID-19 on employment by estimating the following model using a probit regression:

$$y_{i,t} = \alpha + \beta \text{Under}_i + \sum_{\text{year}} \delta \text{year}_{i,t} + \sum_{\text{year}} \theta \text{year}_{i,t} \times \text{Under}_i + \eta X_i + u_{it} \quad (1)$$

where $y_{i,t}$ is 1 if individual i is employed at time t and 0 otherwise. If an individual is underemployed in the pre-COVID period then $\text{Under}_i = 1$, and 0 if the individual is fully-utilised (see Section 4 for detailed definitions). We also control for year-specific effects and interact the underemployment

variable with year, which helps us identify differences in the impact of the COVID-19 pandemic across the two labour market utilisation states. We also control for a range of individual and household characteristics indicated by X_i (as detailed in Section 4), including month fixed effects. We cluster all our standard errors at the individual level, and u_{it} is an idiosyncratic error term.

For our main regressions on earnings progression, we limit focus to those who are ‘continuously’ employed – defined as individuals who were employed in the reference month as well as 12 months prior. We provide descriptive statistics for this sample in Online Appendix Table B.3. We estimate the following model:

$$\Delta y_{i,t} = \alpha + \beta \text{Under}_i + \sum_{\text{year}} \delta_{\text{year}_{i,t}} + \sum_{\text{year}} \theta_{\text{year}_{i,t}} \times \text{Under}_i + \eta X_i + u_{it} \quad (2)$$

where $\Delta y_{i,t}$, is the change in earnings for individual i at month t . More specifically, it is the change in log earnings between time $t-12$ and t . We include the same explanatory variables as in Equation (1) and cluster standard errors at the individual level. Note that although we employ a difference-in-differences method, for both employment and earnings, our aim is to describe the changes that may have occurred over the COVID-affected period rather than make causal inferences.

For employment, we examine two pre-COVID years (2018/2019 and 2019/2020) and one COVID-affected period (2020/2021). For earnings progression, since we are examining the change in earnings rather than the level (as with employment), we examine one pre-COVID year (2018/2019) and two COVID-affected periods (2019/2020 and 2020/2021). For both employment and earnings progression, 2018/2019 is the base year. Thus, the labour-market-group specific differences in employment (earnings progression) compared to the base year (2018/19) for 2019/2020 and 2020/2021 is δ_{year} for the fully-utilised and $\beta + \delta_{\text{year}} + \theta_{\text{year}}$ for the underemployed. Further, we calculate the marginal difference between the underemployed and fully-utilised as β in the base year and $\beta + \theta_{\text{year}}$ in subsequent years.

6. Results

6.1. Employment

As a first step, we consider the impact on an individual’s employment status in the COVID-affected period relative to the pre-COVID period. Recall that for the employment regression we include two pre-COVID periods (2018/2019 and 2019/2020) and one COVID-affected period (2020/2021), with 2018/2019 being the base reference year. First, we directly compare the underemployed and fully-utilised in each year by examining the marginal difference in employment between the two groups. Then, to gain more insights into the outcomes of each group, we look at the marginal employment effects for the underemployed and fully-utilised separately relative to the base year. A full set of regression results are provided in Online Appendix Table B.4. In terms of the covariates other than the main ones of interest, the signs of the coefficients are as expected. The likelihood of employment increases with age but at a decreasing rate, women are less likely to be employed, those with higher qualifications are more likely to be employed, and so forth.

Table 2 shows the marginal difference between the underemployed and fully-utilised in each year. That is, from Equation (1), β in the 2018/19 base year and $\beta + \theta_{\text{year}}$ in 2019/20 and 2020/21. As expected, the underemployed experienced a lower likelihood of being employed relative to the fully-utilised all three years. This difference is just over 6 percentage points in 2018/19, and widens somewhat in 2019/2020 to close to 7 percentage points. However, it is notable that during the COVID-affected period of 2020/21, the employment gap closes, dropping to just over 5 percentage points.

To get a better sense of the different employment changes of the fully-utilised versus underemployed, Table 3 compares the impact for fully-utilised and underemployed individuals separately relative to the base year. That is, we examine δ_{year} from Equation (1) for the fully-utilised and

$\delta_{year} + \theta_{year}$ for the underemployed. We find that the fully-utilised workers were 3 percentage points less likely to be employed in 2019/20 relative to 2018/19. This negative employment trend continued during COVID increasing to 5 percentage points in 2020/21, relative to the reference period of 2018/19. The underemployed were close to 4 percentage points less likely to be employed in 2019/20 relative to 2018/19. This negative trend did not widen further in 2020/21, remaining as a 4 percentage point decrease relative to the reference period of 2018/19.

On the face of it, these results seem somewhat surprising as the underutilised workers have less favourable characteristics (e.g. more likely to be in lower-paid and/or precarious jobs), and existing literature would therefore suggest that they should fare worse in the face of economic shocks such as COVID-19. However, there are several possible reasons why the employment rates of underutilised workers were not as affected by the pandemic as those of fully-utilised workers. First, the demand for lower-skilled workers may have been more buoyant during the pandemic due to the high demand for essential workers (e.g. supermarket workers, courier drivers etc.). Second, the government's wage subsidy payments were a flat rate and thus, represented a larger proportion of a low-income earner's total wages. As such, the wage subsidy may have been more effective at protecting lower-paid jobs, which, in turn, may have meant it was better at protecting the jobs of underemployed individuals (since they are more likely to work in low-paid roles).

Another possibility is that the employment outcomes of fully-utilised workers are less favourable as they are fully employed for all of the pre-COVID period and therefore more likely to choose to exit employment (e.g. due to retirement). In contrast, the underemployed job are underemployed for at least one period in the pre-COVID period and may have been unemployed, not in the labour force or fully-utilised during some of the pre-COVID period. Thus, their employment rate in the COVID-affected period could have improved more as some underemployed were not in employment during some of the pre-COVID quarters. However, previous research using HLFS data over the same time

Table 2. Marginal employment effects: Underemployed relative to fully-utilised.

Year	Marginal employment effects
2018/19	−0.0615*** (0.00664)
2019/20	−0.0684*** (0.00699)
2020/21	−0.0524*** (0.00722)

Notes: *, **, and *** denote statistical significance at the 10, 5, and 1 percent—levels, respectively. Employment status of the underemployed relative to the fully-utilised is β in 2018/19 base year and $\beta + \theta_{year}$ in subsequent years from Equation (1).

Table 3. Marginal employment effects: Relative to base year.

Year	Marginal employment effects	
	Fully-utilised (1)	Underemployed (2)
2018/19		reference
2019/20	−0.0298*** (0.00145)	−0.0367*** (0.00449)
2020/21	−0.0491*** (0.00237)	−0.0400*** (0.00631)
Individual and household characteristics		Yes
Weighted observation count		670,131

Notes: *, **, and *** denote statistical significance at the 10, 5, and 1 percent—levels, respectively. Employment status relative to the base year is δ_{year} for the fully-utilised and $\delta_{year} + \theta_{year}$ for the underutilised from Equation (1).

period shows that about 90% (66%) of those who are fully-utilised full-time (part-time) in one quarter remain fully-utilised in the next quarter and 97% (89%) remain employed in some form (either fully-utilised or underemployed), with only about 3% (11%) exiting employment (i.e. moving into unemployment, the potential labour force or not in the labour force) (Meehan *et al.*, 2022). A lower share of those who are underemployed are in some form of employment the next quarter – 94% (83%) of those who are underemployed full-time (part-time) remain in some sort of employment the next quarter, while 6% (17%) are no longer in any form of employment. One-year transitions over a slightly shorter time period (2016Q2-2018Q2) show a similar pattern of the fully-utilised being more likely to be in some form of employed after a year than the underemployed (96% versus 92%) (Erwin *et al.*, 2019). While these transition patterns do not rule out the possibility that those who are fully-utilised in the pre-COVID period have lower employment rates in the COVID-affected period due to the way the fully-utilised versus underemployed group are defined, they do suggest that the difference in employment levels are not likely to be driven entirely by this factor.

6.2. Earnings

Next, in order to examine earnings, we limit focus to those who are ‘continuously’ employed – defined as individuals who were employed in the reference month as well as 12 months prior, and estimate Equation (2). As mentioned earlier, in the earnings regression, because we are considering the change in earnings over a 12-month time frame, we now have two COVID-affected periods of 2019/20 and 2020/21. The results for the change in earnings regressions are shown in Tables 4 and 5 and are provided for the full sample, as well as the sub-samples of full-time and part-time. As with the employment results, Table 4 presents marginal effects for the underemployed versus the fully-utilised in each year, while Table 5 presents marginal effects relative to the base year for the underemployed and fully-utilised separately. Full regression results for the full sample, full-time workers and part-time workers are provided in Online Appendix Table B.5.

For the full sample, relative to the fully-utilised, the underemployed had lower earnings progression in all years (Table 4, Column 1). Earnings growth in the pre-COVID reference year was about 6.4% lower for the underemployed relative to the fully-utilised. Across the pandemic years, the gap in earnings growth between the two groups got smaller, decreasing to a 4.7% difference in 2019/20 and to just under 4% in 2020/21. Unfortunately, due to data limitations, we cannot assess whether these changes over time are due to a change in hourly earnings or a change in hours worked. However, it should be kept in mind that those who are underemployed may have been more likely to increase the number of hours they worked given they, by definition, were willing and available to do so, while the fully-utilised, by definition, were not.

Restricting attention to the full-time underemployed (Table 4, Column 2), earnings progression was 3.9% lower than their fully-utilised counterparts in the pre-COVID period, remained similar at

Table 4. Marginal earnings progression: Underemployed relative to fully-utilised.

Δ_{year}	Full sample (1)	Full-time (2)	Part-time (3)
2018/19	-0.0644*** (0.00796)	-0.0388*** (0.00753)	0.0311 (0.0198)
2019/20	-0.0469*** (0.00688)	-0.0416*** (0.00681)	0.0392** (0.0177)
2020/21	-0.0395*** (0.00828)	-0.0199** (0.00841)	0.0184 (0.0206)

Notes: *, **, and *** denote statistical significance at the 10, 5, and 1 percent-levels, respectively. Earnings progression of the underemployed relative to the fully-utilised is β in 2018/19 base year and $\beta + \theta_{year}$ in subsequent years from Equation (2).

4.2% lower in the first COVID-affected period, and decreased to 2% lower in the second COVID-affected period.

For the part-time sub-group of underemployed (Table 4, Column 3) – their earnings trajectory is quite different and, in fact, there is no statistically significant difference compared to their fully-utilised counterparts in the pre-COVID period of 2018/19. They experienced greater earnings growth (3.9%) in the first year of the pandemic relative to fully-utilised part-time workers. In the second pandemic year, they appear to return to the pre-COVID setting of no significant difference in earnings progression relative to fully-utilised part-time workers.

Table 5 looks at the earnings progression for the underemployed and fully-utilised separately in the pre-COVID and COVID-affected years. Relative to the pre-COVID period, the earnings of the fully-utilised (Table 5, Column 1), dropped by 1.4% initially, but then increased by 2.8% relative to the base year. The figures are similar when we focus on fully-utilised full-time workers (Table 5, Column 3) – their earnings trajectory drops by 1.8% in the first COVID-affected period and then bounces up to be an increase by 2.3% in the second COVID-affected period, relative to the base year. These patterns align with macroeconomic labour market trends whereby COVID initially led to labour market slack, but later in the COVID-affected period, the labour market was buoyant.

For the fully-utilised working part-time however (Table 5, Column 5), there is an increase in both years following the beginning of the COVID pandemic. Initially earnings growth increased by 7.8%, followed by a 16% increase relative to the pre-COVID period. Note that earnings increases can come via an increase in hours or an increase in hourly earnings, and unfortunately we cannot differentiate between the two sources of earnings increases due to data limitations. It is fairly plausible that both mechanisms are at play for this population of interest. As shown in Online Appendix Table B.2., part-time workers, whether fully-utilised or underemployed, are more likely to be in lower-skilled roles and thus they likely experienced two rises in the minimum wage, one of 6.8% and one of 5.8% (in April 2020 and April 2021).⁷ Further, demand for hours of work for lower-skilled roles may have been more abundant during the pandemic due to an increase in demand for essential workers such as supermarket and security workers. While the regression includes controls for industry, occupation and qualification which should account for at least some of this effect, there may be residual effects.

For the underemployed, as shown in Table 5, Column 2, in aggregate they experienced no earnings growth in the first COVID-affected time period of 2019/20 and a 5% increase later in the pandemic in 2020/21, relative to the reference year of 2018/19. The patterns are quite different for underemployed full-time versus part-time workers. For the former (Table 5, Column 4), they actually experience a dip in their earnings trajectory at the start of the pandemic (just like their fully-utilised counterparts), then an earnings upswing of 4% relative to the reference year. For the latter (Table 5, Column 6, i.e.

Table 5. Marginal earnings progression: Relative to base year.

Δ_{year}	Full sample		Full-time		Part-time	
	Fully-utilised (1)	Underemployed (2)	Fully-utilised (3)	Underemployed (4)	Fully-utilised (5)	Underemployed (6)
2018/19			Reference			
2019/20	-0.0136*** (0.00244)	0.00392 (0.00921)	-0.0176*** (0.00224)	-0.0204** (0.00874)	0.0778*** (0.0136)	0.0857*** (0.0197)
2020/21	0.0276*** (0.00354)	0.0525*** (0.0107)	0.0231*** (0.00330)	0.0419*** (0.0102)	0.159*** (0.0192)	0.146*** (0.0250)
Individual and household characteristics		Yes		Yes		Yes
Work-related characteristics		Yes		Yes		Yes
Weighted observation counts	562,458		493,416		69,042	

Notes: *, **, and *** denote statistical significance at the 10, 5, and 1 percent-levels, respectively. Earnings progression relative to the base year is δ_{year} for the fully-utilised and $\delta_{year} + \theta_{year}$ for the underutilised from Equation (2).

underemployed workers who work part-time) they had an increase in their earnings progression in both COVID years, equating to nearly 9% in 2019/20 and close to 15% in 2020/21, relative to the reference year. As indicated earlier, this could be driven by both an increase in hours and an increase in their hourly earnings rate. While we cannot quantify these two possibilities, it may be that the larger increase in earnings among part-time workers at least partly reflects their greater ability to increase their earnings via an increase in hours compared with full-time workers.

7. Conclusion

This paper explores the impact of the COVID-19 pandemic on earnings progression for underutilised workers, with a particular focus on the underemployed. This study provides new insights into the labour market outcomes of underemployed individuals, particularly the full-time underemployed who are often not included in official statistics. We used a difference-in-differences approach to analyse data from the HLFS linked to Stats NZ's IDI. Our findings reveal that underemployed workers experienced no earnings growth in the first COVID-affected time period of 2019/20, but a 5% increase in the later pandemic period of 2020/21, relative to the pre-COVID reference year of 2018/19.

Additionally, we find that the earnings trajectory of the underemployed full-time workers dipped at the start of the pandemic but recovered with a 4% increase in earnings progression relative to the reference year, whereas underemployed part-time workers experienced an increase in their earnings progression in both pandemic years. The increase in earnings progression for part-time underemployed workers must have been driven by an increase in either their hourly earnings rate, an increase in their hours worked, or both. However, due to data limitations, we cannot know for sure if either of these mechanisms had a greater impact than the other.

We found that the gap in earnings progression between the underemployed and fully-utilised decreased during the pandemic years, indicating that the pandemic may have had a levelling effect on earnings progression for these groups. The findings suggest that while underemployed individuals were more likely to experience future spells out of employment before the pandemic, the gap in earnings growth between the underemployed and fully-utilised decreased during the pandemic years.

Our results contrast with previous research findings that more vulnerable groups, such as the underemployed, tend to fare worse during periods of economic shocks. However, it is in line with previous NZ research that finds that while low-skilled individuals had lower earnings progression during the GFC than higher-skilled individuals, this was not the case during COVID-19. We postulate that there were a number of factors that led to the COVID-19 period being different to previous shocks. First, the government's wage subsidy scheme was paid at a flat rate, therefore covering a higher share of lower-paid workers' wages. Since lower-paid workers are also more likely to be underemployed workers, this may have meant the wage subsidy scheme was more effective at protecting the jobs of underemployed workers relative to fully-utilised workers. Second, the demand for low-skilled essential workers was high during the pandemic, which may have allowed underemployed workers to increase their hours and/or hourly earnings to a greater extent than fully-utilised workers. Third, underemployed workers, particularly those working part-time, are likely to have benefited more than the 2020 and 2021 increases in the minimum wage than fully-utilised workers.

Overall, our study contributes to the small body of literature on underemployment and the labour market effects of COVID-19, while also being the first to examine the effect of economic shocks on wage progression by labour market status in NZ.

Notes

1. The remaining two groups that make up the underutilised are the unemployed who are not working but are available to work and are actively seeking work, and the potential labour force who are not working but are either available or actively seeking work, but not both.
2. Essential services included supermarkets, health services such as hospitals and pharmacies, postal delivery services, sanitation services and emergency services.

3. At level 3, individuals could not socialize outside of their household bubbles, with the exception of small gatherings (up to 10 people) for weddings and funerals. Non-essential services could operate with contactless delivery or pick-up options. Inter-regional travel remained restricted (NZ Government, 2022a).
4. For example, a full-time employee working 40 h a week on the minimum wage would ordinarily have made \$708 before tax in March 2020.
5. This exclusion is made because IR earnings data would be misleading for those who were living overseas for a substantial part of the time period, and presuming many of these people are working overseas, so they may have very different earnings trajectories.
6. We also provide means of all outcomes of interest as well as work-related characteristics of those continuously employed in Online Appendix Table B.3.
7. The minimum wage increased on 1 April 2020 by \$1.20 (from \$17.70 to \$18.90 per hour) and again on 1 April 2021 by \$1.10 (to \$20.00 per hour) (NZ Government, 2022b).

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Disclaimer

Access to the data used in this study was provided by Stats NZ under conditions designed to give effect to the security and confidentiality provisions of the Data and Statistics Act 2022. The results presented in this study are the work of the authors, not Stats NZ or individual data suppliers.

These results are not official statistics. They have been created for research purposes from the Integrated Data Infrastructure (IDI) which is carefully managed by Stats NZ. For more information about the IDI please visit <https://www.stats.govt.nz/integrated-data/>.

The results are based in part on tax data supplied by Inland Revenue to Stats NZ under the Tax Administration Act 1994 for statistical purposes. Any discussion of data limitations or weaknesses is in the context of using the IDI for statistical purposes, and is not related to the data's ability to support Inland Revenue's core operational requirements.

All counts are rounded in accordance with Stats NZ requirements. Component counts may not add to totals due to rounding.

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