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THE COSTS OF INVOLUNTARY JOB LOSS:

IMPACTS ON WORKERS' EMPLOYMENT AND EARNINGS

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ABSTRACT

This paper examines the incidence of involuntary job loss and its impact on the employment and earnings of affected workers, using data from the Survey of Families, Incomes and Employment (SoFIE) for the 2002–09 period. It focusses on employees who had been working in their job for at least one year before the job loss. The impact of displacement on employment and earnings was estimated, using a propensity score-matching approach to select similar non-displaced workers and compare their outcomes. We find that the employment rate of displaced workers was on average 27 percentage points lower 0–1 years after displacement, 14 percentage points lower 1–2 years after, and 8 percentage points lower 2–3 years after, than that of the matched comparison group. The average wage of re-employed displaced workers was 12 percent lower 0–1 years after displacement, 11 percent lower 1–2 years after and 7 percent lower 2–3 years after. Other impacts included increases in unemployment and self-employment, reductions in average weekly hours, and reductions in weekly and annual earnings.

EXECUTIVE SUMMARY

This paper examines the incidence of involuntary job loss and its impact on the subsequent employment and earnings of the affected workers. It uses data from the first seven waves of Statistics New Zealand's longitudinal Survey of Families, Incomes and Employment (SoFIE), covering the period from 2002 to 2009. The international term 'displacement' is used to refer to involuntary job loss.

The research focusses on employees who were aged 20–64 years and had been working in their job for at least one year before their involuntary job loss. Our overall goal was to better understand redundancy and its impacts, but the measure of displacement that is provided by the data source includes dismissals as well as redundancies. We restricted the study population to employees with job tenure of least one year to minimise the proportion of dismissals in the study sample.[1] Employees who received redundancy pay at the end of a job can also be identified in the data source, providing an alternative measure of redundancy.

Our analysis of incidence patterns found that the average annual rate of displacement for employees with at least one year's tenure in their jobs was fairly constant from 2003 to 2007, at around 1.5 percent a year. It increased to 3.3 percent in the seventh wave of the survey, which coincided with the 2008–2009 recession.

The average annual rate of displacement was higher for men than women, for young adults and older adults than the age groups in between, and for less educated employees than the more highly educated. Employees with more years of service in their jobs were substantially less likely to be displaced than those with shorter tenure. By industry, employees in government and defence, education, and health and community services had the lowest displacement rates (0.7–0.9 percent), while employees in manufacturing, utilities and construction, wholesale trade, and transport and storage had the highest rates (2.7–2.9 percent).

Just over half of the displaced workers in our study sample received redundancy pay. Those with longer job tenure were much more likely to receive redundancy pay than those with shorter tenure. Employees with degree-level qualifications also had a higher likelihood of receiving redundancy pay.

The median amount of redundancy pay was just over $15,000 and the mean was just over $28,000 (before tax and in March 2012 dollar values). There was substantial variation in the size of redundancy payments by employee characteristics such as educational level, occupation, and length of service.

We estimated the impacts of displacement using a propensity score-matching approach to select 'similar' non-displaced workers and compare their labour-

[1] Based on international evidence, it is likely that 5–15 percent of the job terminations in our sample of redundancies and dismissals reported by employees with at least one year of job tenure were dismissals, with the rest being redundancies.

market outcomes over a three-year period. The employment rate of the displaced workers, compared with the matched comparison group, was on average 27 percentage points lower 0–1 years after the displacement, 14 percentage points lower 1–2 years after, and 8 percentage points lower 2–3 years after. For displaced workers who received redundancy pay, the employment impacts were initially larger (with a 34 percentage point reduction 0–1 years after displacement) but of similar size to the overall results after 1–2 years and 2–3 years.

The average wage of displaced workers who returned to a waged or salaried job was 12 percent below that of the matched comparison group 0–1 years after displacement, 11 percent below 1–2 years after, and 7 percent below 2–3 years after. For displaced workers who received redundancy pay, the wage losses were slightly larger: a 17 percent reduction 0–1 years after displacement, a 14 percent reduction 1–2 years after, and an 8 percent reduction 2–3 years after.

The impacts of displacement were larger for some population groups than others. Due to the relatively small size of the sample of displaced workers in SoFIE, these variations can't be measured precisely. However, the patterns apparent in the results suggest that in the first year after displacement, the employment losses were larger for older employees (those aged 50–64) and higher-tenure employees (those with continuous employment for five years or more). These groups were slower to return to employment.

When re-employed in waged or salaried jobs, both younger and older employees experienced larger reductions in their wages than did employees in the mid-range age group, those aged 35–49. Workers with low educational attainment (lower secondary-school qualifications or below) experienced larger wage reductions than those with higher educational attainment.

Employees with higher job tenure experienced substantially larger and more persistent wage reductions than those with shorter tenure. For example, the reduction in wages for re-employed high-tenure employees was 22 percent at 0–1 years (compared with 8 percent for lower-tenure employees), and 14 percent at 1–2 years (compared with 6 percent for lower-tenure employees).

Though the main focus of the paper is on the employment and wage impacts, evidence of significant impacts on other labour market outcomes is also reported. The unemployment rate of the displaced workers was 9.4 percentage points higher 0–1 years after the job loss and 2.9 percentage points higher 1–2 years after.

Displacement also led to an increase (of around 5 percentage points) in the proportion who were self-employed and a decline (of 2–3 hours a week) in the average weekly hours of those who returned to waged or salaried employment. The average weekly earnings of those who returned to waged or salaried employment were approximately 20 percent lower. The adverse impacts of displacement on hours worked, earnings and annual incomes persisted out to the third interview after the displacement, the end of the follow-up period.

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1 INTRODUCTION

This paper examines the incidence of involuntary job loss in New Zealand and its impacts on the employment and earnings of affected workers. The overall objective of the paper is to shed new light on patterns of redundancy and its effects. A redundancy occurs when an employee's job is terminated by their employer because of a change in the employer's labour requirements.[2]

Each year, some thousands of employees experience involuntary job loss due to business closures, contractions and restructurings. Restructuring is a natural part of the operation of businesses as they respond to changes in market conditions or technologies or change the business models under which they operate. The process of business restructuring will often have benefits for firms, consumers, and the economy as a whole. It can also impose significant costs on the employees who are displaced from their jobs, including periods of unemployment and reductions in future earnings. During recessions, involuntary job losses caused by business restructuring tend to be both more common and associated with larger costs for workers.

This research was motivated by the decision of the Ministry of Business, Innovation and Employment to participate in an OECD-led, multi-country study of job displacement. 'Displacement' is the international term for redundancy and is used as a synonym for redundancy in this paper. The purpose of the OECD study is to generate better information on the incidence and effects of displacement across the participating countries, and provide advice on policies that will assist displaced workers back into employment and reduce the costs of displacement.[3]

Relatively little is known about the incidence and impacts of involuntary job loss due to business closures and restructuring in New Zealand. There are no published measures of the incidence. The only comparable previous study of the impacts is Dixon and Stillman (2009). That study used LEED[4], an administrative data source containing linked employer and employee data, and indirect evidence to select a sample of firms that were likely to have undergone a closure or restructuring and a sample of workers who were likely to have experienced a job displacement.

This study uses an alternative data source in which redundancies are directly reported by workers. SoFIE is a national longitudinal survey which gathered

[2] See page 7 of the Report of the Public Advisory Group on Restructuring and Redundancy, 2008, for a definition of redundancy in the New Zealand context.

[3] As part of the first phase of the OECD project, researchers in each of the participating countries (including the authors of this paper) have analysed displacement rates and impacts using national datasets and provided the results to the OECD secretariat. Those statistical results for New Zealand will be published in an OECD working paper in 2013. Note that they differ from the results given in this paper in a number of ways, due to the need to maximise data comparability across countries. For example, more restrictions were applied in the selection of the study sample for the OECD analysis.

[4] LEED is the Linked Employer–Employee Database, now part of IDI, the Integrated Data Infrastructure.

information from a representative sample of New Zealanders over an eight-year period from October 2002 to September 2010. An involuntary job loss was identified in the survey when an employee left a job and gave a reason for leaving that was coded as 'laid off/dismissed/made redundant'.

The main benefits of SoFIE as a data source are that the incidence of displacement can be better analysed; it covers a wider range of redundancy events than can be identified in the administrative data sources; it provides information on hours worked and hourly wages, unlike the administrative data sources; and it provides a richer set of information on the personal and job characteristics of displaced workers.

The population studied in this paper is employees who were aged 20–64 and had been employed for at least one year before being dismissed or made redundant. The restriction of the study population to employees with job tenure of least one year is intended to minimise the proportion of job terminations that were due to dismissals and maximise the proportion due to redundancies.[5]

The paper analyses both the incidence of displacement and its impact on workers' labour market outcomes during the three years after the job loss. The impact of job loss is identified by matching each displaced worker with a group of similar workers who were not displaced, using a propensity score matching method. Although it focusses mainly on employment rates and wages, the paper also provides a more limited set of results on the impacts of displacement on hours worked, weekly and annual earnings, annual income from transfer payments, and self-employment rates.

In section 2 we briefly summarise the relevant research. In section 3 we describe the data source and study sample, and in section 4 we present descriptive statistics on rates of displacement and the receipt of redundancy pay. Section 5 outlines the methods used to estimate the impacts of displacement. The main results of the research on the impacts of displacement are presented in section 6. Section 7 summarises the main findings and notes the limitations of the research.

[5] About 22 percent of employees were excluded from the analysis because their job tenure was below one year.

2 THEORY AND PREVIOUS RESEARCH

A recent literature review by the OECD (2011: 3) comparing displacement rates across OECD nations noted: "Because the exact definition of displacement, the time period and the group of workers on which authors focus vary across sources, it is important that cross-country comparisons are taken as just indicative." It found that annual displacement rates generally ranged between 4 and 6.5 percent, but were as low as 2 percent or as high as 8 percent in some cases.

The literature shows that displacement rates are cyclical, rising during economic downturns and falling in expansions. They differ across industries, reflecting differences in firms' exposure to cyclical movements in demand or to other demand shocks. Construction and manufacturing, for example, are commonly found to have higher displacement rates than other industries. At the individual level, displacement rates decline with increases in the employee's job tenure, and are lower for women than men.

Turning to impacts, the published literature has focussed mainly on labour market impacts, particularly the consequences for a worker's future earnings. It is clear that involuntary job loss can lead to significant and persistent reductions in workers' employment rates and earnings. The OECD literature review cited above found estimates of the average wage losses experienced by displaced workers ranging from zero to minus 16 percent, and estimates of the average short-term reductions in monthly, quarterly or annual earnings ranging from minus 9 percent to minus 60 percent (OECD 2011: 5). The range of impact estimates reported in the literature is wide, reflecting differences in data sources, measurement methods, study populations, and time periods.

In explaining displacement impacts, the literature points to the role of job-specific, firm-specific or industry-specific skills in influencing both the time that displaced workers take to re-enter employment and the likelihood that they will need to accept a lower wage. Workers with well-developed job-specific, firm-specific or industry-specific skills may have difficulty finding a new job that rewards their skills and work experience as well as the one they were displaced from. This may lead them to undertake a prolonged period of job search or to accept a relatively large reduction in wages in order to gain re-employment. Essentially, the skills acquired in the job that has been eliminated are less valuable to other employers, leading to a loss of returns.

Another reason for persistent wage losses is that some displaced workers lose pay premiums that were gained through years of service in the pre-displacement job, and were due to organisational pay structures or collective agreements rather than genuine differences in skills and productivity. These premiums are unlikely to be quickly regained.

A common finding in the literature is that older workers and those with higher job tenure tend to experience greater losses of earnings than younger workers and those with less job tenure do (OECD 2011: 7). This is often attributed to older and high-tenure employees being more likely to have high levels of job-specific or

firm-specific skills, to be employed in declining industries, or to enjoy pay premiums based on years of service.

Recent impact studies have found that the costs of job displacement for affected workers can be very long-lasting. Studies focussing on 'high tenure' workers (people who had held their jobs for at least five years) have shown that annual earnings can be significantly below the expected levels for 10 years or even 20 years after the job loss (Eliason and Storrie 2006; Von Wachter et al 2009).

For example, Von Wachter and others (2009), who studied a group of long-tenure workers who were displaced in the early 1980s in the United States, found reductions in average annual earnings that continued for 20 years, despite some recovery over time. After 10 years the annual earnings of the displaced workers remained 20 percent below the level implied by the earnings of the control group of non-displaced workers. Using longitudinal survey data rather than administrative data, Stevens (1997) identified long-run earnings losses for displaced American workers of 5–10 percent after 10 years. The impact of displacement on earnings declined during the first few years after displacement and then reached a plateau without much further improvement.

Persistent long-run impacts have also been identified in studies of displaced workers in Sweden (Eliason and Storrie, 2006) and Canada (Morissette et al, 2007). Given this evidence, we should not assume that the employment and wage impacts estimated in this study at 2–3 years (mostly in the 3–10 percent range) were likely to disappear after a few more years had passed.

Recent impact studies have also identified substantial business cycle variations in the size of the employment and earnings losses experienced by displaced workers (Eliason and Storrie 2006; Morissette et al 2007; Davis and Von Wachter 2011). The negative effects of displacement on employees' earnings tend to be greater and more persistent when labour demand is weaker.

As noted, little is known about the rate or incidence of displacement in New Zealand due to a shortage of good data sources. The only existing impact study using New Zealand data is Dixon and Stillman (2009). That paper used matched employer–employee administrative data to explore the effects of involuntary job loss for workers who were employed at firms that appeared to undergo a closure or restructuring. Only certain types of business restructuring could be identified.

The results indicated that workers who are likely to have lost their job in a complete closure experienced substantial employment and earnings losses. The employment rate for these workers was 17 percent lower one year after the firm closed than that of comparable workers at non-closing firms, and it remained 12 percent lower four years after the closure. The monthly earnings of this group were 22 percent lower one year after the closure and 16 percent lower four years after.

Within this group of affected workers, there were also some significant variations in outcomes: those at small and medium-sized establishments experienced

greater employment and earnings losses than those at large establishments, and those with at least two years' job tenure sustained greater losses than those with shorter tenure. In contrast, workers who were affected by other types of business restructuring experienced much lesser employment and earnings losses or were not adversely affected.

Overall, the results of Dixon and Stillman (2009) suggest that business restructurings that lead to job separations can result in significant reductions in the employment rates and earnings of affected workers, lasting for several years. If workers are directly re-employed by another establishment or firm as part of the restructuring, however, the impacts can be minimal.

3 DATA SOURCE AND STUDY SAMPLE

3.1 Data source

The Survey of Families, Incomes and Employment (SoFIE) is a longitudinal household survey that was conducted by Statistics New Zealand from 2002 to 2010. A representative sample of approximately 22,000 New Zealand residents (both adults and children) who lived in private dwellings was selected and interviewed for the first time in the year from 1 October 2002 to 30 September 2003. The response rate at wave 1 was 81 percent. Respondents were re-interviewed at 12-month intervals over the next seven years. At each interview, spell information was collected retrospectively on employment activity during the previous 12 months.

At the time this study was undertaken, seven waves of data were available for research use, covering the period from 1 October 2002 to 30 September 2009. Because the interviewing for each wave was spread over a full year and each respondent supplied data on the 12 months prior to their interview, the data collected at each wave cover a two-year period. By wave 7 the overall sample retention rate, as a percentage of the original sample of wave 1 respondents, was 76 percent.

Because SoFIE has a nationally representative sample, it can be used to estimate the frequency and incidence of redundancy across the labour force. Compared with the alternative administrative data sources, the SoFIE data contain relatively rich information on personal and job attributes, including ethnic group, occupation, educational attainment, hours worked, and the hourly wage rate.

Displacements can be identified with a higher level of confidence in SoFIE than in administrative data sources such as the Linked Employer–Employee Database (LEED). Every individual in the survey sample who has been made redundant has the opportunity to report it, including people who lost their jobs in small restructuring events that affected just a few workers.

By contrast, displacement studies that use administrative data rely on circumstantial evidence to identify firms that are likely to have closed or downsized. These administrative data sources generally don't contain any variables that would allow researchers to identify the individuals who lost their jobs through a redundancy, or the firms that made them redundant, with a high level of confidence. This means there is considerable potential for misclassification. In addition, workers who lost their job as part of a small restructuring event (such as one that affected less than 20 workers) are typically excluded from study.

The most important disadvantage of SoFIE is that the number of workers in the 'displaced' sample is relatively small. This reduces the statistical precision of the results—which can lead to large standard errors—and limits the depth of analysis that can be usefully undertaken.

There is also a risk that individuals in the original SoFIE sample who experienced negative events such as job loss were more likely to have ceased to respond and left the sample by wave 7. If people who experienced involuntary job loss were more likely to move within New Zealand or overseas, they may have had a lower re-contact rate than non-displaced employees during the life of the survey. If so, then the sample used in this study, which is based on people who were still respondents by wave 7, is likely to underestimate national displacement rates.

3.2 How displacement was measured in SoFIE

When respondents left a job, they were asked about their reasons. The response options provided were:

11	Contract ended / temporary job
12	Wanted a change / preferred a new job
13	Laid off / dismissed / made redundant
14	Wages were too low
15	Unsatisfactory work arrangements
16	Studying
17	Moved house / holiday
18	Caring responsibilities
19	Parental leave
20	Health / disability
21	Retired / no need to work
22	Other

In this paper, jobs that were said to have ended because the respondent was 'laid off/dismissed/made redundant' are defined as displacements. The main problem this poses is that the category includes both dismissals (jobs the employer ended because of misconduct by the employee) and redundancies (jobs the employer ended because of a change in their labour requirements). Ideally, we would like to exclude dismissals from our analysis.[6]

We assume that relatively few employees are dismissed for misconduct after a year of continuous employment. The study population for this paper is restricted to employees who had held their job for at least one year at the time of their 'baseline' pre-displacement interview to reduce the proportion of dismissals.

There is relatively little information on the actual frequency of dismissals. Borland et al (1999: 43) reports redundancy and dismissal rates for employees interviewed in the first six waves of the British Household Panel Survey, covering the period from 1991 to 1996. In these data, dismissals made up approximately 14 percent of all self-reported dismissals and redundancies, and 9 percent of dismissals and redundancies reported by employees with job tenure of two years

[6] The term 'laid off' is used colloquially in New Zealand. Short-term lay-offs (when employment ceases for a period of weeks or months after which the employee is recalled to the same job) are rare and are not described or regulated in employment law.

or more. Stevens (1997) reports findings from an analysis of PSID[7] responses undertaken in the 1990s in the US, which found that dismissals made up 16 percent of job endings where the respondent reported they had been 'laid off' or 'dismissed'. However, there is no supporting information on the characteristics of the employee sample used in this analysis.

Together, these sources suggest that perhaps 5–15 percent of employees in our sample of dismissals and redundancies may have been dismissed rather than made redundant. It is difficult to speculate about the impact of the dismissed employees on the overall results, because little research appears to have been done on the employment patterns and wages of people who are dismissed. If these employees tend to have less continuous employment patterns and lower wage growth than other employees, their presence in the study sample could mean that the impact estimates in this paper are too high.

The sub-sample of displaced workers who reported receiving redundancy pay can be treated as an alternative study sample. There is little doubt that employees in this group were made redundant rather than dismissed. However, the redundancy-pay recipients have somewhat different characteristics than the non-recipients (described below). There is also a risk that the receipt of a lump sum payment may have changed their job search behaviour, affecting their outcomes to some degree.

3.3 Study sample

In this paper, the study sample of displaced workers comprises employees who were aged 20-64 years and had job tenure of at least one year at a particular 'baseline' interview, who went on to report at their next interview (approximately a year later) that they had left their job because of a dismissal or redundancy. A small number of people who had not supplied enough information on their earnings at the baseline wave were excluded. After these exclusions, we have 636 cases. All of these displaced workers were interviewed seven times from the first wave of the survey (conducted from 1 October 2002 to 3 December 2003) to the seventh (conducted from 1 October 2008 to 30 September 2009).

The timing of the interviews and its implications for the analysis is summarised in Table 1. For example, the wave 2 interviews recorded displacements that occurred between 1 October 2002 and 11 December 2004, whereas the wave 3 interviews recorded displacements that occurred between 1 October 2003 and 3 December 2005. We retain the wave structure in our analysis as this ensures we have seven observation points for each person, corresponding to the dates of the seven interviews. We don't analyse employment rates or earnings between interviews because jobs that are held between interviews tend to be somewhat under-reported in SoFIE, and this would lead to lower measured employment rates.

[7] PSID is the Panel Study of Income Dynamics, a longitudinal survey of households and adults in the United States.

We use the full sample of 636 cases in the descriptive statistics and descriptive regressions reported in Section 3. However, our impact estimates are based on a smaller sample of 420 individuals who reported *one* redundancy or dismissal in the life of the survey only, and experienced this redundancy or dismissal between waves 3 and 7. The latter restriction ensures we have data for everyone on their employment and earnings, measured at two points in time well before the displacement—specifically at 1–2 years and at 2–3 years before. This information is used to match displaced workers with similar non-displaced workers.

We apply survey sampling weights when calculating descriptive statistics on the incidence of displacement in the labour force (as reported in table 2), but not elsewhere in the paper. We carried out the impact analysis without using the survey sampling weights as they were not specifically designed for this type of analysis.

4 DESCRIPTIVE STATISTICS ON DISPLACEMENT RATES AND REDUNDANCY PAY

4.1 The incidence of displacement

Table 2 reports descriptive statistics on the incidence of involuntary job loss for all employees with job tenure of at least one year and for subgroups of this study population. On average, 1.8 percent of employees with job tenure of one year or more when interviewed had left the job because of a redundancy or dismissal when interviewed one year later. Assuming very few employees were dismissed after working in their job for at least a year, 1.8 percent is a rough estimate of the annual rate of redundancy for employees with at least one year's job tenure.

The annual rate of displacement was fairly constant during the first five waves of the analysis. It increased sharply to 3.3 percent in wave 7 (2007–09), which coincided with the 2008–09 recession in New Zealand. The New Zealand economy went into recession in the first quarter of 2008. Initially the contraction of output was steep, with GDP dropping by 3.1 percent by the first quarter of 2009. Growth resumed in the second quarter of 2009 but the economy remained weak (Fabling and Maré 2012: 5). Aggregate employment began to contract at the beginning of 2009 and fell for four quarters before stabilising.

The average rate of displacement from 2002 to 2009 was somewhat higher for men than women (2.1 percent compared with 1.5 percent), somewhat higher for those aged 20–24 and 55–64 than for the age groups between, and somewhat higher for less educated employees. For example, employees with no qualifications had an average annual rate of 2.2 percent compared with 1.5 percent for those with degree-level qualifications

Ethnic group variations were small. The incidence of displacement declined with rising job tenure: it was highest in the lowest-tenure group (2.1 percent of those in the 1<2 years category) and lowest in the highest-tenure group (1.5 percent of those with tenure of 10 years or more).

The largest variations in the incidence of displacement are apparent when industries are compared. Employees in the government and defence, education, and health and community services industry groups had the lowest rates on average (0.7 – 0.9 percent). Employees in manufacturing, utilities and construction, wholesale trade and transport and storage had the highest rates (2.7 – 2.9 percent).

We estimated a logistic regression to better identify the personal and job characteristics most strongly associated with a higher risk of redundancy, controlling for the effects of other characteristics. The results are presented in the left-hand side of Table 3. 'Whether displaced' was regressed on a set of year dummies, measures of worker characteristics, job tenure, industry and occupation. All the available waves of data were pooled in the sample for this regression.

The following employee characteristics were found to be statistically significant: year of interview, job tenure, and being employed in a few specific industries. Compared with wave 2, all subsequent periods—and especially wave 7—are associated with a higher risk of displacement. Higher job tenure is associated with a significantly *lower* risk of displacement.

Compared with employees with job tenure of 1–2 years (the omitted group), all other tenure groups had reduced marginal probabilities of being displaced. For example, those in the '10 years or more' tenure group are estimated to have a 0.5 percentage point lower likelihood of displacement. This is roughly consistent with the descriptive statistics in table 2, which show average displacement rates of 1.5 and 2.1 percent for these two tenure groups.

Employment in the manufacturing industry or the wholesale trade industry was associated with a significantly higher than average risk of displacement, and employment in government and defence, education, and health and community services with a significantly lower than average risk of displacement. (Note that the omitted industry, retail trade, had a displacement rate close to the all-industries average.) No other variables were significant in the regression.

Compared with other OECD countries, New Zealand appears to have a low aggregate rate of displacement. As noted above, a literature review by OECD (2011) indicates that in the countries with relevant data, annual displacement rates typically ranged between 4 and 6.5 percent. The aggregate rate of 1.8 percent reported in this paper is likely to be lower partly because the study population is restricted to employees with minimum job tenure of one year, and partly because the time period covered was largely one of strong employment growth. Although there are other possible explanations, the evidence needed to assess them is lacking.[8]

However, the socio-economic incidence patterns reported here are broadly consistent with patterns reported in other countries. In particular, it is common for displacement rates to be higher for men than for women, higher for low-tenure workers than high-tenure workers, and higher in the manufacturing and construction industries than in other industries (OECD, 2011: 3).

4.2 Redundancy pay

Fifty-four percent of employees in the study population reported receiving redundancy pay. This is an interesting group for two reasons. First, it is highly likely that those who received redundancy pay lost their job because of a business restructuring and not because of (alleged or real) misconduct.

[8] Attrition from the SoFIE sample over time is one possible contributing factor. Displaced workers may have had a higher rate of attrition by wave 7 than non-displaced workers, leading to an underestimation of the national rate at each year. As explained previously, the analysis is conducted on people who were still members of the longitudinal sample by wave 7, and excludes those who had dropped out before then. Another hypothesis is that high levels of voluntary turnover in the New Zealand labour market allow firms to achieve workforce reductions by 'natural attrition', reducing the need for redundancies.

Therefore, the results for this group are unlikely to be distorted by the inclusion of dismissals. Second, the redundancy pay variable identifies a group whose job search behaviour may be different. Their receipt of redundancy pay might be expected to delay or extend their job search, perhaps leading to lower employment rates at the first interview following the displacement.

Variations in the proportion of displaced workers that received redundancy pay are shown in the fourth column of table 2. Because the underlying sample sizes are small, these proportions are not measured very precisely, and therefore the numbers should be interpreted with caution.

The redundancy pay receipt rates in table 2 show a strong positive relationship between job duration and the likelihood of receiving redundancy pay; a weaker positive relationship between educational attainment and the likelihood of receiving redundancy pay; and some sizeable variations across occupational groups and industries. The proportion receiving redundancy pay ranged from 34 percent for workers with 1–2 years' employment to 81 percent for workers with at least 10 years' employment. Workers in managerial and professional occupations were more likely than average to receive redundancy pay. Employees in service and sales occupations, trades occupations, and elementary occupations were less likely. Rates of receiving redundancy pay were relatively high in the wholesale trade, communications, finance and insurance, and government and defence industries. But they were very low in hospitality (which covers accommodation, restaurants, and cafes) and low in utilities, construction, and retail trade.

Job tenure, educational attainment, occupation, and industry are likely to be jointly correlated. A logistic regression model was estimated to identify the characteristics most strongly associated with the receipt of redundancy pay, controlling for the influence of other factors. Because of the small number of observations (636 cases in our displaced worker sample and 351 with redundancy pay), we do not include industry and occupation in the regression, and age group is collapsed into four categories. The results are given in the right-hand side of table 3.

Higher job tenure and holding a degree-level qualification were significantly associated with a higher likelihood of receiving redundancy pay. Specifically, having 2–3 years' job tenure was associated with a 12 percentage point increase in the likelihood; 5–10 years' tenure with a 26 percentage point increase; and 10 or more years' tenure with a 41 percentage point increase (all compared with the omitted 1–2 years tenure category).

Having a degree-level qualification was associated with a 21 percentage point increase in the likelihood of redundancy pay, relative to the omitted educational group 'no qualifications'. No other characteristics had a large enough effect in this regression model to meet thresholds of statistical significance.

The median redundancy pay amount was just over $15,000, and the mean was just over $28,000 (before tax and expressed in March 2012 values). Statistics on

the redundancy pay received by various groups are shown in table 4. As would be expected, groups with relatively high pay (such as professionals and managers) reported much larger payments than groups with relatively low pay. For example, the mean for employees in managerial occupations was $45,100, while the mean for employees in sales and service, agricultural and elementary occupations (which are grouped together for sample size reasons) was $13,600.

Job tenure was also an important source of variation, with average payments ranging from $12,100 for the 2–3 year tenure group to $47,800 for the 10-years-or-more group. Although the mean and median payments vary from year to year, no consistent trend emerges.

4.3 Employment rates after displacement

The fifth and sixth columns of table 2 give re-employment rates measured at the two interviews that followed the job loss. Because the survey interviews were spread evenly over each year, the first post-displacement interview could have occurred any time in the 12 months following the job loss and the second interview any time 1–2 years following the job loss.

On average, 69 percent were employed at their first post-displacement interview and 85 percent at their second. Re-employment rates were lower for women than for men; for 50–64 year olds than for younger age groups; for Maori; and for high-tenure employees. These differences in employment rates are likely to reflect differences in pre-displacement employment propensities as well as differences in the impact of job loss.

Interestingly, the 0–1 year re-employment rate for workers who lost their jobs in the final period (covering the 2008–09 recession) was lower than for those who lost their jobs in earlier periods—but not dramatically lower. The 0–1 year re-employment rate for workers who lost their jobs in 2007–09 was 65 percent, compared with an average of 71 percent previously.

5 METHODS USED TO ESTIMATE POST-DISPLACEMENT IMPACTS

5.1 Measures of post-displacement outcomes

The main outcome variables are the employment rate and the real hourly wage (in logs).

The employment rate is based on whether the individual was employed at the time of a given interview. We include self-employment in our measures of employment rates.

The real hourly wage is defined as a person's average hourly earnings across all waged or salaried jobs, at the time of a given interview. There were few multiple job holders in the sample, and therefore our measure of average hourly earnings from all jobs is not substantially different from a measure based on the main job alone.

In section 6.2 we briefly analyse eight other outcome variables:

- The proportion of people who had **experienced a spell of unemployment** in the year since their previous interview.
- The **unemployment rate**, defined as the proportion of people who were not working and were searching for work at the time of the interview.
- The **self-employment rate**, defined as the proportion of people who were self-employed at the time of the interview (including those who were also employed in a waged or salaried job).
- Average **weekly hours** worked in all waged or salaried jobs, measured at the time of the interview.
- Real **weekly earnings** from waged or salaried jobs, measured at the time of the interview.
- Real **annual earnings** from all waged or salaried jobs, measured over the year between each interview.
- Real **annual income** from all sources, measured over the year between each interview.
- Real annual incomes from **government income transfers**, measured over the year between each interview.

5.2 Estimation samples

To study the impact of displacement, we restrict the study sample to individuals who were made redundant or dismissed between waves 3 and 7 and reported their job loss at waves 4–7. This ensures we have data on each person's employment and earnings at two time points well before the displacement

(specifically, at 1–2 and 2–3 years prior). Other personal and job characteristics are measured at the 'baseline' wave, the interview immediately before the job loss. This could have been as little as one week or as long as one year earlier, depending on when the job loss occurred.

Because the available data from SoFIE ends at wave 7, we have different numbers of observations on the employment status and earnings of displaced workers at different times after their job loss, depending on the timing of the event. Our main set of impact estimates uses the maximum available sample of displaced workers at each time.

We construct them as follows:

- Impacts 0–1 years after displacement (t=0.5). These estimates are obtained by pooling the data for displaced workers who were selected at waves 3–6 and reported a displacement at waves 4–7, that is in the period from 1 October 2004 to 30 September 2009.
- Impacts 1–2 years after displacement (t=1.5). These estimates are obtained by pooling the data for displaced workers who were selected at waves 3–5 and reported a displacement at waves 4–6, that is in the period from 1 October 2004 to 4 December 2008.
- Impacts 2–3 years after displacement (t=2.5). These estimates are obtained by pooling the data for displaced workers who were selected at waves 3–4 and reported a displacement at waves 4–5 (from 1 October 2004 to 28 November 2007).

We also report a full set of results, showing impacts at 0–1, 1–2 and 2–3 years after displacement, for the third sample above (displaced workers who were selected at waves 3–4 and reported a displacement at waves 4–5). This is the only sub-sample with data on outcomes at all three time points.

To be included in the estimation sample for the employment impacts, displaced workers also needed to have provided data on their employment status at interviews 1–2 and 2–3 years prior to displacement. They also needed to have provided data on their wage rate 1–2 years prior to displacement. Most people with job tenure of one year or more who reported a displacement at waves 4–7 met these criteria, but a few individuals were dropped because of missing data.

To be included in the estimation sample for a particular wage impact, individuals needed to meet the above criteria; to have supplied data on their wage rate when interviewed 2–3 years prior to displacement; and to be employed in a wage or salaried job at the relevant time after displacement.

These are more restrictive criteria. The number of displaced workers in the estimation sample for each employment and wage impact is reported in table 5.

The 'employment' estimation samples were also used to examine the impact of displacement on unemployment rates, self-employment rates, and annual

earnings. The 'wages' estimation samples were also used to examine the impact of displacement on hours worked and weekly earnings from waged and salaried jobs at each post-displacement period.

A significant group of displaced workers had not returned to wage or salaried jobs at the time of their post-displacement interviews. This means our estimates of the impact of displacement on wages, hours worked, and weekly earnings may be influenced by changes in the composition of the sample. For example, if more highly skilled individuals had, on average, been more quickly re-employed after displacement, this could raise the average post-displacement wage rate and lead to an underestimation of the negative impact of displacement on wages. On the other hand, if more highly skilled individuals took longer to return to employment after displacement or were more likely to transition to self-employment, this could reduce the average post-displacement wage rate and lead to an over-estimation of the impact of displacement on wages.

5.3 Matching and impact-estimation methods

We would like to know the difference between displaced workers' actual employment and earnings after displacement and the employment and earnings they would have had if they hadn't been displaced. This difference would represent the impact of displacement. Because the latter outcomes can't be observed, we estimate the impact of displacement by comparing the post-displacement outcomes of our displaced worker samples with those of a matched group of non-displaced workers who were as similar as possible on all relevant characteristics prior to the displacement.

A propensity score index, combined with exact matching by wave and certain other characteristics (described below), was used to select the five best matches for each displaced worker. The impact of displacement was then calculated by comparing the average employment rate or wage of the displaced workers in the post-displacement period with that of the matched comparison group.[9]

The *potential* comparison group for each wave of displaced employees is all never-displaced employees who were also employed in a wage or salaried job at the baseline wave; had continuous job tenure of at least one year; and were aged 20–64.

To implement the propensity score matching approach, we estimated a binary choice model of the probability of displacement. We used the records of all displaced and potential comparison group employees, and information on the personal and job characteristics and employment and wage history of each individual.

For example, the probability of displacement or propensity score model for the wage impacts includes information on gender; age; educational attainment; job tenure; industry; occupation; whether employed at previous waves of the survey; the log of the wage earned at previous waves of the survey; and interactions

[9] This gives an estimate of the average treatment effect on the treated.

between these variables. We interacted gender with age, job tenure, occupation, and industry; and age with job tenure, occupation, and industry. The 'prior employment' and 'prior wage' variables are measured at the interviews 1–2 years and 2–3 years before the displacement. All other personal and job characteristics are measured at the interview immediately before the displacement (the baseline interview). To facilitate matching, industry and occupation are aggregated into three or four groups, classified according to whether the average displacement rates of that industry or occupation were relatively low or relatively high.

Slightly different propensity score estimation models were used when we examined the impact of displacement on other labour market outcomes such as hours worked, self-employment rates, and log weekly earnings. These included pre-displacement measures of the relevant outcome variable.

By construction, everyone was employed in a waged or salaried job at the interview 0–1 years prior to displacement. The wage rate at this pre-displacement interview was not included in the propensity score model because the wages of soon-to-be-displaced employees might already be adversely affected by conditions at their firm. We examined descriptive statistics on the wage growth profiles of displaced workers, and found that the wages of some subgroups showed signs of slower growth at the interview immediately before displacement.

We implemented separate propensity score models for each estimation sub-sample and wave. These yielded a propensity score estimate for each individual in the study population and the potential comparison group. The actual comparison group matches were then selected using a 'nearest neighbour' approach. We selected up to five people whose propensity scores were closest to those of the displaced workers[10], within each estimation subgroup and selection period. For example, when we estimated displacement impacts for males, each displaced employee was matched with five non-displaced individuals who were employed in the same baseline, pre-displacement wave; were also male; and had the nearest propensity score.[11]

We ensured the common support criterion was met by dropping any study sample members whose estimated propensity scores are above the maximum or below the minimum of the comparison group members. We also ensured that the propensity score models were 'balanced' so that, conditioning on propensity score, there were no remaining statistically significant differences between the

[10] A maximum propensity score distance was specified to prevent poor matches from being made. As a result, some displaced workers have four matches rather than five.

[11] In selecting the number of matches, there is a tradeoff between bias and precision. Selecting a smaller number of matches per displaced worker would have lowered the risk of bias in the estimates by ensuring the matches were closer in their characteristics to the displaced worker, but also led to less precise estimates with larger sampling errors.

treatment and matched comparison groups in the distribution of measured characteristics.[12]

The impact of displacement was then calculated by comparing the average outcomes of the displaced workers in a given post-displacement period with those of the matched comparison group sample. Standard errors for each impact estimate were estimated using a bootstrapping method.[13]

Table 6 and figures 1 and 2 illustrate the process of matching, using the samples used to estimate employment impacts and wage impacts at 0–1 years after displacement. Table 6 shows the mean values of various personal and job characteristics before and after displacement for the potential comparison sample, the matched comparison sample, and the displaced worker sample. Before matching, there is little difference between the pre-displacement employment rates of the potential comparison and displaced worker samples, but significant differences in the average log wages of these groups. The potential comparison sample has higher mean wages than the displaced worker sample.

After matching, the difference in log wages is largely eliminated and the comparison and study samples are closely matched on both pre-displacement employment and wages. The differences in the distribution of demographic and job characteristics are also reduced but not eliminated. This reflects our matching by propensity score rather than a list of specific characteristics.

The pre and post-displacement employment rates and average log wages of these samples are plotted in figures 1 and 2. Figure 1 shows that the pre-displacement employment rates of the potential comparison sample, the matched comparison sample, and the displaced worker sample were almost identical. The employment rates of these different groups diverge only after displacement.

In contrast, figure 2 shows a substantial gap between the pre-displacement average log wage of displaced workers and that of the potential comparison sample. After matching, the differences at 2–3 years and 1–2 years prior to displacement are eliminated. A small difference in wages 0–1 years prior to displacement remains. We deliberately did not include information on the wage at this time in the matching process, for the reasons noted above.

[12] Our small sample sizes made it easier to meet the standard balancing tests by reducing the likelihood that post-matching differences between the treatment and matched comparison group would be significant.

[13] This involves drawing a sub-sample from the analysis sample multiple times (with replacement), replicating the impact analysis using each sub-sample, and then calculating standard errors as the standard deviation of the impact estimates across the replications. We used 50 replications. The sub-samples drawn in the bootstrap replications were stratified by 'whether displaced', to ensure a consistent number of displaced workers was used in each replication.

6 RESULTS: THE IMPACTS OF DISPLACEMENT

6.1 Main results on employment and wage impacts

Our main estimates of the impact of displacement on employment and wages at 0–1 years, 1–2 years and 2–3 years after are presented in table 7. These use the largest available samples of displaced workers to derive each result. The first row of each table gives the average impact of displacement for the total sample. The second row gives the average impact for employees who received redundancy pay. The third and subsequent rows give results for sub-samples defined by gender, age group, level of education, job tenure, and whether the pre-displacement wage was below or above the median.

We use bold font to identify the estimates that are significantly different from zero at the 95 percent confidence level, and show the standard errors in brackets below each estimate. Although many of the results are significantly different from zero, they have large standard errors, which indicates that the point estimates are fairly imprecise.

Results shown in the first row of table 7 indicate that the employment rate of displaced workers was on average 27 percentage points lower than that of workers in the matched comparison group 0–1 years after displacement; 14 percentage points lower 1–2 years afterwards; and 8 percentage points lower 2–3 years afterwards. For displaced workers who reported redundancy pay, the employment impacts were initially larger (with a 34 percentage point reduction 0–1 years after displacement) but of similar size after 1–2 years (a 15 percentage point reduction) and 2–3 years (a 6 percentage point reduction).

Thus, the estimated impact of displacement on employment rates is initially large, but it declines rapidly during the next three years. It is not surprising that the employment impacts were initially larger for workers who received redundancy pay, because their average job tenure was 8.2 years compared with 6.3 years for the full sample. The prior research on displacement has found that larger employment and wage impacts are experienced by high-tenure workers.

Each subgroup of displaced workers shown in table 7 experienced statistically significant reductions in its employment rate 0–1 years after the event, ranging from –21 percentage points to –34 percentage points. Most groups had statistically significant employment reductions at 1–2 years after the event, ranging from –8 to –22 percentage points.

Because the sampling errors are relatively large, there are no statistically significant differences in the estimated employment impacts across demographic groups. Nevertheless, some of the main patterns of variation in the table are consistent with the differences in impacts we would expect in the light of past research. In particular, the short run employment rate losses, as measured at the first post-displacement interview, appear to be materially larger for older employees (those aged 50–64) than for younger and prime-aged employees. They are also materially larger for higher-tenure employees (those with

continuous employment of five years or more) than lower-tenure employees. These differences had diminished by the second post-displacement interview.

The right-hand side of Table 7 presents the estimated wage impacts for displaced workers who were re-employed in waged or salaried jobs. The figures show the difference between the average log wage of the displaced workers and that of the matched comparison group workers, which is a reasonable approximation of the percentage difference in mean wages. Considering all re-employed displaced workers, the estimated impact was a 12 percent loss of earnings at 0–1 years after displacement; an 11 percent reduction 1–2 years after; and a 7 percent reduction 2–3 years after. For the sub-sample of displaced workers who received redundancy pay, the average wage impacts are slightly larger: wages were 17 percent lower 0–1 years after displacement; 14 percent lower 1–2 years after; and 8 percent lower 2–3 years after. Only the 0–1 year and 2–3 year estimates are statistically significant.

Given the large standard errors, few of the wage impacts estimated for a particular subgroup are statistically different from those estimated for the contrasting groups—low and high-tenure employees are the exception. However, analysis of the patterns in the results suggests that younger and older employees experienced larger reductions in their wages than the 35–49 age group did. Workers with low educational attainment experienced larger wage reductions than more highly educated workers. Employees with high job tenure (five years or more) experienced substantially larger wage reductions than those with less tenure, and the difference at 0–1 years was significant. Specifically, the reduction in wages for re-employed high tenure employees was 22 percent at 0–1 years, (compared with 8 percent for lower-tenure employees) and 14 percent at 1–2 years (compared with 6 percent for lower-tenure employees).

The larger wage losses experienced by higher tenure workers can be attributed to the factors discussed above, such as the loss of returns on firm-specific or industry-specific specialised skills and the loss of pay premiums gained through years of service. The reason workers with low levels of education might suffer larger wage losses than those with average or higher levels of education is less obvious. However, in this sample the 'low education' group had substantially higher mean job tenure than the other educational groups, which could readily explain the larger wage impacts found.

6.2 Additional results

Impact estimates for a consistent sample of displaced workers

Table 8 reports displacement impacts for the subset of displaced workers whose outcomes can be followed for 2–3 years. This is a smaller subset than was used in the estimation of 0–1 year and 1–2 year outcomes in Table 7, but it allows us to track changes in outcomes over time for a consistent set of displaced workers. By contrast, the differences between the 0–1 year outcomes and the 1–2 year outcomes reported in Table 7 may reflect both a true time pattern and a change in sample composition.

Estimates from a single consistent cohort will be less precise due to the smaller sample size, and will more strongly reflect the specific period in which the cohort is observed. The consistent cohort we consider here experienced job loss in a reasonably favourable labour market (October 2004 to September 2007), implying that smaller employment and wage losses could be expected. The effects of the 2008–09 recession will be reflected most strongly in this cohort's outcomes at 2–3 years after displacement.

As expected, the employment losses initially experienced by this sample, at 0–1 years and 1–2 years after displacement, were in fact smaller than those estimated previously for the full sample. The employment rate of the displaced workers was 23 percentage points lower at the first post-displacement interview, 11 percentage points lower at the second interview, and 8 percentage points lower at the third interview. For those who received redundancy pay, employment was 26 percentage points lower at 0–1 years after displacement, 12 percentage points lower at 1–2 years, and 6 percentage points lower at 2–3 years.

Given the smaller size of the initial impacts, the speed of decline over time was also slightly slower. Note that the 2–3 year impacts are exactly the same as those reported in Table 7, as they are obtained from the same sub-sample.

The size of the initial wage impacts for this sample and the patterns of decline over time are broadly similar to those found in our main results. The average wage of the displaced workers was 12 percent lower at the first post-displacement interview, 13 percent lower at the second interview, and 7 percent lower at the third interview. The comparable wage impacts for those with redundancy pay are 12, 15 and 8 percent.

The conclusion to be drawn from this supplementary analysis is that our use of several different estimation samples in our main results has probably not led to a seriously distorted view of how quickly the effects of displacement diminish over time. However, the exact numbers obtained will be influenced by a variety of factors that can't be excluded from this analysis, including the state of the labour market at the time different groups of displaced workers lost their jobs.

Impact estimates for full-time employees

People who are displaced from part-time jobs may be less severely affected than those displaced from full-time jobs, particularly if their hours of work were low. Sixteen percent of the displaced workers in our main estimation sample were employed for less than 30 hours a week before job loss. This group is not large enough to support separate impact estimates for part-time employees. However, to check the sensitivity of our main results to variations in hours worked, we repeated the matching and impact analysis after excluding part-time employees from the displaced worker and potential comparison-group samples.

Most of the employment impacts estimated for full-time employees were slightly *larger* than those obtained for all employees, but only by 0–2 percentage points . Excluding part-time employees had mixed and often small effects on the wage impact estimates. But on balance, it tended to make them *smaller*, suggesting

that displaced part-time workers experienced larger wage losses when re-employed than displaced full-time employees did.

The exclusion of part-time employees had the greatest effect on the wage impacts estimated for displaced women and young adults—two groups with relatively high proportions of part-time employees. It reduced the size of these estimated wage losses, although not always consistently.

Impacts on other labour market outcomes

The literature on displacement has identified a range of different labour market and income effects. In this section we briefly estimate the impacts on eight additional labour market outcomes:

- The proportion of people who had **experienced at least one spell of unemployment** in the year since their previous interview.
- The **unemployment rate**, defined as the proportion of people who were not working and were searching for work at each post-displacement interview.[14]
- The **self-employment rate**, defined as the proportion of people who were working in a self-employment job at each post-displacement interview.
- The average **weekly hours** worked in all waged or salaried jobs, measured at the time of each post-displacement interview.
- The log of **real weekly earnings** from waged or salaried jobs, measured at the time of each post-displacement interview.
- **Real annual earnings** from all waged or salaried jobs, measured over the year between each interview.
- **Real annual incomes** from all sources, measured over the year between each interview.
- Real annual incomes from **government income transfers**, measured over the year between each interview.

The last three measures (annual earnings, annual total incomes and annual transfer incomes) are measured in constant (March 2007) dollars and are defined for all sample members, including those whose income in the reference year was zero. This ensures that changes in average incomes in the post-displacement period are not affected by changes in the set of people that received income from each source.

[14] In this paper, the unemployment rate is calculated as the number of non-employed job seekers divided by the total population, rather than the total labour force. This means it differs from an official unemployment rate. Another difference is that a person does not need to have searched for work actively in every week of their unemployment spell to be classified as unemployed. In SoFIE, they were only asked to specify their search methods once for each spell of job search. We classify a respondent as unemployed if they reported using at least one active search method during the entire spell.

Table 9 gives descriptive statistics on each of these variables for the displaced workers and matched comparison groups.[15] Here, we focus on the levels recorded at the interview immediately prior to displacement. No one was unemployed at that time, reflecting the fact that the study sample was restricted to employees with at least one year of job tenure. Approximately 4 percent were self-employed (in addition to their waged or salaried employment). These soon-to-be displaced employees worked 40.7 hours on average, earned $837 a week (6.59 in logs), and earned around $44,500 a year. Their total annual incomes were around $48,900 on average and their total transfer payments were around $951 per year on average.

The method used to estimate the impact of displacement on each outcome variable was analogous to that used for the employment and wage impacts. It is described in Section 4 above. The results obtained are given in Table 10. In addition, we graphically illustrate the impacts of displacement in Figure 3, by plotting the outcomes of the displaced workers and their matched comparisons before and after displacement.

As in Table 7, we used the maximum number of displaced employees who met the data availability conditions at each post-displacement time period to generate the estimates. This means the estimation samples change from one column of the table to the next. Results that are statistically significant are shown in bold font.

Table 10 shows that displacement raised the proportion of employees that reported an unemployment spell in the previous 12 months by 21 percentage points at the first post-displacement interview, and 7 percentage points at the second. The unemployment rate of the displaced workers was 9.4 percentage points higher than that of the matched comparison group at the first post-displacement interview and 2.9 percentage points higher at second. By 2–3 years after, no difference remained.

The self-employment rate of displaced workers was around 5 percentage points higher at both the first and second post-displacement interviews. By the third interview, there was no significant difference between the displaced and comparison samples in self-employment rates.

The average weekly hours of the displaced workers who were re-employed in waged or salaried jobs were 2–3 hours a week—or 5–8 percent— lower than those of the matched comparison group at each time point after displacement. This impact persisted at the third interview.

The weekly earnings of displaced workers who were re-employed were 23 percent lower at 0–1 years, and 17 percent lower at both 1–2 years and 2–3 years. Note

[15] These descriptive statistics are calculated for the samples of displaced workers that were used to estimate impacts at 0–1 years after displacement. The samples used to estimate impacts at 1–2 years and 2–3 years are slightly different, giving slightly different pre- and post-displacement means. The patterns of change are similar.

that these are larger than the reductions in hourly earnings presented above because they include the impact of the reduction in average hours worked.[16]

Annual earnings were, on average, around 21 percent lower than those of the matched comparison group at the first interview after displacement; 40 percent lower at the second interview, and 21 percent lower at the third interview. The first time point does not capture the full impact of displacement on annual earnings as it includes earnings from the period before the job loss. Note that individuals with zero earnings were included in the annual earnings, annual incomes, and transfer payment figures, and this helps explain the relatively large impacts on these outcomes.

Average annual personal incomes were 20 percent higher than those of the matched comparison group at the first displacement interview. This rise in incomes was due to the receipt of redundancy pay. If we subtract redundancy payments from annual incomes, we estimate an income reduction of 5.4 percent.

Average annual incomes were 20 and 19 percent lower at the second and third post-displacement interviews, but neither impact estimate is statistically significant. As for annual earnings, the first time point (0–1 years) does not capture the full impact of the displacement as it includes income from the period before the job loss.

Average annual incomes from government income transfers were around 50 percent higher than those of the matched comparison group at 0–1 years and 1–2 years after displacement. However, these estimates are either insignificant or only marginally significant.

Summarising these results, there is evidence of significant negative impacts on a range of labour market outcomes. The unemployment rate of the displaced workers was 9.4 percentage points higher 0–1 years after their job loss and 2.9 percentage points higher 1–2 years afterwards. Displacement was followed by an increase in the proportion who were self-employed (of around 5 percentage points) and a decline in the average weekly hours of those who returned to waged or salaried employment (of 5–8 percent or 2–3 hours a week). The average weekly earnings of those who returned to waged or salaried employment were approximately 20 percent lower. Many of these adverse impacts persisted out to the third interview after the displacement, the end of our follow-up period.

A comparison of the unemployment rate increases with the employment rate reductions reported earlier in this paper reveals large gaps between the two, at both 0–1 years and 1–2 years after the job loss. This indicates that a substantial proportion of the displaced workers (around 18 percent at the first interview and 11 percent at the second) were neither working nor searching for work at those times. The reasons for this inactivity deserve further investigation.

[16] For example, at 0–1 years after displacement, weekly hours declined by 7.8 percent while wages declined by 12.3 percent. This implies a decline in weekly earnings of approximately 12.3+7.8=20.1 percent, which is the actual percentage impact estimated (after taking the antilog and substracting 1).

6.3 Comparison with findings of previous NZ study

The employment and weekly earnings impacts reported here can be loosely compared with results reported in Dixon and Stillman (2009) for workers who lost their jobs in complete firm closures. Due to differences in the study sample and the definition and timing of the outcome measures, these comparisons are approximate only. In Dixon and Stillman, the sample of displaced workers included employees with job tenure of only 2–12 months. The employment measure excluded self-employment and the earnings measure was average monthly rather than average weekly earnings. Finally, the impacts were reported for specific months after displacement.

The impacts found in the current study are generally larger. The employment rate reductions reported in Dixon and Stillman for six months and 12 months after displacement are 21 and 16 percent. This compares with 27 and about 20 percentage points for the displaced workers studied in this paper. However, if we had excluded self-employment jobs in the current study, the employment rate reductions would have been about 5 percentage points larger again.

For those who had returned to waged or salaried jobs, Dixon and Stillman estimated a reduction in average monthly earnings of 11 percent at six months and 10 percent at 12 months. These numbers are well below the comparable weekly earnings impacts reported in this paper: 20 percent at six months and around 18 percent at 12 months.

Larger impacts would be expected, because employees with less than one year of employment before the job loss were excluded in the current study but not the Dixon and Stillman analysis. In addition, the sample of displaced workers used in this study includes a group who lost their jobs at the start of the 2008–09 recession.

For subgroups of employees, we are forced to compare results obtained using monthly earnings in the first study with results obtained using hourly earnings in the second. These are less likely to be comparable, because any changes in monthly earnings are likely to incorporate changes in hours worked as well as changes in wages.

In the previous study, displacement was found to have similar impacts on the employment rates of men and women but larger impacts on the monthly earnings of women. In this study, both the employment and the wage losses are somewhat larger for women than for men, at 0–1 and 1–2 years after displacement. But they are not significantly larger, given the large standard errors for each estimate.

In the previous study, people aged 25–34 were found to experience larger employment and wage impacts than those in the 35–54 and 55–64 age groups, and no evidence was found of larger impacts for the oldest age group. In this study, the age group patterns are more consistent with the research results typically reported internationally on this topic.

Employees in the 50–64 age group were slower to return to work than younger employees, particularly in the first year after displacement, and they experienced larger wage reductions. Larger wage losses for the 50–64 group are particularly evident in the results presented in table 8 for the wave 3–4 sub-sample (although these age-group differences are not statistically significant, as noted above).

The previous study found evidence of larger employment and wage losses for workers with longer job tenure. But due to data limitations, it could not examine the outcomes of workers with genuinely long job durations (such as five years or more). This study has been able to distinguish the latter group and finds robust evidence that higher-tenure workers are more seriously affected. They were less likely to return to work within the first post-displacement year and experienced larger wage reductions throughout the follow-up period.

The current study offers some new insights for workers who receive redundancy pay. The reduction in employment rates at 0–1 years was somewhat larger for the redundancy pay group than for other displaced employees, and the average wage losses estimated for this group were higher for the entire follow-up period. These differences could be due to differences in prior characteristics (including higher job tenure), or to the effects of redundancy pay on job-search behaviour.

7 CONCLUSION

This paper has examined the incidence of involuntary job loss and its impact on workers' subsequent employment and earnings. It focusses on employees who were working in their job for at least one year before their job loss, and uses data from Statistics New Zealand's longitudinal household survey for 2002–09.

Due to the design of the relevant question in SoFIE, the analytical sample of displaced workers is likely to include a minority of people who were dismissed rather than made redundant. This is likely to be a source of bias in our results, and it may mean the estimated employment and wage losses reported in this paper are too large overall. However, the results obtained for the displaced employees who received redundancy pay are similar to those for the entire sample of displaced workers. This provides some assurance that involuntary job loss does indeed have substantial and sustained costs for many of the affected workers.

The annual rate of displacement for employees with one year of job tenure was fairly constant during 2003–07, at around 1.5 percent a year, but it increased to 3.3 percent in the seventh wave of the survey, which coincided with the 2008–2009 recession. Fifty-four percent of the displaced workers in the sample received redundancy pay. The median redundancy pay amount was just over $15,000 and the mean was just over $28,000.

The impact of displacement on employment rates and hourly earnings was estimated using a propensity score matching approach to select 'similar' non-displaced workers and compare their outcomes. Our impact estimates show that the employment rate of displaced workers compared with the matched group was on average 27 percent lower 0–1 years after displacement, 14 percent lower 1–2 years after, and 8 percent lower 23 years after.

For displaced workers who received redundancy pay, the employment impacts were initially larger: 3–4 percent lower than expected 0–1 years after displacement. They were similar in size to the overall results after 1–2 years (15 percent lower) and 2–3 years (6 percent lower).

The average wage of re-employed displaced workers was 12 percent lower than that of the matched comparison group 0–1 years after displacement, 11 percent lower 1–2 years after, and 7 percent lower 2–3 years after. For displaced workers who received redundancy pay, the effects on average wages were slightly larger: 17 percent lower 0–1 years after displacement, 14 percent lower 1–2 years after, and 8 percent lower 2–3 years after.

Due to small sample sizes, variations in the size of displacement impacts between groups defined by gender, age group, educational attainment, job tenure, and pre-displacement wage level cannot be measured precisely. However, patterns apparent in the results suggest that in the first year after displacement, the adverse employment impacts are larger for older employees and high job-tenure employees. These groups were slower to regain employment.

When re-employed in waged or salaried jobs, both younger and older employees experienced larger reductions in their wages than employees aged 35–49. Workers with low educational attainment experienced larger wage reductions than those with average or higher educational attainment. Employees with higher job tenure experienced substantially larger and more persistent wage reductions than those with lower job tenure. For example, the reduction in wages for re-employed higher-tenure employees was 22 percent at 0–1 years, compared with 8 percent for lower-tenure employees); and 14 percent at 1–2 years, compared with 6 percent for lower-tenure employees.

Other measures of labour market outcomes also showed significant changes. Unemployment rates rose sharply in the year immediately after the job loss. During the three years after the job loss, the average hours of those who returned to waged or salaried jobs were 5–8 percent lower than those of the matched comparison group, and average weekly earnings were around 20 percent lower.

Displaced workers were more likely to be self-employed after their job loss. Their annual wage and salary earnings and incomes were also significantly reduced. Though the unemployment impacts were relatively short-lived, the impacts on hours, wages, and weekly and annual earnings were much more sustained.

Because the survey data cover seven years only, we can't tell whether the employment and wage losses experienced by displaced workers persisted in the long run. As discussed above, overseas studies of the long-run impacts of displacement have identified persistent effects lasting for 10 years or more. Given this evidence, we should not assume that the employment and wage impacts estimated in this study at 2–3 years after displacement—mostly in the 3–10 percent range—were likely to disappear after a few more years.

Another issue to consider when interpreting the findings of this study is that the period covered was largely one of strong employment growth and low unemployment, except for the final two years. Displacement research in other countries has shown that displacement tends to cause larger employment and wage losses when labour demand is weaker.

In future, the findings of the study could be extended in two ways. First, data from the final wave of SoFIE could be incorporated, providing information on outcomes 3–4 years after displacement and possibly some additional insights into the effects of recession. Second, the scope for linking SoFIE to administrative measures of individuals' employment and earnings could be considered. If linked, the administrative measures could be used to estimate the impacts of involuntary job loss on workers' employment and earnings over a much longer follow-up period.

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TABLES

Table 1: Timing of the data collection

Wave	Interview dates	Period in which the job loss reported at this wave could have occurred	Label in tables
2	1 Oct 2003 – 11 Dec 2004	1 Oct 2002 – 11 Dec 2004	2002–04
3	1 Oct 2004 – 3 Dec 2005	1 Oct 2003 – 3 Dec 2005	2003–05
4	1 Oct 2005 – 28 Nov 2006	1 Oct 2004 – 28 Nov 2006	2004–06
5	1 Oct 2006 – 28 Nov 2007	1 Oct 2005 – 28 Nov 2007	2005–07
6	1 Oct 2007 – 4 Dec 2008	1 Oct 2006 – 4 Dec 2008	2006–08
7	1 Oct 2008 – 30 Sep 2009	1 Oct 2007 – 30 Sep 2009	2007–09

Table 2: Displacement statistics for employees with job tenure of one year or more (continued on next page)

	Proportion of employees who were displaced	Proportion who were displaced and received redundancy pay	Personal and job profile of employees who were displaced	Of those reporting a displacement		
				Received redundancy pay	Employed 0-1 years later	Employed 1-2 years later
	%	%	%	%	%	%
All	1.8	1.0	100.0	53.5	69.4	84.7
Year of displacement						
2002-04	1.7	1.1	14.9	61.2	69.4	88.8
2003-05	1.4	0.7	12.3	48.6	67.9	87.1
2004-06	1.3	0.6	11.2	50.8	69.5	85.9
2005-07	1.6	0.9	15.2	53.8	78.0	83.2
2006-08	1.6	0.8	14.8	53.3	71.0	78.1
2007-09	3.3	1.7	31.6	52.5	65.0	NA
Gender						
Male	2.1	1.1	60.1	52.0	70.3	87.1
Female	1.5	0.8	39.9	55.6	67.9	81.4
Age group						
20-24	2.0	0.8	8.5	41.2	67.0	92.6
25-34	1.7	0.7	20.4	42.2	70.3	77.9
35-44	1.7	0.9	26.2	51.3	75.8	87.5
45-54	1.8	1.1	26.7	58.9	68.8	93.3
55-64	2.1	1.4	18.2	67.6	60.9	71.3
Ethnic group						
European	1.9	1.0	76.6	54.2	71.0	85.8
Maori	1.8	0.9	11.7	48.1	62.4	74.1
Pacifika	1.7	1.0	4.7	63.0	63.0	92.3
Other ethnic group	1.6	0.8	6.8	48.7	67.9	83.7
Highest qualification						
No qualification	2.2	1.0	17.4	47.5	70.7	85.7
Lower secondary school qualification	2.6	1.2	13.7	47.4	73.7	87.6
Upper secondary school qualification	2.0	1.1	13.6	56.1	71.0	87.8
Basic vocational qualification	1.8	0.8	10.6	44.6	75.2	84.6
Vocational qualification	1.6	0.8	23.4	51.1	65.0	85.5
Degree-level qualification	1.5	1.0	17.6	67.0	67.0	80.6
Educational level not classified	1.5	1.0	3.8	67.4	62.8	72.7
Job tenure						
1-<2 years	2.1	0.7	25.1	33.6	66.1	88.6
2-<3 years	1.9	1.0	16.5	50.5	72.3	81.0
3-<5 years	1.9	0.9	20.5	49.1	73.9	83.9
5-<10 years	1.8	1.1	21.2	62.0	74.8	87.8
10+ years	1.5	1.2	16.7	81.1	58.4	79.1
Occupational group						
Managerial	2.0	1.3	18.6	67.5	75.0	86.0
Professional	1.1	0.8	11.2	70.3	66.4	84.2
Associate professional and technical	1.9	1.2	14.0	63.1	61.9	85.5
Clerical	2.3	1.2	16.6	52.4	63.5	82.9
Service and sales	1.4	0.5	9.7	32.7	70.9	75.9
Agricultural	1.3	0.5	2.8	40.6	75.0	93.3
Trades	2.5	0.9	9.6	34.9	73.4	89.9
Machine operators and assemblers	2.3	1.1	10.7	49.2	64.8	84.2
Elementary	2.4	0.9	6.7	35.5	86.8	88.5

Table 2 continued

	Proportion of employees who were displaced	Proportion who were displaced and received redundancy pay	Personal and job profile of employees who were displaced	Of those reporting a displacement		
				Received redundancy pay	Employed 0-1 years later	Employed 1-2 years later
	%	%	%	%	%	%
Industry						
Agriculture, forestry, fishing, mining	1.9	0.9	4.9	46.4	80.4	80.0
Manufacturing	2.8	1.8	22.7	63.7	67.2	82.4
Utilities, construction	2.7	0.5	9.4	17.8	70.1	89.2
Wholesale trade	2.8	2.0	9.9	71.7	72.6	89.0
Retail trade	1.8	0.5	10.0	30.7	75.4	84.3
Hospitality	1.2	S	1.7	S	S	68.4
Transport, storage	2.9	1.5	6.8	51.3	75.6	93.8
Communications	2.4	2.4	2.1	100.0	75.0	95.2
Finance, insurance	1.2	0.9	2.4	74.1	55.6	63.6
Business services	2.2	1.0	12.8	46.6	70.5	89.9
Government, defence	0.9	0.8	2.8	93.8	62.5	90.9
Education	0.7	0.5	4.4	64.0	44.0	69.2
Health and community services	0.8	0.5	5.0	54.4	70.2	82.9
Cultural and recreational services	2.0	1.1	2.3	53.8	73.1	75.0
Personal and household services	1.1	0.5	2.6	46.7	80.0	100.0
Mean age of displaced employees	42.1	44.3				
Mean job duration prior to displacement (years)	6.3	8.2				
Sample sizes	636	351	636	636	636	636

Notes: S = suppressed for confidentiality reasons. N/A = not applicable.

Table 3: Regressions modelling the probability of displacement and the probability of receiving redundancy pay if displaced (continued on next page)

	Probability of experiencing displacement			Probability of receiving redundancy pay if displaced		
	Coefficient	Std Err	Marginal effect x 100	Coefficient	Std Err	Marginal effect
Intercept	**-4.463**	0.264		-0.754	0.410	
2003-05	**0.532**	0.153	0.815	-0.189	0.370	-0.041
2004-06	**0.373**	0.146	0.571	-0.242	0.338	-0.052
2005-07	**0.669**	0.117	1.026	-0.184	0.287	-0.040
2006-08	**0.571**	0.171	0.875	-0.355	0.287	-0.077
2007-09	**1.230**	0.124	1.885	-0.247	0.226	-0.054
Female	-0.056	0.097	-0.086	0.205	0.175	0.044
Aged 30-39	0.076	0.144	0.116	-0.057	0.294	-0.012
Aged 40-49	0.084	0.137	0.129	0.052	0.311	0.011
Aged 50-64	0.247	0.137	0.379	0.211	0.285	0.046
Maori	-0.063	0.119	-0.097	-0.006	0.325	-0.001
Pacific	-0.139	0.218	-0.213	0.504	0.494	0.109
Other ethnic group	-0.250	0.202	-0.384	-0.423	0.436	-0.092
Lower school qualification	0.181	0.143	0.277	-0.096	0.269	-0.021
Upper school qualification	0.031	0.173	0.047	0.556	0.399	0.120
Basic vocational qualification	-0.054	0.148	-0.082	-0.276	0.319	-0.060
Vocational qualification	-0.077	0.121	-0.118	0.080	0.283	0.017
Degree-level qualification	0.081	0.149	0.124	**0.959**	0.331	0.208
Educational level not classified	0.101	0.232	0.154	0.291	0.474	0.063
Tenure 2-<3 years	-0.191	0.137	-0.293	**0.535**	0.270	0.116
Tenure 3-<5 years	**-0.225**	0.108	-0.345	0.507	0.287	0.110
Tenure 5-<10 years	**-0.280**	0.114	-0.430	**1.178**	0.286	0.255
Tenure 10 years or more	**-0.440**	0.118	-0.674	**1.870**	0.319	0.405
Managerial	-0.076	0.158	-0.116			
Professional	-0.139	0.194	-0.213			
Clerical	0.068	0.156	0.104			
Service and sales	-0.236	0.184	-0.361			
Agricultural	-0.481	0.440	-0.737			
Trades	-0.180	0.201	-0.276			
Machine operators and assemblers	-0.173	0.193	-0.265			
Elementary occupations	-0.068	0.215	-0.105			

Table 3 continued

	Probability of experiencing displacement			Probability of receiving redundancy pay if displaced		
	Coefficient	Std Err	Marginal effect x 100	Coefficient	Std Err	Marginal effect
Agriculture, forestry, fishing, mining	0.173	0.293	0.265			
Manufacturing	**0.552**	0.162	0.846			
Construction	0.365	0.211	0.559			
Wholesale trade	**0.363**	0.183	0.556			
Hospitality	-0.467	0.368	-0.716			
Transport, storage	0.365	0.241	0.558			
Communications	0.089	0.360	0.136			
Finance, insurance	-0.162	0.275	-0.249			
Business services	-0.025	0.193	-0.039			
Government, defence	**-0.791**	0.247	-1.212			
Education	**-0.836**	0.219	-1.281			
Health and community services	**-0.709**	0.231	-1.086			
Cultural and recreational services	0.061	0.354	0.093			
Personal and household services	-0.423	0.274	-0.647			
Other industries	0.471	0.450	0.721			
No. observations	40557			636		
No. observations displaced	636			636		
No. observations with redundancy pay				351		
Psuedo R^2	0.041			0.096		

Notes: Estimates that are significant at the 5% error level are shown in bold font. The omitted categories are 2002-04; males; ages 20-29; European ethnicity; no qualifications; tenure 1-<2 years; occupation = associate professional and technical; and industry = retail trade.

Table 4: Redundancy pay statistics

	Redundancy payments	
	Mean	Median
	$	$
All employees with redundancy pay	28,200	15,100
2002-04	30,500	14,500
2003-05	23,800	16,500
2004-06	20,400	15,400
2005-07	39,000	20,700
2006-08	32,400	14,500
2007-09	23,700	13,000
Male	33,100	16,300
Female	21,000	14,500
No qualification	23,700	15,300
Lower secondary school qualification	20,900	14,500
Upper secondary school qualification	21,800	13,300
Vocational qualification	30,900	15,400
Degree-level qualification	38,000	20,700
Tenure 1-<2 years	15,600	9,800
Tenure 2-<3 years	12,100	8,800
Tenure 3-<5 years	20,300	12,100
Tenure 5-<10 years	32,500	16,600
Tenure 10 years or more	47,800	38,100
Managerial	45,100	28,700
Professional	37,400	23,800
Associate professional and technical	20,900	14,500
Clerical	16,200	10,800
Trades and machine operators and assemblers	25,200	13,700
Sales and service, agricultural and elementary occupations	13,600	10,800

Notes: The figures are expressed in March 2012 dollar values and rounded. The numbers in this table should be interpreted with caution because the underlying sample of employees is relatively small (n=351).

Table 5: Numbers of displaced workers used in the impact estimates

	Employment impacts			Wage impacts		
	0-1 years after	1-2 years after	2-3 years after	0-1 years after	1-2 years after	2-3 years after
	Main estimation samples used in table 6					
All	420	252	167	224	158	117
Received redundancy pay	228	136	90	116	90	68
Male	233	136	94	129	88	69
Female	187	116	73	95	70	48
Aged 20-34	87	44	26	53	29	22
Aged 35-49	170	109	72	89	67	49
Aged 50-64	163	99	69	82	62	46
No qualification or lower secondary school	129	69	44	69	46	33
Upper secondary or post-school qualification	199	122	85	110	76	58
Bachelor degree or higher	92	61	38	45	36	26
Low tenure - less than 5 years in job	241	151	107	131	91	73
High tenure - 5 or more years in job	179	101	60	93	67	44
Pre-displacement wage below median	237	144	99	129	98	69
Pre-displacement wage above median	183	108	68	95	60	48
	Two-wave estimation sample used in table 7					
All	167	167	167	96	114	117
Received redundancy pay	90	90	90	54	66	68
Male	94	94	94	60	68	69
Female	73	73	73	36	46	48
Aged 20-34	26	26	26	17	20	22
Aged 35-49	72	72	72	42	50	49
Aged 50-64	69	69	69	37	44	46
No qualification or lower secondary school	44	44	44	27	33	33
Upper secondary or post-school qualification	85	85	85	47	55	58
Bachelor degree or higher	38	38	38	22	26	26
Low tenure - less than 5 years in job	107	107	107	60	72	73
High tenure - 5 or more years in job	60	60	60	36	42	44
Pre-displacement wage below median	99	99	99	57	71	69
Pre-displacement wage above median	68	68	68	39	43	48

Notes: Only people who reported a displacement at waves 4-7 are included in these estimation samples. A small number of individuals who did not provide information on their employment or wages at every wave before the displacement were also excluded, as detailed in the text.

Table 6: Analysis of matching quality for two selected estimation samples

	Employment impacts 0-1 years after displacement			Wage impacts 0-1 years after displacement		
Sample means	**Potential comparison group**	**Matched comparison group**	**Displaced workers**	**Potential comparison group**	**Matched comparison group**	**Displaced workers**
Pre-displacement						
Employment rate 2-3 years prior	0.953	0.965	0.960	1.000	1.000	1.000
Employment rate 1-2 years prior	1.000	1.000	1.000	1.000	1.000	1.000
Employment rate 0-1 years prior	1.000	1.000	1.000	1.000	1.000	1.000
Log wage 2-3 years prior	2.949	2.913	2.929	2.952	2.889	2.898
Log wage 1-2 years prior	2.972	2.931	2.941	2.989	2.915	2.909
Log wage 0-1 years prior	3.000	2.979	2.952	3.015	2.946	2.937
Male	0.47	0.56	0.55	0.49	0.59	0.58
Female	0.53	0.44	0.45	0.51	0.41	0.42
Mean age	43.7	44.1	44.3	44.0	43.7	43.5
Aged 20-34	0.22	0.22	0.21	0.21	0.23	0.24
Aged 35-49	0.44	0.42	0.40	0.45	0.43	0.40
Aged 50-64	0.33	0.36	0.39	0.34	0.34	0.37
No qualification or lower secondary school	0.25	0.31	0.31	0.26	0.35	0.31
Upper secondary or post-school qualification	0.23	0.24	0.22	0.22	0.22	0.25
Bachelor degree or higher	0.48	0.39	0.43	0.48	0.38	0.40
Mean job duration (years)	7.43	7.37	7.13	7.87	6.21	6.39
Low tenure - less than 5 years in job	0.54	0.53	0.57	0.50	0.56	0.58
High tenure - 5 or more years in job	0.46	0.47	0.43	0.50	0.44	0.42
Pre-displacement wage below median	0.50	0.53	0.57	0.48	0.56	0.57
Pre-displacement wage above median	0.50	0.47	0.43	0.52	0.44	0.43
Post-displacement						
Employment rate 0-1 years after	0.962	0.959	0.688	1.000	1.000	1.000
Employment rate 1-2 years after	0.944	0.943	0.813	0.965	0.970	0.943
Employment rate 2-3 years after	0.929	0.938	0.850	0.947	0.953	0.958
Log wage 0-1 years after	3.033	3.016	2.845	3.044	2.974	2.851
Log wage 1-2 years after	3.053	3.028	2.861	3.066	2.997	2.913
Log wage 2-3 years after	3.066	3.018	2.916	3.079	3.014	2.947
Sample sizes	21212	2100	420	18456	1120	224
Covariate balancing test statistics						
Pseudo-R^2		*0.003*			*0.005*	
Chi^2 from LR test (df)		*3.54 (39)*			*3.38 (40)*	
p-value		*1.000*			*1.000*	

Notes: A 4-wave sample, selected in 2004-08, was used.

Table 7: Impacts of displacement on employment and wages

	Employment impacts (percentage points)			Displaced workers' mean log wage before displacement	Wage impacts (log points)		
	0-1 years after	1-2 years after	2-3 years after	0-1 years before	0-1 years after	1-2 years after	2-3 years after
All employees	**-0.271** (0.024)	**-0.138** (0.024)	**-0.082** (0.037)	2.94	**-0.123** (0.035)	**-0.110** (0.038)	-0.074 (0.044)
Received redundancy pay	**-0.337** (0.030)	**-0.154** (0.032)	-0.063 (0.053)	3.05	**-0.166** (0.051)	**-0.140** (0.057)	-0.082 (0.047)
Male	**-0.257** (0.032)	**-0.115** (0.036)	**-0.089** (0.033)	2.98	**-0.146** (0.039)	**-0.099** (0.049)	**-0.122** (0.061)
Female	**-0.291** (0.036)	**-0.157** (0.041)	-0.056 (0.051)	2.87	**-0.161** (0.059)	**-0.163** (0.061)	-0.015 (0.078)
Aged 20-34	**-0.205** (0.047)	**-0.155** (0.074)	-0.038 (0.071)	2.82	**-0.171** (0.075)	-0.192 (0.106)	-0.105 (0.108)
Aged 35-49	**-0.264** (0.034)	**-0.122** (0.037)	-0.065 (0.037)	3.00	**-0.102** (0.049)	-0.052 (0.057)	-0.044 (0.054)
Aged 50-64	**-0.322** (0.040)	**-0.141** (0.042)	-0.094 (0.062)	2.94	**-0.172** (0.068)	-0.110 (0.062)	-0.046 (0.072)
No qualification or lower secondary school	**-0.283** (0.051)	**-0.132** (0.056)	-0.102 (0.070)	2.78	**-0.192** (0.057)	**-0.173** (0.056)	**-0.142** (0.061)
Upper secondary or post-school qualification	**-0.211** (0.053)	-0.112 (0.060)	**-0.151** (0.067)	2.95	-0.084 (0.074)	-0.130 (0.076)	0.040 (0.110)
Bachelor degree or higher	**-0.295** (0.040)	**-0.146** (0.041)	-0.014 (0.045)	3.13	-0.084 (0.051)	-0.080 (0.056)	-0.042 (0.068)
Low tenure - less than 5 years in job	**-0.235** (0.028)	**-0.134** (0.035)	**-0.077** (0.031)	2.92	**-0.077** (0.039)	-0.057 (0.052)	-0.026 (0.059)
High tenure - 5 or more years in job	**-0.324** (0.039)	**-0.142** (0.039)	-0.098 (0.067)	2.96	**-0.222** (0.070)	**-0.138** (0.058)	-0.116 (0.069)
Pre-displacement wage below median	**-0.284** (0.033)	**-0.076** (0.032)	-0.049 (0.045)	2.66	**-0.124** (0.037)	**-0.090** (0.041)	**-0.103** (0.039)
Pre-displacement wage above median	**-0.269** (0.039)	**-0.216** (0.046)	**-0.118** (0.052)	3.30	**-0.131** (0.050)	-0.095 (0.056)	-0.021 (0.069)

Notes: The numbers in the table represent the difference between the mean outcome of the displaced workers and that of the matched comparison group. The employment impacts represent the percentage point difference in employment rates. The wage impacts represent the difference in log wages, which is an approximation of the percentage difference in the wage rate. Results that are statistically significant at the 5% error level are in bold font. Bootstrap standard errors are shown in brackets below each estimate. See table 4 for sample sizes. The impact estimates for '0-1 years after' use a 4-wave sample, selected in 2004-08. The impact estimates for '1-2 years after' use a 3-wave sample, selected in 2004-07. The impact estimates for '2-3 years after' use a 2-wave sample, selected in 2004-06.

Table 8: Impacts of displacement on employment and wages for workers who were displaced in 2005-07

	Employment impacts (percentage points)			Displaced workers' mean log wage before displacement	Wage impacts (log points)		
	0-1 years after	1-2 years after	2-3 years after	0-1 years before	0-1 years after	1-2 years after	2-3 years after
All employees	**-0.225**	**-0.111**	**-0.082**	2.94	**-0.123**	**-0.131**	-0.074
	(0.042)	(0.034)	(0.037)		(0.046)	(0.041)	(0.044)
Received redundancy pay	**-0.261**	**-0.115**	-0.063	3.02	**-0.122**	**-0.150**	-0.082
	(0.054)	(0.045)	(0.053)		(0.065)	(0.061)	(0.047)
Male	**-0.185**	-0.074	**-0.089**	2.96	**-0.175**	**-0.120**	**-0.122**
	(0.045)	(0.038)	(0.033)		(0.063)	(0.048)	(0.061)
Female	**-0.281**	**-0.139**	-0.056	2.90	-0.122	**-0.201**	-0.015
	(0.059)	(0.057)	(0.051)		(0.095)	(0.076)	(0.078)
Aged 20-34	**-0.177**	-0.100	-0.038	2.81	-0.116	-0.171	-0.105
	(0.080)	(0.074)	(0.071)		(0.160)	(0.096)	(0.108)
Aged 35-49	**-0.200**	-0.059	-0.065	2.96	-0.072	-0.059	-0.044
	(0.050)	(0.036)	(0.037)		(0.077)	(0.066)	(0.054)
Aged 50-64	**-0.271**	**-0.150**	-0.094	2.98	**-0.265**	-0.133	-0.046
	(0.057)	(0.063)	(0.062)		(0.092)	(0.074)	(0.072)
No qualification or lower secondary school	**-0.251**	-0.102	-0.102	2.72	**-0.356**	**-0.202**	**-0.142**
	(0.079)	(0.063)	(0.070)		(0.102)	(0.066)	(0.061)
Upper secondary or post-school qualification	**-0.205**	-0.119	**-0.151**	2.91	0.037	-0.118	0.040
	(0.091)	(0.084)	(0.067)		(0.091)	(0.101)	(0.110)
Bachelor degree or higher	**-0.232**	**-0.103**	-0.014	3.28	-0.026	-0.089	-0.042
	(0.052)	(0.044)	(0.045)		(0.064)	(0.064)	(0.068)
Low tenure - less than 5 years in job	**-0.221**	**-0.095**	**-0.077**	2.91	-0.056	-0.057	-0.026
	(0.042)	(0.039)	(0.031)		(0.067)	(0.054)	(0.059)
High tenure - 5 or more years in job	**-0.251**	**-0.136**	-0.098	2.98	**-0.294**	**-0.185**	-0.116
	(0.065)	(0.059)	(0.067)		(0.115)	(0.081)	(0.069)
Pre-displacement wage below median	**-0.260**	-0.060	-0.049	2.67	**-0.136**	**-0.094**	**-0.103**
	(0.055)	(0.041)	(0.045)		(0.062)	(0.042)	(0.039)
Pre-displacement wage above median	**-0.206**	**-0.183**	**-0.118**	3.29	-0.088	**-0.140**	-0.021
	(0.057)	(0.058)	(0.052)		(0.065)	(0.061)	(0.069)

Notes: The numbers in the table represent the difference between the mean outcome of the displaced workers and that of the matched comparison group. The employment impacts represent the percentage point difference in employment rates. The wage impacts represent the difference in log wages, which is an approximation of the percentage difference in the wage rate. Results that are statistically significant at the 5% error level are in bold font. Bootstrap standard errors are shown in brackets below each estimate. See table 4 for sample sizes.

Table 9: Means of the outcome variables for displaced workers and the matched comparison group workers

	Displaced workers						Matched comparison group		
	Before displacement			After displacement			After displacement		
	2-3 years	1-2 years	0-1 years	0-1 years	1-2 years	2-3 years	0-1 years	1-2 years	2-3 years
Employment rate	96.0	100.0	100.0	68.7	81.3	84.9	95.8	95.1	93.1
Unemployment spell in past 12 months	6.0	2.4	0.0	22.4	8.4	3.6	1.1	1.3	1.7
Unemployment rate	1.2	0.0	0.0	10.0	3.2	0.6	0.7	0.3	0.5
Self-employment rate	5.2	4.0	4.3	10.0	11.6	8.4	5.6	5.7	6.0
Hours per week	39.7	40.6	40.7	37.3	37.9	37.2	40.5	39.9	39.9
Log wage	2.90	2.91	2.94	2.85	2.89	2.94	2.98	3.00	3.01
Wage ($)	19.7	19.8	20.5	19.3	19.9	20.8	21.6	21.9	22.2
Log weekly earnings	6.52	6.56	6.59	6.38	6.46	6.47	6.61	6.64	6.64
Weekly earnings ($)	786	818	837	749	784	790	861	885	852
Annual earnings ($)	39,406	42,887	44,495	35,682	26,688	31,427	45,084	44,546	39,806
Annual income ($)	45,565	47,269	48,876	60,133	41,488	39,484	49,940	51,573	48,737
Annual transfer payments($)	1,187	1,135	951	1,605	2,368	2,461	1,096	1,507	2,162

Notes: Outcomes were measured at the time of each interview. Earnings and incomes are expressed in March 2007 dollar values.

Table 10: Impacts of displacement on other labour market outcomes

	Impacts of displacement		
	0-1 years after	**1-2 years after**	**2-3 years after**
Experienced unemployment since the previous interview			
Estimate	**0.213**	**0.071**	0.019
Standard error	(0.023)	(0.016)	(0.018)
Change relative to comparison group (%)	*2170.6*	*619.6*	*114.3*
Unemployment rate at interview			
Estimate	**0.094**	**0.029**	0.001
Standard error	(0.013)	(0.012)	(0.008)
Change relative to comparison group (%)	*1075.5*	*1393.2*	*23.6*
Self employment rate			
Estimate	**0.044**	**0.058**	0.024
Standard error	(0.017)	(0.021)	(0.031)
Change relative to comparison group (%)	*79.5*	*101.4*	*40.0*
Weekly hours			
Estimate	**-3.16**	**-2.02**	**-2.76**
Standard error	(1.052)	(0.956)	(1.249)
Change relative to comparison group (%)	*-7.8*	*-5.1*	*-6.9*
Log weekly earnings			
Estimate	**-0.226**	**-0.172**	**-0.173**
Standard error	(0.052)	(0.052)	(0.066)
Change relative to comparison group (%)	*-20.2*	*-15.8*	*-15.9*
Annual earnings ($)			
Estimate	**-9402**	**-17858**	**-8378**
Standard error	(1567)	(2492)	(2859)
Change relative to comparison group (%)	*-20.9*	*-40.1*	*-21.0*
Annual personal income ($)			
Estimate	**10193**	-10085	-9253
Standard error	(3067)	(5492)	(4866)
Change relative to comparison group (%)	*20.4*	*-19.6*	*-19.0*
Annual personal income excluding redundancy payments ($)			
Estimate	**-2713**	-10085	-9253
Standard error	(2575)	(5492)	(4866)
Change relative to comparison group (%)	*-5.4*	*-19.6*	*-19.0*
Annual income from government transfers ($)			
Estimate	510	**861**	299
Standard error	(264)	(305)	(446)
Change relative to comparison group (%)	*46.5*	*57.2*	*13.8*

Notes: The impact estimates in the table represent the difference between the mean outcome of the displaced workers and that of the matched comparison group. We also show the impact in *relative* terms, by calculating the reduction in the hours of work, earnings or income experienced by the displaced workers as a proportion of the mean hours, earnings or income of the comparison group at a given time. Impact estimates that are statistically significant at the 5% error level are in bold font. Standard errors are shown in brackets below each estimate. The samples sizes for the hours of work and weekly earnings impacts are given top right-hand section of table 4 and the sample sizes for the other outcome variables are given in the top left-hand section of table 4. The impact estimates for 0-1 years use a 4-wave sample, selected in 2004-08. The impact estimates for 1-2 years use a 3-wave sample, selected in 2004-07. The impact estimates for 2-3 years use a 2-wave sample, selected in 2004-06.

Figure 1: Matching for employment impacts, main estimation sample

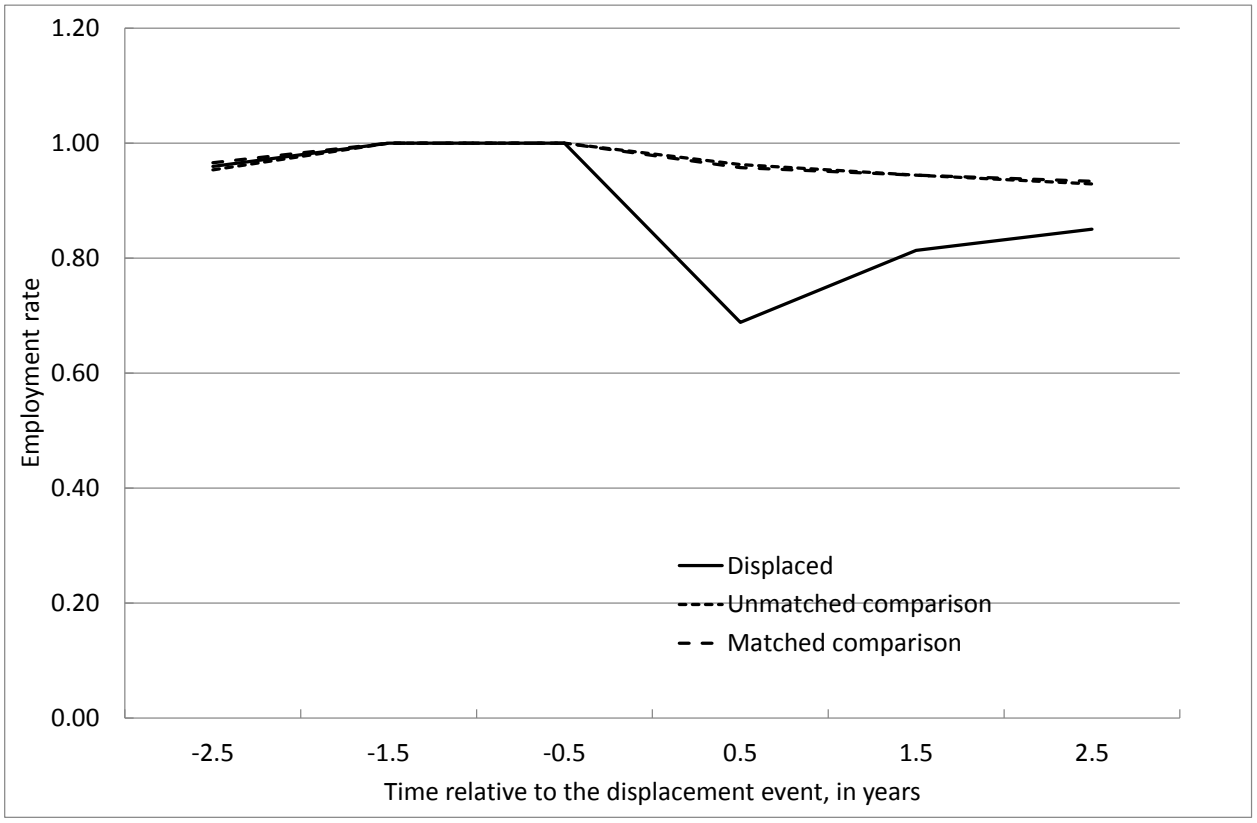


Figure 2: Matching for log wage impacts, main estimation sample

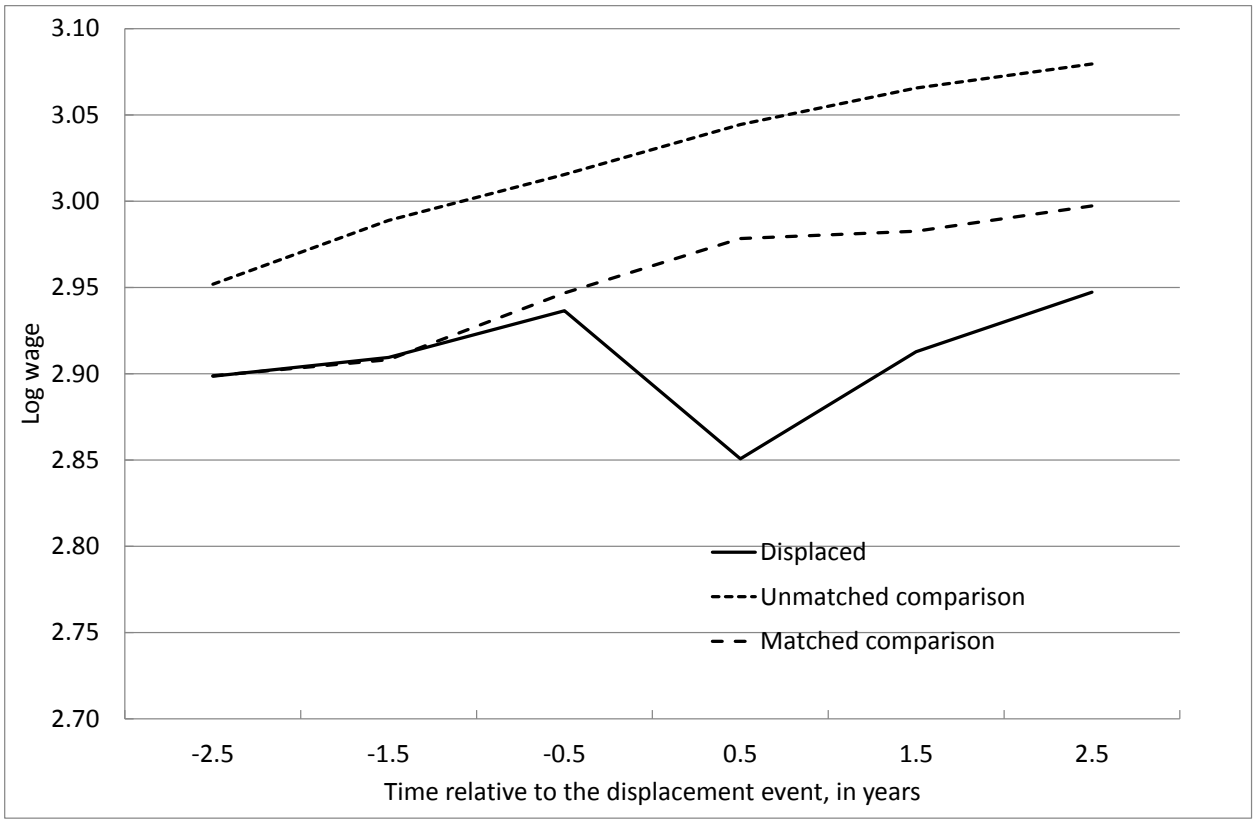


Figure 3: Other labour market impacts (continued on next page)

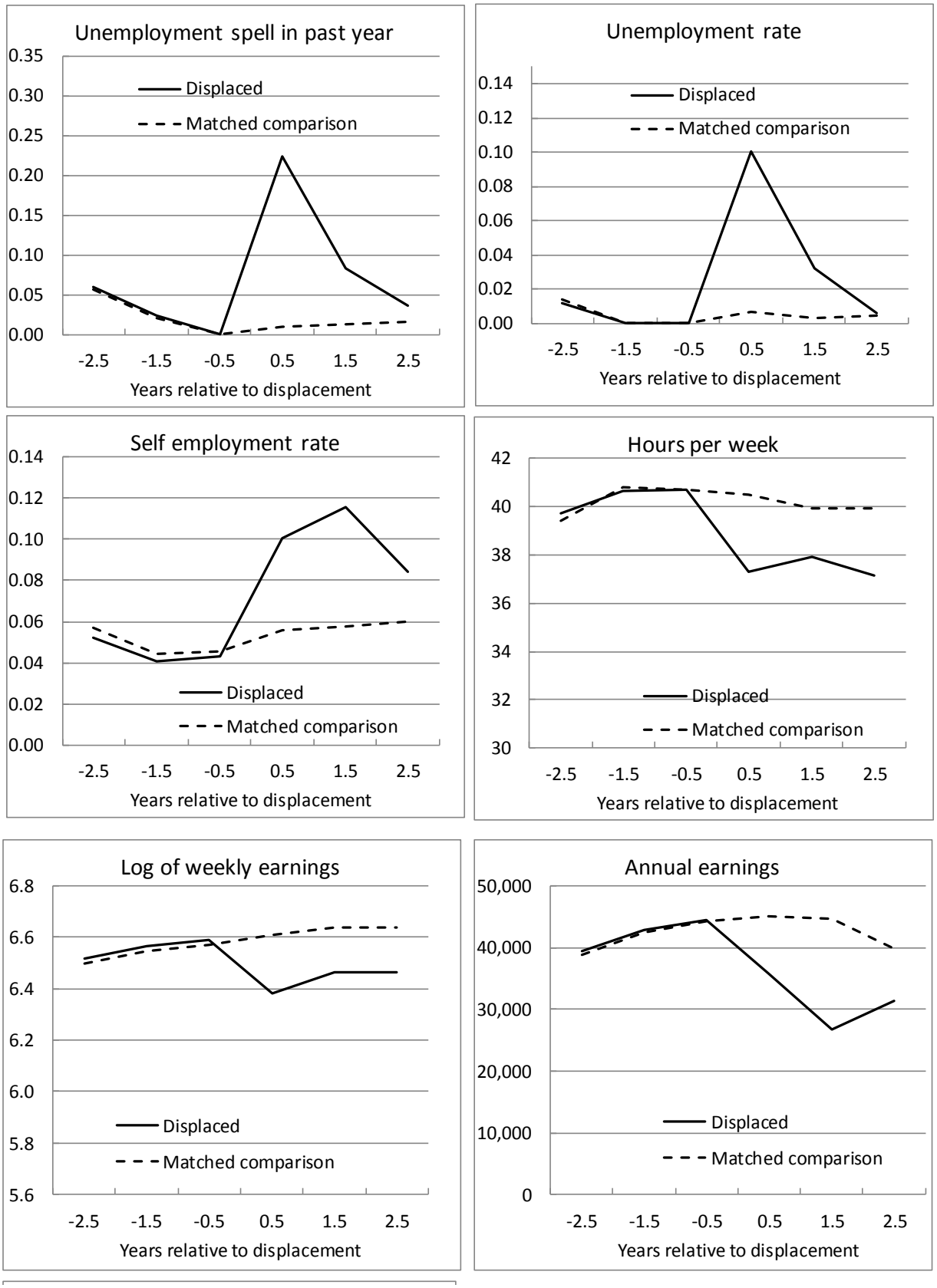
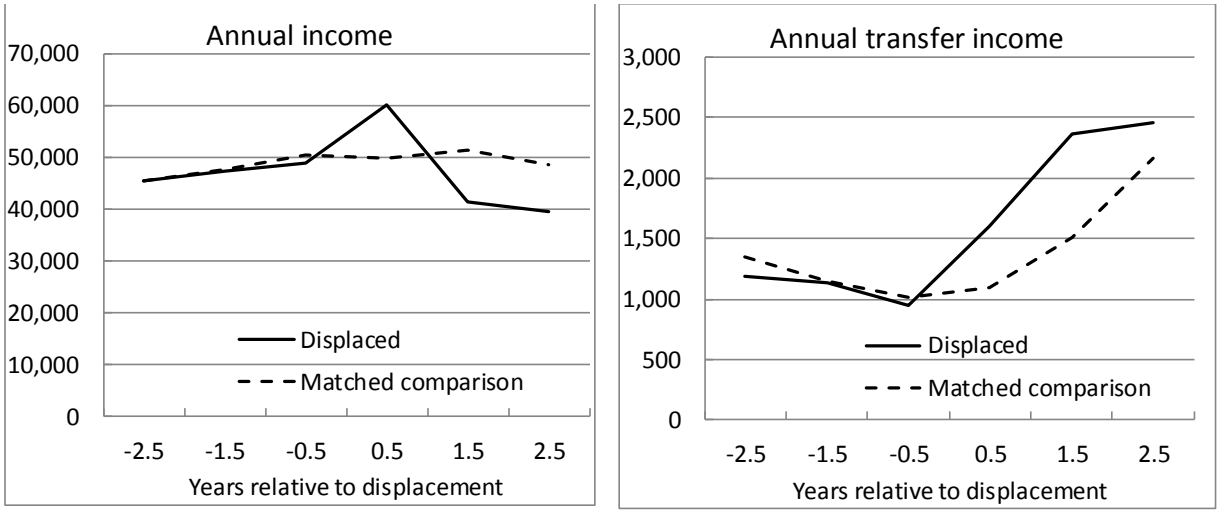


Figure 3 continued: Other labour market impacts



Notes: Earnings and incomes are expressed in March 2007 dollar values. The measures of hours per week and weekly earnings are restricted to people with waged or salaried employment and positive earnings. In contrast, the measures of annual earnings, annual income and annual transfer income include people with zero incomes.