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No youth left behind?

The long-term impact of displacement on young workers

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Abstract

We investigate short- and long-term impacts on labour market outcomes of experiencing a displacement for young workers. The period under study is 2000–2009. The end of the observation period is characterised by a shrinking labour market, coinciding with the start of the financial crisis. The main merit of the study is the inclusion of a wide battery of dependent variables. In general we find sizeable short-term effect on both unemployment and wage-employment. Furthermore, the results indicate that displacement has a long-term negative effect on wage employment. Part of this pattern seems to be masked by an increased likelihood of self-employment. A positive effect on self-employment is desirable from a policy perspective. Finally, among those who are employed in the final observation year, we find a small negative effect of displacement on hourly wages. This is solely explained by the foregone work experience of the displaced workers in the years after displacement.

JEL classification: J64, J65, C23

Keywords: Unemployment, youth, displacement, scarring

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I. INTRODUCTION

The births and deaths of enterprises are necessary to a well-functioning modern economy and are a prerequisite for allocating resources from low-productive to high-productive units. However, plant closures and downsizing do not come without costs, and the consequences for those exposed might be severe and long lasting.

The main question we ask in this paper is the following: How important are negative labour demand shocks experienced at a young age for future marginalisation? Furthermore, do young workers who experience negative shocks react by seeking alternative options like education or self-employment.? Using employer-employee data from Norway we shed light on the impact of displacement on a wide set of outcomes.

The youth unemployment rate is consistently higher compared to the general rate of unemployment (OECD, 2011). Do negative labour demand shocks experienced at a young age contribute to this gap? Furthermore, during the last decade, the proportion of young people on disability pension has increased considerably in Norway. During the period of analysis, which is from 2001 to 2009, the number of individuals under 30 who are on disability increased by approximately 30 per cent (NAV, 2011). This development led to considerable concern as well as recognition of the need to better understand the mechanisms behind this increase. Possible explanations relate to the relevance of environmental and personal experiences early in childhood, school difficulties and mechanisms in the school-to-work transition. In this paper, we focus on the last of these three and examine the consequence of experiencing negative labour demand shocks at the beginning of one's career.

Experiencing displacement potentially leads to unemployment and periods spent out of the labour market. Theories focusing on human capital accumulation predict that periods spent out of the labour market lead to loss of both general and firm-specific human capital, which in turn may have a negative impact on future career development. Furthermore,

signalling theory, as discussed in Farber and Gibbons (1996), emphasises that observable characteristics, such as education, carry only partial information about productive ability. Potential employers also learn from observed actions on the part of the worker. Having experienced a displacement, for instance, may be regarded as a negative signal to future employers.

However, knowledge on the long-term consequences of displacement for young workers is still scant. More research is necessary for several reasons. First, displacement may be the first stage prior to more absorbing states in the welfare system, such as disability pension. Second, youth is a period of high wage growth in a person's career; hence, interruptions in the form of unemployment can have long-term consequences. Third, we need more research incorporating the heterogeneity of outcomes for this group of workers. Compared to older persons, young people are more heterogeneous with respect to their attachment to the labour market. Youth is also a vulnerable period of trial and error; many experience difficulties when it comes to finding their place both in the labour market and in society. The main contribution of this paper is that we include a wide set of different outcome variables, capturing different potential effects of displacement that are especially relevant when focussing on young workers, such as labour market outcomes, as well as outcomes on the fringe and outside of the labour market. Outcomes in the labour market include employment (both employment and self-employment), wages and unemployment. Outcomes outside the labour market are education include health-related outcomes such as sick leave, rehabilitation, and disability, as well as periods on social assistance.

We use high-quality employer-employee register data for the period 2000 to 2009. From this data set we select all workers in the age range of 20 to 28 and then divide the sample into displaced and non-displaced workers. We designate displaced workers as those who worked in a firm that existed in 2001 and which ceased to exist or reduced its number of

workers by at least 30 per cent over the course of 2002. This sample is then linked to individual registers with information on past individual labour market experience, education, demographic characteristic, as well as to registers covering characteristics of the workplace. We follow these individuals until the end of 2009. The methodology used is well established in the empirical studies of the impacts of displacement (Jacobsen et al., 1993; Couch et al., 2010; Huttunen et al., 2011). We use both OLS and OLS-fixed effect models.

The paper proceeds as follows: The next section presents a review of the relevant literature; Section 3 presents the data, variables, and sample; Section 4 presents the methodological approach; Section 5 presents the results; and Section 6 concludes the paper.

II. RELATED LITERATURE

Our paper relates to two strands of literature—the displacement literature and the scarring literature. In recent years, we have seen an increasing interest in analysing the impacts of plant closure on several outcomes, such as future employment and earnings (Ruhm, 1991; Huttunen et al., 2011; Eliasson and Storrie, 2006), child outcomes (Rege et al., 2011), disability (Rege et al., 2009), and death (Eliasson and Storrie, 2009). Studies focussing on the impact of displacement on youth are few; however, Kletzer and Fairlie (2003) use US data to estimate the long-term costs of job displacement for young adults from 19 to 36 years old. Earnings and wage losses were found to be large during the first three years after displacement. After three years, however, the shortfall in annual earnings (relative to what would have been expected without job loss) was 9% for men and 12.5% for women. Gregg (2001) does not focus on displacement but uses UK data to examine the cumulated experience of youth unemployment. The results show strong evidence of structural dependence induced by early unemployment experience, for men, but only minor persistence for women.

The scarring literature is concerned with the future consequences of negative labour market experiences. Interruptions in employment will lead to loss in current income but may also have long-term effects through the increased likelihood of unemployment in the future (Arulampalam et al. 2000; Arulampalam 2001). Arulampalam (2001) uses data from the UK and finds that unemployment is accompanied by a wage penalty of approximately 14 per cent three years later, compared to what they would have earned in the absence of unemployment. Gregory and Jukes (2001) also use UK data and analyse wage scarring—i.e., the effects of unemployment on subsequent wages—for a representative sample of British men during the 1984–94 period. The incidence of unemployment is found to have only a temporary effect—an average earnings setback of 10% on initial re-engagement largely eroding over two years. By contrast, they find the effect of unemployment duration to be permanent—a one-year spell adding a wage penalty of 10 percentage points. Such wage penalties are smallest for young low paid men—who are most at risk of unemployment—and largest for prime age and highly paid men.

III. THE NORWEGIAN CONTEXT

Compared to other OECD countries, the rules and regulations in Norway provide a great deal of security to employees (OECD, 2004). The Norwegian labour market is generally characterised as having a large proportion of permanent jobs. In addition, the centralised wage setting system produces a compressed wage structure, especially at the bottom, creating high *de facto* wage floors in the labour market. In such settings, it may be challenging for newcomers to the labour market to compete for available jobs openings, particularly those with little education.

The unemployment insurance system covers all workers, conditional on having had wage earnings the previous year equivalent to the amount a full-time industrial worker earns

in two months. For those entitled to unemployment benefits, the compensation rate is 62.4 per cent of previous earnings up to a ceiling. The unemployment insurance (UI) system has undergone a number of changes since the late 1990s in that both entitlement requirements have increased and maximum duration has been reduced.

Youth unemployment in Norway is low compared to most other advanced economies (OECD, 2008), yet young people are particularly vulnerable with an unemployment rate that is up to three times higher than for prime-age citizens in times of low economic activity. Figure 1 presents the development in youth unemployment for men (left) and women (right) in the period under study (2000–2009) for three age groups (below 20, 20–24 and 25–29 years). The general patterns in the figures show that the period under study is characterised by changing business cycles. The level of unemployment rose sharply for the two oldest groups when the labour market was developing poorly in the 2001–2003 period. Thereafter, and until the start of the Great Recession, the level of unemployment fell sharply only to rise again towards the end of the decade, as shown in Figure 1. This change in levels is greater for the two oldest age groups and is mostly because most individuals below age 20 are enrolled in ordinary education. The effects of business cycles are also stronger on men than on women, because men are overrepresented in some industries such as manufacturing, that are more sensitive to changes in business cycles. Such patterns warrant separate analyses for men and women.

[Figure 1 about here]

Since 1979, Norway has had a so-called ‘youth guarantee’ for those in the 16–19 age group. Youth aged 20–24 have also been entitled to the ‘youth guarantee’ in the period 1995–1998 and again since 2009. The intention of the ‘youth guarantee’ has been to ease the school into work transition by means of increased guidance and the provision of feasible active labour

market programmes (ALMPs) for unemployed youth. The purpose of these programmes is not only to increase the chances of obtaining an ordinary job, but also to increase the chances of engaging in ordinary education. In the period from 1993 to 2003 close to half of registered unemployed youth between 20 and 24 years old participated in ALMP. Training programmes (classroom courses) and vocational programmes (a combination of on-the-job and off-the-job training) were the most extensive. Employment programmes (basically wage subsidies) appear to be the most successful, relative to both other programmes and non-participation (Hardoy, 2005).

IV. DATA

1. Data and variables

The database consists of several individual registers covering information on employment, unemployment, income, social welfare, demographics, etc., which are administered and merged by Statistics Norway. From this database, we draw a sample consisting of all men and women aged 19–28 years who were working full-time by the end of 2001. The data have a panel structure, making it possible to follow individuals over time with regard to their transitions into and out of the labour market and welfare arrangements. The data also have time-varying information on wages, unemployment, and welfare payments. Moreover, access to a unique identifier makes it possible to link individuals to the plants where they worked and hence to characteristics of the workplace. The period of observation is 2000–2009, which means that we follow individuals from two years prior to an eventual displacement to seven years after the displacement.

2. Definition of displacement

The database, which consists of all young men and women employed and working full-time by December 31st, 2001, is divided into two groups: displaced and non-displaced. Workers

separating from plants that either closed down or reduced their number of employees by 30 per cent or more over the course of 2002 are defined as displaced. We also require that plants that closed down did not reappear in the following year. Furthermore, we require the plants to have been registered with at least five employees at the end of 2001. To avoid potential contamination from very short-lived plants, we also require the plant to have existed by December 31st, 2000. Hence a plant that closed down between 2001 and 2002 must have existed in 2000 and cannot have reappeared in 2003. This is our target group, i.e., the group about which we wish to make inferences. In line with many other studies in this field, we choose a calendar year as the time window during which displacement can occur.

3. Sample

The starting point is all young men and women registered as full-time workers by the end of 2001. Over the course of 2002, they either experience a displacement or they do not. For this group, we include two pre-years (2000, 2001), one displacement year (2002), and seven post years (2003–2009); this amounts to a total of ten years. Furthermore, we omit youth who were registered in an ongoing education in October 2001. In addition, we put limitations on the employment and unemployment experience of persons in the sample. Concretely, we require workers to have been employed for at least 100 days during the year following the potential time of displacement¹ and we require the duration of an eventual unemployment spell the preceding year to not have been for longer than a month at the most. We make these somewhat strict rules in order to ensure that the group of youth on which we focus has ‘something to lose’ with respect to job loss.

¹ Analysis of displaced workers often operates with two or three years of preceding work experience; however, since we are dealing with young people, such a restriction would leave us with a very select sample of youth, which would be inappropriate for our purpose.

4. *Dependent variables*

To capture the wide set of possible transitions relevant to youth, we investigate seven outcome variables in total. The first is *unemployment*, assuming the value of 1 if the individual is registered as unemployed—either openly unemployed or participating in an ordinary active labour market programme—and 0 if otherwise. The second dependent variable is *employment*, assuming the value of 1 if the individual is registered as a wage earner, and 0 if otherwise. The third variable, measures whether the individual is currently undertaking *regular education*, also using a dummy variable. Based on these three dependent variables, for which we have annual observations, we also construct an aggregate dependent variable called NEUE, which assumes the value 1 if the individual is neither unemployed nor employed or in education, and 0 if otherwise. The fourth dependent variable is an aggregate of three health-related variables covering *sick leave*, *rehabilitation measures*, and *disability pension*. Sick leave refers to a physician-certified long-term sick leave of 17 days or more. Medical rehabilitation benefits are offered to persons who have been in long-term sick leave and are in need of further medical treatment and rehabilitation to be able manage everyday activities. If employment is not resumed after one year of sick leave and one year on medical rehabilitation, then the person engages in vocational rehabilitation, which has an average duration of about two years. Disability pension is the next step if, after four or five years on these arrangements, the person is still unable to resume work. This health-related variable is also constructed as a dummy variable, taking the value 1 if the individual is engaged in at least one of the above three measures, and 0 if otherwise. The fifth dependent variable is *social assistance*, which is a means-tested economic support arrangement that ensures that everyone has the necessary means for a decent living. This is also constructed as a dummy variable. The sixth dependent variable is a measure of *self-employment*, taking the value 1 if the individual is self-employed and has an annual income above approximately €10,000, and

0 if otherwise. The seventh and final dependent variable is *hourly wages*, which is calculated based on information about total wage earning, working time, and employment duration.²

Note that the seven different outcome variables are not mutually exclusive. The requirement for being in any one category is simply having been in that category over the course of the year. Hence, we carry out separate analyses for the different outcomes, allowing individuals to be registered in more than one outcome in the course of any one year.

5. Explanatory variables

The key explanatory variables are dummy variables measuring the years before and after the displacement, as presented in equation (1). In addition, we include a set of explanatory variables: individual characteristics of age, work experience, seniority, immigrant status, educational attainment, number of children under the age of 6, and number of children under the age of 11.

Work experience is based on register information and measures the number of years the worker has had a labour income above the minimum requirement of the Norwegian social security system (which was approximately €7,500 annually in 2005). Seniority is measured in years with the employer in the last year prior to the time of displacement. Completed level of education is measured by five dummy variables: compulsory school, secondary education, low-level college or university degree, high level college or university degree, and unknown education. Immigrant status is measured by two dummy variables—Western immigrants and non-Western immigrants.³

² Working time is measured weekly in three categories: full-time (30 hours or more), long part-time (15–29 hours), and short part-time (4–14 hours). In the construction of hourly wage, full-time is given weight 1, long part-time weight 2/3, and short part-time weight 1/3. Duration of employment is measured in number of days.

³ Non-Western immigrants include foreign workers with two foreign-born parents in the following regions: Asia (including Turkey), Africa, South America, and Central and Eastern European countries. Western immigrants are then defined as the remaining foreign workers with two foreign-born parents.

Regional characteristics include the unemployment rate at the county level (19 counties in all) and county of residence. Lastly, we include information on industry (12 dummy variables). All explanatory variables, except the local unemployment rate, are measured at the last pre-displacement year. Local unemployment rate is measured as an annual time-varying variable.

V. METHOD

Our approach is well known in the empirical literature that analyses the impacts of displacement (Jacobsen et al., 1993; Couch et al., 2010; Huttunen et al., 2011). The method is inspired by methods used in the programme evaluation literature (see e.g., Heckman and Robb, 1985; LaLonde, 1986). The effect of the displacement on future labour market outcomes is given by the following equation. We estimate both OLS and OLS-fixed affect variants of (1).

$$Y_{it} = X_{it}\alpha_1 + \sum_{j=-2}^7 D_{it-j}\alpha_2 + \alpha_i + \tau_t + \varepsilon_{it} \quad (1)$$

where Y_{it} is the outcome measure for individual i at time t (one of the seven outcome variables mentioned in the previous section). X is a vector of observable individual characteristics, regional characteristics, and characteristics of the plant. τ_t accounts for year dummies capturing trends in the economy. The fixed effect α_i captures time-invariant unobserved individual fixed effects and ε_{it} is a stochastic error term assumed to have a constant variance and to be uncorrelated across individuals and time.

Define $t-j = 2002$ as the time displacement takes place. Further define t as the observation year, where $t = 2000, \dots, 2009$ and allow j to take the values $-2, -1, 0, \dots, 7$ indicating that displacement can affect labour market outcomes from two years before its occurrence to seven years after its occurrence. The main variables of interest are the displacement variables

D_{it-j} . These are dummy variables measuring the impact of displacement at time $t-j$ on the dependent variable at time t . The parameter α_2 captures the impact of displacement before, during, and after the event occurs. In the fixed effect estimations, we include only regional unemployment as a control variable (in addition to time dummies and the variables measuring the impact of displacement).

VI. RESULTS

First, Table 1 presents some descriptive statistics, separately for men and women and for displaced and non-displaced workers.

[Table 1 about here]

The average age of our target group is 25 years with an average five to six years of work experience and seniority of about two years. About 95 per cent are Norwegian born, fewer than one in five have children, and an even smaller proportion is married. With respect to education, the pattern is similar for the employed population at large—more women than men go on to higher education after completing secondary school while men have a higher proportion with secondary education or less compared to women. Some differences between the displaced and non-displaced workers are worth mentioning. The displaced workers have slightly less work experience and seniority and a somewhat larger proportion is in the lowest educational category (compulsory school). However, all in all, we regard the differences between the displaced and non-displaced workers as small, which is reassuring considering the setup that we put forward.

1. The impact of displacement on different outcomes

Table 2 presents the results of the impact of displacement on different outcomes, for men (upper half) and women (lower half). The different outcomes are employment,

unemployment, education, and one aggregate measure of them: ‘not in employment, unemployment or education’ (NEUE). All outcome variables are measured as dummy variables (explained in detail in section 3). We present OLS and OLS individual fixed effects. In the OLS estimations, we include the full set of controls. In the OLS-fixed effect we include only the time-varying control variable of the local unemployment rate. We present results only for the core explanatory variables, but other results can be made available on request.

We start by commenting on the OLS results for men. The first column shows that the pre-displacement difference in unemployment between displaced and non-displaced workers is small, increasing to approximately 13 percentage points in the first post-displacement year. This effect can be compared to the average share unemployed non-displaced workers in the last pre-displacement year. Considering that only 1.5 per cent of the non-displaced workers were registered as unemployed in the last year preceding the displacement year, this short term effect is very large in relative terms. However, the displaced workers recover fairly well in the years that follow and by the end of the observation period, there is a small and non-significant gap between displaced and non-displaced workers. This suggests that the effect of negative demand shocks wears off, even if the last part of the observation period includes the years 2008 and 2009, characterized by low labour demand. However, the fall in the unemployment rate does not necessarily imply that they have resolved their labour market situation. These figures may mask participation in welfare programmes or non-registered unemployment, for example.

The second column shows that displaced workers receive an immediate negative impact on employment equal to approximately 21 percentage points, representing a reduction of approximately 25 per cent compared to the non-displaced workers, which is a sizeable short-term effect. The employment gap narrows throughout the post-displacement years, with

the exception of the last year (2009), indicating that when the labour market was developing less favourably at the end of the observation period the employment gap stopped narrowing.

[Table 2 about here]

Results in the third column suggest that an alternative for displaced workers is to invest more in education. In the first post-displacement year, displaced workers have a 2.5 percentage points higher probability of being a student compared to non-displaced workers. Compared to the mean level of education for non-displaced workers in the first post-year, this represents an increase of approximately 65 per cent. The positive gap disappears towards the end of the observation, suggesting that investing in education is an option that displaced workers choose in the first four to five years after displacement.

Finally, in the fourth column, we look at the so-called NEUE measure. We construct a dummy equal to 1 if the individual is neither unemployed, nor employed, or in education. Naturally, we find a positive gap between displaced and non-displaced workers. The immediate, short-term effect is estimated to 11 percentage points. Compared to the average NEUE measure for non-displaced workers, equal to approximately 5 per cent in the first post year, this is a sizeable short term effect. The gap is reduced in the years that follow but is still equal to 2.5 percentage points by the end of the observation period. In the next section, we investigate the role of health-related outcomes, social assistance, or self-employment in explaining the remaining gap.

The individual fixed-effect results are very similar. The fixed-effect specification measures effects relative to the outcome two years before the displacement, which is why this dummy variable is removed to avoid perfect collinearity. For example, the OLS estimate for unemployment suggests that there is a small positive difference equal to 0.005. This corresponds approximately to the difference between the OLS and fixed-effect estimates.

The lower half presents the results for women. For women, we also find an initial unemployment effect that is reduced over time and is insignificant by the last year of observation. The immediate unemployment reduction (estimated to 8.3 percentage points) is somewhat smaller compared to men. Still, considering that the average unemployed share among non-displaced women in the last year preceding displacement is 1.3 per cent, it is a quite sizable short term effect measured in relative terms. Furthermore, it is noteworthy that, in contrast to men, the displaced women experience a stable reduction in the employment gap throughout the observation period, including the last two years characterized by a labour market that was developing less favourably. This result is in accordance with a gender-segregated labour market in which men are overrepresented in industries that are more exposed to variations in business cycles. The next model shows that for women, as for men, one short-term effect of displacement is to choose education. The estimates are comparable in size to those for men. Finally, the NEUE estimates show a relatively large short-term effect, which is reduced over time, but is still significant and positive in the last year of observation. The last four models show the fixed-effect estimates. The results for the men are quite similar to those of the OLS. Since the fixed-effect specification measures effects relative to the outcome two years before the displacement, and these are positive in the OLS specification, the NEUE estimates in the last two years are not significant.

2. Explanations of the unexplained gap

The results presented above indicate that the unemployment effect of displacement wears off but the employment estimates and the NEUE estimates suggest an unexplained gap. In this section, we look more closely at this question by analysing three other possible outcomes: i) health-related benefits (an aggregate of sick leave, rehabilitation, and disability), ii) social assistance, and iii) self-employment. Table 3 presents the results, separately for men and

women. Because the OLS- and fixed estimates present quite similar results, we present only the OLS results.

The first column show an immediate increase in the likelihood of being on health related benefits for men, equal to 0.007 percentage points. A difference of 0.007 percentage points represents a relative difference equal to approximately 75 per cent. Still, the year preceding the displacement there is also a significant difference, although somewhat smaller; equal to 0.004 percentage points. Towards the end of the observation period the effect picks up somewhat. One possible explanation for the last pattern is the financial crises starting in 2008. The results for the health variable for women show a slight immediate increase in the likelihood of being on health related benefits. The increase seems to start already in 2001, i.e., in the year preceding the displacement. The effects stabilises in the years following the displacement, with some of the years being non-significant, and by the end of the observation period it is reduced somewhat and it is no longer significant.

The second column shows a short-term effect of displacement for young workers on the likelihood of receiving social assistance of 5.4 percentage points in the first year after displacement. This represents an increase of approximately 130 per cent compared to the mean proportion of non-displaced workers who were registered as receiving social assistance in 2001 (4.1 per cent).⁴ The results show that the difference between displaced and non-displaced workers is only significant in the first two to three years after displacement.

[Table 3 about here]

Finally, the third column shows results of whether displacement leads to an increased probability of self-employment and find that this is, in fact, the case - especially for men.⁵ In the first post-displacement year, displaced workers have a 1.4 percentage points higher

⁴ Social assistance is means tested and is intended as a last resort over short periods of time for individuals who are in acute need of financial assistance.

⁵ We lack information on self-employment in the last year of observation (2009).

likelihood of being self-employed compared to non-displaced workers, which represents an increase of approximately 140 per cent. This difference increases by 2.5 percentage points the following year and is sustained throughout the observation period. These results suggest that self-employment is one relevant employment option for displaced workers, especially for men.⁶ One interpretation of this result is that self-employment may be a feasible opportunity for displaced workers who are striving to find work. Hence, the transition to self-employment contributes to explain the unexplained gap in post-displacement outcomes, as shown in Table 2.⁷

3. Mechanisms and explanations

In this section, we focus on two types of mechanisms that may shed light on the previous results. First, we look at the distinction between downsizing and plant closure. Second, we compare the results for low and highly skilled workers.

One concern is the potential bias in estimated effects caused by the unobserved selection of workers, which is more likely to be prevalent in the case of plant downsizing than plant closures when all workers are made redundant. Therefore, in this section, we split the displacement variable into two: plant closure and downsizing. Plant closure refers to workers separating from plants that close down, while downsizing refers to those workers who are employed at a plant that reduces its number of employees by 30 per cent or more.

Table 4 presents descriptive statistics for the two displacement groups, for men on the left and women on the right. Workers who undergo downsizing are somewhat younger, somewhat less experienced, have slightly less seniority (only men), and have somewhat lower education. However, we consider these differences to be modest.

⁶ See for example van Praag and Van Ophemmm (1995) for U.S evidence on the determinants of being self-employed.

⁷ In general, the share of women in Norway that are self-employed is very low, approximately 3 per cent (Rønsen 2012).

[Table 4 about here]

The results of the regression analyses are shown in Figures 5.1 and 5.2, for men and women respectively. The stripped line shows the impact on unemployment over time and the straight line shows the impact on employment. Since the OLS and fixed-effect results were quite similar, we choose to limit the presentation to the OLS results.

[Figure 2 about here]

The results for men (Figure 2) suggest that workers who undergo a downsizing experience a stronger employment reduction in the short term compared to those who undergo a plant closure. This difference is, however, reduced and eliminated in the following years. Regarding unemployment, we find no significant differences. The short-term difference in employment may support the hypothesis that those who are downsized are a more select group of workers who have unobserved characteristics that are negatively correlated to employment. However, this effect is only transitory. With respect to women, we also find a stronger negative short-term employment effect for displaced workers. In contrast to men, we find an opposite effect with regard to unemployment, i.e., those who are displaced experience a less negative unemployment effect in the short term. This finding is in line with a hypothesis that those who are downsized are less likely to register as unemployed in the aftermath of a displacement because fewer of them are eligible for unemployment benefits. They consider their employment opportunities (in the short term) slim or they choose to withdraw from the labour market, for example to invest in education.

[Figure 3 about here]

To investigate the differences in the impacts of displacement according to skill group, we split education into two categories: low education (completed secondary school at the most) and high education (university or college degree). Table 5 presents the results from OLS regressions, for men in the upper half and women in the lower half (OLS-fixed effects were nearly the same). For each gender and level of education, we present results for four dependent variables: unemployed, employed, education, and self-employed.

[Table 5. about here]

The unemployment effect of displacement on the men is stronger among low-skilled than it is among highly skilled workers. For the low-skilled workers, the immediate negative unemployment effect is 9.4 percentage points, compared to 5.9 percentage points for the highly skilled workers. The difference is sustained in the following years but disappears towards the end of the observation window. The results for the employment effect also show that the low-skilled workers are more severely hit by displacement to begin with than the highly skilled workers, 22 and 17 percentage points, respectively. The difference between low skilled and highly skilled is sustained in the years that follow and, in contrast to unemployment, the difference is also present in the long run. The next column shows that both low-skilled and highly skilled displaced workers are more likely to be enrolled in education compared to non-displaced workers. Therefore, differences in education cannot explain the discrepancy in employment. However, the likelihood of becoming self-employed, shown in the fourth column, can help to explain the observed pattern; low-skilled displaced workers are more likely to be self-employed compared to non-displaced low-skilled workers, while this is not the case for highly skilled workers.⁸

⁸ We have also undertaken an analysis in which we have included health-related variables. The effects were generally small and not significant for both genders and both skill levels. Therefore, we choose not to present these results.

The lower half of Table 5 presents the results for the women, which, with some exceptions, resembles those for the men. The unemployment and employment effects are generally milder on highly skilled women but the pattern is less clear when it is compared to the men. In the short term, displaced low-skilled women experience larger positive unemployment effects and larger negative employment effects compared to displaced highly skilled workers. Towards the end of the observation period, however, highly skilled displaced women experience larger negative employment effects compared to low-skilled displaced women. One possible interpretation of this pattern is that women generally have a less stable attachment to the labour market than men do, because of absence due to childbirth and child rearing, for example. Highly skilled women are generally older when they give birth compared to low-skilled women (reference category). The results for education, on the other hand, are much clearer: low-skilled displaced women are more likely to enter education in the period after displacement, compared to non-displaced women. No similar pattern is found for highly skilled women. Finally, with regard to self-employment, we generally find small and no significant effects for both displaced and non-displaced female workers.

4. Impact on wages

The results presented above have shown that displacement has considerable short-term effects on employment, but its long-term effects are moderate. Moreover, even if most displaced workers have returned to work by the end of the observation period, many of them have experienced periods out of the labour market. Time spent out of the labour market means loss of both firm-specific and general human capital, which may be a cause of slower wage development.

In this final section, we analyse whether displacement has any long-lasting effects on wage-earning capacity. We concentrate on individuals who are registered with a positive

wage in the final year of observation (2009). Since we now focus on the last year of observation, the regression model differs from the estimations based on equation (1). The dependent variable is the log of hourly wages in 2009. Hourly wage is constructed based on information related to working time (full-time, long part-time, and short part-time) and number of days employed. The key explanatory variable is a dummy variable measuring whether or not the individual experienced a displacement in 2001 or not. As control variables, we include the same battery of pre-determined variables as in the previous sections. The only explanatory variable for 2009 is the measure of the local unemployment rate. We estimate two models for men and two models for women, the results of which are presented in Table 6. In the second model, we include an aggregate measure of the number of months the individual has been unemployed in the 2002–2008 period (omitting the measure of unemployment in 2009), with the intention of capturing potential negative effects of displacement on future earnings due to shorter work experience in the intermediate period. The mean duration of unemployment in the 2002–2008 period is 3.1 months for those who experienced a displacement in 2001, and 1.5 months for those who did not experience a displacement.

[Table 6]

In Model 1 the results for men show that experiencing a displacement in 2001 reduces annual wages in 2009 by approximately 1.5 per cent (significant at 10 per cent). This suggests that experiencing a displacement has a rather moderate long-term effect on wage capacity. Furthermore, the wage effect disappears as soon as we control for months of unemployment in the 2002–2008 period, suggesting that the loss of work experience due to periods outside the labour market explains the results of Model 1. The lower level of work experience of displaced workers appears to put them at some disadvantage compared to non-displaced workers with respect to future earning capacity. This appears to be a rather strong result

considering the rather low mean levels of unemployment experienced by both groups in the intermediate period. The results for women reveal that displacement has a similar long-term effect on future earning capacity, but the effect is not significant. Similarly to the results for men, we find that the length of unemployment has a negative effect on future wage earnings.

VII. CONCLUSIONS

Using high-quality register data for the period from 2000 to 2009, we analyse the long-term consequences of displacement for young workers. Our main sample comprises working men and women in the 20–28 age range who were displaced between 2001 and 2002. The main contribution of the paper is that we investigate the impact of displacement on a wide set of outcome variables that are especially relevant for young workers, from employment (both wage employment and self-employment), unemployment and education to health-related and other welfare benefits. We also include an analysis capturing the potential wage effects of displacement.

We find that young displaced workers experience a sharp short-term increase in unemployment following a displacement. However, the recovery rate is rapid and good and, by the end of the observation period, the unemployment gap is closed. This result applies to both men and women. Nevertheless, the declining unemployment gap does not necessarily mean that displaced workers have returned to work. Such findings could, for instance, mask transitions to states outside the labour market. Some young workers are not eligible for unemployment benefits and, therefore, have lower incentives to register as unemployed. An initial indication of this is the finding that experiencing a displacement reduces employment in both the short and long run. In addition, results indicate that when it comes to employment prospects low-skilled workers fare worse after a displacement, compared to highly skilled workers. Furthermore, the fact that the negative impact on employment does not disappear

suggests the likelihood of an increase in other competing states. To investigate this further, we investigate three additional outcomes: health-related benefits, social assistance, and self-employment. We find some, but relatively small effects on the likelihood of experiencing a transition to health-related benefits. The effects are most visible for men. However, there is a positive short-term effect on social assistance. The results also indicate that some displaced low-skilled workers choose to become entrepreneurs after displacement, suggesting that self-employment cannot be overseen in discussions of the overall impact of negative demand shocks. Moreover, findings are potentially good news for policy makers in that the fall in employment does not seem to coincide with large transitions to potentially absorbing health-related benefits, but rather to self-employment.

Even if most displaced workers return to work by the end of the observation period, many of them have undergone periods out of the labour market. Time out of the labour market means loss of valuable human capital, which may result in lower wage capacity in the future. In the final analysis, we assess whether displacement has any long-lasting effects on hourly wages. We find that experiencing a displacement in 2001 reduces the hourly wage in the last year of observation (2009) by approximately 1.5 per cent. This moderate reduction is fully explained by the foregone work experience of the displaced workers in the intermediate period.

A final question is whether our results can be generalised to other countries. We think they can, but mainly to countries that share some features with the Norwegian economy, such as a relatively compressed wage structure, large and coordinated wage settlement agreements, and a comprehensive set of rules and regulations governing the labour market. Lastly, the results need also be understood within a context where the state has the financial resources and the willingness to smooth business cycles through stimulation policies and active labour

market policies. Norway shares these features with several of the other Nordic and Northern European countries.

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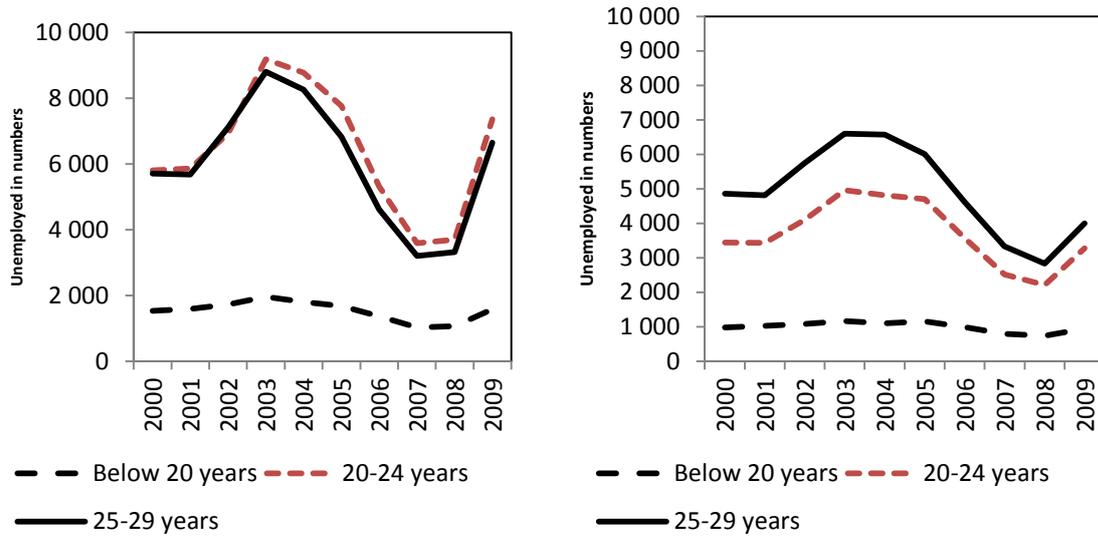
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Figure 1. Youth unemployment for men (left) and women (right), 2000–2009



Source: Official statistics from the Norwegian Labour and Welfare Administration (NAV).

Figure 2. Impact of plant closure and downsizing on unemployment and employment. Men. OLS estimates.

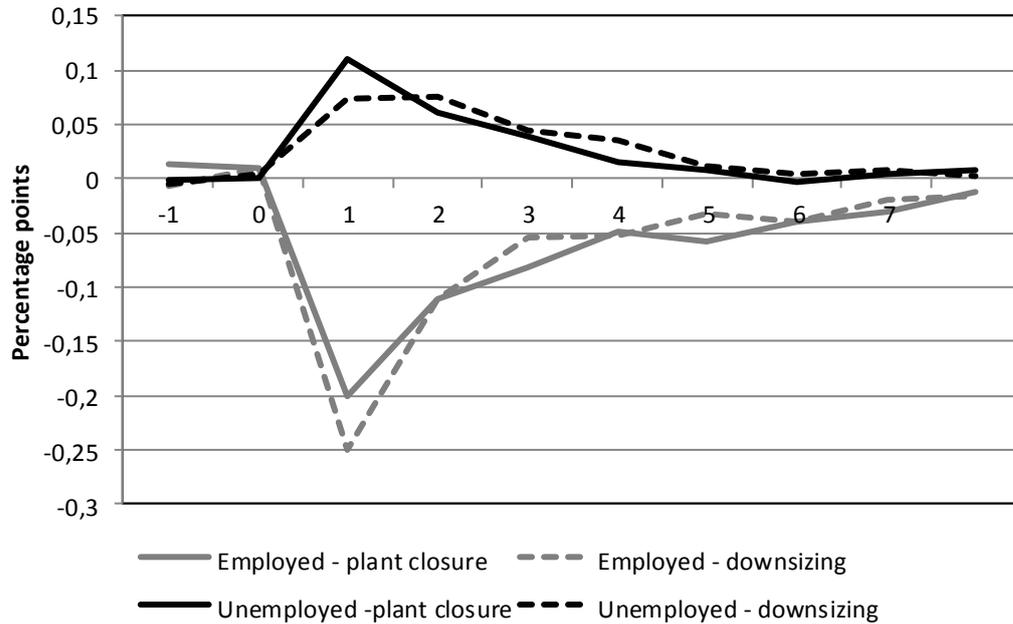


Figure 3. Impact of plant closure and downsizing on unemployment and employment. Women. OLS estimates



Table 1. Descriptive statistics for displaced and non-displaced workers aged 20–28, by gender. Mean values

	Men		Women	
	Non-Displaced	Displaced	Non-Displaced	Displaced
Age (years)	25.2	25.1	25.4	25.1
Work experience (years)	6.1	5.9	5.7	5.5
Seniority (years)	2.4	2.0	1.9	1.7
Non-Western (share)	0.03	0.03	0.03	0.03
Western (share)	0.01	0.01	0.02	0.02
Children younger than 6 (share)	0.19	0.17	0.20	0.20
Children younger than 11 (share)	0.23	0.21	0.24	0.24
Married (share)	0.18	0.11	0.18	0.17
Compulsory school (share)	0.17	0.18	0.13	0.16
Secondary school (share)	0.64	0.62	0.47	0.53
College/University low level (share)	0.15	0.17	0.36	0.27
College/University high level (share)	0.03	0.03	0.03	0.03
Unknown education (share)	0.005	0.005	0.008	0.01
Local unemployment level (%)	2.8	2.8	2.9	2.9
N	562244	43851	318491	24686

Table 2. Impact of displacement over time on different outcomes (unemployed, employed, in education or NEUE). Men (above) and women (below). OLS and OLS-fixed effect estimates.

Men								
Time	OLS				OLS-FE			
	Unemploy ed	Employed	In education	NEUE	Unemploy ed	Employed	In education	NEUE
-2	0.005** (0.002)	-0.008** (0.003)	0.004 (0.005)	0.005 (0.003)				
-1	0.010*** (0.002)	0.004*** (0.001)	-0.003 (0.007)	-0.002 (0.003)	0.005* (0.003)	0.011*** (0.001)	-0.007 (0.004)	-0.006** (0.003)
0	0.131*** (0.006)	-0.212*** (0.006)	0.025*** (0.004)	0.111*** (0.005)	0.126*** (0.006)	-0.205*** (0.007)	0.021*** (0.006)	0.106*** (0.006)
1	0.088*** (0.006)	-0.101*** (0.006)	0.027*** (0.004)	0.039*** (0.004)	0.082*** (0.006)	-0.093*** (0.007)	0.024*** (0.006)	0.034*** (0.005)
2	0.054*** (0.005)	-0.078*** (0.006)	0.024*** (0.004)	0.035*** (0.005)	0.049*** (0.006)	-0.071*** (0.007)	0.020*** (0.006)	0.030*** (0.005)
3	0.033*** (0.005)	-0.059*** (0.006)	0.015*** (0.004)	0.037*** (0.005)	0.028*** (0.005)	-0.052*** (0.007)	0.011* (0.006)	0.032*** (0.006)
4	0.013*** (0.004)	-0.047*** (0.006)	0.013*** (0.004)	0.037*** (0.005)	0.010** (0.004)	-0.040*** (0.007)	0.009 (0.006)	0.032*** (0.006)
5	0.012*** (0.003)	-0.044*** (0.006)	0.002 (0.003)	0.037 (0.005)	0.008** (0.004)	-0.036*** (0.007)	-0.001 (0.005)	0.032*** (0.006)
6	0.012*** (0.003)	-0.031*** (0.006)	0.001 (0.003)	0.024*** (0.005)	0.006* (0.003)	-0.023*** (0.007)	-0.002 (0.005)	0.020*** (0.006)
7	0.007 (0.004)	-0.031*** (0.006)	0.003 (0.003)	0.025** (0.005)	0.001 (0.004)	-0.024*** (0.006)	-0.002 (0.005)	0.019*** (0.006)
R ² -adj.	0.042	0.050	0.055	0.034	0.025	0.034	0.020	0.020
N	606095	606095	606095	606095	606095	606095	606095	606095
Women								
Time	OLS				OLS-FE			
	Unemploy ed	Employed	In education	NEUE	Unemploy ed	Employed	In education	NEUE
-2	-0.004 (0.003)	0.001 (0.005)	-0.007 (0.006)	0.008 (0.005)				
-1	-0.001 (0.003)	0.010*** (0.001)	-0.001*** (0.007)	-0.002 (0.005)	0.004 (0.004)	0.009* (0.005)	0.005 (0.006)	-0.009** (0.004)
0	0.083*** (0.007)	-0.239*** (0.009)	0.024*** (0.004)	0.158*** (0.009)	0.087*** (0.007)	-0.239*** (0.010)	0.032*** (0.008)	0.150*** (0.009)
1	0.072*** (0.007)	-0.107*** (0.009)	0.026*** (0.006)	0.036*** (0.007)	0.075*** (0.007)	-0.107*** (0.010)	0.035*** (0.008)	0.027*** (0.008)
2	0.043*** (0.007)	-0.063*** (0.009)	0.030*** (0.007)	0.012* (0.005)	0.047*** (0.007)	-0.062*** (0.009)	0.039*** (0.008)	0.004 (0.008)
3	0.029*** (0.007)	-0.052*** (0.009)	0.021*** (0.006)	0.015*** (0.007)	0.033*** (0.007)	-0.052*** (0.010)	0.030*** (0.008)	0.007 (0.008)
4	0.010* (0.006)	-0.040*** (0.009)	0.015*** (0.007)	0.024*** (0.008)	0.014** (0.007)	-0.039*** (0.009)	0.024*** (0.008)	0.016* (0.009)
5	0.002 (0.006)	-0.034*** (0.009)	0.011* (0.007)	0.022*** (0.008)	0.006 (0.005)	-0.033*** (0.009)	0.020** (0.008)	0.014 (0.009)
6	0.007 (0.005)	-0.022*** (0.009)	0.001 (0.007)	0.016** (0.008)	0.012** (0.005)	-0.022*** (0.009)	0.009 (0.008)	0.007 (0.009)
7	0.005 (0.005)	-0.015*** (0.006)	0.005 (0.007)	0.014** (0.008)	0.008 (0.004)	-0.016* (0.009)	0.011 (0.009)	0.006 (0.009)
R ² -adj.	0.054	0.042	0.034	0.032	0.020	0.054	0.020	0.035
N	343177	343177	343177	343177	343177	343177	343177	343177

Note: In the OLS, we also control for work experience (and experience squared), age (and age squared), immigrant category (Western immigrant, non-Western immigrant), seniority (and seniority squared), number of children under 6 years, level of education (5 dummy variables), local unemployment rate, industry (12 dummy variables, county (19 counties), and year dummies. In the OLS-fixed effect, we control for local unemployment rate. Level of significance: *** 1 per cent, ** 5 per cent, * 10 per cent.

Table 3. Impact of displacement over time on different outcomes (health related benefits, social assistance and self-employment . Men (left) and women (right). OLS estimates

Time	Men			Women		
	Health related	Social assistance	Self-employed	Health related	Social assistance	Self-employed
-2	0.002* (0.001)	0.001 (0.009)	0.003** (0.001)	0.003 (0.002)	0.024* (0.014)	0.001 (0.001)
-1	0.004** (0.002)	0.011 (0.008)	0.006*** (0.002)	0.007*** (0.002)	0.022* (0.013)	0.001 (0.001)
0	0.007*** (0.002)	0.054*** (0.011)	0.014*** (0.002)	0.008*** (0.003)	0.057*** (0.017)	0.005*** (0.002)
1	0.005** (0.002)	0.038*** (0.012)	0.021*** (0.004)	0.006* (0.003)	0.043*** (0.015)	0.003 (0.002)
2	0.002 (0.002)	0.013 (0.011)	0.025*** (0.004)	0.007** (0.003)	0.036** (0.015)	0.005** (0.002)
3	0.003 (0.002)	0.022* (0.011)	0.018*** (0.004)	0.005 (0.003)	0.029** (0.015)	0.006** (0.003)
4	0.003 (0.002)	0.036*** (0.012)	0.017*** (0.004)	0.004 (0.004)	0.008 (0.012)	0.007*** (0.003)
5	0.005** (0.002)	0.012 (0.011)	0.013 (0.003)	0.007* (0.004)	0.008 (0.012)	0.004 (0.003)
6	0.004* (0.002)	0.016 (0.011)	0.015*** (0.003)	0.007* (0.004)	0.012 (0.012)	0.005 (0.003)
7	0.005** (0.002)	0.010 (0.011)		0.004 (0.004)	0.001 (0.012)	
R ² -adj.	0.068	0.042	0.055	0.039	0.042	0.024
N	606095	606095	606095	343177	343177	343177

Note: In the OLS, we also control for work experience (and experience squared), age (and age squared), immigrant category (Western immigrant, non-Western immigrant), seniority (and seniority squared), number of children under 6 years, level of education (5 dummy variables), local unemployment rate, industry (12 dummy variables, county (19 counties), and year dummies. Level of significance: *** 1 per cent, ** 5 per cent, * 10 per cent.

Table 4. Descriptive statistics for worker in plants who experience downsizing and plant closure. Men and women. Mean values

	Men		Women	
	Downsizing	Plant closure	Downsizing	Plant closure
Age (years)	25.1	25.1	25.0	25.3
Work experience (years)	5.8	6.1	5.4	5.6
Seniority (years)	1.9	2.1	1.7	1.7
Non-Western (share)	0.03	0.03	0.03	0.04
Western (share)	0.01	0.01	0.02	0.01
Children younger than 6 (share)	0.16	0.17	0.19	0.20
Children younger than 11 (share)	0.20	0.21	0.24	0.24
Married (share)	0.11	0.12	0.17	0.19
Compulsory school (share)	0.17	0.18	0.16	0.16
Secondary school (share)	0.61	0.64	0.52	0.53
College/University low level (share)	0.18	0.14	0.27	0.26
College/University high level (share)	0.03	0.03	0.03	0.04
Unknown education (share)	0.01	0.01	0.01	0.01
Local unemployment level (%)	2.8	2.8	2.9	2.8
N	28858	14993	17642	7044

Table 5. Impact of displacement over time among low and highly skilled workers on different outcomes (unemployed, employed in education, and self-employed). Men (above) and women (below). OLS estimates

Men								
Time	Low skilled				Highly skilled			
	Unemploy ed	Employed	In education	Self- employed	Unemploy ed	Employed	In education	Self- employed
-2	0.005** (0.002)	-0.006* (0.003)	0.005 (0.005)	0.004 (0.002)	0.004 (0.004)	-0.006 (0.007)	-0.006 (0.012)	-0.001 (0.002)
-1	0.011*** (0.003)	0.006*** (0.007)	-0.005 (0.008)	0.007 (0.002)	0.005 (0.004)	0.004 (0.010)	0.002 (0.002)	0.002 (0.003)
0	0.140*** (0.007)	-0.223*** (0.007)	0.024*** (0.004)	0.016*** (0.002)	0.095*** (0.011)	-0.172*** (0.012)	0.022* (0.011)	0.007 (0.004)
1	0.099*** (0.007)	-0.108*** (0.007)	0.028*** (0.005)	0.024*** (0.004)	0.041*** (0.009)	-0.062*** (0.012)	0.019* (0.011)	0.006 (0.005)
2	0.058*** (0.006)	-0.086*** (0.007)	0.027*** (0.004)	0.028*** (0.004)	0.034*** (0.009)	-0.045*** (0.012)	0.010 (0.010)	0.010* (0.006)
3	0.035*** (0.007)	-0.064*** (0.007)	0.013*** (0.004)	0.021*** (0.004)	0.017** (0.007)	-0.041*** (0.012)	0.022** (0.010)	0.009 (0.006)
4	0.016*** (0.004)	-0.051*** (0.007)	0.011*** (0.004)	0.020*** (0.004)	-0.001 (0.007)	-0.026** (0.011)	0.018* (0.009)	0.009 (0.006)
5	0.014*** (0.004)	-0.046*** (0.006)	0.001 (0.004)	0.016*** (0.004)	0.001 (0.007)	-0.025** (0.011)	0.015* (0.009)	0.003 (0.007)
6	0.014*** (0.003)	-0.037*** (0.007)	0.002 (0.004)	0.018*** (0.004)	0.001 (0.004)	-0.011 (0.012)	-0.002 (0.008)	0.007 (0.004)
7	0.007 (0.004)	-0.035*** (0.007)	0.005 (0.004)		0.006 (0.005)	-0.013 (0.011)	-0.008 (0.008)	
R ² -adj.	0.041	0.046	0.052	0.020	0.022	0.030	0.050	0.010
N	495247	495247	495247	495247	105836	105836	105836	105836
Women								
Time	Low skilled				Highly skilled			
	Unemploy ed	Employed	In education	Self- employed	Unemploy ed	Employed	In education	Self- employed
-2	0.001 (0.003)	-0.002 (0.006)	0.002 (0.007)	0.001 (0.001)	0.002 (0.003)	-0.008 (0.008)	-0.010 (0.013)	-0.001 (0.001)
-1	0.003 (0.004)	0.009 (0.006)	-0.008 (0.005)	-0.001 (0.001)	0.002 (0.005)	0.002 (0.001)	0.004 (0.010)	0.002 (0.003)
0	0.094*** (0.009)	-0.253*** (0.012)	0.032*** (0.007)	0.003 (0.002)	0.059*** (0.010)	-0.207*** (0.017)	0.004 (0.011)	0.007* (0.004)
1	0.075*** (0.009)	-0.117*** (0.011)	0.029*** (0.007)	0.001 (0.002)	0.055*** (0.011)	-0.075*** (0.016)	0.017 (0.012)	0.007* (0.004)
2	0.047*** (0.009)	-0.072*** (0.012)	0.040*** (0.008)	0.003 (0.003)	0.022*** (0.009)	-0.025* (0.015)	0.002 (0.017)	0.009* (0.005)
3	0.026*** (0.009)	-0.062*** (0.012)	0.024*** (0.008)	0.001 (0.003)	0.027*** (0.009)	-0.016 (0.015)	0.005 (0.011)	0.004 (0.004)
4	0.008 (0.008)	-0.052*** (0.012)	0.016** (0.008)	0.003 (0.003)	0.013 (0.008)	-0.010 (0.015)	0.006 (0.011)	0.007 (0.004)
5	0.004 (0.008)	-0.027** (0.011)	0.016** (0.008)	0.004 (0.003)	0.001 (0.009)	-0.049*** (0.016)	-0.004 (0.011)	0.003 (0.005)
6	0.009 (0.006)	-0.020* (0.012)	0.002 (0.008)	0.007* (0.004)	0.008 (0.009)	-0.025* (0.015)	-0.004 (0.009)	-0.001 (0.004)
7	0.001 (0.007)	-0.026** (0.011)	0.005 (0.008)		0.005 (0.006)	0.013 (0.015)	-0.001 (0.010)	
R ² -adj.	0.035	0.062	0.044	0.011	0.012	0.033	0.033	0.012
N	208186	208186	208186	208186	131882	131882	131882	131882

Note: In the OLS, we also control for work experience (and experience squared), age (and age squared), immigrant category (Western immigrant, non-Western immigrant), seniority (and seniority squared), number of children under 6 years, level of education (5 dummy variables), local unemployment rate, industry (12 dummy variables, county (19 counties), and year dummies. Level of significance: *** 1 per cent, ** 5 per cent, * 10 per cent.

Table 6. Impact of displacement on wages. Men and women. Dependent variable: log hourly wage in 2009. OLS estimates.

	Men		Women	
	Model 1	Model 2	Model 1	Model 2
Displaced	-0.015*	0.001	-0.016	-0.007
	(0.008)	(0.015)	(0.015)	(0.015)
Months - unemployed 2002–2008		-0.011*** (0.006)		-0.010*** (0.001)
R ² -adj.	0.121	0.128	0.101	0.106
N	52563	52563	27661	27661

Note: We also control for experience (and experience squared), age (and age squared), immigrant category (Western immigrant, non-Western immigrant), seniority (and seniority squared), number of children under 6 years, level of education (5 dummy variables), local unemployment rate, industry (12 dummy variables, county (19 counties), and year dummies. Level of significance: *** 1 per cent, ** 5 per cent, * 10 per cent.