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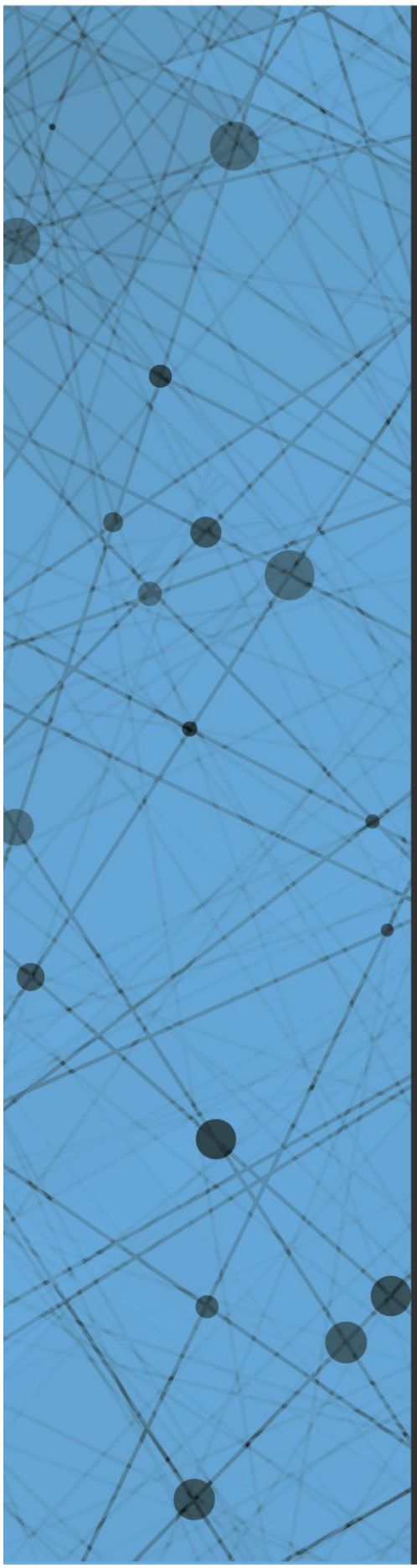

The Impacts of Job displacement on workers by education level

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Abstract

This research note extends previous research by Hyslop and Townsend (2017; 2019) on the longer term impacts of job displacement on workers labour market outcomes, to examine the impacts for workers with different levels of education. It uses data from the Survey of Family, Income and Employment (SoFIE) to identify job displacements over the period 2001–10, matched to administrative data from Statistics New Zealand's Integrated Data Infrastructure (IDI) covering the period 1999–2015, to facilitate at least five years of post-displacement observations. The results suggest that displaced workers with degree-level education experience larger adverse short-term employment effects, smaller medium to longer term employment effects, but larger and enduring earnings losses, than other displaced workers. The patterns are consistent with various hypotheses, including that, after a period of unsuccessful job search, degree-level educated workers may accept either lower skilled jobs or jobs with worse skill match. Alternatively, they may experience greater loss of either firm or industry-specific human capital, or lose substantial earnings premiums when displaced, that are difficult to replace.

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Tables and Figures

1 Introduction

This research note extends previous research by Hyslop and Townsend (2017; 2019) to analyse the longer term impacts of involuntary job-loss ("displacement") on workers labour market outcomes by education level. In line with much of the international literature, Hyslop and Townsend (2017; 2019) estimate substantial and long-lasting adverse effects of job displacement on workers' subsequent employment and earnings: displaced workers' employment rates are about 10 percentage points lower, and their earnings about 20% lower, 3-5 years later than for comparable non-displaced workers. Nedelkoska et al (2015) discuss several reasons why job displacement may affect workers subsequent labour market outcomes,[1] and identify skills mismatch as an important explanation of such impacts: this occurs both through an increase in occupational change, and also through moving into less-skilled jobs.

The main hypothesis of interest to the Productivity Commission to test is whether post-displacement outcomes are better for workers with higher levels of education. It is not clear how displacement effects will vary by level of education. On one hand, workers with higher education and skills have better labour market outcomes in general. On the other hand, if more educated workers are also in jobs with higher levels of firm or sector-specific human capital,[2] then the job displacement effects on their subsequent outcomes may be greater than for less educated workers.[3] Swaim and Podgursky (1989) and Farber (1997) both find that, in the US, more educated displaced workers have higher re-employment rates and experience lower earnings losses conditional on being employed.[4]

The analysis uses matched survey and administrative data within Statistics New Zealand's Integrated Data Infrastructure (IDI). First, the sample of workers is derived from Statistics New Zealand's Survey of Family Income and Employment (SoFIE); and the SoFIE survey is used to identify job displacement events over the period 2001–10. Second, the SoFIE sample is then matched to administrative data from Inland Revenue (IRD) on workers' monthly employment and earnings over the period 1999–2015. This facilitates analysis of the impacts of job loss over the five years following displacement, as well as being able to control for their employment and earnings histories over the two and a half years prior to displacement. In particular, we focus on

[1] These include that it may be difficult to find a new job that values the skills used and developed on the previous job; the job separation may result in the loss of any earnings premiums from incentive contracts on the job; search costs required to find a job; and possible stigma effects associated with having been laid-off from a job.
[2] That is, the skills used in a job that are less easily transferred to other firms or sectors.
[3] Similarly, if more educated workers tend to have higher levels of earning from incentive contracts, or greater levels of stigma associated with job loss. Consistent with the idea of specific human capital loss associated with job displacement, Herz (2019) finds that workers experience greater wage loss when not finding re-employment in a similar job.
[4] These analyses use data from the Displaced Workers Survey (DWS), which is a supplement to the Current Population Survey (CPS). A weakness of the DWS is that there is no non-displaced worker comparison group, so that the re-employment rate comparison is among displaced workers, and may simply reflect higher employment rates of more educated workers. I consider the earnings loss results more robust, as each worker's earnings loss is measured relative to their pre-displacement earnings adjusted for occupational wage growth.

the impact of job loss on workers monthly employment rate and their earnings conditional on being employment, averaged within each of the five years following displacement.

The next section compares the characteristics of the analytical sample of displaced and non-displaced workers stratified by education level. Section 3 briefly discusses the propensity score matched method used to analyse the impacts of job displacement, and presents the results.

2 Descriptive statistics

The data appendix contains a discussion of the SoFIE survey, and sample construction used in this analysis. As in Hyslop and Townsend (2017; 2019), the analysis here focuses on workers aged 20-64 years old, who experience involuntary job loss between October 2001 and September 2010. In order to moderate the effects of involuntary job loss for just cause, we follow the OECD (2013) and focus on workers who had been in the job for at least one year.[5] Our sample is restricted to those workers who are matched to the IDI spine.[6]

For each worker who experienced at least one job displacement, we define their focal displacement month as the month of their first displacement from a job held for at least one year. The focus on workers' first displacement event means that the impact analysis includes possible subsequent displacements that has been shown to be important (e.g. Stevens 1997). We include all monthly observations of never-displaced workers employed in each focal displacement month as our non-displaced worker comparison population.

Table 1 presents descriptive statistics for a variety of characteristics of displaced and non-displaced workers. For each of displaced and non-displaced workers, the first column summarises the characteristics of all 20-64 year old workers in SoFIE who had been in the job for at least one year. There were 1,245 displaced workers satisfying these criteria, and 638,829 non-displaced worker observations in focal displacement months.[7] The subsequent columns relate to subsamples stratified by education level. The comparatively small number of displaced workers constrains the stratification of the sample by education, and four broad subgroups are used: No qualifications; High school qualifications; Post-school "Vocational" qualifications; and Degree-level qualifications.[8] These education subgroups range from 14% of the displaced worker sample for those with degree-level qualifications to 36% for those with vocational

[5] The OECD (2013) also argues that short tenure job loss is more likely the result of poor match quality, rather than for economic reasons.

[6] Hyslop and Townsend (2017) report the match rate is 98% for the full sample of displaced workers (i.e. including those with less than a year of job tenure). This is higher than Statistics New Zealand's most recent match rate of 92% for the full SoFIE sample, but employed workers are likely to have higher match rates. Also, that the tax-data measured employment rates corresponding to SoFIE employment dates is on the order of 0.9 (see Hyslop and Townsend 2017), suggests that the effective match rate for our analysis may be about 90%.

[7] All sample counts discussed in the paper are randomly rounded (base-3) to satisfy Stats NZ's confidentiality rules. The displaced worker characteristics are measured at the time of displacement. The non-displaced worker sample consist of all observations of never-displaced workers who are working during a month in which a job displacement is observed, so typically includes multiple observations on the individual never-displaced workers.

[8] Given differences in the distribution of education level across age groups, below I also subset the analysis on age, which further constrains the education groupings.

qualifications. Consistent with international findings (e.g. Kletzer 1998), job displacement rates are lower for more educated workers.[9] For example, 50% of displaced workers have either no qualifications or only high school qualifications, compared to 42% of non-displaced workers.

Comparing the full sample characteristics, displaced workers are less likely to be female, slightly younger, less likely to be partnered, more likely to have Maori or Pacific ethnicity, and have nearly 1-year shorter job tenure on average. Such relative differences also generally hold across the education-level subsamples. Comparing the average earnings by education level (for either displaced or non-displaced workers) shows the strong positive relationship between higher education and earnings – e.g. the SoFIE average monthly earnings of degree-level education workers are more than 50% higher than that of Vocational education workers. That the average (SoFIE measured) earnings of displaced workers are substantially lower than that of non-displaced workers, partly reflects lower education but are earnings also lower within education groups.[10]

Table 2 summarises the distribution of education by three age groups for the displaced and non-displaced worker samples: younger workers (aged 20-29), prime aged (30-49), and older workers (50-64). This shows distribution of education varies across age groups, with younger cohorts of workers having higher education levels on average. For this reason, in addition to the full sample analysis of education effects, I will also conduct some age-stratified analysis to assess the robustness of the results.

3 Analysis and results

The analysis here follows that in Hyslop and Townsend (2017; 2019). In this note, I focus on the impacts of displacement on monthly (wage and salary) employment, and earnings conditional on being employed, as measured in the EMS tables in the IDI. This approach uses propensity-score matching to identify a comparison sample of observationally similar never-displaced workers: i.e. workers whose estimated propensity to be displaced is similar to that of displaced workers.[11] The robustness of the analysis relies on the assumption that, conditional on the characteristics used to predict displacement, workers' potential labour market outcomes are

[9] Swaim and Podgursky (1989) show that, in the US, education differences appear to be due to differences in job displacement rates across occur rather than within occupations.

[10] Although Dixon and Maré (2013) found evidence of declining earnings pre-displacement in SoFIE, Hyslop and Townsend (2017; 2019) found no evidence of this. Also, as discussed in Hyslop and Townsend (2017; 2019), the monthly LEED earnings of displaced workers appear to be inflated by factors such as redundancy and accumulated leave in their final payments from a job.

[11] The propensity score model controls for age, gender, education, ethnicity, job tenure, and pre-displacement employment and earnings. For each displaced worker, up to 10 non-displaced worker matches are selected with replacement among those employed in the same month as the displacement occurs, subject to two constraints. First, displaced and non-displaced workers whose propensity scores lie outside the "common support" are excluded. Second, a non-displaced worker's propensity score must lie within +/-1% of a displaced worker's propensity score to be matched. The non-displaced worker outcomes are weighted by the inverse of the number of matches for each displaced worker. The resultant matched samples are statistically balanced – e.g. see Hyslop and Townsend (2017; 2019) results for the full displaced worker sample.

independent of whether or not they are displaced – i.e. that a worker's displacement status is essentially random conditional on the observed predictors, and there are no unobserved factors that affect both their displacement and their potential labour market outcomes. This is a strong and untestable assumption, however the earlier analysis is suggestive that job displacements are relatively random across workers.

This approach then estimates the impacts as the difference in average outcomes of the displaced and matched non-displaced comparison samples. The approach is applied separately for each of the alternative subsamples discussed below – i.e. for each subsample, the propensity score model is re-estimated, and then matching is done based on that sample's model estimates. We focus on two labour market outcomes over the five years following the focal displacement date: first, workers monthly wage and salary employment rates; and second, their average earnings in months they are employed (i.e. their "conditional earnings").[12] We estimate separate impacts for each of the five years following the displacement event, in which each year's impact is the average across months in that year.[13]

I begin by estimating the impacts across all displaced workers, and for the full sample stratified by education level. Following this, I consider two extensions to assess the robustness of the results: first, I focus on prime-aged workers, and restrict the age range to 25–49 years;[14] and second, I examine the impacts by age group for a more restrictive education stratification.

3.1 Main results

The main results of the impacts of job displacement are presented in Table 3: the employment impacts are in the top panel, and the impacts on earnings in the lower panel. These are based on analysis using the full age range (20-64): for the full sample in the first column, and then by education subgroups in the following columns. It is worth emphasising here that the displacement impacts are measured relative to the employment and earnings of comparable non-displaced workers– e.g. the impacts of job displacement for degree-level educated workers are measured relative to the employment and earnings of comparable non-displaced degree-level educated workers.

First, the displacement impacts on both employment and earnings follow similar patterns for each education group. Workers with degree-level education have noticeably larger adverse employment effects in the first year after displacement – i.e. 33% lower employment than non-displaced degree-level educated workers (compared to 22-24% impacts for the other education

[12] The earnings analysis is not adjusted for possible differential selection into employment between displaced and non-displaced workers. Podgursky and Swaim (1987) show that the bias from ignoring selection is likely to be small. The alternative, commonly used approach is to analyse the impacts on workers' unconditional earnings; however, the strong (extensive margin) employment effects tends to confound the additional intensive margin (hourly wage and hours) effects.

[13] As well as annual-averaged monthly impacts, I also estimated point-in-time impacts measured at the (6-month) midpoint of each year following displacement. The results are substantively robust to this alternative.

[14] I broaden the prime-age range somewhat to increase the sample size for this analysis.

groups); slightly worse in the second year (15% impacts, compared to 12-14% for other education groups); and then slightly better outcomes after three years (6-9% impacts, compared to 8-11% for other education groups). These estimates suggest that, although degree-level educated workers take longer to find re-employment, they have relatively better medium to longer term employment prospects, than other workers. However, given the relatively small sample sizes, only the first-year impacts are statistically significantly different for degree-level educated workers.

Second, there are no statistically significant differences in the estimated earnings impacts across the education groups. However, the point-estimates of the earnings losses associated with job loss are always worse for workers with degree-level education. During the first three years following displacement, the conditional earnings loss is estimated to be about 40 log-points (about one-third), compared to 18-35 log-points for other workers. Their earnings losses decline to 20 log-points in year-5, but this compares with 13-18 log-point losses for the other education groups. Thus, despite possibly better medium term re-employment outcomes, degree-level educated displaced workers appear to suffer greater persistent earnings loss than the other education groups.

Taken together, the results are consistent with the notion that although degree-level educated displaced workers have relatively better medium term re-employment prospects than other education groups, to successfully find employment requires relatively larger loss of earnings. There are several plausible hypotheses for this pattern. For example, higher educated workers may accept employment with relatively lower skills or worse skills match; their job displacements may involve greater loss of firm or industry specific human capital; or they experience larger loss of earnings premiums associated with incentive contracts. However, this analysis is not able to distinguish among the possible reasons.

As discussed above, it is important to understand that the impacts are measured relative to the employment and earnings of comparable non-displaced workers. That is, worse impacts for degree-level educated workers implies that those workers have relatively lower employment and earnings than comparable non-displaced degree-level educated workers, and not, e.g., that they have worse outcomes relative to other displaced worker education groups.

3.2 Age-based results

I first repeat the analysis above, restricted to 'prime-age' workers, aged 25-49. This reduces the sample to about 60% of all displaced workers (ranging from 50% for workers with no qualifications, to two-thirds for workers with degree-level qualifications).

The results from this analysis are presented in Table 4. The estimated impacts on both employment and earnings are generally lower than those for the full age range in Table 3, which is consistent with displacement having greater impacts on older workers. However, the relative

patterns across the education groups are broadly similar. In particular, the Degree-level group has larger short run, and lower longer run, employment impacts. The earnings impacts on this group are also generally larger, although there is less systematic pattern, perhaps due greater sampling variation in the smaller samples.

To further control for age differences in education levels, the second extension to the main analysis I considered was to estimate displacement effects by level of education across the three age groups in Table 2. However, given the small numbers of displacements, this necessitated further aggregation of education differences: for this exercise I have stratified education into none and school qualifications versus post-school and degree-level qualifications. The results are presented in Table 5.

Again, the sample sizes are too small to detect any statistically significant within-age group differences in displacement impacts by education level. Focusing on the point estimates, for young workers, it appears those with post-school qualifications have marginally better employment and earnings outcomes than those with at most school qualifications. In contrast, for prime age displaced workers, the employment losses are somewhat worse for those with post-school qualifications; to some extent this also holds for earnings losses. For older workers, the relative employment effects are mixed, while earnings losses are generally lower for those with post-school education.

4 Concluding discussion

This research note has extended Hyslop and Townsend's (2017; 2019) analysis of the impacts of involuntary job loss on workers subsequent labour market outcomes, to examine how the effects vary by education level. The main results suggest that displaced workers with degree-level education experience larger adverse effects on the short-term employment, smaller medium to longer term employment effects, but larger and enduring effects on earnings, than other displaced workers. These patterns consistent with the notion that, on average, (worker-firm) job match quality is more important for higher (degree-level) educated workers; and that they either require longer to find a suitable replacement job, or after a period of unsuccessful search, lower their expectations and accept lower-skilled positions. Alternative interpretations include that more educated workers experience greater loss of either firm or industry-specific human capital, or lose substantial earnings premiums when displaced, that are difficult to replace.

The main caveat associated with the analysis here is the assumption that propensity score matching on observed characteristics adequately controls for any non-random differences in the displacement propensity across workers, so that their potential labour market outcomes are independent of their displacement status. In addition, the relatively small numbers of measured displacements by education level has constrained the ability to draw strong conclusions from the analysis.

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Table 1: SoFIE sample descriptive statistics

	Displaced Workers					Non-Displaced Workers				
	All	No Quals	High School	Vocat-ional	Degree-level	All	No Quals	High School	Vocat-ional	Degree-level
Female	0.429	0.329	0.516	0.389	0.492	0.514	0.497	0.552	0.476	0.547
	(0.50)	(0.47)	(0.50)	(0.49)	(0.50)	(0.50)	(0.50)	(0.50)	(0.50)	(0.50)
Age	41.8	44.6	39.5	41.9	43.1	42.4	46.6	40.1	42.9	41.4
	(12.3)	(12.6)	(12.5)	(11.9)	(11.0)	(11.6)	(11.3)	(11.9)	(11.4)	(10.9)
Partnered	0.607	0.610	0.605	0.611	0.610	0.652	0.654	0.637	0.666	0.651
	(0.49)	(0.49)	(0.49)	(0.49)	(0.49)	(0.48)	(0.48)	(0.48)	(0.47)	(0.48)
Family size	2.69	2.73	2.73	2.66	2.64	2.76	2.72	2.83	2.77	2.70
	(1.37)	(1.58)	(1.34)	(1.29)	(1.34)	(1.40)	(1.43)	(1.43)	(1.39)	(1.35)
NZ European	0.773	0.683	0.774	0.812	0.814	0.781	0.721	0.780	0.808	0.782
	(0.42)	(0.47)	(0.42)	(0.39)	(0.39)	(0.41)	(0.45)	(0.41)	(0.39)	(0.41)
Maori	0.123	0.232	0.097	0.114	0.051	0.110	0.180	0.097	0.116	0.059
	(0.33)	(0.42)	(0.30)	(0.32)	(0.22)	(0.31)	(0.38)	(0.30)	(0.32)	(0.24)
Pacific	0.051	0.073	0.081	0.034	0.000	0.047	0.068	0.073	0.031	0.024
	(0.22)	(0.26)	(0.27)	(0.17)	(0.07)	(0.21)	(0.25)	(0.26)	(0.17)	(0.15)
Asian	0.029	0.012	0.016	0.020	0.102	0.042	0.021	0.033	0.022	0.104
	(0.17)	(0.11)	(0.14)	(0.13)	(0.30)	(0.20)	(0.14)	(0.18)	(0.15)	(0.31)
Other ethnicity	0.017	0.012	0.024	0.013	0.034	0.015	0.005	0.011	0.018	0.023
	(0.13)	(0.09)	(0.15)	(0.12)	(0.17)	(0.12)	(0.07)	(0.11)	(0.13)	(0.15)
Job tenure	5.827	7.268	5.540	5.369	5.695	6.767	7.856	6.574	6.970	5.826
	(7.01)	(8.92)	(6.30)	(6.50)	(6.44)	(7.27)	(8.21)	(7.18)	(7.26)	(6.49)
Employed	0.882	0.890	0.895	0.859	0.915	0.927	0.913	0.926	0.928	0.938
(LEED)	(0.32)	(0.31)	(0.31)	(0.34)	(0.31)	(0.26)	(0.28)	(0.26)	(0.26)	(0.24)
Earnings	3,223	2,508	2,928	3,115	5,165	4,483	3,276	3,818	4,343	6,495
(SoFIE, $)	(3,805)	(2,588)	(3,108)	(3,110)	(6,558)	(3,990)	(2,147)	(2,701)	(2,976)	(6,496)
Fraction	1	0.198	0.299	0.359	0.142	1	0.159	0.262	0.369	0.207
No. Observations	1,245	246	372	447	177	638,829	101,367	167,598	235,851	132,483

Notes: Standard deviations in parentheses. Sample includes 20-64 year olds with at least 1-year of job tenure: displaced worker observations are in the month of displacement (October 2001–September 2010); non-displaced worker observations are pooled across months in which any displacements occur. Earnings are expressed in CPI-adjusted June quarter 2016 $-values. Sample sizes are randomly rounded to base-3. Degree-level qualifications include Bachelor and Higher degrees.

Table 2: Highest education by Age-group for displaced and non-displaced workers

	Aged 20-29	Aged 30-49	Aged 50-64	All
(a) Displaced workers				
No qualifications	0.167	0.167	0.268	0.198
High school	0.393	0.304	0.236	0.299
Vocational	0.333	0.368	0.354	0.359
Degree-level	0.119	0.162	0.134	0.142
No. observations	252	612	381	1,245
(b) Non-displaced worker observations				
No qualifications	0.085	0.141	0.230	0.159
High school	0.361	0.263	0.209	0.263
Vocational	0.334	0.373	0.384	0.370
Degree-level	0.219	0.222	0.178	0.208
No. observations	106,926	333,933	196,443	637,302

Note: Each panel column shows the qualification distribution for an age group. Sample sizes are randomly rounded to base-3. 1,530 non-displaced worker observations have missing highest education level. Degree-level qualifications include Bachelor and Higher degrees.

Table 3: Impacts of job displacement by Education – all workers, aged 20–64

Year since displacement	All	No Quals	High School	Vocat-ional	Degree-level
		(a) Employment rate			
Year 1	-0.249***	-0.237***	-0.234***	-0.224***	-0.332***
	(0.012)	(0.027)	(0.021)	(0.020)	(0.032)
Year 2	-0.143***	-0.142***	-0.122***	-0.134***	-0.155***
	(0.013)	(0.028)	(0.023)	(0.022)	(0.037)
Year 3	-0.110***	-0.106***	-0.108***	-0.108***	-0.085**
	(0.013)	(0.032)	(0.024)	(0.023)	(0.038)
Year 4	-0.099***	-0.105***	-0.080***	-0.099***	-0.062
	(0.014)	(0.034)	(0.025)	(0.024)	(0.039)
Year 5	-0.087***	-0.087**	-0.078***	-0.088***	-0.084**
	(0.014)	(0.034)	(0.026)	(0.025)	(0.041)
		(b) Log(earnings)			
Year 1	-0.334***	-0.343***	-0.350***	-0.311***	-0.387***
	(0.031)	(0.086)	(0.072)	(0.053)	(0.140)
Year 2	-0.272***	-0.275***	-0.239***	-0.244***	-0.431**
	(0.031)	(0.095)	(0.074)	(0.052)	(0.172)
Year 3	-0.234***	-0.208**	-0.229***	-0.177***	-0.405**
	(0.031)	(0.102)	(0.064)	(0.060)	(0.171)
Year 4	-0.185***	-0.178*	-0.174***	-0.135	-0.335*
	(0.029)	(0.106)	(0.066)	(0.061)	(0.174)
Year 5	-0.172***	-0.130	-0.181***	-0.141	-0.201
	(0.029)	(0.107)	(0.068)	(0.059)	(0.178)
No. Displaced workers	1,245	246	372	447	177

Notes: Estimated standard errors are in parentheses. Degree-level qualifications include Bachelor and Higher degrees. The earnings impacts in panel (b) are conditional on being employed.
*** p<0.01, ** p<0.05, * p<0.1

Table 4: Impacts of job displacement by Education – prime aged (25–49)

Year since displacement	All	No Quals	High School	Vocat-ional	Degree-level
		(a) Employment rate			
Year 1	-0.229***	-0.220***	-0.219***	-0.230***	-0.295***
	(0.016)	(0.054)	(0.032)	(0.025)	(0.050)
Year 2	-0.133***	-0.117**	-0.133***	-0.147***	-0.153***
	(0.017)	(0.056)	(0.034)	(0.028)	(0.055)
Year 3	-0.089***	-0.102*	-0.094***	-0.101***	-0.077
	(0.017)	(0.057)	(0.034)	(0.028)	(0.050)
Year 4	-0.079***	-0.099*	-0.059*	-0.102***	-0.051
	(0.018)	(0.057)	(0.034)	(0.029)	(0.054)
Year 5	-0.067***	-0.061	-0.053	-0.082***	-0.046
	(0.018)	(0.059)	(0.035)	(0.030)	(0.058)
		(b) Log(earnings)			
Year 1	-0.285***	-0.314	-0.299*	-0.223***	-0.346
	(0.038)	(0.343)	(0.154)	(0.057)	(0.270)
Year 2	-0.242***	-0.183	-0.271*	-0.190***	-0.328
	(0.038)	(0.354)	(0.163)	(0.067)	(0.312)
Year 3	-0.205***	-0.230	-0.232	-0.094	-0.350
	(0.038)	(0.352)	(0.156)	(0.064)	(0.255)
Year 4	-0.162***	-0.177	-0.210	-0.063	-0.266
	(0.037)	(0.377)	(0.159)	(0.067)	(0.190)
Year 5	-0.153***	-0.236	-0.184	-0.110	-0.141
	(0.037)	(0.388)	(0.187)	(0.073)	(0.236)
No. Displaced workers	732	120	216	279	117

Notes: Estimated standard errors are in parentheses. Degree-level qualifications include Bachelor and Higher degrees. The earnings impacts in panel (b) are conditional on being employed.
*** p<0.01, ** p<0.05, * p<0.1

Table 5: Impacts of job displacement by Education and Age

Year since displace-ment	Employment rate			log(earnings)		
	All	High school	Post School	All	High school	Post school
			(a) Young (Aged 20-29)			
Year 1	-0.189***	-0.200***	-0.186***	-0.312***	-0.380***	-0.224
	(0.026)	(0.035)	(0.043)	(0.080)	(0.102)	(0.148)
Year 2	-0.079***	-0.065	-0.083*	-0.223***	-0.230*	-0.211
	(0.028)	(0.040)	(0.047)	(0.085)	(0.134)	(0.186)
Year 3	-0.071	-0.076*	-0.093*	-0.268***	-0.219*	-0.225
	(0.031)	(0.042)	(0.051)	(0.094)	(0.131)	(0.225)
Year 4	-0.043	-0.043	-0.062	-0.116	-0.107	-0.106
	(0.032)	(0.044)	(0.054)	(0.088)	(0.112)	(0.210)
Year 5	-0.051	-0.065	-0.050	-0.125	-0.140	-0.111
	(0.033)	(0.048)	(0.057)	(0.098)	(0.123)	(0.266)
No. Disp. workers	252	141	114	252	141	114
			(b) Prime (Aged 30-49)			
Year 1	-0.239***	-0.206***	-0.259***	-0.317***	-0.264***	-0.334***
	(0.016)	(0.025)	(0.024)	(0.046)	(0.078)	(0.070)
Year 2	-0.145***	-0.119***	-0.170***	-0.260***	-0.214***	-0.289***
	(0.018)	(0.026)	(0.026)	(0.044)	(0.079)	(0.085)
Year 3	-0.106***	-0.091***	-0.114***	-0.226***	-0.215***	-0.201**
	(0.018)	(0.027)	(0.026)	(0.041)	(0.082)	(0.084)
Year 4	-0.099***	-0.076***	-0.110***	-0.206***	-0.179**	-0.189**
	(0.018)	(0.028)	(0.026)	(0.040)	(0.091)	(0.083)
Year 5	-0.087***	-0.052*	-0.113***	-0.188***	-0.172*	-0.182*
	(0.019)	(0.027)	(0.028)	(0.040)	(0.094)	(0.096)
No. Disp. workers	612	288	324	612	288	324
			(c) Older (Aged 50-64)			
Year 1	-0.311***	-0.314***	-0.320***	-0.454***	-0.479***	-0.417**
	(0.023)	(0.032)	(0.036)	(0.090)	(0.113)	(0.166)
Year 2	-0.199***	-0.177***	-0.216***	-0.394***	-0.407***	-0.364**
	(0.026)	(0.036)	(0.037)	(0.093)	(0.123)	(0.182)
Year 3	-0.174***	-0.147***	-0.180***	-0.324***	-0.286	-0.311*
	(0.027)	(0.040)	(0.039)	(0.083)	(0.180)	(0.178)
Year 4	-0.154***	-0.163***	-0.136***	-0.266***	-0.292**	-0.210
	(0.029)	(0.042)	(0.040)	(0.071)	(0.130)	(0.133)
Year 5	-0.134***	-0.144***	-0.112***	-0.227***	-0.214*	-0.153
	(0.030)	(0.043)	(0.043)	(0.063)	(0.115)	(0.129)
No. Disp. workers	381	195	186	381	195	186

Notes: Estimated standard errors are in parentheses. The "High school" education group includes workers with no qualifications. The earnings impacts are conditional on being employed.
*** p<0.01, ** p<0.05, * p<0.1

Data appendix

The analysis presented in this paper is based on data from Statistics New Zealand's Survey of Family Income and Employment (SoFIE). SoFIE was a longitudinal household survey, consisting of 8 (October – September) annual waves, from 2002/03 until 2009/10, covering the period October 2001 – September 2010. See Hyslop and Townsend (2017; 2019) for more detailed description of SoFIE, and the construction of the analytical sample.

Involuntary job displacements are identified for individuals' who reported:

1. they had left a job, and
2. the reason for leaving was "Laid off / Dismissed / Made redundant".

As noted by Hyslop and Townsend (2017; 2019), Dixon and Maré (2013), and the OECD (2013), this job-displacement measure confounds lay-offs and redundancies, with job-loss because of worker misconduct. In an attempt to limit this effect, we restrict attention to workers' displacement events from jobs they have held for at least one year. We restrict our analysis to workers aged 20-64. This results in a total of 1,245 distinct workers who reported such a job displacement, which forms our sample of "displaced workers".

For each displaced worker, we define their focal displacement date as the month in which they were first displaced from a job after at least 1-year. For those displaced workers who reported a single displacement over the duration of SoFIE, this is simply their displacement month; while for the few workers who report multiple displacements, the focal displacement date is the month of first displacement. The sample of non-displaced worker observations consists of all monthly observations of never-displaced workers, who were employed in any of these focal displacement months in jobs for at least 1-year. This means that never displaced workers typically appear multiple times corresponding to different focal displacement dates: as reported in Table 1, there are 638,829 never displaced worker monthly observations that satisfy this selection criteria.

The outcomes measured in the analysis are calendar monthly wage and salary employment and earnings, as measured in the IRD Employer Monthly Schedule (EMS) tables in the IDI. All earnings in our analysis are adjusted using the CPI to be in constant June quarter 2016 $-values. All descriptive statistics and results are based on unweighted analysis. This is partly due to uncertainty concerning the correct weights to use for the longitudinal analysis, but early descriptive analysis presented in Hyslop and Townsend (2016) suggests weighting will not substantively affect the results.