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The career paths and employment transitions of Early Childhood Education workers

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Abstract

This research note analyses the career paths and labour market outcomes of the early childhood education (ECE) workforce. Several data sources are used to complement and cross-check each other. Using tax data, we find that turnover in the ECE sector involves younger and less qualified workers. Entrants and exiters are much less attached to the ECE sector than workers who continue in the sector. A large share of entrants continue to work mainly in non-school industries after entry into ECE, and a large share of exiters already work mainly in these industries before leaving ECE. There are limited worker flows between ECE and the school sector. We also find that ECE and Primary school teaching graduates have largely similar employment and earnings prospects after graduation. Using the Household Labour Force Survey and Census data, we find that about 70% of workers in 'Pre-school education' are teachers, compared with under 50% in 'Childcare services' and just over 50% in 'Primary education'. Workers in Primary schools have higher earnings on average than those in the ECE sector. However, this is likely because Primary school workers work more hours, are older and better qualified than ECE workers. The pay gap between the two sectors has narrowed over time, due to the relative increases in hours worked and qualifications of workers in the ECE sector.

JEL codes

I28, J24, J31

Keywords

early childhood education, education, teachers, careers

Haiku

ECE careers
Similar prospects to schools
But work fewer hours

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1 Introduction

The Early Childhood Education (ECE) sector has changed over the last decade from comprising mainly community-based, not-for-profit services to comprising mainly privately-owned services. With the increase in demand for ECE, there has also been an increase in the demand for ECE staff. Although the Ministry of Education (MOE) has information on the ECE sector from the Early Learning Information (ELI) system and annual ECE Census, the information available is primarily about the service providers and the children that attend these services. There is limited information about the ECE teaching and non-teaching workforce.

This study follows on from a recent study of the characteristics of the ECE workforce by Hyslop and Le (2019) to examine the career paths and dynamics of workers in the ECE sector. Specifically, the study seeks to address the following questions:

1. What is the career path of staff working in ECE?
2. What is the career path of qualified ECE teachers?
3. What proportion of staff working in ECE are teachers?
4. What are ECE staff paid and how does it compare to other industries?

We again use data from the Integrated Data Infrastructure (IDI), matching the employment and earnings experiences of workers in the ECE industries with qualifications information from the MOE sources. In order to provide a baseline comparison, we also examine the experiences of workers in primary school education.

The study covers 2001-2018, which is the entire period currently available in the IDI. Using administrative data, we adopt an event study approach to describe the career paths of ECE sector and primary education workers, in which we focus on the cohort of workers who are employed in these sectors in 2010.[1] We then track their employment and earnings patterns over the period before and leading up to 2010, and also over the period following 2010. As well as the full cohorts of ECE and primary education workers, we also distinguish two subgroups: first, the 'entrants' subgroup who are first observed working in the sector in 2010; and second, the exiters' subgroup who are last observed working in the sector in 2010. These allow us to abstract from the potentially mid-career patterns of established workers, and focus on the pre- and early-career experiences of the entrants before and during their early years in each sector; and similarly, focus on the late- and post-career experiences of the exiters.

Because the administrative data does not identify a worker's occupation, the analysis of the 2010 cohort of workers in the ECE and primary education industries, includes both teachers and non-teachers. In an attempt to separate teachers from other workers in these sectors, we conduct

[1]We have repeated the analysis for the cohorts of workers employed in the ECE and primary education sectors in 2007 and 2013, and found the results are robust to the choice of focal year. The 2010 cohort is selected as the mid-point of the sample observation period, allowing the career paths to be followed for eight years before and after 2010.

a parallel study of the 2010 cohort of graduates with ECE and primary education teaching qualifications.

As well as the absence of occupation measures, the administrative data also does not include the number of hours worked. To address these shortcomings, we supplement our main analysis using data from the Household Labour Force Survey (HLFS) and the Census. These two sources collect information on each worker's occupation as well as their industry, which enables us to identify those who work as teachers versus other occupations in the ECE and primary education sectors. The HLFS and Census also collect information on hours worked, and weekly earnings (HLFS-Income Supplement in June) or annual income (Census), which enables us to estimate and compare the work intensity (i.e. hours worked) and remuneration (hourly wages, weekly earnings or annual income) of workers across occupations and industries.

The note is organised as follows. In the next section we describe the data sources to be used. Section 3 describes the characteristics and career paths of ECE workers and ECE teaching graduates using EMS data. Section 4 analyses earnings, wage rates and self-employment rates of ECE teachers and other ECE workers based on HLFS and Census data. Note that the EMS analysis covers employment in any occupation within the industry, due to the lack of occupation data in the EMS data, whereas HLFS and Census analyses are able to distinguish between teachers and non-teachers. Where possible we compare ECE workers (teachers) with Primary school workers (teachers). Section 5 summarises.

2 Data

This study uses data from Statistics New Zealand's IDI, an integrated data environment with longitudinal microdata about individuals, households and firms. The data are obtained from several sources, including sample surveys, tax records and other administrative sources. In order to examine workforce dynamics, we need data on personal employment, qualifications and personal demographics.

We define the ECE sector as comprising two 2006 Australian and New Zealand Standard Industrial Classification (ANZSIC06) industries: P801000 (Pre-school Education) and Q871000 (Childcare Services). ECE workers are defined as those who work in either of these two industries. The 'Childcare services' industry also includes outside school-hours care, which is in the 'school-aged' rather than 'early childhood' sector, so this definition will overstate the ECE workforce but this is the best we can do given the available data.

2.1 EMS and MOE qualifications data

To address the first two research questions (what is the career path of staff working in ECE, and what is the career path of qualified ECE teachers), we use data on worker's employment and earnings from the Employer Monthly Schedule (EMS). Each month all employers file an EMS

record with Inland Revenue, which lists all employees at that firm in the month, the amount of income they received, and the amount of tax that was deducted at source. From this we can calculate, among other things, gross earnings and employment duration for each paid job for each person. In addition to wage and salary earnings, the EMS data also includes pay-as-you-earn (PAYE) tax withheld, payments from government benefits, student allowances, paid parental leave, ACC compensation and NZ Superannuation. At the time of analysis, the EMS data cover April 1999 to September 2019, so there are almost 20 years of longitudinal monthly data on wages and benefits, allowing us to examine people's labour market history.

EMS data are on a monthly frequency, which we aggregate to the calendar year, to correspond to the academic year in New Zealand. We focus on all workers who work in the ECE sector[2] during the year. A worker might work in multiple jobs concurrently or change from one job to another in the same year. Thus, a worker might be involved in several industries in a year. Given this, for each ECE worker we define their primary industry as the industry with their highest earnings in the year.

Data on qualifications are from the MOE's data on course completion at the tertiary level.[3] These data provide detailed information on provider code, qualification level code, subject code, completion year, etc. From this we can derive the highest qualification obtained to date, and whether a person has an ECE teaching qualification to date.[4] Both of these measures will likely understate the number of qualified workers because they do not record qualifications obtained before 2003 or overseas. Finally, basic personal demographic characteristics are derived from date of birth, sex and ethnicity available in one of the central IDI tables (data.personal_detail), which is Statistics NZ's best assessment of a person's characteristics based on multiple sources available in the IDI. Immigrant status is inferred from citizenship, domestic student status and funding source in the MOE's data on tertiary enrolments and courses.[5]

2.2 Household Labour Force Survey and Census

There are at least two significant shortcomings of the EMS data for our analysis. First, the EMS does not include information on a worker's occupation. Because of this, although we can identify

[2] As in Hyslop and Le (2019) ECE workers are defined as those who work in plants whose ANSIC06 code in the Business Register is either of the two ECE industries. The numbers are about 2-3% lower if we define ECE workers as those who work in *enterprises* whose ANZSIC06 code is either of the two. That approach ignores ECE workers employed in ECE roles but by a non-ECE firm, such as teachers at a crèche provided by a university. Either way, this definition understates the ECE workforce by not covering self-employed who do not pay themselves a wage.

[3] Even though MOE completion data are available from 2000, pre-2003 data had a poor matching rate into the IDI due to the lack of the National Student Index (NSI). As a result, older cohorts of workers (i.e. those who completed their tertiary education before 2003) will tend to appear to have lower rates of qualifications in the data.

[4] Warren Smart identifies 123 ECE teaching qualifications which can lead to registration with the Teaching Council. In the absence of data on ECE teacher registration, this study assumes that a worker with at least one of such qualifications is a qualified ECE teacher.

[5] We classify immigrants as those who ever appear in the MOE course data as a non-NZ citizen, a non-domestic student, a full fee paying foreign student, and English for Migrants student, or a Ministry of Foreign Affairs and Trade sponsored student. These criteria are likely to understate immigrants, as people who became residents before entering tertiary education (and thus appear in MOE data as domestic students) are not distinguished from NZ born.

all workers who work in ECE (or Primary education) industries, we are unable to distinguish teachers from workers in other occupations in these industries.

Second, the EMS reports monthly earnings, but does not include any information on hours worked, so we cannot identify part-time and full-time workers. Thus, while this study provides reliable measures of monthly earnings for ECE workers, they are not full-time equivalent measures and should be used with caution, especially in comparison with sectors which have different patterns of working hours.[6] This may be potentially problematic if there are significant fractions of workers who work part-time in the ECE industry.

In order to assess the extent of these issues, we supplement our longitudinal analysis of the EMS and MOE data with some analysis from the Household Labour Force Survey (HLFS) and the Census of Population and Dwellings. Each of these data sources collects information on occupations and hours worked by workers on their current jobs. In addition, the HLFS has an annual 'income supplement' (also called the New Zealand Income Survey, NZIS) to the June quarter survey that collects information on weekly earnings which, together with the hours worked, can be used to estimate workers hourly wage; while the Census collects information on individuals' annual income, reported in categorical income bands. These two data sources can address the last two research questions (what proportion of staff working in ECE are teachers, and what are ECE staff paid and how it compares to other industries).

2.2.1 Household Labour Force Survey

The HLFS is a large representative survey of the resident population, consisting of about 15,000 households each quarter. In addition to its primary focus of labour market activity, the HLFS also collects information on the demographic characteristics of respondents. The HLFS has been conducted since 1986, with periodic changes; the IDI includes the HLFS quarterly samples since the surveying moved to computer-aided interviewing in 2006. Because of a substantial survey redevelopment that took effect in 2016, our analysis focuses on data from quarterly samples over the period 2016Q2–2019Q3. This provides 14 quarters of main survey, and four quarters of the annual NZIS.

For our HLFS analysis, we select all workers either whose main occupation is as an ECE or Primary school teacher, or who work in ECE or Primary school education. Specifically, we select workers' whose main job's occupation is either ECE teacher (Australian and New Zealand Standard Classification of Occupations, ANZSOC 241111, 241112) or Primary School teacher (241211, 241212, 241213), or whose main job's industry is either Pre-school Education (ANZSIC06 P801000), Childcare Services (Q871000) or Primary Education (P802100). We focus

[6] Fabling and Maré (2015) address the absence of hours using a few assumptions. The authors believe that their adjusted labour input measure is still an overestimate of the actual labour input for many workers, but it is superior to a simple headcount approach. Applying their approach is beyond the scope of this study.

primarily on the characteristics and outcomes of people who work in the ECE industries, and use those in primary education as a comparison group.

2.2.2 Census of Population and Dwellings

The Census provides population-level coverage of characteristics and activity on a five-yearly frequency (seven years between the 2006 and 2013 Censuses because of the February 2011 Christchurch earthquake). We use this information to supplement that from the HLFS over the three most recent Census periods – i.e. 2006, 2013, and 2018. Because it covers the full population, the census has the advantage of providing larger samples for analysis than the HLFS, but at the disadvantage of not being a dedicated labour market activity survey. In this regard, the primary weakness is that it only collects individuals' total annual income, and furthermore this is collected in categorical bands. As it also collects hours worked per week on individuals' main and other jobs at the time of the census, estimates of an hourly wage measure are expected to be less reliable than those derived from the HLFS data.

3 EMS analysis

This section presents and discusses the analysis of the career paths of ECE sector workers, in comparison to primary education workers, using the administrative EMS data. This discussion focuses on the analysis of the 2010 cohorts of workers in the ECE and primary education sectors, and separately the 2010 cohort of graduates with ECE and primary education teaching qualifications. The results presented and discussed here are broadly comparable to those based on analyses of 2007 and 2013 cohorts or workers and graduates.[7] The section ends with a brief discussion of self-employment in the ECE sector.

3.1 Descriptive statistics of ECE workers

We begin by describing the characteristics and career experiences of ECE workers based on EMS data. Where possible we disaggregate the analysis by the two ECE industries: Pre-school and Childcare services.

3.1.1 Characteristics of ECE workers

Table 1 describes the demographic characteristics of several types of ECE workers in 2010. The first three columns cover all ECE workers, the next three cover workers in the 'Pre-school education' industry only, and the last three cover the 'Childcare services' industry only. In 2010 over 47,000 people worked in ECE. The average age of ECE workers in 2010 was 36.9 years. The

[7] As discussed in Hyslop and Le (2019), and in line with broad demographic changes, ECE and primary education sector workers tend to become older, more qualified, more likely to be migrants and non-Pakeha, and slightly less likely to be females. We also find slightly less worker turnover in the sectors across the cohorts.

overwhelming majority of ECE workers (93%) were female and 14% were migrants.[8] In terms of ethnicity, 63% were European, 19% were Māori or Māori-European, 5% were Pacifika and 7.8% Asian. This ethnic composition suggests that the share of people of Māori or Māori-European ethnicities in the ECE workforce is similar to their share in the population.[9]

Table 1: Characteristics of ECE workers 2010

	All ECE			Pre-school education only			Childcare services only		
	All	Entrants	Exiters	All	Entrants	Exiters	All	Entrants	Exiters
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
N workers	47,022	10,185	7,959	32,346	7,095	5,547	17,364	5,250	4,443
Mean age	36.9	31.6	34.0	38.0	33.1	35.5	34.7	30.5	32.4
Female	0.927	0.869	0.867	0.940	0.902	0.898	0.910	0.865	0.875
Migrant	0.143	0.162	0.126	0.138	0.155	0.121	0.160	0.182	0.153
Has ECE qual	0.231	0.048	0.047	0.245	0.092	0.081	0.234	0.087	0.129
Ever has ECE qual	0.342	0.184	0.060	0.353	0.233	0.108	0.361	0.241	0.179
Ethnicity									
European	0.627	0.574	0.585	0.610	0.566	0.566	0.667	0.625	0.647
Māori	0.100	0.106	0.123	0.121	0.124	0.154	0.048	0.054	0.052
Pacifika	0.050	0.048	0.046	0.056	0.051	0.051	0.039	0.038	0.038
Asian	0.078	0.095	0.064	0.070	0.089	0.059	0.097	0.111	0.084
Other single	0.012	0.016	0.016	0.011	0.014	0.015	0.016	0.020	0.020
Māori-European	0.088	0.103	0.103	0.088	0.102	0.098	0.086	0.094	0.095
Other mix	0.040	0.043	0.043	0.038	0.040	0.038	0.043	0.045	0.049
Birth cohort									
<1970	0.396	0.249	0.307	0.423	0.277	0.335	0.339	0.229	0.273
1970s	0.240	0.214	0.209	0.253	0.244	0.244	0.214	0.186	0.180
1980-84	0.123	0.123	0.128	0.124	0.126	0.134	0.127	0.130	0.136
1985-89	0.144	0.182	0.194	0.129	0.176	0.166	0.177	0.204	0.228
>=1990	0.096	0.231	0.159	0.069	0.173	0.118	0.141	0.249	0.181
Age group									
<25	0.228	0.399	0.335	0.186	0.335	0.267	0.305	0.439	0.389
25-34	0.236	0.231	0.240	0.239	0.244	0.257	0.238	0.235	0.245
35-44	0.239	0.193	0.194	0.259	0.227	0.228	0.201	0.159	0.161
45-54	0.179	0.108	0.124	0.191	0.120	0.138	0.154	0.105	0.116
55+	0.119	0.069	0.107	0.125	0.074	0.110	0.102	0.062	0.090

Source: Statistics New Zealand's Integrated Data Infrastructure

Note: Year is calendar year. Counts are randomly rounded to base 3 to protect confidentiality.

About 22% of the 2010 ECE workforce had never previously worked in the sector (i.e., they are 'entrants'), 17% would never again work in the sector after 2010 (i.e., 'exiters'), and the remaining 61% are 'continuing' ECE sector workers.[10] On average entrants were over 5 years younger than the general ECE workforce, and while exiters were (2.4 years) older than entrants, they were 3 years younger than all ECE workers. This suggests that a lot of the turnover in the ECE sector involves younger workers. Entrants and exiters were a lot less likely to be female.

[8] As mentioned in footnote 5, our definition is likely to understate immigrants. Indeed, Hyslop et al's (2019) Table 1 shows that the share of immigrants in the NZ usual resident population aged 18 or above was 29% in 2013.

[9] Unpublished work for Hyslop et al (2019) shows that based on the 2013 Census population aged 18 or above, 69% were European and 17% were Māori or Māori-European.

[10] Strictly speaking 'never previously' refers to period April 1999 to the current year (2010), and 'never again' refers to January 2011-September 2019. Note that some people can be both entrants and exiters (i.e. 2010 was their only year working in the ECE sector).

While about a quarter of the general ECE workforce had an ECE teaching qualification, less than 5% of entrants and exiters were qualified.[11] However, counting qualifications obtained in the future ('ever has an ECE qualification'), the share of qualified workers among entrants is three times that among exiters (18% vs. 6%). This suggests that a lot of workers enter the ECE sector while studying and eventually become qualified; in contrast, few people study for an ECE teaching qualification after leaving the sector. The characteristics of the 'continuing' ECE workforce (i.e., those who worked in the sector both before and after 2010), were broadly similar to those of the full workforce.

Workers in the 'Pre-school education' industry are slightly older and more qualified than those in the 'Childcare services' industry, but generally there are no significant differences in demographic characteristics between the two industries. Similar patterns prevail for entrants and exiters within each industry; namely entrants and exiters are younger, less likely to be female and qualified, suggesting that they are less likely to be teachers.

3.1.2 Employment history of ECE workers

Figure 1 shows employment rates (panel a) and conditional earnings (panel b) during 2002-2018 for 2010 ECE workers in general, as well as for entrants and exiters. Two types of employment are examined: any wages and salaries (WS) employment as reported in EMS data, and only WS employment in the ECE sector.[12] Note that the employment rates in the ECE sector will be lower than overall, because ECE employment is a subset of total employment. Conditional earnings are earnings derived from the respective employment, conditional on employment in that type.

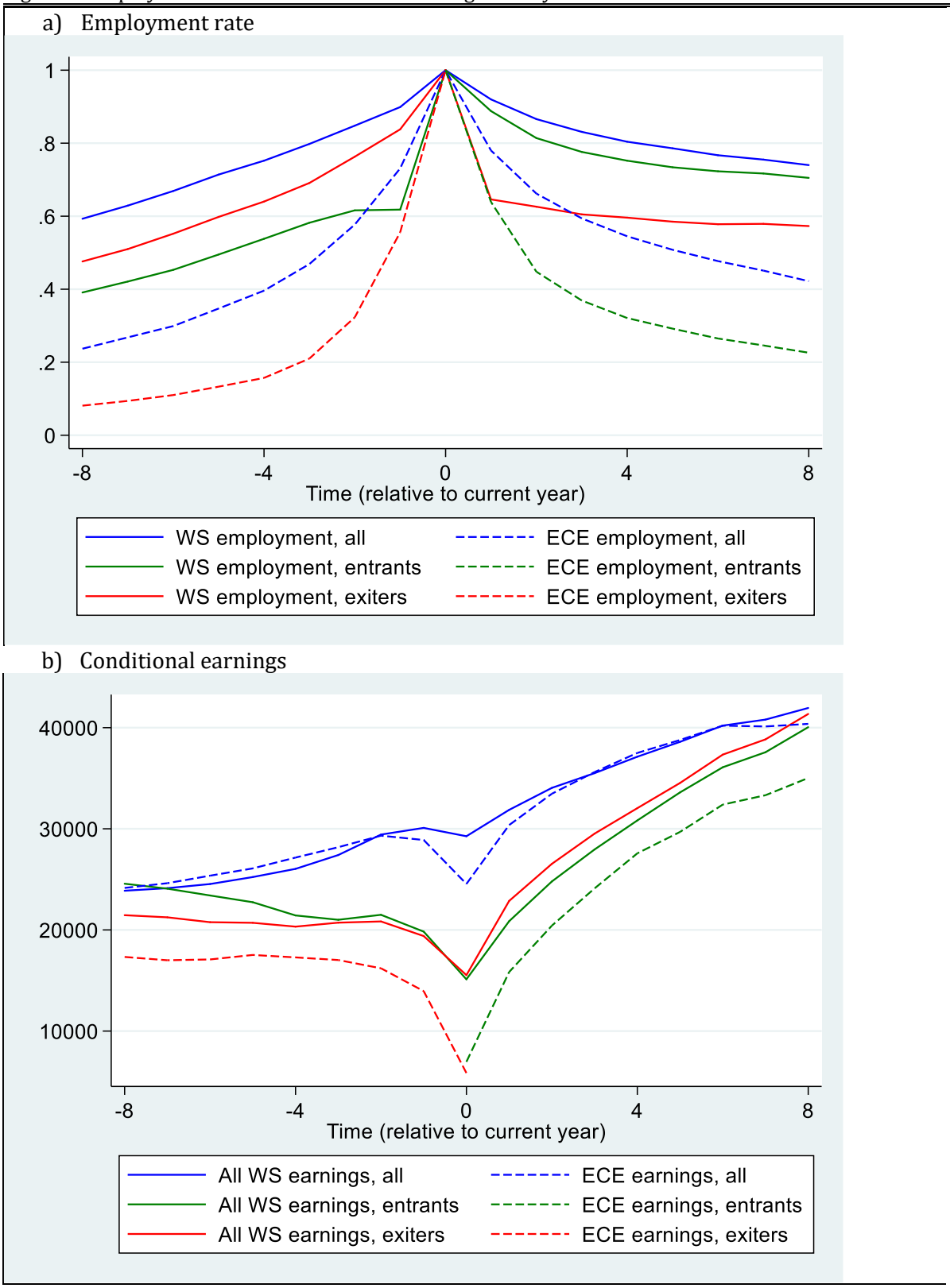
For both employment and earnings, the lines for the general ECE workforce sit above those of entrants and exiters, suggesting that continuers have higher employment and earnings than entrants and exiters. This is at least partly due to the fact that continuers have more work experience (i.e., older) and more likely to be qualified than entrants and exiters, as noted in Section 3.1.1. Exiters' overall WS employment rate (red solid line) declines after year 0, suggesting that many who exit ECE also exit WS employment. Entrants' overall WS employment rises (green solid line), indicating that many who enter ECE also enter WS employment for the first time.

The employment patterns are relatively symmetrical about 2010 (year=0), with entrants' and exiters' patterns looking broadly symmetrical. Exiters' ECE employment rate (red dash line) rises very sharply just before 2010, suggesting that exiters are not very attached to the ECE sector. While 24% of the 2010 ECE workforce were already working in ECE in 2002, only 8% of those who left ECE permanently in 2010 were working in the sector eight years earlier. In fact, ECE employment is a relatively small fraction of exiters' employment until 2009 (year=-1). Similarly, entrants' ECE employment rate (green dash line) declines very rapidly after 2010, suggesting that

[11] As mentioned in footnote 3, our data are likely to understate the number of qualified workers because they do not record qualifications obtained (roughly) before 2003 or overseas.
[12] By construction, the ECE employment rate of entrants before 2010 (time=0) is zero; similarly, the employment rate of exiters after 2010 is zero.

entrants tend not to stay in ECE long, and ECE employment is a relatively small fraction of the overall employment. For example, while 42% of the 2010 ECE workforce were still working in ECE in 2018, only 22% of those who entered ECE for the first time in 2010 were still working in ECE eight years later (less than one-third of their total employment).

Figure 1: Employment rates and conditional earnings history for 2010 ECE workers



Note: Earnings are in December 2019 dollars. Current year is 2010.

Conditional on employment, earnings grow over time for all groups.[13] Average conditional earnings are almost identical between entrants and exiters. Even though these two groups have lower earnings than the general ECE workforce, the gap is smaller the further it is from the current year. For example, eight years before entering the ECE sector, entrants' average conditional earnings were 3% higher than those of the average ECE workforce but it is third *lower* in the year after entry.[14] Conversely, exiters' average conditional earnings were a third lower than those of the average ECE workforce in the year before exit, but it is only 1% lower eight years after. These patterns suggest workers tend to take a pay cut when they enter ECE and that part of the reason why they leave the sector is for higher pay elsewhere. These changes in earnings could be due to changes in the number of hours worked, but it still suggests pay does not seem to be what attracts people to the ECE sector.

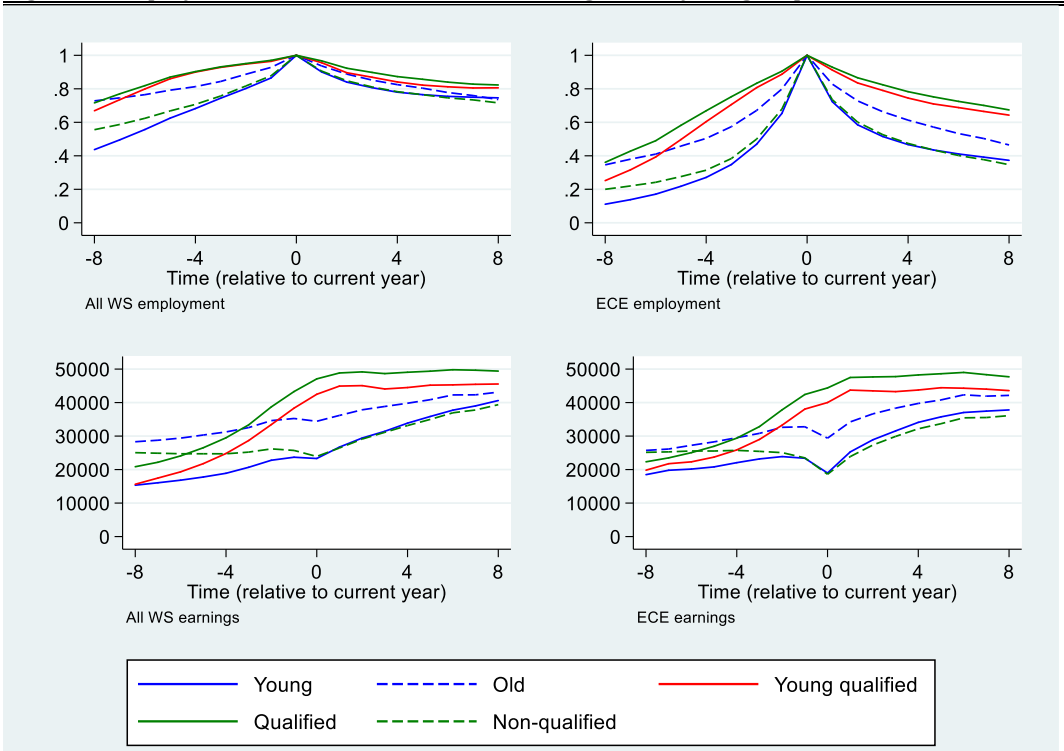
Comparing total earnings with ECE earnings is difficult because of the respective conditioning sets. Nonetheless, it appears that for the general ECE workforce these two measures are very similar, while the ECE earnings make up of around 76-90% total earnings in the years after entry for entrants and 72-85% in the years before exit for exiters. This suggests that entrants and exiters have to top up their ECE earnings with earnings from other industries.[15] It is also interesting that the trends in average (total) earnings for entrants and exiters are quite similar before and after 2010, with the higher average associated with the groups without ECE employment (i.e. entrants pre-2010, and exiters after-2010). This suggests these two groups are broadly similar, which is perhaps not surprising given their relatively low ECE employment rates away from 2010.

Figure 2 presents employment rates and conditional earnings for different groups of 2010 ECE workers: young (aged 18-34) vs old (aged 35+), and qualified (having an ECE teaching qualification) vs not qualified. The young group and the qualified group experienced sharp rises in 'any WS' employment rates (top left panel) before year 0, but after that year there is little difference in employment rates across the groups. Eight years previously (i.e. 2002), 73% of the current 'old' group were in WS employment while only 44% of the current 'young' group were. Eight years later (2018), the respective employment rates for these two groups are 74% and 75%. Whereas 56% of the non-qualified group and 72% of the qualified group were in WS employment in 2002 (time=-8), their employment rates in 2018 (time=8) are 72% and 82% respectively. However, the qualified group is much more attached to ECE employment (top right panel). In 2002, 36% of the qualified group were in ECE employment, compared with 20% of the non-

[13] The kink in year 0 ECE earnings, especially pronounced for entrants and exiters, is due to the fact that only part of the year is worked by those entering and exiting. Indeed, if entries and exits are evenly distributed throughout the year, then average earnings for entrants and exiters in that year should be around half of those in other years, other things being equal. In fact, the average 2010 earnings are less than half of the earnings in the next closest year for these groups.
[14] Given the reason noted in footnote 13, comparison of conditional earnings in year 0 between entrants/exiters and continuers does not make sense.
[15] Appendix Figure A1 and Figure A2 show that these patterns for entrants, exiters and continuers are similar when we examine the 'Pre-school education' and 'Childcare services' industries separately.

qualified group; while in 2018, 67% of the qualified group are still in ECE employment, compared to 35% employment for the non-qualified group.

Figure 2: Employment rates and conditional earnings history for groups of ECE workers in 2010



Note: Earnings are in December 2019 dollars. Current year is 2010.

The pattern for total earnings (bottom left panel) and ECE earnings (bottom right panel) are strikingly similar. Similar to Figure 1, conditional earnings rise over time for all groups, with the qualified group experienced the largest gains. While eight years ago ECE earnings for the current qualified group was 11% lower than for the non-qualified group, this gap was closed two years later and then switches to favouring the qualified group. One year from now average ECE earnings for the qualified group is twice as high as that for the non-qualified group. However, eight years from now average ECE earnings for the qualified group is only a third higher than for the non-qualified group, probably because some of the current non-qualified group will have then become qualified. There is always an earnings gap between the current 'young' and the current 'old' groups over the 16 years examined. The ratio of average ECE earnings between these two groups was 0.72 eight years ago, rising to 0.9 eight years later, suggesting that experience becomes relatively less important as workers age (i.e., earnings are concave in age). For both employment rates and earnings, the profile for the 'young qualified group' largely resembles that of the 'qualified' group, as due to limitations in the qualifications data (see footnote 3) the qualified group tend to be in the younger ages.

3.1.3 Sources and destinations of ECE entrants and exiters

Table 2 shows where ECE entrants come from and where they go after leaving the sector. Among the entrant group, 35% work mainly in 'Pre-school', 22% in 'Childcare services', and 38% in 'Non-school' during the year they enter ECE.[16] In the year before entry, 57% of entrants work mainly in 'Non-school' industries, 27% do not appear not in the EMS data, and 10% receive only benefit income in EMS. Only 3-5% were from 'Primary school' or 'Other school', and continue to work in the school sector after entry into ECE. 'Not in EMS' means these workers could come from studying (without receiving a student allowance), self-employment or overseas. Finally, only 1.7% have miscellaneous EMS payments (student allowances, paid parental leave, ACC compensation or NZ Superannuation) as their main EMS income in the year before entering ECE.[17]

Mirroring this, in the year they exit ECE, 32% of the exit group work mainly in 'Pre-school', 18% in 'Childcare services', and 44% in 'Non-school'. In the year after exit 57% of exiters work mainly in 'Non-school', 21% leave EMS, and 11% go on benefit. Only 5% of ECE exiters are in the school sector in the year of exit, and 7-8% and continue to work there after exit.

Table 2: Sources and destinations of ECE entrants and exiters

Year	Pre-school	Childcare	Primary school	Other school	Other industry	Not in EMS	On benefit	Misc EMS
Entrants								
-8	.	.	0.019	0.015	0.357	0.552	0.052	0.005
-7	.	.	0.022	0.016	0.382	0.520	0.055	0.005
-6	.	.	0.021	0.020	0.413	0.485	0.056	0.006
-5	.	.	0.022	0.021	0.452	0.442	0.056	0.007
-4	.	.	0.024	0.021	0.492	0.395	0.059	0.008
-3	.	.	0.024	0.024	0.534	0.346	0.061	0.011
-2	.	.	0.026	0.028	0.562	0.304	0.068	0.011
-1	.	.	0.029	0.024	0.565	0.267	0.097	0.017
0	0.354	0.224	0.024	0.018	0.380	.	.	.
Exiters								
0	0.322	0.185	0.034	0.023	0.436	.	.	.
1	.	.	0.040	0.032	0.574	0.207	0.112	0.035
2	.	.	0.042	0.034	0.550	0.236	0.102	0.035
3	.	.	0.043	0.033	0.529	0.258	0.097	0.040
4	.	.	0.042	0.037	0.516	0.271	0.090	0.044
5	.	.	0.046	0.034	0.505	0.279	0.087	0.048
6	.	.	0.049	0.033	0.496	0.287	0.084	0.051
7	.	.	0.051	0.034	0.494	0.290	0.075	0.056
8	.	.	0.051	0.034	0.488	0.292	0.074	0.062

Source: Statistics New Zealand's Integrated Data Infrastructure

Note: Entries are shares of the group in each category. Year is calendar year, measured relative to 2010. Miscellaneous EMS payments include student allowances, paid parental leave, ACC compensation or NZ Superannuation.

[16] 'Non-school' classified workers are those who worked in ECE, but with more than 50% of their earnings for the year from other industries.

[17] These people might derive more income from other sources such as self-employment or investment.

In summary this section shows that among the ECE workforce in a particular year, entrants and exiters are less attached to the ECE sector in the sense that their ECE employment rates (before exit or after entry) are much lower than continuers'. While working in ECE entrants and exiters are also less attached to the sector in the sense that they also derive earnings from employment in other industries. While there is little difference in retention rates between the 'young' and the 'old' groups, workers with an ECE teaching qualification are far more likely to stay in the sector than those without. The majority (57%) of entrants to the ECE sector have worked mainly in 'Non-school' and 38% continue to work mainly in there after acquiring employment in ECE. Similarly, 44% of exiters are already working mainly in 'Non-school' before leaving ECE, and even more work mainly there after leaving. About 10% of ECE entrants are on benefit the year before entry, and 11% of ECE exiters go on benefit after leaving the sector. Very small proportions of ECE entrants and exiters come from/ go to the school education industries.

3.2 Comparison with the primary school education industry

We next describe the characteristics and career experiences of workers in primary school education to facilitate comparison with ECE workers. Primary school workers are defined as those who work in plants whose ANSIC06 code in the Business Register is Primary Education (P802100).

3.2.1 Characteristics of Primary school education workers

Table 3 describes the demographic characteristics of Primary school workers. To facilitate comparison, corresponding statistics for ECE workers (from Table 1) are also reprinted. In 2010 the Primary school industry had a workforce of 68,000, over 40% larger than the ECE workforce. The average age of Primary school workers in 2010 was 44.7 years. Just over three quarters of Primary school workers were female and 10% were migrants. Disaggregated by ethnicity, 74% were European, 14% were Māori or Māori-European, 2.5% were Pacifika and 3.7% Asian.

About 19% of the Primary school workforce in 2010 were entrants and 14% were exiters. On average entrants were over 6 years younger than the general Primary school workforce while exiters were 3 years older than entrants. While 17% of the general Primary school workforce had a Primary education teaching qualification,[18] 14% of entrants and 9% of exiters were qualified. However, counting qualifications obtained in the future, the share of qualified workers among entrants is almost twice among exiters (17% vs. 10%). This suggests that a lot of people enter the Primary school industry while studying and eventually become qualified, yet very few people study for a Primary school teaching qualification after leaving the industry. Over two thirds of the Primary school workforce were 'continuers'; their characteristics largely resemble those of the general workforce.

[18] Warren Smart identifies 143 qualifications that can lead to registration with the Teaching Council as qualified Primary school teachers. Most of these qualifications are Bachelors, Diplomas or Masters.

Table 3: Characteristics of Primary school education workers and ECE workers 2010

	Primary education			ECE		
	All	Entrants	Exiters	All	Entrants	Exiters
N workers	67,959	12,897	9,738	47,022	10,185	7,959
Mean age	44.7	38.6	41.9	36.9	31.6	34.0
Female	0.758	0.721	0.717	0.927	0.869	0.867
Migrant	0.104	0.117	0.108	0.143	0.162	0.126
Has Primary school/ECE qual	0.173	0.139	0.090	0.231	0.048	0.047
Ever has qual	0.188	0.167	0.098	0.342	0.184	0.060
Ethnicity						
European	0.740	0.685	0.679	0.627	0.574	0.585
Māori	0.069	0.080	0.086	0.100	0.106	0.123
Pacifika	0.025	0.033	0.033	0.050	0.048	0.046
Asian	0.037	0.045	0.042	0.078	0.095	0.064
Other single	0.011	0.014	0.016	0.012	0.016	0.016
Māori-European	0.072	0.084	0.081	0.088	0.103	0.103
Other mix	0.040	0.047	0.047	0.040	0.043	0.043
Birth cohort						
<1970	0.633	0.458	0.541	0.396	0.249	0.307
1970s	0.212	0.218	0.197	0.240	0.214	0.209
1980-84	0.075	0.104	0.086	0.123	0.123	0.128
1985-89	0.052	0.125	0.091	0.144	0.182	0.194
>=1990	0.028	0.095	0.084	0.096	0.231	0.159
Age group						
<25	0.073	0.207	0.166	0.228	0.399	0.335
25-34	0.164	0.202	0.173	0.236	0.231	0.240
35-44	0.240	0.243	0.223	0.239	0.193	0.194
45-54	0.264	0.197	0.208	0.179	0.108	0.124
55+	0.258	0.150	0.230	0.119	0.069	0.107

Source: Statistics New Zealand's Integrated Data Infrastructure
Note: Year is calendar year. Counts are randomly rounded to base 3 to protect confidentiality.

Compared with ECE workers, Primary school workers are on average 8 years older. Primary school workers are much more likely to be European (74% vs. 63%), but less likely to be female (76% vs. 93%) and to appear 'qualified'. This is likely to reflect the fact that Primary school workers are older, hence their qualifications are less likely to be recorded by the MOE data. In both sectors, entrants and exiters are younger and less likely to be qualified than continuers.

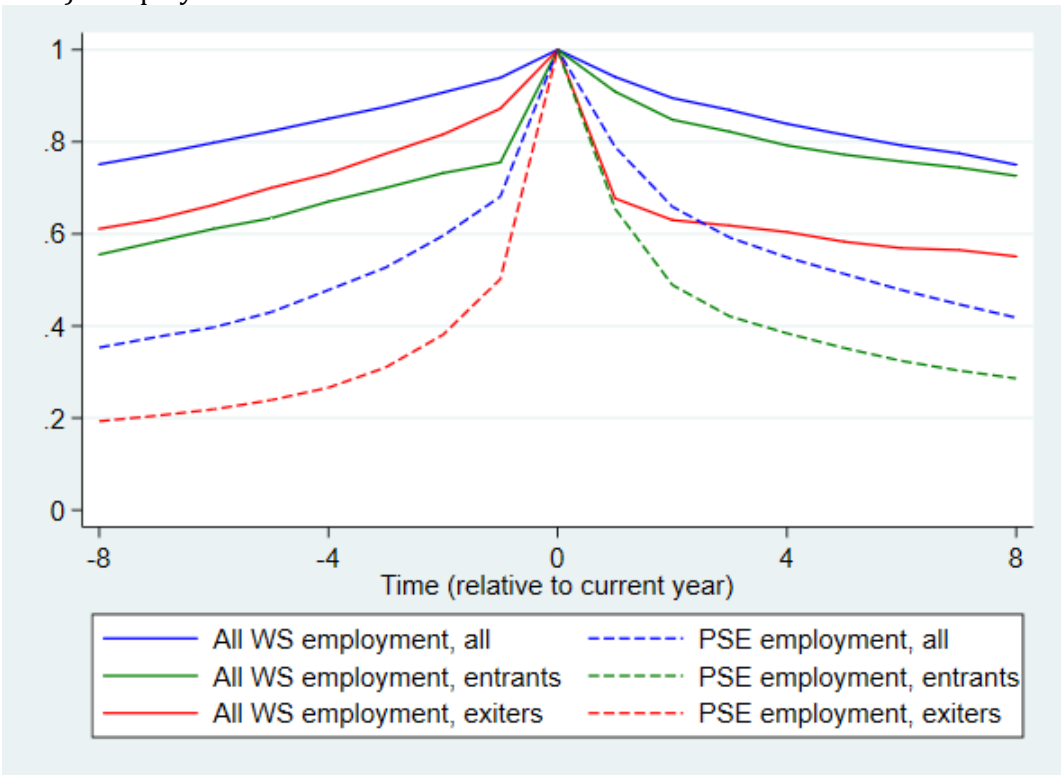
3.2.2 Employment history of Primary school education workers

Figure 3 shows employment rates (panel a) and conditional earnings (panel b) during 2002-2018 for 2010 Primary school workers. Continuers outperform entrants and exiters in both outcomes, which is not surprising given that continuers are older and more likely to be qualified than entrants and exiters, as noted in Section 3.2.1. Exiters' overall WS employment rate (red solid line) declines after year 0, suggesting that many who exit the Primary school industry also exit WS

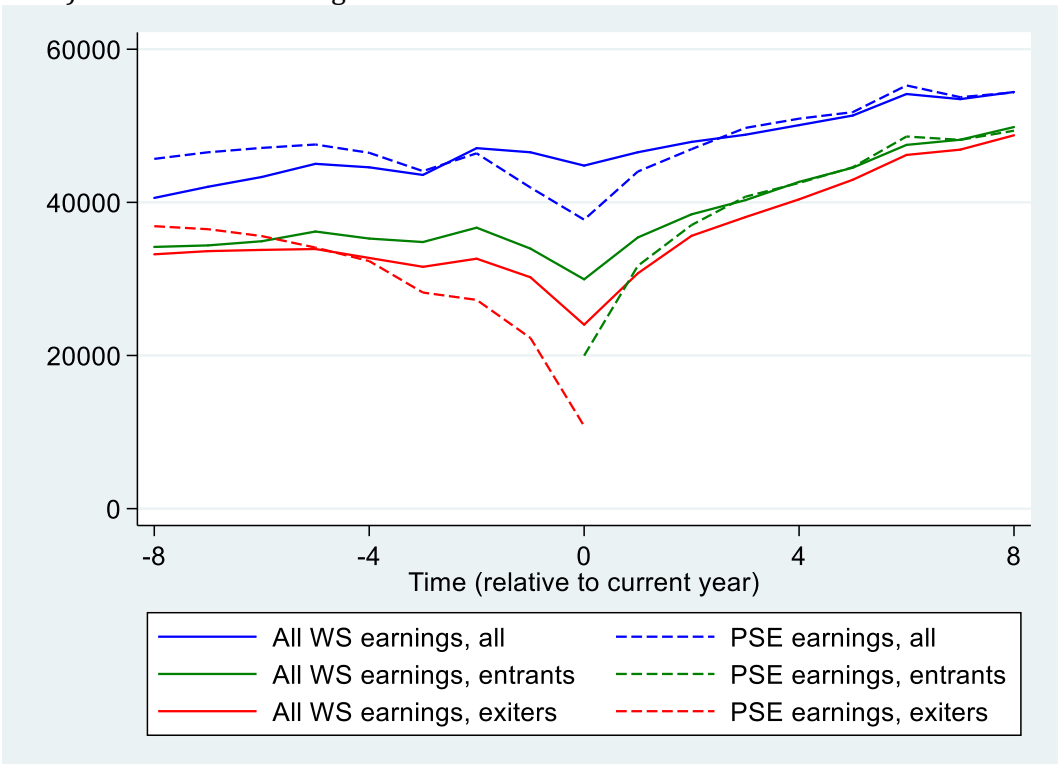
employment. Entrants' overall WS employment rises (green solid line), indicating that many who enter Primary school also enter WS employment for the first time.

Figure 3: Employment rates and conditional earnings history for 2010 Primary school education workers

a) Employment rate



b) Conditional earnings



Note: Earnings are in December 2019 dollars. Current year is 2010.

While 35% of the 2010 Primary school workforce were already working in Primary school in 2002, only 19% of those who left Primary school permanently in 2010 were working in the sector eight years earlier. 42% of the 2010 Primary school workforce were still working in Primary school in 2018, compared with 29% of those who entered Primary school for the first time in 2010. Although these numbers show that Primary school entrants and exiters are less attached to the Primary school industry than the general Primary school workforce, they suggest that retention rates are still much better in Primary school than in the ECE sector.

Conditional earnings largely follow an upward trend for all groups. Average conditional earnings are slightly higher for entrants than for exiters, probably reflecting the fact that entrants are more likely to be qualified than exiters. Both of these two groups have lower earnings than the general Primary school workforce, yet the gaps narrow over time. For example, eight years before entering the Primary school industry, entrants' average conditional earnings were 16% lower than those of the average Primary school workforce, dropping to 8% eight years after entry. Similarly, exiters' average conditional earnings were 18% lower than those of the average Primary school workforce eight years before exit, compared to 10% lower eight years after exit.

Thus, unlike the ECE sector, entrants into the Primary school industry do not suffer a pay cut, and those who leave the industry do not experience such a large pay rise as that experienced by ECE exiters. Average total earnings and average Primary school earnings are very similar, suggesting that compared with ECE workers, Primary school workers are less likely to top up their earnings by working in other industries.

3.2.3 Sources and destinations of 'Primary school education' entrants and exiters

Table 4 shows the sources and destinations of 'Primary school' entrants and exiters. Among entrants, 65% work mainly in Primary school, 8.5% in 'Other school', 2.9% in 'Other education' and 23% in 'Non-education' in the year they enter Primary school. In the year before entry 38% of entrants work mainly in 'Non-education', 33% in 'Other school', 18% not in EMS, and 5.2% from benefit. Only 1.5% come from miscellaneous EMS payments as their main EMS income in the year before entering the Primary school industry.

In the year they exit Primary school, 51% of exiters work mainly in Primary school, 13% in 'Other school', and 32% in 'Non-education'. In the year after exit 40% of exiters work mainly in 'Non-education', 20% leave EMS, and 6.3% go on benefit. 14-22% of the exit group continue to work in 'Other school' after exiting Primary school.

A large share (38%) of Primary school entrants have worked mainly in 'Non-education' and 23% continue to work mainly there after entering Primary school. Similarly, 32% of exiters are already working mainly in 'Non-education' before leaving Primary school, and even more work mainly there after leaving. There is also little movement between Primary school employment and the miscellaneous category of having student allowances, paid parental leave, ACC compensation

or NZ Superannuation as the main EMS income. These patterns largely are similar to those observed in the ECE sector.

However, the Primary school industry has much stronger links to other education industries. A third of Primary school entrants come from 'Other school' and 4.6% from 'Other education'. 22% of 'Primary school' exiters go to 'Other school' and 6.1% to 'Other education'. There is also less movement between Primary school employment and benefit receipt than between ECE employment and benefit receipt. Only 5.2% of Primary school entrants are on benefit the year before entry, and 6.3% of 'Primary school' exiters go on benefit after leaving the industry (compared with 10% and 11% respectively from ECE).

Table 4: Sources and destinations of 'Primary school education' entrants and exiters

Year	Prim. school	Other school	Other ed	Other industry	Not in EMS	On benefit	Misc EMS
Entrants							
-8	.	0.169	0.033	0.353	0.390	0.050	0.005
-7	.	0.179	0.035	0.369	0.360	0.051	0.006
-6	.	0.193	0.035	0.383	0.333	0.049	0.007
-5	.	0.210	0.034	0.391	0.308	0.050	0.007
-4	.	0.232	0.035	0.402	0.278	0.044	0.008
-3	.	0.259	0.038	0.404	0.251	0.040	0.008
-2	.	0.299	0.038	0.395	0.215	0.041	0.011
-1	.	0.328	0.046	0.382	0.178	0.052	0.015
0	0.654	0.085	0.029	0.233	.	.	.
Exiters							
0	0.507	0.128	0.046	0.319	.	.	.
1	.	0.215	0.061	0.401	0.199	0.063	0.060
2	.	0.175	0.062	0.392	0.233	0.063	0.075
3	.	0.165	0.059	0.394	0.240	0.057	0.085
4	.	0.155	0.058	0.392	0.245	0.053	0.097
5	.	0.146	0.056	0.381	0.257	0.051	0.109
6	.	0.140	0.056	0.372	0.261	0.051	0.120
7	.	0.138	0.054	0.374	0.262	0.046	0.127
8	.	0.136	0.054	0.361	0.266	0.045	0.137

Source: Statistics New Zealand's Integrated Data Infrastructure
Note: Entries are shares of the group in each category. Year is calendar year, measured relative to 2010. Miscellaneous EMS payments include student allowances, paid parental leave, ACC compensation or NZ Superannuation.

3.3 Comparing ECE and Primary school teaching graduates

Not all ECE or Primary school workers are teachers. Since the EMS data do not contain occupation, it is impossible to distinguish teachers from other workers. In order to obtain cleaner comparisons between ECE teachers and Primary school teachers, this section repeats the comparisons presented in Section 3.2 for ECE teaching graduates vs. Primary school teaching graduates.

3.3.1 Characteristics of ECE and Primary school teaching graduates

Table 5 describes the demographic characteristics of ECE and Primary school teaching graduates. To align with the analysis in Section 3.1 and 3.2 we focus on people who graduate in 2010. However, to facilitate temporal comparisons we also show the statistics for graduate cohorts 2007 and 2013.

Table 5: Characteristics of ECE teaching graduates and Primary school teaching graduates

	ECE			Primary school		
	2007	2010	2013	2007	2010	2013
N graduates	1,866	2,616	2,952	2,136	2,040	2,280
Mean age	33.3	32.3	31.5	31.3	30.6	30.1
Median age	32	30	28	28	27	26
Female	0.939	0.937	0.936	0.838	0.840	0.843
Migrant	0.215	0.221	0.245	0.160	0.174	0.151
Ethnicity						
European	0.617	0.622	0.579	0.701	0.651	0.629
Māori	0.040	0.047	0.054	0.055	0.075	0.091
Pacifika	0.074	0.045	0.056	0.034	0.041	0.046
Asian	0.114	0.132	0.157	0.045	0.072	0.067
Other single	0.021	0.015	0.010	0.021	0.009	0.009
Māori-European	0.087	0.094	0.098	0.093	0.096	0.111
Other mix	0.045	0.045	0.047	0.052	0.054	0.049
Birth cohort						
<1970	0.347	0.242	0.152	0.267	0.191	0.117
1970s	0.254	0.229	0.206	0.240	0.197	0.192
1980-84	0.211	0.155	0.132	0.253	0.157	0.108
1985-89	0.186	0.331	0.218	0.240	0.416	0.222
>=1990		0.041	0.292		0.040	0.361
Age group						
<25	0.291	0.342	0.352	0.367	0.407	0.426
25-34	0.283	0.278	0.312	0.302	0.290	0.284
35-44	0.259	0.228	0.201	0.194	0.188	0.188
45-54	0.138	0.123	0.112	0.111	0.091	0.087
55+	0.029	0.030	0.023	0.027	0.026	0.017

Source: Statistics New Zealand's Integrated Data Infrastructure
Note: Year is calendar year. Counts are randomly rounded to base 3 to protect confidentiality.

In 2010 over 2,600 students graduated with a qualification that would enable them to register with the Teaching Council as a qualified ECE teacher. The average age of ECE teaching graduates in 2010 was 32.3 years. The vast majority of ECE teaching graduates (94%) were female and 22% were migrants. By ethnicity, 62% were European, 14% were Māori or Māori-European, 4.5% were Pacifika and 13% Asian. Thus, the share of women among ECE teaching graduates matches that among ECE workers. Compared with ECE workers, ECE teaching graduates are less likely to be Māori and more likely to be Asian. Comparing the three ECE graduation cohorts, it appears that the mean and median ages of graduates fall over time. The share of Europeans among ECE teaching graduates falls over time, while the share of Māori rises slightly, and the share of

Asians rise more strongly. The share of females in ECE teaching graduates remains steady at 94% over the three years considered.

Over 2,000 students graduated in 2010 with a qualification that would enable them to register with the Teaching Council as a qualified Primary school teacher. The average age of Primary school teaching graduates in 2010 was 30.6 years. 84% of Primary school teaching graduates were female and 16% were migrants. Europeans accounted for 65% of Primary school teaching graduates, Māori and Māori-European 17%, Pacifika 4.1% and Asians 7.2%. Accordingly, the share of women among Primary school teaching graduates is higher than among Primary school workers (76%). Compared with Primary school workers, Primary school teaching graduates are less likely to be European and more likely to be Asian. The mean and median ages of graduates also fall over time. The share of Europeans among Primary school teaching graduates falls, while the shares of Māori and Asians rise considerably over 2007-2013. The share of females in Primary school teaching graduates stablises at 84% over the period.

While the number of ECE teaching graduates in 2013 was 58% higher than in 2007, the number of Primary school teaching graduates only experienced a 6.7% increase over the period. Although the Primary school workforce is over 40% larger than the ECE workforce (Table 3), the number of ECE teaching graduates has exceeded the number of Primary school teaching graduates since 2008 (numbers not shown in report). This suggests that the ECE workforce is becoming increasingly qualified over time. Compared with Primary school teaching graduates, ECE teaching graduates are older, less likely to be European and more likely to be Asian. For both fields, graduates have become younger, less likely to be European and more likely to be Māori or Asian. However, the shares of females have remained fairly stable over the period.

3.3.2 Employment history of ECE and Primary school teaching graduates

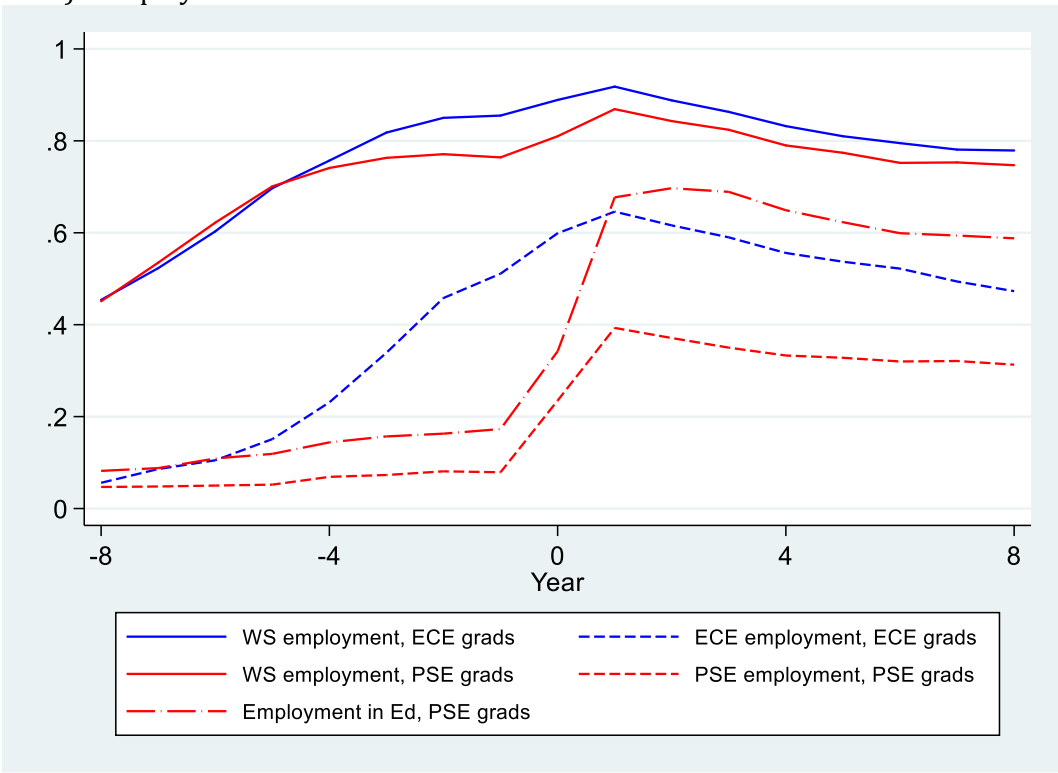
Figure 4 shows employment rates (panel a) and conditional earnings (panel b) during 2002-2018 for 2010 ECE and Primary school teaching graduates. The two groups of graduates have very similar employment rates in the years around their graduation, with ECE teaching graduates doing slightly better. The year after graduation, 92% of ECE teaching graduates and 87% of Primary school teaching graduates are in WS employment (blue and red solid lines). Eight years after graduation 78% of ECE teaching graduates have any WS employment, compared with 75% among Primary school teaching graduates. These are very high employment rates, given that not in WS employment might mean being overseas (e.g. international students leaving New Zealand), self-employed, in further study (without receiving a student allowance or any benefit). The downward trend in employment rates after graduation is likely to reflect attrition from the EMS rather than worsening employment prospects.

Interestingly, ECE teaching graduates are far more likely to work in ECE (blue dash line) than Primary school teaching graduates to work in Primary school (red dash line). This could be because Primary school teaching graduates have the option to be teachers in other education

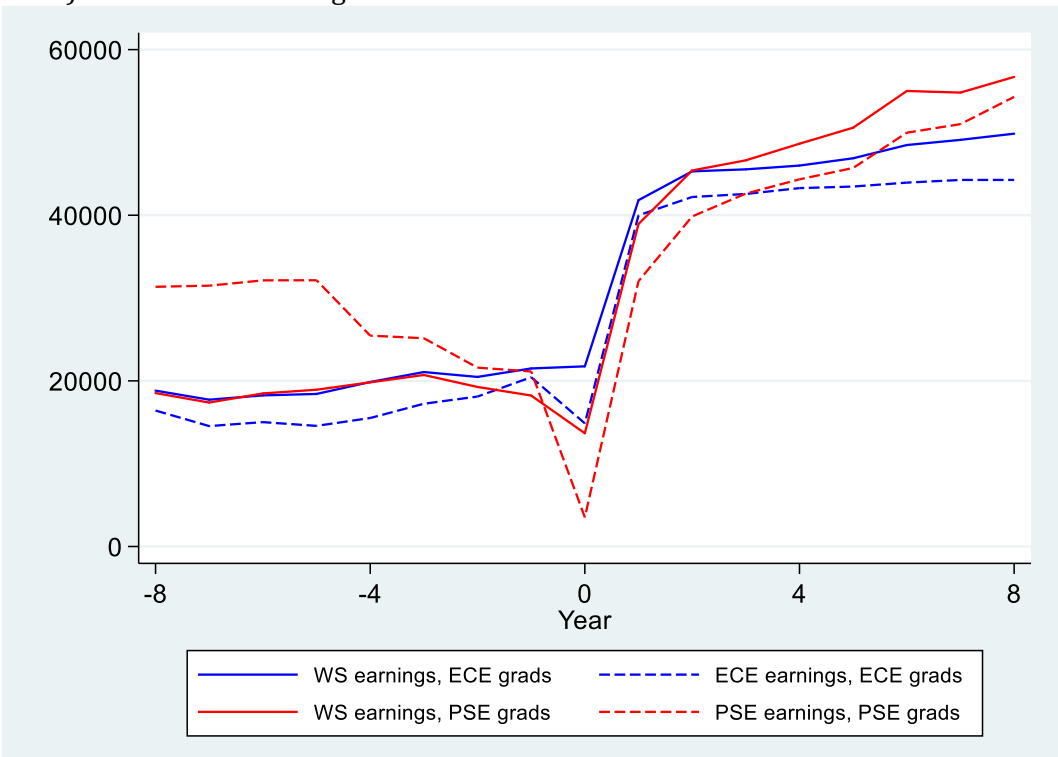
industries. Indeed, after graduation Primary school teaching graduates are more likely to work in education industries (red dash dot line) than ECE teaching graduates to work in the ECE sector.

Figure 4: Employment rates and conditional earnings history for 2010 ECE and Primary school education teaching graduates

a) Employment rate



b) Conditional earnings



Note: Earnings are in December 2019 dollars. Current year is 2010.

Conditional on WS employment, average earnings for the two groups of graduates are also very similar, especially before graduation. Compared with ECE teaching graduates, Primary school teaching graduates earn more before studying, their earnings dip more before graduation, but grow more strongly two years on after graduation. Nevertheless, ECE teaching graduates experience higher earnings from studying. Five years after graduation, average Primary school earnings of Primary school teaching graduates are only 42% higher than five years before graduation. In contrast, over the same period average ECE earnings of ECE teaching graduates increase threefold.

The results in this section show that ECE and Primary school teaching graduates have largely similar employment and earnings prospects after graduation. This seems to suggest that qualified ECE teachers do not suffer disadvantages in labour market outcomes compared with qualified Primary school teachers.

3.3.3 Sources and destinations of ECE and Primary school teaching graduates

Table 6 and Table 7 respectively show where ECE and Primary school teaching graduates work before and after graduation. Five to eight years before graduation, ECE teaching graduates work mainly in 'Non-school' industries or are not in EMS. At that stage they have very little connection with the ECE sector. Within four years before graduation, a lot of ECE teaching graduates (17-44%) already work mainly in the ECE sector, reflecting working while studying for an ECE teaching qualification. In the year of graduation, 29% of ECE teaching graduates work mainly in 'Non-school'. Within four years after graduation with an ECE teaching qualification, 54-61% of ECE teaching graduates work mainly in the ECE sector, only 10-12% work in 'Non-school'. Around 10% of ECE teaching graduates work mainly in Primary school after graduation; they might have a 'combination' qualification which enables them to register as either a Primary school teacher or an ECE teacher.[19] Very few graduates (less than 1.5%) rely on benefit income after graduation.

Before graduation the vast majority of Primary school teaching graduates also work mainly in 'Non-education' industries or are not in EMS. Unlike ECE teaching graduates, it is not very common (less than 9%) for Primary school teaching graduates to work in their professional industries (school industries) in the years immediately before graduation.

These results suggest that both ECE and Primary school teaching graduates move from working in casual jobs before graduation to a professional career afterwards. ECE teaching graduates are much more likely than their Primary school counterparts to work in their professional industry before graduation. This is because there is a place for unqualified teachers in the ECE sector, while it is not really the case in the Primary school industry. Both groups of graduates work mainly in education after graduation.

[19] Data on courses taken can be used to determine whether a student undertaking one of these 'combination' qualifications majors in ECE teaching or in Primary education teaching.

Table 6: Sources and destinations of ECE teaching graduates

Year	Pre-school	Childcare	Primary school	Other school	Other industry	Not in EMS	On benefit	Misc EMS
-8	0.025	0.021	0.029	0.023	0.358	0.497	0.047	.
-7	0.032	0.029	0.032	0.023	0.409	0.430	0.042	0.003
-6	0.048	0.036	0.031	0.028	0.461	0.352	0.041	0.003
-5	0.070	0.047	0.033	0.030	0.516	0.260	0.041	0.003
-4	0.103	0.073	0.032	0.030	0.521	0.194	0.041	0.006
-3	0.154	0.106	0.034	0.031	0.494	0.144	0.032	0.005
-2	0.225	0.136	0.030	0.024	0.433	0.113	0.031	0.008
-1	0.268	0.175	0.024	0.019	0.369	0.086	0.044	0.015
0	**0.328**	**0.198**	**0.047**	**0.026**	**0.294**	**0.088**	**0.019**	.
1	0.399	0.209	0.103	0.084	0.123	0.069	0.013	.
2	0.390	0.204	0.114	0.079	0.100	0.095	0.015	0.003
3	0.378	0.188	0.114	0.078	0.107	0.119	0.013	0.003
4	0.357	0.178	0.104	0.072	0.120	0.158	0.011	.
5	0.352	0.163	0.099	0.068	0.132	0.170	0.011	0.005
6	0.343	0.150	0.095	0.068	0.138	0.188	0.010	0.008
7	0.325	0.141	0.099	0.071	0.144	0.200	0.013	0.007
8	0.320	0.122	0.103	0.068	0.169	0.195	0.014	0.009

Source: Statistics New Zealand's Integrated Data Infrastructure
Note: Entries are shares of the group in each category. Year is calendar year, measured relative to 2010. Miscellaneous EMS payments include student allowances, paid parental leave, ACC compensation or NZ Superannuation.

Table 7: Sources and destinations of Primary school teaching graduates

Year	Prim. school	Other school	Other ed	Other industry	Not in EMS	On benefit	Misc EMS
-8	0.035	0.019	0.028	0.371	0.509	0.034	0.004
-7	0.035	0.025	0.028	0.447	0.432	0.029	0.004
-6	0.041	0.031	0.037	0.515	0.338	0.034	0.004
-5	0.038	0.034	0.047	0.584	0.258	0.035	0.004
-4	0.049	0.035	0.060	0.597	0.213	0.040	0.006
-3	0.051	0.038	0.068	0.604	0.193	0.040	0.006
-2	0.051	0.034	0.078	0.606	0.167	0.054	0.010
-1	0.051	0.031	0.091	0.591	0.139	0.076	0.021
0	**0.151**	**0.090**	**0.101**	**0.469**	**0.152**	**0.037**	.
1	0.303	0.268	0.106	0.193	0.106	0.024	.
2	0.316	0.263	0.118	0.147	0.137	0.019	.
3	0.316	0.257	0.116	0.138	0.160	0.009	0.004
4	0.290	0.243	0.116	0.144	0.200	0.007	.
5	0.288	0.219	0.116	0.150	0.213	0.010	0.004
6	0.276	0.207	0.116	0.153	0.237	0.007	0.004
7	0.278	0.209	0.107	0.157	0.238	0.007	0.004
8	0.282	0.199	0.107	0.162	0.237	0.006	0.007

Source: Statistics New Zealand's Integrated Data Infrastructure
Note: See Table 6.

3.4 Self-employment in the ECE sector

Finally, we briefly discuss the characteristics of self-employed ECE sector workers. Table 8 describes self-employment in the ECE sector. About 1,000 people are self-employed in this sector each year during 2000-2016. Even though the number of ECE employees who work mainly in 'Pre-school education' is typically double the number who work mainly in 'Childcare services', 60% of ECE self-employed people work in 'Childcare services'. Thus, the self-employment rate in 'Pre-school education' is about a third to a half that in 'Childcare services' and is falling over time in both industries. In 2001, 2.8% of the 'Pre-school education' and 5.6% of 'Childcare services' workforces were respectively self-employed. In 2016, the corresponding numbers were 1.5% and 3.8% respectively.

Table 8: Self-employment in ECE

	Number employees[(1)]		Number self-employed		% of all ECE self-employed with:		
Year	Pre-school	Childcare services	Pre-school	Childcare services	Wage income	Self-emp last year	Self-emp next year
2001	12,324	9,060	351	528	0.33	0.87	0.86
2002	13,320	9,096	372	525	0.36	0.84	0.90
2003	14,172	9,468	390	540	0.36	0.86	0.84
2004	15,015	9,594	390	534	0.40	0.85	0.90
2005	16,080	9,849	408	603	0.40	0.82	0.86
2006	17,037	10,368	417	573	0.44	0.88	0.87
2007	18,765	10,668	420	582	0.46	0.86	0.89
2008	21,642	10,347	435	588	0.46	0.87	0.87
2009	24,111	11,571	438	591	0.49	0.87	0.89
2010	25,680	12,279	462	618	0.50	0.84	0.89
2011	26,724	12,684	462	633	0.51	0.88	0.88
2012	27,285	13,356	480	648	0.47	0.86	0.90
2013	28,353	13,944	483	669	0.49	0.88	0.88
2014	29,079	14,457	495	657	0.49	0.88	0.86
2015	29,820	15,024	483	624	0.49	0.90	0.87
2016	30,189	15,801	462	615	0.49	0.89	0.53

Source: Self-employment data are from the data set created by Fabling and Maré (2015).
Note: Counts are randomly rounded to base 3 to protect confidentiality.
[(1)] From Table 1 in Hyslop and Le (2019), year is calendar year. All other columns are based on March year, which we align with the previous calendar year (e.g. March year 2001 with calendar year 2000, etc). Self-employment data are not yet available beyond March year2017.

Between and a third and half of self-employed people also have wage income (i.e. they would be included in the EMS analysis above). Most people are self-employed year after year. For example, 84% of those who were self-employed in 2010 were also self-employed the year before, and 89% continued to be so the year after.

Demographic statistics (not shown in the report) indicate that self-employed people in ECE are less likely to be female and almost no one has an ECE teaching qualification. This suggests self-employed people in ECE are not likely to be teachers. They could be business owners or

dependent service providers (such as cleaners). Fewer than 10 are self-employed in the 'Primary school education' industry in each year.

4 HLFS and Census analysis

4.1 HLFS analysis

Table 9 summarises the characteristics of Pre-school, Childcare services and Primary-school workers for the combined quarterly samples in the first three columns; while columns 4–6 contain the characteristics of workers with wage and earnings data reported in the combined June-quarter samples.[20] All HLFS estimates have been weighted using the HLFS sample weight to provide population estimates. To provide a comparison of the coverage from the respective data sources, we have reported the estimated number of workers in each industry in the third row of the table.[21] These numbers are broadly consistent with those observed in the EMS data (Hyslop and Le (2019), Table 1 and also reprinted in Table 8), although understandably lower because of the point-in-time focus of the HLFS versus the annual focus of the EMS.

In the fourth row we report the fraction of workers in each industry who work as teachers. This shows that most Pre-school workers are teachers (a little over 70%), while less than half (43%) of Childcare services workers are teachers, and a little over half (54%) of Primary school workers are teachers. We also document the fractions of all workers (and separately Teachers) who are 'Employers' and 'Self-employed' (with no employees). About 2% of all Pre-school workers are employers, and a further 2% are self-employed; much larger fractions of Childcare services workers are employers (3.7%) and self-employed (8.5%); while very few Primary school workers are either employers or self-employed. Smaller fractions of teachers are employers (less than 0.7% in Pre-schools, and 1.2% in Childcare services), or self-employed (1.8% in Pre-schools, and relatively large 6.0% in Childcare services).

The next set of rows pertain to weekly hours worked, which show two patterns. First, Primary school workers (and teachers) work more hours per week than either Pre-school or ECE workers. Across all workers, the average usual hours worked by those in Primary schools (36.6 hours per week) are about 4.5 hours per week more than those in Pre-schools (32.1) and about 5 hours per week more than those in Childcare services (30.5). In addition, the hours worked by teachers is greater in each industry, and differentials between Primary and the ECE industries are greater (about 8 hours per week on average). The differences in average actual weekly hours both across industries, and between teachers and other workers, are smaller but in the same directions. Second, the average usual weekly hours worked are great than the actual hours across all groups:

[20] Except for wages and earnings, we will focus our discussion on the results based on all quarters in the first three columns, and highlight any differences with the June quarters.
[21] These estimates are derived by dividing the total population counts by the number of HLFS quarters (i.e. 14, or 4 for the June samples).

by 1-3 hours per week for those in Pre-school and Childcare services, and about 4-5 hours per week for those Primary schools. At least one contributing factor for such differences will be school holidays: i.e. if the HLFS survey's reference week falls during school holidays then workers in these industries will likely work substantially reduced (if any) hours.

Table 9: HLFS Characteristics of ECE and Primary-school workers – 2016Q2-2019Q3

	All Quarters			June Quarters with wage data		
	Pre-school	Childcare	Primary	Pre-school	Childcare	Primary
No. Obs	3,408	2,265	6,360	876	588	1,689
Population count	437,000	288,300	819,800	114,200	75,400	221,900
Average quarterly count	31,210	20,590	58,560	28,550	18,850	55,480
Fraction Teachers	0.710	0.434	0.535	0.726	0.422	0.543
Fraction Employers	0.020	0.037	S	0.014	0.034	S
Fraction Teachers ERs	0.007	0.012	S	S	S	S
Fraction Self-Emp (no Ees)	0.022	0.085	0.003	0.012	0.081	S
Fraction Teachers SE	0.018	0.060	S	S	0.063	S
Usual weekly hours	32.1	30.5	36.6	32.6	30.8	37.2
	(11.6)	(13.7)	(17.1)	(10.9)	(15.1)	(17.1)
Usual weekly hours	33.6	33.8	41.6	33.9	33.6	42.2
(of Teachers)	(10.3)	(9.3)	(16.2)	(9.8)	(9.7)	(16.1)
Actual weekly hours	27.2	26.4	29.3	29.2	28.9	33.2
	(15.1)	(16.4)	(20.7)	(13.0)	(15.9)	(19.2)
Actual weekly hours	28.3	28.3	33.0	29.7	31.2	37.4
(of Teachers)	(14.5)	(14.4)	(21.7)	(12.7)	(11.6)	(19.9)
Weekly earnings	---	---	---	$827	$727	$1,008
				(412)	(597)	(587)
Annualised				$43,100	$37,900	$52,500
Weekly earnings	---	---	---	$864	$859	$1,147
(of Teachers)				(366)	(727)	(476)
Annualised				$45,100	$44,800	$59,800
Hourly wage	---	---	---	$25.4	$23.6	$27.6
				(10.1)	(12.9)	(11.0)
Hourly Wage	---	---	---	$25.8	$25.6	$29.5
(of Teachers)				(8.1)	(15.8)	(10.8)

Notes: The number of observations in the first row are randomly rounded (RR3) sample sizes; entries in subsequent rows are derived from rounded (R100) population counts based on HLFS 'finalwgt' (standard deviations in parentheses). Entries marked 'S' are suppressed for confidentiality (population cell counts<1,000). Average quarterly counts are calculated by dividing the (rounded) total population count by the number of HLFS quarters. Earnings and wages are expressed in constant 2019Q4 $-values using CPI. 'Annualised' values are estimated as weekly earnings * 52.14 weeks.

The final set of rows in Table 9 relate to workers weekly earnings and hourly wages from the June quarters' samples.[22] First, perhaps reflecting differences in hours worked, the average earnings of workers in Primary schools ($1,008 for all workers, and $1,147 for teachers) is greater

[22] To be included in these samples, respondents must report positive earnings and hours worked data. Thus, we have excluded a very small number of respondents who report working in the industries of interest, but report negative weekly earnings. This selection requirement at least partly explains why the average numbers of workers in these samples is lower than in the samples based on the HLFS for all quarters.

than for those in Pre-schools ($827, and $864), and Childcare services ($727, and $859). For comparison with the other sources (i.e. EMS and Census), we have also calculated the average 'annualised' weekly earnings for each group as 52.14 weeks * the average weekly earnings of the group.[23] Second, the final two rows report the average hourly wages earned by each group. The average wage of all workers in Primary schools ($27.60/hour) is 9% higher than those in Pre-school ($25.40/hour) and 17% higher than those in Childcare services ($23.60/hour). For teachers, both the average wages are higher and the Primary-school differentials are also higher, about 15% relative to teachers in both Pre-school and Childcare services.

In Table 10 we compare the sample characteristics of self-employed versus employees in each of the three industries of interest. As the self-employed numbers are quite small, there is a limited number of characteristics that can be reported and, because there are essentially no self-employed workers in primary schools, we report the characteristics only of employees for that industry. Self-employed workers are, on average, about 6 years older than employees in Pre-schools and Childcare services; while Primary-school employees are 3-5 years older than those in the ECE industries. There are some marked ethnic differences between employees in the ECE industries and Primary schools: about 78% of employees in Primary schools are European versus 64% and 62% in Pre-schools and Childcare services; while only 3% of Primary-school employees are Asian compared to 13% and 16% in Pre-schools and Childcare services respectively. Workers in Primary schools have higher qualifications on average than those in the ECE sector: e.g. 85% have university qualifications compared to about 65% in ECE; and only 9% have school qualifications compared to 22% in ECE. Also, employees in the ECE sector have higher qualifications than self-employed workers: e.g. only 44% of self-employed Pre-school workers, and 36% of self-employed Childcare services workers, have university qualifications; while the highest qualification of about one-third of self-employed workers in ECE are school qualifications.

In terms of job tenure, the main differences across the industries is that over 90% of employees in ECE have permanent jobs, compared to about 80% in Primary schools; while only 3% of ECE employees have fixed-term contracts compared to 13% of Primary-school employees. Comparing hours worked across the groups in Table 10 shows that self-employed ECE workers work 10-15% more hours than ECE employees; and Primary-school employees work about 20% more hours than ECE employees (42 hours/week compared to 33 in ECE). The hourly wages and weekly earnings of Primary-school employees are also higher than ECE employees.[24]

[23] We emphasise that the estimated annualised earnings are not intended as definitive estimates of annual earnings or income, but rather as indicative measures to provide simple comparisons across alternative data sources.
[24] Because the self-employed samples are small, we can only report earnings and wages for those in Childcare services. Also, derived wages for self-employed workers are often problematic due to their accounting systems: nonetheless, the average wage of self-employed workers is much lower (about one-half) than for employees in Childcare services.

Table 10: HLFS sample characteristics of Teachers by Self-Employment vs Employee status

	Pre-school		Childcare services		Primary school
	Self-Emp	Employees	Self-Emp	Employees	Employees
No. Obs	45	2,334	63	909	3,285
Pop count (All Qtrs)	5,500	302,400	7,500	115,900	437,300
Average quarterly count	390	21,600	540	8,280	31,240
Pop count (June Qtrs)	S	81,500	2,000	29,300	120,500
Average quarterly count	S	20,380	500	7,330	30,130
Age	46.3	40.4	44.6	38.2	43.5
	(10.1)	(12.5)	(12.5)	(12.1)	(13.5)
Female	1.000	0.970	1.000	0.983	0.863
Partnered	0.782	0.706	0.667	0.723	0.743
Ethnicity:					
European	0.582	0.643	0.867	0.615	0.777
Māori	S	0.078	S	0.067	0.072
European & Māori	S	0.068	S	0.047	0.044
Pacific	S	0.043	S	0.074	0.033
Asian	S	0.127	S	0.160	0.033
Miscellaneous ethnicity	S	0.042	S	0.036	0.042
Highest qualification:					
University Quals	0.436	0.652	0.360	0.643	0.853
Level 4-6 Quals	S	0.091	0.253	0.092	0.050
School Quals	0.345	0.216	0.320	0.225	0.091
No Quals	S	0.036	S	0.035	0.005
Part-time work	S	0.231	S	0.242	0.202
Job-permanent	S	0.914	S	0.923	0.807
Job-fixed term	S	0.027	S	0.027	0.131
Usual weekly hours	37.0	33.5	39.8	33.4	41.7
	(11.0)	(10.1)	(12.4)	(8.8)	(16.1)
Actual weekly hours	30.2	28.3	34.4	27.8	33.0
	(15.8)	(14.4)	(15.4)	(14.2)	(21.7)
Weekly earnings	S	$869	$429	$831	$1,147
		(359)	(329)	(339)	(476)
Annualised		$45,300	$22,400	$43,300	$59,800
Hourly wage	S	$26.0	$13.3	$25.2	$29.5
		(7.8)	(8.4)	(7.3)	(10.8)

Notes: The number of observations in the first row in each panel are randomly rounded (RR3) sample sizes; entries in subsequent rows are derived from rounded (R100) population counts based on HLFS 'finalwgt' (standard deviations in parentheses). Entries marked 'S' are suppressed (population cell counts<1,000). Average quarterly counts are calculated by dividing the (rounded) total population count by the number of HLFS quarters. Not specified highest qualification excluded from the table. Earnings and wages are expressed in constant 2019Q4 $-values using CPI. 'Annualised' values are estimated as weekly earnings * 52.14 weeks.

4.2 Census analysis

We have replicated the descriptive analysis of the HLFS data for each of the three censuses, and discuss the pattern of results here. For each census we follow the approach taken with the HLFS and focus on individuals who worked in either of the ECE industries or Primary school education. Because of the well-publicised problems with administering the 2018 census that resulted in a

large number of non-responses to the questionnaire, we focus our analysis on the sub-sample of individuals for whom both their occupation and industry were reported in the census (using this as a proxy for completed census form).[25]

We document some of the main employment, income and hours worked by workers in each of the Pre-school, Childcare services and Primary school industries in 2018 in Table 11. The corresponding characteristics of workers in 2006 and 2013 censuses are documented in appendix Table A1 and Table A2 respectively. We focus our discussion here on three main issues. First, the fraction of workers who work as teachers in each industry. In 2018, 68% of Pre-school workers were teachers, compared to 48% of Childcare services workers, and 54% of Primary school workers. These fractions are similar to those in the HLFS in Table 9. The fractions of teachers increased in both the ECE sector industries over the 2006–2018 period – from 61% of Pre-school workers and 41% of Childcare services workers – while the fraction in Primary schools was roughly constant.

Second, we document the total annual income distributions of all workers in each industry. The 2018 distributions for Pre-school and Childcare services workers are quite similar, although Childcare services workers are more likely to have low income (<$30,000) than Pre-school workers and less likely to have income above $50,000. In contrast, Primary school workers tend to have noticeably higher incomes, with 38% above $60,000 compared to only 15% on Pre-school workers. We also provide a simple indicative measure of average income of workers in each industry.[26] Based on this approach, in 2018, the average income of Pre-school workers was $41,500, compared to $35,200 for those in Childcare services and $53,700 for those in Primary schools.[27] Comparing the estimates across time, suggests (inflation-adjusted) real average incomes of workers in Pre-schools increased about 21% between 2006 and 2018, compared to 9% for workers in Childcare services and 7% for Primary school workers.

Third, we document the average (usual) hours worked by all workers and teachers whose main jobs are in these industries. These patterns are broadly similar to those measured in the HLFS. In particular, Primary school workers worked longer hours on average than ECE sector workers; and teachers work longer hours than other workers in each industry. Also, the average hours of workers in Pre-schools increased about 2.8 hours per week (10%) between 2006 and 2018, while those in Childcare services increased about 0.8 hours per week (3%), and the average

[25] Results based on the full census sample (i.e. including those with imputed occupation and industry information from elsewhere) are broadly similar. There is an unknown tradeoff between more reliable information based on the non-imputed sample versus possible bias if that sample is selective and not representative of the broader population of ECE and Primary school education workers.

[26] This estimate uses the mid-points of each income category, $200,000 for those with income above $150,000 ($133,000 for those with income above $100,000 in 2006), and in-line with our HLFS estimates we ignore those who report negative or zero incomes (presumably self-employed workers). For each census we then adjust the estimate using the CPI to be expressed in constant December-quarter 2019 $-values.

[27] Although not directly comparable to the annualised weekly earnings estimates from the HLFS (because the Census asks about total annual income versus weekly earnings), it is encouraging that the magnitudes and relative rankings from the two data sources are broadly similar.

hours worked in Primary schools remained essentially constant. All else equal, these differences may explain much of the relative increase in the average annual income of Pre-school workers compared to those in Childcare services and Primary schools.

Table 11: 2018 Census characteristics of ECE and Primary school workers

	Pre-School Education	Childcare Services	Primary School Education
No. Observations	23,361	10,782	45,207
Fraction Teachers	0.684	0.476	0.539
Fraction Employers	0.023	0.045	0.003
Fraction Teachers & Employers	0.007	0.008	0.001
Fraction Self-employed (no Ees)	0.050	0.093	0.012
Fraction Teachers & Self-emp	0.031	0.035	0.001
Annual income:			
Loss	0.001	0.002	0.001
Zero income	0.003	0.004	0.001
$1-$5,000	0.040	0.080	0.025
$5,001-$10,000	0.046	0.073	0.034
$10,001-$15,000	0.055	0.069	0.055
$15,001-$20,000	0.069	0.083	0.066
$20,001-$25,000	0.081	0.093	0.068
$25,001-$30,000	0.087	0.092	0.061
$30,001-$35,000	0.081	0.082	0.049
$35,001-$40,000	0.091	0.087	0.051
$40,001-$50,000	0.157	0.144	0.100
$50,001-$60,000	0.130	0.096	0.106
$60,001-$70,000	0.065	0.040	0.097
$70,001-$100,000	0.079	0.039	0.244
$100,001-$150,000	0.010	0.010	0.037
$150,001 or More	0.005	0.007	0.005
Average Income>0[(1)]	$41,500	$35,200	$53,700
Usual hours	31.7	29.8	35.2
(main job)	(12.2)	(13.6)	(17.2)
Usual hours	33.2	33.6	40.4
(of Teachers)	(11.1)	(10.3)	(16.8)
Usual hours	32.2	30.5	35.9
(All jobs)	(12.3)	(13.8)	(17.1)
Usual hours	33.6	33.9	40.8
(Teachers, all jobs)	(11.3)	(10.4)	(16.7)

Notes: All entries are based on randomly rounded (RR3) counts to protect confidentiality (standard deviations are in parentheses). The sample is restricted to those (non-imputed) observations with both occupation and industry reported in the 2018 Census.

[(1)] Average income is estimated using the mid-points of each income range, $200,000 for the top category, excluding the zero income and income loss categories, and then expressed in 2019Q4 $-values using the CPI.

We have also derived indicative average weekly and hourly pay rates by dividing the average annual income estimates by 52.14 weeks, and then further by the average total hours worked by workers in each industry. For this to provide unbiased estimates of weekly earnings and hourly wages assumes that earnings are the dominant component of total income and that

the usual weekly hours worked reported in the census are representative over the year. Although not reported in the tables, the estimates are broadly similar to those estimated from the HLFS data. The 2018 Census estimated average weekly incomes range from 93% of the HLFS average weekly earnings for Childcare services ($674) workers to 96% for Pre-school ($796) and 102% for Primary school ($1,029) workers; while the 2018 Census average hourly incomes range from 94% of the HLFS average hourly earnings for Childcare services workers ($22.6) to 97% for Pre-school ($25.2) and Primary school ($29.2) workers. Also, comparing the estimated hourly rates across the three censuses suggests that real average hourly pay rates increased about 9% for Pre-school workers, and 4% for Childcare services and Primary school workers, between 2006 and 2018. We emphasise that these are intended to be simple indicative, rather than definitive, estimates; however, we find the similarities with the HLFS-based estimates encouraging.

We next document the 2018 characteristics of self-employed versus employees in each industry in Table 12 (the 2006 and 2013 census characteristics are presented in appendix Table A3 and Table A4 respectively). The demographic and other characteristics in the 2018 Census are generally comparable to those from the HLFS samples.[28] Perhaps the most striking change over the period of analysis has been the dramatic rise in the fraction of ECE employees with University qualifications, and associated fall in the fractions with Level 4-6 qualifications. Between 2006 and 2018, the fraction of Pre-school employees with University qualifications increased from 30% to 66%, and the fraction of Childcare services employees increased from 27% to 62%. There was also a substantial increase in the fraction of Primary school employees with University qualifications, from 61% in 2006 to 87% in 2018. In addition, in line with the increase in average hours worked, there has been a drop in the fraction of ECE employees who work part-time (from 30% in 2006 to about 25% in 2018): the fraction of part-time workers in ECE is now similar to that in Primary schools.

[28] The estimated average annual incomes of employees appear to vary somewhat from the HLFS estimates: we are not sure the extent to which this reflects sampling variation, or the method used to estimate the averages. As the Census measure pertains to income from all sources, while the HLFS measure is only wage and salary earnings, conceptually the Census measure may be expected to be higher. However, the HLFS measure relates to the reference week, and it may be that annualising this measure overstates annual income on average.

Table 12: 2018 Census characteristics of Teachers by Self-Employment vs Employee status

	Pre-school Ed		Childcare services		Primary-school
	Self-Emp	Employees	Self-Emp	Employees	Employees
No. observations	720	15,090	378	4,662	24,246
Age	44.9	40.6	43.0	38.0	44.4
	(11.3)	(12.5)	(10.8)	(12.1)	(12.9)
Female	0.992	0.973	0.984	0.975	0.867
Partner	0.763	0.691	0.770	0.672	0.749
Ethnicity:					
European	0.808	0.649	0.738	0.642	0.792
Māori	0.029	0.056	0.024	0.041	0.052
European & Māori	0.067	0.075	0.095	0.075	0.069
Pacific	0.017	0.043	S	0.037	0.019
Asian	0.054	0.140	0.079	0.168	0.035
Miscellaneous ethnicity	0.021	0.037	0.040	0.038	0.033
Highest qualification:					
University Quals	0.233	0.662	0.190	0.620	0.869
Level 4-6 Quals	0.283	0.199	0.262	0.188	0.113
School Quals	0.400	0.116	0.397	0.156	0.016
No Quals	0.083	0.022	0.135	0.035	0.002
Part-time work	0.246	0.259	0.230	0.243	0.233
Annual income:					
Loss	S	S	S	S	0.000
Zero income	S	0.002	S	0.001	0.001
$1-$5,000	0.075	0.027	0.063	0.027	0.009
$5,001-$10,000	0.113	0.032	0.103	0.034	0.015
$10,001-$15,000	0.113	0.040	0.103	0.034	0.021
$15,001-$20,000	0.133	0.051	0.143	0.057	0.024
$20,001-$25,000	0.142	0.066	0.167	0.080	0.027
$25,001-$30,000	0.117	0.081	0.135	0.093	0.035
$30,001-$35,000	0.113	0.082	0.087	0.101	0.036
$35,001-$40,000	0.071	0.105	0.071	0.122	0.043
$40,001-$50,000	0.067	0.199	0.071	0.241	0.121
$50,001-$60,000	0.029	0.167	0.024	0.149	0.154
$60,001-$70,000	0.008	0.070	S	0.038	0.151
$70,001-$100,000	S	0.073	S	0.021	0.349
$100,001-$150,000	S	0.003	S	0.002	0.010
$150,001 or More	S	0.001	S	S	0.002
Average Income>0[(1)]	$23,900	$38,900	$23,700	$38,700	$46,800
Usual hours	35.5	33.0	35.8	33.2	40.4
(Main job)	(13.8)	(10.9)	(12.7)	(9.9)	(16.8)
Usual hours	36.1	33.4	36.4	33.6	40.8
(All jobs)	(13.9)	(11.0)	(13.2)	(10.0)	(16.7)

Notes: All entries are based on randomly rounded (RR3) counts to protect confidentiality (standard deviations are in parentheses). Entries marked 'S' are suppressed (population cell counts<6). The sample is restricted to those (non-imputed) observations with both occupation and industry reported in the 2018 Census. Not specified highest qualification excluded from the table.

[(1)] Average income is estimated using the mid-points of each income range, $200,000 for the top category, excluding the zero income and income loss categories, and then expressed in 2019Q4 $-values using the CPI. Because of the suppressed cells these estimates should be treated with caution.

4.3 Summary of HLFS and Census findings

We briefly summarise the main HLFS and Census data results as follows. First, the fraction of workers who are Teachers in Pre-schools is currently about 70%, compared to about 45% in Childcare services and 55% in Primary schools. Since 2006, the fraction has risen about 10% in Pre-schools (7 percentage points, from 61% to 68%) and about 15% in Childcare services (6 percentage points, from 41% to 48%); while the fraction has remained largely constant in Primary schools.

Second, about 2% of Pre-school workers and 4-5% of Childcare services workers are Employers, and a further 5% and 9% are Self-employed (with no employees) respectively; compared to 0.3% Employers and 1.2% Self-employed in Primary schools. Although these fractions have fluctuated somewhat across the three censuses for the ECE sector, the fraction of Self-employed workers does appear to have increased. It is intriguing that the self-employment rates are higher in the HLFS and Census data than in the tax data, and that they have increased in the former data source but decreased in the latter.

Third, the average hours worked is higher for those in Primary schools than the ECE sector; and, on average, Teachers work longer hours than other workers in each industry. Also, the average hours worked by Teachers in the ECE sector has increased over time, while it has been constant for those in Primary schools.

Finally, workers in Primary schools have higher earnings on average than those in the ECE sector. HLFS estimates imply Primary school Teachers have about 15% higher hourly wages than Teachers in either Pre-schools or Childcare services, while the wage differential is about 10% in Pre-schools (17% in Childcare services) for all workers. To the extent that teachers (and other workers) are remunerated according to their qualifications, at least some of these differences likely reflect relatively higher qualification levels of Primary school workers. As well as the hourly wage differences, relatively more hours worked by those in Primary schools also contribute to higher weekly earnings and annual incomes compared to ECE workers. Based on census data, there is some evidence that both hourly pay and hours worked in Pre-schools (especially) have increased relative to Primary schools, which will close the earnings gaps. The closing wage gap may also reflect the relative increase in qualifications of workers in the ECE sector.

5 Summary

This note has summarised analysis of the career paths and labour market outcomes of the ECE workforce. Using tax data, we find that the ECE workforce includes a substantial share of transitory workers, and turnover in the ECE sector involves younger and less qualified workers. For example, 22% of the 2010 workforce entered the sector in that year, and 17% left the sector after that year; and both entrants and exiters are much less attached to the ECE sector than

continuers. A large share of entrants continue to work mainly in non-school industries after entry into ECE, and a large share of exiters already work mainly in these industries before leaving ECE. There are limited worker flows between ECE and the school sector.

We also find that ECE and Primary school teaching graduates have largely similar employment and earnings prospects after graduation. This seems to suggest that qualified ECE teachers do not suffer disadvantages in labour market outcomes compared with qualified Primary school teachers.

Using the Household Labour Force Survey and Census data, we find that we find that about 70% of workers in 'Pre-school education' are teachers, compared with just under 50% in 'Childcare services' and just over 50% in 'Primary education'. These data confirm that workers in Primary schools have higher earnings on average than those in the ECE sector. Primary school teachers earn 10-15% higher hourly wages than those in the ECE sector. In addition, their higher earnings are because Primary school workers work more hours, and are older and better qualified than ECE workers. The pay gap between the two sectors has narrowed over time, due to the relative increases in hours worked and qualifications of workers in the ECE sector.

6 References

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Appendices

Table A1: 2006 Census characteristics of ECE and Primary school workers

	Pre-School Education	Childcare Services	Primary-School Education
No. Observations	11,493	11,571	42,927
Fraction Teachers	0.609	0.414	0.536
Fraction Employers	0.026	0.040	0.004
Fraction Teachers & Employers	0.014	0.010	0.001
Fraction Self-employed (no Ees)	0.021	0.080	0.014
Fraction Teachers & Self-emp	0.007	0.013	0.003
Annual income:			
Loss	0.001	0.001	0.001
Zero income	0.002	0.006	0.001
$1-$5,000	0.091	0.108	0.041
$5,001-$10,000	0.087	0.099	0.066
$10,001-$15,000	0.111	0.110	0.084
$15,001-$20,000	0.122	0.123	0.076
$20,001-$25,000	0.108	0.115	0.071
$25,001-$30,000	0.108	0.113	0.063
$30,001-$35,000	0.085	0.092	0.049
$35,001-$40,000	0.081	0.077	0.081
$40,001-$50,000	0.090	0.071	0.153
$50,001 - $70,000	0.073	0.040	0.243
$70,001 - $100,000	0.010	0.013	0.048
$100,001 or More	0.005	0.010	0.012
Not stated	0.025	0.022	0.012
Average Income>0[(1)]	$34,200	$32,300	$50,200
Usual hours	28.9	29.0	35.0
(main job)	(14.3)	(15.5)	(17.9)
Usual hours	31.8	31.4	40.6
(of Teachers)	(13.0)	(11.6)	(17.1)
Usual hours	30.2	30.5	36.4
(All jobs)	(15.1)	(16.3)	(18.3)
Usual hours	33.0	32.6	41.7
(Teachers, all jobs)	(14.0)	(12.3)	(17.3)

Notes: All means are based on randomly rounded (RR3) counts (standard deviations are in parentheses).
[(1)] Average income is estimated using the mid-points of each income range, $133,000 for the top category, excluding the income loss, zero income and Not stated categories, and then expressed in 2019Q4 $-values using the CPI.

Table A2: 2013 Census characteristics of ECE and Primary school workers

	Pre-School Education	Childcare Services	Primary-School Education
No. Observations	20,907	14,472	45,978
Fraction Teachers	0.630	0.480	0.533
Fraction Employers	0.020	0.041	0.003
Fraction Teachers & Employers	0.008	0.011	0.001
Fraction Self-employed (no Ees)	0.059	0.098	0.011
Fraction Teachers & Self-emp	0.024	0.029	0.002
Annual income:			
Loss	0.001	0.002	0.001
Zero income	0.003	0.006	0.002
$1-$5,000	0.051	0.082	0.026
$5,001-$10,000	0.060	0.075	0.044
$10,001-$15,000	0.074	0.082	0.066
$15,001-$20,000	0.085	0.088	0.073
$20,001-$25,000	0.091	0.087	0.069
$25,001-$30,000	0.086	0.089	0.059
$30,001-$35,000	0.078	0.080	0.052
$35,001-$40,000	0.080	0.081	0.048
$40,001-$50,000	0.138	0.132	0.102
$50,001-$60,000	0.109	0.091	0.109
$60,001-$70,000	0.060	0.041	0.125
$70,001-$100,000	0.056	0.036	0.184
$100,001-$150,000	0.007	0.009	0.032
$150,001 or More	0.004	0.006	0.002
Not stated	0.016	0.015	0.008
Average Income>0[(1)]	$39,500	$36,000	$52,800
Usual hours	29.9	29.2	34.8
(main job)	(13.0)	(13.9)	(18.2)
Usual hours	31.8	32.4	40.0
(of Teachers)	(11.7)	(10.9)	(17.9)
Usual hours	30.9	30.3	36.1
(All jobs)	(13.5)	(14.6)	(18.5)
Usual hours	32.6	33.1	41.1
(Teachers, all jobs)	(12.1)	(11.5)	(18.1)

Notes: All means are based on randomly rounded (RR3) counts (standard deviations are in parentheses).

[(1)] Average income is estimated using the mid-points of each income range, $200,000 for the top category, excluding the income loss, zero income and Not stated categories, and then expressed in 2019Q4 $-values using the CPI.

Table A3: 2006 Census characteristics of Teachers by Self-Employment vs Employee status

	Pre-school Ed		Childcare services		Primary-school
	Self-Emp	Employees	Self-Emp	Employees	Employees
No. observations	81	6,717	150	4,488	22,719
Age	42.3	39.1	39.0	35.4	42.7
	(9.7)	(12.1)	(9.1)	(11.6)	(11.9)
Female	0.963	0.986	1.000	0.991	0.859
Partner	0.852	0.686	0.780	0.639	0.752
Ethnicity:					
European	0.704	0.616	0.760	0.650	0.702
Māori	S	0.093	S	0.043	0.052
European & Māori	S	0.044	0.040	0.057	0.042
Pacific	S	0.058	S	0.043	0.018
Asian	S	0.059	S	0.080	0.022
Miscellaneous ethnicity	0.148	0.130	0.160	0.126	0.164
Highest qualification:					
University Quals	0.222	0.297	0.180	0.274	0.613
Level 4-6 Quals	0.481	0.455	0.320	0.408	0.362
School Quals	0.222	0.183	0.400	0.243	0.020
No Quals	S	0.043	0.080	0.057	0.002
Part-time work	0.333	0.297	0.180	0.301	0.211
Annual income:					
Loss	S	S	S	S	0.000
Zero income	S	0.001	S	0.002	0.000
$1-$5,000	0.111	0.055	0.100	0.047	0.020
$5,001-$10,000	0.111	0.063	0.120	0.071	0.028
$10,001-$15,000	0.111	0.093	0.140	0.097	0.034
$15,001-$20,000	0.148	0.113	0.180	0.132	0.040
$20,001-$25,000	0.185	0.106	0.100	0.146	0.046
$25,001-$30,000	0.074	0.130	0.160	0.161	0.046
$30,001-$35,000	S	0.103	0.060	0.130	0.046
$35,001-$40,000	S	0.109	S	0.106	0.111
$40,001-$50,000	S	0.114	0.040	0.071	0.239
$50,001 - $70,000	S	0.086	S	0.014	0.353
$70,001 - $100,000	S	0.003	S	0.001	0.026
$100,001 or More	S	S	S	S	0.004
Not stated	S	0.020	0.040	0.020	0.007
Average Income>0[(1)]	$19,800	$36,900	$23,800	$32,300	$57,700
Usual hours	28.4	31.7	36.9	31.0	40.7
(Main job)	(13.5)	(12.9)	(14.6)	(11.3)	(17.0)
Usual hours	32.4	32.8	39.0	32.1	41.8
(All jobs)	(15.5)	(13.8)	(15.0)	(12.0)	(17.3)

Notes: All means are based on randomly rounded (RR3) counts (standard deviations are in parentheses). Not specified highest qualification excluded from the table.

[(1)] Average income is estimated using the mid-points of each income range, $133,000 for the top categorical range, and excluding the income loss, zero income and Not stated categories, and then expressed in 2019Q4 $-values using the CPI. Because of the suppressed cells these estimates should be treated with caution.

Table A4: 2013 Census characteristics of Teachers by Self-Employment vs Employee status

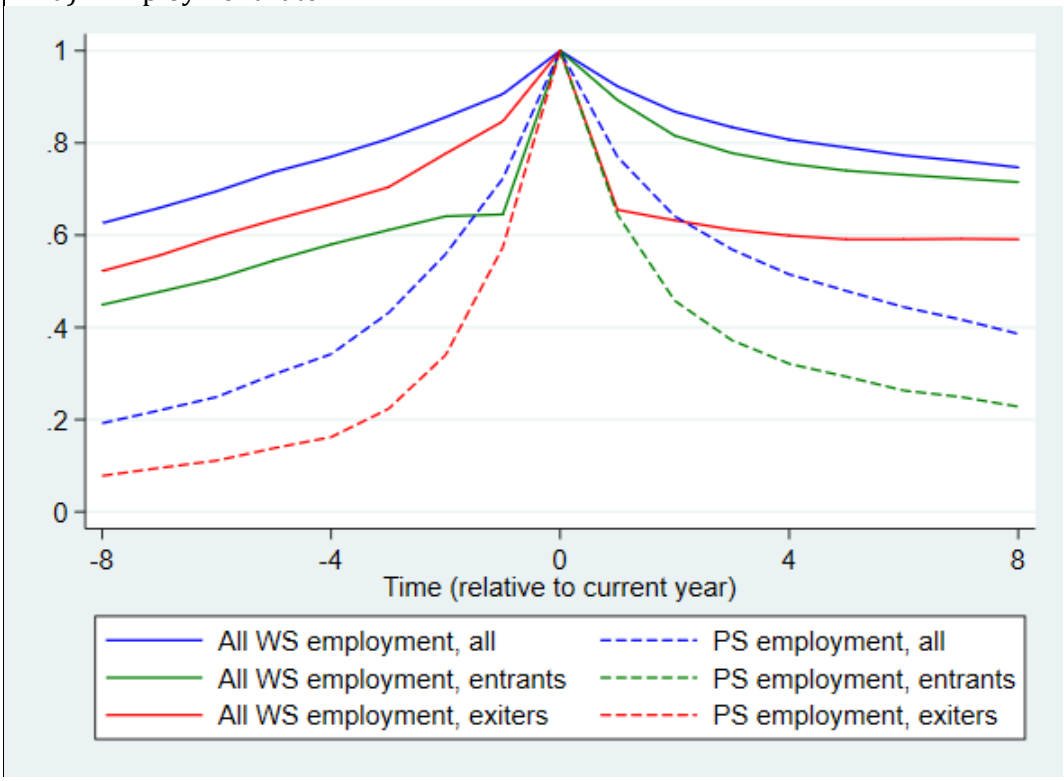
	Pre-school Ed		Childcare services		Primary-school
	Self-Emp	Employees	Self-Emp	Employees	Employees
No. observations	510	12,408	423	6,336	24,216
Age	41.5	40.1	41.4	37.0	44.4
	(11.0)	(12.4)	(10.7)	(12.0)	(12.4)
Female	0.988	0.975	1.000	0.980	0.866
Partner	0.782	0.685	0.738	0.649	0.759
Ethnicity:					
European	0.835	0.673	0.780	0.661	0.809
Māori	0.035	0.073	0.057	0.045	0.050
European & Māori	0.053	0.059	0.064	0.068	0.056
Pacific	0.012	0.049	S	0.042	0.020
Asian	0.041	0.100	0.050	0.141	0.026
Miscellaneous eth	0.018	0.045	0.043	0.044	0.040
Highest qualification:					
University Quals	0.182	0.532	0.142	0.527	0.740
Level 4-6 Quals	0.276	0.278	0.291	0.250	0.229
School Quals	0.453	0.147	0.447	0.172	0.027
No Quals	0.059	0.027	0.099	0.036	0.001
Part-time work	0.294	0.280	0.241	0.275	0.240
Annual income:					
Loss	S	0.000	S	S	0.000
Zero income	S	0.002	S	0.001	0.001
$1-$5,000	0.076	0.033	0.085	0.032	0.012
$5,001-$10,000	0.141	0.040	0.135	0.043	0.022
$10,001-$15,000	0.141	0.054	0.135	0.052	0.028
$15,001-$20,000	0.147	0.062	0.128	0.066	0.030
$20,001-$25,000	0.135	0.080	0.128	0.086	0.034
$25,001-$30,000	0.106	0.082	0.142	0.097	0.040
$30,001-$35,000	0.094	0.081	0.085	0.095	0.043
$35,001-$40,000	0.053	0.095	0.057	0.113	0.042
$40,001-$50,000	0.041	0.183	0.043	0.212	0.133
$50,001-$60,000	0.018	0.147	0.014	0.133	0.167
$60,001-$70,000	S	0.067	S	0.039	0.199
$70,001-$100,000	S	0.057	S	0.019	0.237
$100,001-$150,000	S	0.002	S	S	0.007
$150,001 or More	S	0.001	S	S	0.001
Not stated	0.012	0.014	0.021	0.011	0.004
Average Income>0[(1)]	$22,200	$42,400	$22,400	$38,800	$60,600
Usual hours	33.3	31.7	35.3	32.0	40.1
(Main job)	(14.0)	(11.6)	(15.2)	(10.4)	(17.9)
Usual hours	34.6	32.4	36.9	32.6	41.1
(All jobs)	(14.4)	(11.9)	(16.8)	(10.8)	(18.1)

Notes: All means are based on randomly rounded (RR3) counts (standard deviations are in parentheses). Not specified highest qualification excluded from the table.

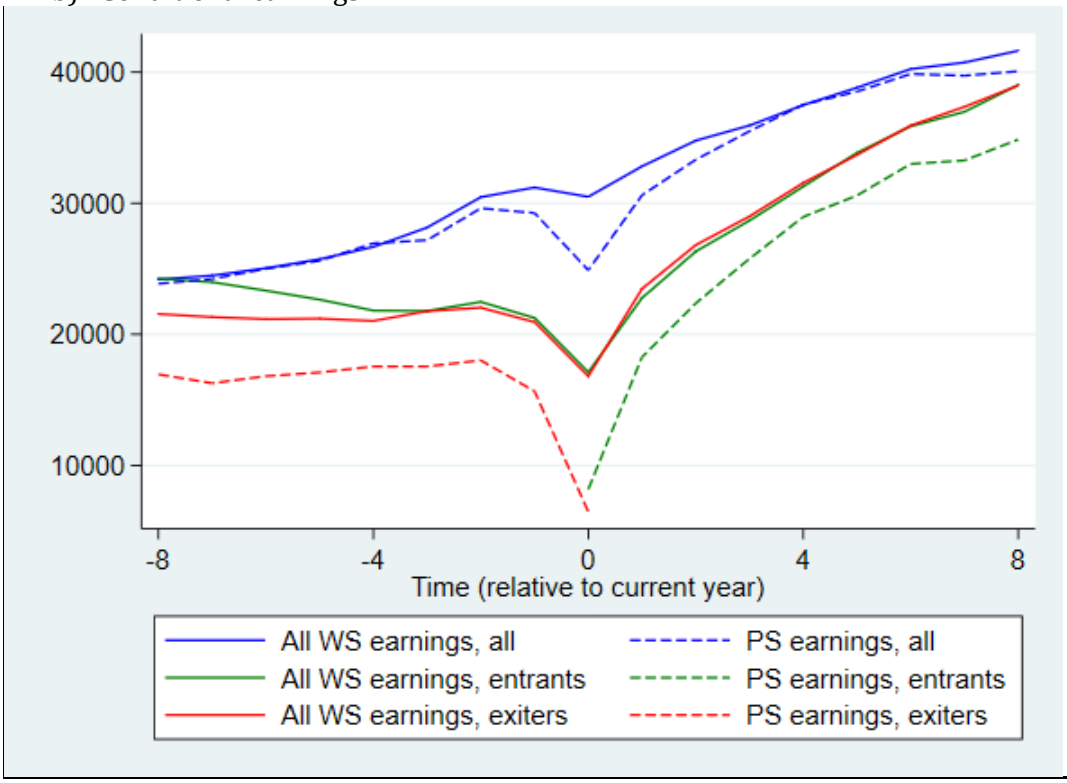
[(1)] Average income is estimated using the mid-points of each income range, $200,000 for the top category, excluding the income loss, zero income and Not stated categories, and then expressed in 2019Q4 $-values using the CPI. Because of the suppressed cells these estimates should be treated additional caution.

Figure A1: Employment rates and conditional earnings history for 2010 'Pre-school education' workers

a) Employment rate



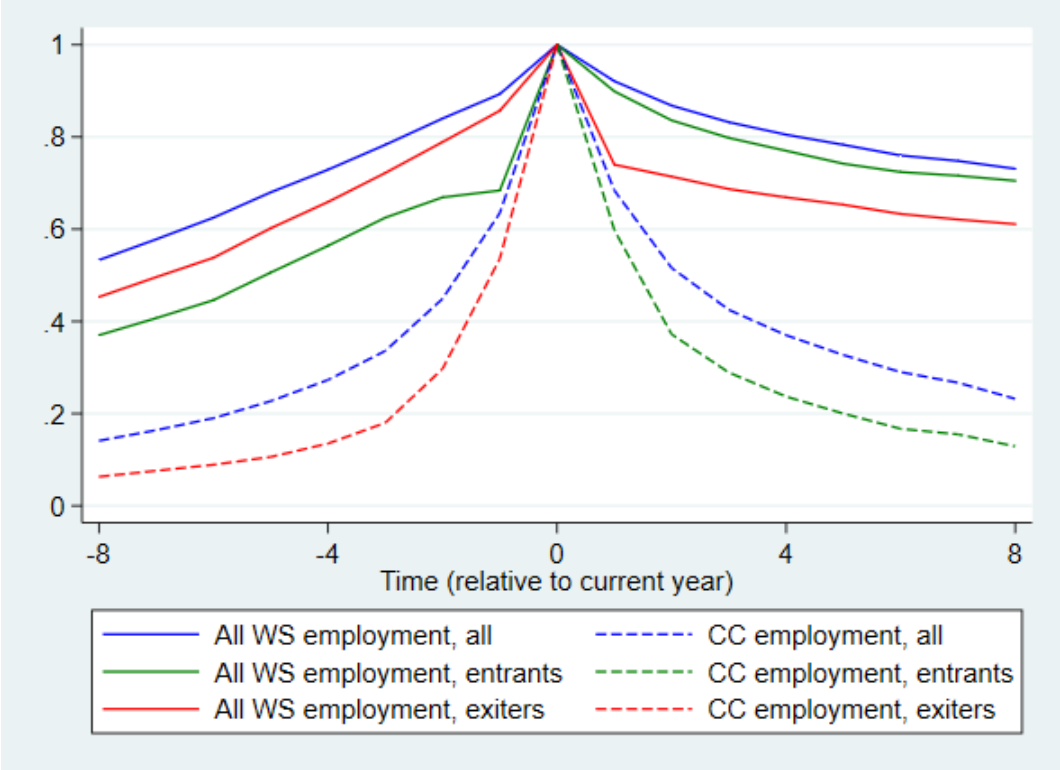
b) Conditional earnings



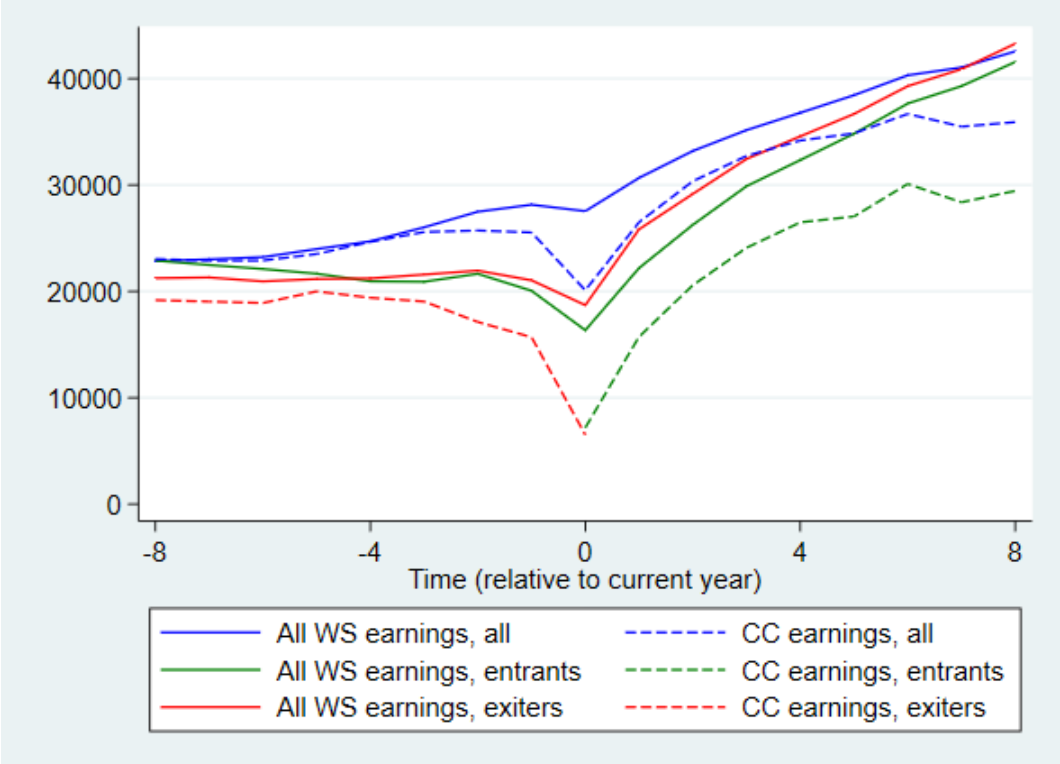
Note: Earnings are in December 2019 dollars. Current year is 2010.

Figure A2: Employment rates and conditional earnings history for 2010 'Childcare services' workers

a) Employment rate



b) Conditional earnings



Note: Earnings are in December 2019 dollars. Current year is 2010.

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