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Paul Bingley,* Lorenzo Cappellari† and Marco Ovidi‡

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Abstract

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JEL Classification: J14, J26, J65, H55.

Keywords: Unemployment, workplace closure, senior workers.

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We study the labour market dynamics for older workers following job loss. By examining the unique challenges displaced senior employees face, including prolonged unemployment, substantial financial losses, and negative health outcomes, we shed light on an important socioeconomic issue in ageing societies. Studying these careers contributes to developing more effective age-inclusive employment policies and practices, ultimately promoting economic stability and well-being for an increasingly vital workforce segment. Understanding and addressing these issues is crucial as populations age and traditional career trajectories evolve, ensuring that older workers can maintain their economic contributions and quality of life in the face of job displacement.

Several studies have examined career paths following job loss in the general population. To illustrate relevant findings, we gather a selection of studies into three groups relating to how employment and earnings consequences vary with the nature of the displacing workplace, the financial consequences of displacement, and the variation in outcomes by age at displacement.

Three studies use matched employer-employee data to decompose the earnings losses following job displacement into firm- and worker-specific components. Estimating earnings losses following displacement in the US, Jung and Kuhn (2019) find that over 85 percent stem from losing a particularly good job at the top of the job ladder. A Dislocated Worker Program—retraining and placement support—to this population if found ineffective in mitigating these earnings losses. Analysing the earnings of displaced workers in Washington State of the US, Lachowska, Mas and Woodbury (2020) find earnings losses are mostly due to reduced hourly wages immediately falling and recovering only slowly. Decomposing wage losses, most are due to regaining employment at firms that pay similar wages on average but in a lower-paying role. Loss of firm-specific human capital (the value of the worker-firm match) explains about half of wage losses.

Using displacements in Germany, Fackler, Muler and Stegmaier (2021) decompose earnings losses into worker- and firm-specific losses, finding losses of firm-specific wage premia explain the largest share of displacement earnings penalties, driven by displacements from large firms. While these studies do not find a role for worker heterogeneity in explaining earnings losses, losing a firm size premium

may be important, and much of the earnings loss is due to destroyed high-quality worker-firm matches. Hence, those displaced from large firms and those with long tenure on the job are found to suffer greatest earnings losses.

Three studies analyse the effects of job loss on household finances. Analysing unemployment spells of different durations in Portugal, Bravo and Herce (2022) finds long-run effects on retirement income and standard of living as pensioners. Impacts of job loss on working careers extend into retirement due to earnings-related contributory pension schemes. Simulations show that the timing of unemployment effects can amplify pension wealth losses, and policies such as minimum pension provisions, pension credits and other pension scheme redistributive features can partially mitigate the impact of unemployment periods on future entitlements.

Analysing the effects of unemployment in Norway, Fagereng, Onshuus and Torstensen (2024) find average lasting income reductions, accompanied by a decrease in (imputed) consumption of about half of the income loss. Those with greater liquid assets at the outset experience less of a decline in consumption, whereas those with higher debt levels encounter a more substantial decrease. Among households with larger initial liquid asset holdings, those with substantial debts experience a greater consumption decline.

Using observed expenditure data, Andersen et al. (2023*a*) find that of the income loss Danish households experience following job loss, liquid financial balances reduce by 50 percent of the income fall and expenditure by 30 percent of their income loss. The remainder is accounted for by mortgage refinancing and consumer credit. Job loss has profound and lasting effects on household finances, impacting retirement income, consumption patterns, and overall financial stability, with the severity of these effects influenced by factors such as unemployment duration, initial asset holdings, debt levels, and access to various financial coping mechanisms.

Three studies focus on differences in job loss effects by age at displacement. Analysing the employment prospects of Austrian workers displaced by workplace closure, Ichino et al. (2017) finds similar employment effects by age in the long run. However, older age groups face greater employment reduction in the short run before quickly recovering. Effects of workplace closure on wages do not differ by age. Studying firm closures due to bankruptcy among Dutch workers, Dee-

len, Graaf-Zijl and van den Berge (2018) find reduced employment and wages on re-employment, especially for seniors compared to middle-aged workers. Among seniors, employment and wage effects are largest for formerly long-tenured workers, those from declining industries and high unemployment regions. Differences are less pronounced among younger displacements.

Evaluating the effect of job displacement due to workplace closures in Norway, Salvanes, Willage and Willén (2024), contrast effects in different life stages—education, mobility, family structure, and retirement. Regarding labour market outcomes, there is a clear pattern of increasing severity and persistence with age. For younger workers under 30, the immediate impact on employment is relatively moderate, with a reduction of about 10 percentage points. These younger workers tend to recover more quickly, with the employment effect diminishing to around two percentage points after four years. In contrast, older workers aged 50 and above experience more severe and lasting consequences. Their immediate employment reduction is substantially larger at approximately 25 percentage points, and unlike their younger counterparts, they show little signs of recovery even after four years. The earnings effects follow a similar trend, with older workers experiencing larger and more persistent negative impacts on their income than younger workers.

While not fitting into the above groupings, three other studies use different identifying assumptions to make significant relevant contributions. In contrast to job loss studies that use workplace closure for identification, Cederlöf (2024) uses discontinuities in the likelihood of displacement generated by a last-in-first-out rule used at layoffs in Sweden. Long-run earnings losses are only found for workers losing their jobs in mass layoffs, whereas workers displaced in smaller layoffs fully recover. Mass layoffs reduce employment, prolong unemployment and cause workers to leave the labour force, likely due to reduced local labour demand.

In an analysis of the heterogeneous effect of displacements due to Swedish workplace closures, Athey et al. (2024) find that older workers in routine-task intensive jobs have the greatest earnings losses. Matching treated with non-displaced controls to establish causation, machine learning is used to uncover heterogeneous treatment effects, revealing that those suffering the largest earnings losses were already on negative earnings trajectories pre-displacement. In contrast, studies of

workplace closure that match on pre-determined characteristics would not allow for differential pre-trends — they would be matched away.

Finally, while not exploiting workplace closure, Frimmel (2021) studies changes in elderly unemployed labour market trajectories in Austria following a reform delaying pensionable age. Although unemployment duration remains unaffected, re-employment chances, earnings and participation in active labour market programmes increase. Elderly unemployed men closer to their early pensionable age are systematically assigned to programs increasing their job application and job search skills, while those more than five years away from eligibility are more likely to participate in training to increase their skills. In this way, the pension reform improved the re-integration of senior unemployed men. Identifying exogenous variation comes from pension benefit reform rather than workplace closure.

Across these studies, job displacement consistently leads to notable and often persistent earnings penalties, largely driven by the loss of high-quality worker-firm matches and firm-specific wage premia, with older and long-tenured workers experiencing especially severe and enduring impacts. Household finances also suffer, as income loss translates into reduced consumption, diminished pension entitlements, and an increased reliance on debt or liquid assets to cope. Nonetheless, factors such as retraining programs, pension reforms, and broader labor market conditions can partially mitigate these negative consequences, and younger workers tend to recover more quickly from displacement. Overall, the severity of job loss outcomes varies by age, layoff scale, initial financial positions, and the nature of the displacing firm, underscoring the variety of challenges facing displaced workers.

The paper proceeds as follows. Section I presents the empirical approach. Section II describes the institutional setting and Section III describes the data construction and selection. Section IV presents our results. We relate our findings to the literature in Section V, and Section VI concludes.

I. Empirical Approach

We estimate job loss impacts through event-study models of workers' outcomes around workplace closures. Using the labour market histories of treatment and

control groups defined in Section III, we estimate:

$$Y_{it} = \theta_0 + \theta_1 T_i + \sum_{l=-6}^{10} \alpha_l T_i \cdot 1[t = t_i^* + 1 + l] + \sum_{l=-6}^{10} \mu_l \cdot 1[t = t_i^* + 1 + l] + \psi_i + \psi_t + \zeta_{it}, \tag{1}$$

where Y_{it} is a labor market outcome of individual i displaced in year t. Time relative to closure is normalized to zero in the closure year ($t_i^* + 1$), and coefficients α_l are estimated relative to $t_i^* - 2$. Estimated models include worker and year dummies (ψ_i and ψ_t, respectively), following the standard approach in the literature on job loss impacts on workers (e.g., Bertheau et al., 2023). Estimates of coefficients α_l depict the dynamic impacts of workplace closure on the labour market trajectory of displaced workers. These coefficients can be interpreted as the causal effects of workplace closure under the assumption that absent workplace closure, the outcomes of treated and control workers would have evolved similarly over time. We focus in Section IV on how these estimates vary by worker's age and, in particular, the characteristics of seniors at job loss.

II. Institutional Setting

Denmark's labour market institutions have undergone significant changes over the past 40 years, with the development of the "flexicurity" model being a key feature. This model, which emerged in the 1990s, combines three main elements: flexible hiring and firing rules, generous unemployment benefits, and active labor market policies. The flexibility aspect allows employers to easily adjust their workforce, while the security component provides income protection for workers through unemployment insurance. Active labor market policies aim to quickly reintegrate unemployed individuals through training, education, and job search assistance (Kreiner and Svarer, 2022).

Collective bargaining has played a crucial role in shaping Danish labour market institutions. Characterized by a high degree of organization among employers and employees, this system has historically set wages and working conditions through negotiations between unions and employer associations. Over the past four decades,

in the private sector there has been a trend towards decentralization of bargaining, allowing for more flexibility at the company level while maintaining sector-wide agreements. This has enabled the adaptation of working conditions to specific needs of industries and firms (Dahl, le Maire and Munch, 2013; Mailand, 2020).

The unemployment insurance system has undergone several reforms since the 1980s. Initially offering very long benefit durations, reforms in the 1990s and 2000s gradually reduced the maximum benefit period from effectively unlimited to two years. Additionally, eligibility criteria have been tightened, and the link between active labour market participation and benefit receipt has been strengthened. These changes aimed to increase work incentives while maintaining a relatively generous safety net (Andersen, 2023).

The pension system has evolved significantly over the sample period, with changes to social security, occupational pensions and private pensions. Old age pension (*folkepension*) was available from age 67, except for 2006-19 when it was from 65, before being raised to 67 gradually again. An early pension program (*efterløn*) was available to individuals with (increasingly long histories of) unemployment insurance fund membership from age 60-67(65) until 2014-20, when the first eligibility age gradually increased to 63. In 1992, eligibility to the Efterløn program was extended to age 55 for individuals who were unemployed for at least 12 out of the last 24 months. This extended program (*overgangsydelse*) was further extended in 1994 to cover the long-term unemployed down to age 50. Entry to Overgangsydelse closed in 1996. Disability pension (*førtidspension*) is available from ages 18 until old age pension eligibility (Bingley et al., 2023).

Defined contribution occupational pensions for white-collar and public-sector workers expanded in the late 1980s to include more of the workforce and were included in all collective bargaining agreements by the mid-1990's. Contribution rates gradually increased to the present levels of 14-17 percent of gross earnings, with an employer:employee contribution ratio of 2:1 (Jarner, Munk and Steffensen, 2022). Individual private pension contributions are tax-advantaged to a limited extent, but their contribution to total pension wealth is overshadowed by collectively bargained occupational pensions (Andersen et al., 2023*b*).

Over the past four decades, Denmark's shift to a flexicurity-based labour mar-

ket—featuring decentralised collective bargaining, tightened unemployment benefits, and significant changes in pension eligibility ages—has impacted unemployed seniors by reducing early retirement pathways, reinforcing active labour market participation requirements, and reshaping the overall income support framework for older jobseekers.

III. Data

We use data from administrative registers of the Danish population. The civil registration system was established in 1968, and every resident in Denmark has been registered with a unique personal identification number. Subsequently, this number has been used in all national registers, enabling accurate linkage (Pedersen, 2011). We utilise information from Statistics Denmark's income register, which accounts for all sources of income (Baadsgaard and Quitzau, 2011), and the labour market database (Petersson, Baadsgaard and Thygesen, 2011).

Continuity of workplace identities (variable *lbnr*, establishments with unique physical addresses) are verified, forming the backbone of the labour market database that allows linking employers to employees (Hansen, 1991). To classify the workplace industry, we use variable *branche1* for the period 1980-2008 and *arb-hoved-bra-db07* from 2009. We recode to 111 persistent industry groups using coding frames *dse77*, *db93* and *db07*. To identify private sector workplaces, we use the (first digit of the) firm identity variable *arbgnr* for the years 1980 to 2008, and use the variable *arb-sektorkode* thereafter. We draw the population of residents from 1980 to 2019, age 25 to 69, who have their main (most income during the year from a) job at a private sector workplace in any year.

Labour market status variables are drawn from the register *IDAP*. Retirement is observed from the type of pension receipt. A week 49 employment census categorises individuals according to their labour market attachment that week and prioritises attachments by income received during the year. From 1980 to 2008, the variable *pstill* and 2009-19, the variables *offpens* and *qeftlon* allow us to distinguish between disability pension and other early pension benefits. For the proportion of the year in unemployment, we use the variable *arledgr* from 1980 to 2009 and

arledgr-netto from 2010. Sickness benefits are recorded as *adagp*.

Though unrelated to labour market status, we use the education variable *hfaudd* from the *IDAP* register. This variable is the highest completed educational qualification, computed by Statistics Denmark as the qualification that takes the longest time to obtain by the shortest route according to Education Ministry norms. We calculate the length of schooling from the number of months associated with the highest completed education using the *pria* coding frame.

Financial variables are drawn from the register *IND*. Pre-tax earnings from work come from the variable *lonind* for 1980-2009 and from *corloen* thereafter. Individual income after transfers and taxes comes from variable *perindkialt* from 1980-2009 and *perindkialt-13* from 2010. For assets, we use variable *qaktivf* for 1980 to 2006, and from 2007, *qaktivf-ny05*. For debts, we use variable *qpassivn* throughout.

A. Workplace Closures

We identify workplace closures and major downsizes following Browning and Heinesen (2012). We track a workplace's owner (firm), industry, municipality, and employees by linking workplace records and job spells. We investigate year-to-year changes in these characteristics between the end of November census dates. We consider a workplace closed if we observe several of these characteristics changing from one year to the next. Importantly, if, despite other changes, a large share of employees is re-employed at a single newly-established workplace, we do not consider such an event a closure. We focus on private-sector workplaces because of the difficulty of identifying distinct public-sector workplaces.

In more detail, we define workplace closures in two steps. First, we consider two consecutive years (t and t + 1), and flag workplaces that belong to firms that do not change in this time interval ("same owner"). We similarly define workplaces where their two-digit industry code does not change ("same industry"), and the municipality does not change ("same municipality") between t and t + 1. Second, we link workplaces to job spells observed in t and t + 1 and calculate the share of employees retained in the same workplace and those employed at a newly established workplace. We repeat this procedure from 1980 and 2017.

Consider workplace-level data in year t. If a workplace with employees in year

t records no employees in year t + 1, it is considered closed. A workplace is *not* considered closed between t and t + 1 if *any* of the following four events is observed: First, the workplace has the same owner and industry in t + 1. Second, the workplace has the same owner and retains at least 30 per cent of base-year employees ("same employees"). Third, the workplace has the same industry and the same employees, or the same municipality and the same employees. Fourth, at least 40 per cent of workers are re-employed at a newly established workplace.

By imposing sample restrictions, we capture only meaningful events. We only consider closures involving a downsize of at least 30 per cent of employees and at least three workers. Moreover, we consider workplaces with at least five employees five years before closing down; a restriction excluding 68 per cent of closures. When a closure is recorded, we define the year of closure based on the employment downsize observed. When multiple years meet the closure definition for the same workplace, we choose the year of maximum employment downsize. Once a unique year of closure is identified for all closing workplaces, we define the event year as the one with the greatest downsize in the three preceding years. This step addresses the possibility that employment downsize starts earlier than closure. The event year is the exact year of closure for 92 per cent of workplaces.

Our procedure identifies 51,002 closures from 1986-2017, around 1,500 per year. As expected, job flows in the closure year suggest that these are disruptive events for workers. Ninety-six percent of employees leave the workplace the following year, compared to three percent at non-closing workplaces. Moreover, 83 percent of workers at closing workplaces leave their firm, and 30 percent do not record any job spells the following year, compared to 30 percent and 15 percent in non-closing workplaces, respectively.

Workplace closures are difficult to anticipate. 83 per cent of closures leave the workplace with no employees, with an average downsize of 18 workers (median 9) in the closure year. In contrast, the median closing workplace has the exact headcount the year before closure as in the previous year. Therefore, closures do not generally involve a gradual, predictable downsizing.

B. Treatment and Control Groups

Once workplace closure is defined, our sample construction proceeds in two steps. First, we select samples of treated and untreated workers. Second, we select one suitable control peer for each treated worker based on gender, birth year, and labour market history. Specifically, we consider employees with stable working histories for the first step. Let t^* indicate the year before workplace closure ("base" year). We select workers aged between 25 and 59 in t^* with at least three years of tenure at the firm, regardless of gender. This selection yields our treatment group of 300,632 workers experiencing one workplace closure between 1986 and 2017. We then consider a pool of potential control workers not exposed to workplace closure using the same criteria as for the treatment group (aged 25-59, with at least three years of tenure at the current firm). Each worker is considered a potential control every year when these conditions are met.

In the second step of sample construction, we select a control group by matching each treated worker with one observationally similar unexposed peer. As a preliminary, we split the sample into cells defined by birth year and gender. Subsequently, for each year and cell, we apply a 1:1 matching algorithm without replacement to select matched controls. We minimize differences in schooling, workplace size, job tenure, earnings in $t^* - 1$ and $t^* - 2$, county of residence and one-digit industry dummies. Our algorithm matches 96 per cent of treated workers, with a final sample of 289,434 observations in the treatment group matched with an observation in the control group.

The characteristics of treated and control workers are strikingly similar, as shown in Table 1 (treated-control differences are displayed in column 5). Our sample is mainly formed by men (62%), reflecting the under-representation of women in the private sector, and this fraction is perfectly balanced across treatment and control workers by design. Labour market outcomes, measured in the base year, are also closely aligned for the two groups. Differences in earnings or income, even when statistically different from zero (p-values of treated-control differences are displayed in column 8), are well below 1% of the control mean.

Treated and control workers have similar tenure, around 7.5 years, and are em-

ployed in workplaces of similar size, around 130 employees. The likelihood of receiving unemployment benefits and their duration are slightly larger for treated workers, perhaps reflecting a higher likelihood of redundancy at closing workplaces in the year before closure. Overall, treated and control workers are observationally very similar. Nonetheless, as explained in Section I, our research design does not rely on the comparability of outcome levels between treated and control workers.

IV. Results

We present our findings from a series of event studies graphically. Each study contrasts the effects of displacement on a specific outcome for different groups. All event studies have the same format, using years to closure as the running variable, ranging from six years pre-displacement to ten years post, with the third year before displacement serving as the reference category. In the first subsection, we contrast displacement effects between (five-year) age groups at displacement from 25 to 59. These studies place senior workers in the broader life-cycle context. In the second subsection, focussing on seniors (age 50-59 at displacement), we contrast effects by characteristics observed pre-displacement. These studies describe the heterogeneity in displacement effects between groups of seniors.

In an event study, it is essential that there are no existing trends or differences in the data prior to the event. The absence of such trends supports the identification assumption that any observed changes in the post-event period can be causally attributed to the event itself. If there are pre-existing trends, these could confound the results, making it difficult to distinguish between the effects of the event and any underlying factors that were already influencing the outcome before the event occurred. The credibility of causal inference relies on the assumption that outcomes would have remained on parallel trajectories in the absence of the event, so confirming there are no discernible trends before the event is crucial to rule out the possibility that observed post-event changes merely reflect an ongoing pattern rather than the true impact of the event itself. All of our event studies match characteristics three years before an event and graph outcomes six years prior to validate the research design.

A. Displacement Effects by Age Group

This subsection considers the effects of job displacement on various outcomes related to the labour market—employment, unemployment, sickness, disability, and retirement—and to personal finances—earnings, income, and wealth—for different age groups. Event studies for each outcome are presented in separate figures, each with two panes. The upper panes show event studies for seven age groups and the grand mean. Lower panes show displacement effects by age group for three different time horizons—one, three, and ten years post-displacement. While the upper panes follow age group effect trajectories around displacement, the lower panes present a subset of these effects to highlight variations between displacements at different life cycle stages. These effects are estimated as differences in outcomes between treated workers and their matched controls, and over time (the matching procedure is described in Section III).

A.1. Employment, Unemployment, Sickness and Retirement

We study displacement effects on employment in Figure 1. The outcome of interest is a binary indicator, taking the value one if we observe any earnings from work during the year and zero otherwise, i.e., an indicator of (at least some) employment during the year. On average, across all age groups (as denoted by the dashed line), in the year after displacement, displaced workers' employment is five percentage points (pp) lower compared to their matched controls. The penalty slowly diminishes, converging to two pp in the long run, i.e. ten years after displacement. This evidence of a strong instantaneous employment penalty followed by a partial long-run recovery is consistent with most evidence in the job loss literature (e.g., Bertheau et al., 2023).

The figure also shows some heterogeneity between age groups. The dynamic pattern of treatment effects has a similar shape, modestly downward shifted (less employment) with higher ages at displacement. However, the immediate employment penalty for those displaced in their late fifties is double that of displacements on average but recovers more quickly in the long run. Indeed, ten years after displacement, employment for those displaced in their late fifties is higher than for

early fifties displacements. A more rapid recovery for the older group is consistent with treated and control observations more likely exiting the labour market, leading to a smaller causal effect than for the slightly younger group.

The lower pane of Figure 1 describes how displacement effects evolve over the life cycle. There are three lines for different post-displacement time horizons, and all curves are downward sloping, meaning that the displacement employment penalties increase with age for any given time horizon post-displacement. While there is little difference in effects between time horizons, the employment penalty slowly increases over the life-cycle, with the greatest incremental employment fall for displacements during their fifties.

Individuals not in employment following displacement may transition to unemployment or leave the labour force. Figures 2 and 3 present event studies for unemployment by looking at the receipt of any unemployment insurance benefits during a year and the duration of the support received. The profiles in the upper panes resemble y-axis mirror images of employment Figure 1. There is an immediate, on average nine pp, increase in receipt of any unemployment benefits. This increased unemployment decays rapidly and becomes insignificant seven years after displacement. While older groups at displacement suffer more immediate unemployment, all groups recover in the long run.

The duration of unemployment in Figure 3 shows a similar pattern to the extensive margin, but peaking in the year after displacement at, on average, four percent of the year unemployed, recovering to become insignificant seven years after displacement. In contrast to the life-cycle employment effects profiles in the lower pane of Figure 1, unemployment profiles differ by time horizon; while unemployment increases with age at displacement, the differences narrow in the years following displacement.

As workers age, depending upon pension benefit rules, labour force exit to retirement becomes more relevant. Figure 4 shows that displacement impacts retirement, with average effects increasing until four years post-displacement before levelling off. Workers displaced in their late fifties have a much greater retirement effect, increasing to six pp four years after displacement, compared to an average of one pp across all age groups. Increased retirement for the oldest group becomes less

pronounced as time elapses, with an effect of two pp in the long run. This reversal is likely due to retirement also becoming common among non-displaced workers over time in the oldest group.

Among retirees, we can distinguish between disability benefit (*førtidpension*) recipients in Figure 5 and other early retirement benefits (*efterløn* and *overgangsydelse*) in Figure 6. While disability benefits are available on health grounds for all age groups, efterløn was available for ages 60-64(66) and overgangsydelse 50-59. Partly, as a consequence of this age-related eligibility difference, the effect of displacement on disability benefits is an order of magnitude smaller than that for other early retirement benefits. Exit to other early retirement benefits for those in their fifties shown in Figure 6 dominates the overall retirement effects presented in Figure 4. Life cycle patterns illustrated in the lower panes of the figures show increasing disability from displacements in their early forties and increasing other early retirement exits from the early fifties.

Job displacement due to plant closure can have significant and long-lasting health effects on workers. These impacts span physical and mental health domains, with some effects persisting for years after the initial job loss (Browning and Heinesen, 2012). Detrimental health effects of displacement might increase sickness benefits payments for workers exposed to workplace closure relative to their non-displaced counterparts. Figure 7 plots the event study estimates using the amount of sickness benefits payments as a measure of the intensity of the health consequences of the shock. A common pattern across age groups is an immediate increase in sickness benefit receipt, followed by a rapid reduction in sickness to half the immediate level after three years. Senior workers do not follow a distinctive pattern of sickness benefit receipt following displacement.

Job displacement leads to an immediate and substantial drop in employment across all age groups, with older workers experiencing a larger initial penalty but quicker partial recovery; unemployment peaks in the first year and then diminishes, older individuals show higher transitions to retirement (especially other early retirement pathways rather than disability), and all age groups exhibit a brief but marked spike in sickness benefits.

A.2. Earnings, Income and Wealth

Figure 8 considers the effect of workplace closure on log earnings, where earnings refer to annual pre-tax income from labour. Logs imply that non-employed workers with zero earnings are not part of the analysis. Therefore, any earnings penalty induced by workplace closure would result from re-employment at lower-paying jobs. On average, across all age groups (as denoted by the dashed line), in the year of displacement, the earnings of displaced workers are ten percent lower compared to their matched controls. This penalty persists in the first year post-displacement but starts diminishing afterwards, converging to five percent in the long run, ten years after displacement. This evidence of a strong instantaneous earning penalty followed by a partial long-run recovery is consistent with most evidence in the job loss literature (e.g., Bertheau et al., 2023). It suggests that displaced workers are either re-employed at lower-paying jobs compared to pre-displacement but then manage to move to higher pay, or that control workers may lose some ground on the pay ladder as time goes by.

The figure also reveals considerable heterogeneity between age groups. While the dynamic profile of treatment effects of all groups under 50 at displacement follows the average profile, the older groups are distinct because their earnings do not recover in the long run. Indeed, there is a further deterioration for the oldest group (aged 55-59 at the time the shock hit them) for seven years after displacement. Hence, older workers' post-displacement labour market trajectories find more obstacles than younger groups, resulting in a greater inability to recover the pre-displacement wage levels. However, the older group's increased long-run penalty should be interpreted with caution because, for them, low-paid employment post-displacement could trigger retirement. The incentive to retire may be heterogeneous within the treated group, inducing selective survival in the labour market among the treated. If the highest paid are more likely to retire, the lowest paid will remain on the labour market, reducing average earnings for those remaining.

The lower pane of Figure 8 offers a snapshot of the treatment effects at given leads by age groups, providing a different perspective on our estimates relative to the upper pane. All curves are downward sloping, meaning that the displacement

earnings penalties increase with age for any given time horizon post-displacement. For all age groups but the oldest two, the long-run penalty is smaller than the medium-term, which is in turn smaller than the short-term penalty. This gradient shrinks as we move towards older age groups, and reverts for the oldest one.

In Figure 9, we consider the effects of displacement on log income, defined as the total individual income from all sources including transfers minus taxes. Because everyone has a positive net income, nobody is excluded from the log income analysis. In terms of magnitudes, the grand mean income fall in the year after displacement is five percent of income (compared to ten percent of earnings), with a gradual recovery to a three percent income loss (five percent earnings loss) ten years out. The most prominent difference compared with the log earnings event study is that the time profile of the displacement penalty is relatively homogeneous between age groups, with the oldest group replacing lost income faster than younger groups. This pattern may reflect retirement transitions occurring among displaced and non-displaced old workers.

Combining information on earnings and employment to calculate total earnings in Figure 10, we impute zero earnings to non-employed individuals. As was the case for log earnings, workers in the oldest age group are the ones displaying the greatest loss right after displacement, of about 50,000 kr. per year. The smallest loss—10,000 kr.—accrues to the youngest group. Of course (and this remark also applies to the log earnings results of Figure 8 1), older workers may lose more simply because they earn more. However, the long-run evolution is distinctively different in that the penalty of the oldest age group is the fastest in converging to zero ten years post-displacement; it is actually as close to zero as for 35-39 year-olds. This rapid convergence is likely due to control workers in the oldest age group leaving employment and transitioning to retirement as time elapses, therefore scoring zero on their outcome variable, converging towards the level observed for treated workers.

To facilitate comparability between the log earnings results, which have a percent change interpretation, and the earnings level results, which are expressed in kr., in Figure 11 we express earnings levels relative to baseline earnings pre-displacement. The earning loss of the oldest age group in the first post-displacement year accounts

for about 15 percent of pre-displacement earnings, a magnitude comparable that estimated from log earnings. Performing a similar transformation for income in Figure 12, the displacement loss relative to pre-displacement is much lower for any age group. For the oldest group, this loss is around six percent in the first post-displacement year; a loss that is more persistent than the earnings loss in the short run but then converges to zero ten years post-displacement.

Job loss is a major shock whose consequences are not necessarily confined to the labour market but may well spread to other aspects of the economic behaviour of individuals and households, such as consumption and savings. Observing job loss penalties on the capacity to accumulate wealth or pay down debt is worrying at any age. For young workers, the inability to repay debts may result in mortgage defaults with major consequences on household welfare. At older ages, the inability to save may result in reduced consumption and welfare after retirement.

Figure 13 displays the causal effects of job loss on assets, which include financial assets, (the tax-assessed value of) real estate but excludes pension wealth. Assets fall by about 20,000 kr. after job loss and continue to fall by about 2,000 kr. annually, reaching a loss of 40,000 kr. ten years post-displacement. There are no differences by age at displacement. A remarkably similar pattern emerges when considering debts in Figure 14. Debts are counted at the end of the calendar year, including mortgages and other loans from financial institutions, credit card debt, student debt, and debts owed to the municipality. An initial reduction in debt of 10,000 kr. after a job loss is followed by reductions of about 1,000 kr. annually until reaching a debt reduction of about 20,000 kr. ten years after displacement. While the debt trajectory is similar to that of assets but of lesser magnitude, debt changes are only significant for displacements after age 44.

Figures 13 and 14 indicate that job displacement may constrain workers' ability to acquire debt, which in turn limits the capacity to invest in assets, such as real estate. In support of this interpretation, Figure 15 shows that net wealth remains relatively constant post-displacement, but this apparent stability masks reduction on both sides of the balance sheet: while diminished assets can lower welfare at any stage of life, restricted access to credit—reflected by lower debt—can likewise adversely affect overall well-being.

B. Heterogeneous Effects Among Displaced Seniors

In the main analyses, we estimated the mean effects of job displacement on various outcomes for different age groups over the next ten years. Contrasting mean effects between these age groups put the displacement of seniors in the broader labour market context. In this subsection, focussing on seniors, we consider heterogeneity in the effect of job displacement for five outcomes – log earnings, total earnings, employment, retirement and disability – along nine margins at baseline – sex, industry, earnings, local unemployment, income, wealth, workplace size, job tenure and schooling. We present event studies in panels with six panes; three panels for each outcome. Panes on the left (right) represent ages 50-54 (55-59). For a given outcome, the first panel splits effects by sex (at the top), industry (in the middle) and earnings (at the bottom); the second panel splits by income (at the top), local unemployment (in the middle) and wealth (at the bottom); the third panel splits by workplace size (at the top), job tenure (in the middle) and schooling (at the bottom). Outcomes are presented sequentially: log earnings (Figures 16-18), employment (Figures 19-21), total earnings (Figures 22-24), retirement (Figures 25-27) and disability (Figures 28-30).

B.1. Log Earnings Effect Heterogeneity

Consider the first panel for the outcome log earnings in Figure 16. The grey dashed lines represent the mean effects on log earnings; effects that differ by age group (the left panes are different to the right) but are identical for each sample split (top, middle and bottom) by construction and are presented for reference. Mean effects are about twice as large for ages 55-59 compared to 50-54 (the panes have different scales). Solid blue lines indicate membership in the category defined in the legend, whereas solid red lines indicate the reference category (everyone else). Conditional on continuing to work, women experience greater earnings losses than men following displacement, persistently losing about 13 pp compared to 11 pp in their early fifties. In their late fifties, women lose about 21 pp compared to 19 pp for men until six years after displacement, where women lose about 30 pp. This increasing sex difference in earnings effects for the older group is likely due to differential exit

from the labour market, where women who remain in work long after displacement are likely less eligible to early pension benefits than men.

Splitting log earnings effects by manufacturing versus other industries in the panes in the middle row of Figure 16 reveals no difference for the five years following displacement. Thereafter, half of the earnings loss is replaced for those displaced from manufacturing in their early fifties, whereas earnings continue to fall for manufacturing displacements in their late fifties. This contrast is consistent with declining manufacturing employment motivating retraining among those displaced with more potential years left on the labour market. Splitting by median earnings pre-displacement, lower earners lose the most in the first year after displacement, but differences immediately disappear for those displaced in their early fifties, whereas an additional two pp earnings penalty persists for late fifties displacements.

The second panel of log earnings outcomes presented in Figure 17 shows that those with above sample median income pre-displacement persistently have about two pp lower earnings conditional on employment than those with below median income. Higher local unemployment at displacement causes greater earnings losses; effects that last five years post-displacement for those displaced in their early fifties but are persistent for those displaced when older. The wealthiest half of the sample pre-displacement lost about two pp more earnings than the least wealthy. Figure 18 presents the final panel of log earnings outcomes. Those displaced from the smallest (half of the sample of closing) workplaces initially lose about five pp more earnings than those displaced from larger workplaces; a difference that increases to about eight pp up to ten years after displacement. High-tenure workers lose about two pp more earnings than low-tenure workers, a differential that is clearest in the early fifties. There are no persistent differences in earnings effects when splitting the sample by median years of schooling.

The patterns in Figure 17 suggest that individual and contextual factors jointly shape earnings trajectories after job displacement among older workers. The finding that individuals with higher pre-displacement income or wealth experience persistently greater earnings losses may reflect, on the one hand, that these workers were in more specialised positions or faced greater wage rigidity, making re-employment

at comparable pay difficult. On the other hand, persistently lower earnings among workers displaced during periods of high local unemployment underscore the role of deteriorating labour market conditions in prolonging scarring effects, especially for those in their mid-fifties and beyond. The larger earnings penalty for workers from smaller firms may indicate limited re-employment networks or fewer transitional support mechanisms in these workplaces, while the heightened losses among high-tenure workers could be tied to skill specificity or higher wage expectations that are not readily matched in new jobs. Interestingly, the absence of significant differences across schooling levels suggests that once workers reach older ages, general educational attainment may offer less protection against the long-run earnings impact of displacement than factors such as tenure, prior earnings, and labour market conditions. It may also be that education is less important for seniors' earnings and employment in the private than the public sector; our analysis only considers displacements from private sector establishments.

The log earnings analyses reveal that pre-displacement income, wealth, and the local unemployment environment can shape older workers' long-run earnings trajectories. Workers with higher incomes or wealth pre-displacement tend to experience larger absolute earnings losses—likely because they have more to lose in the first place—but these effects vary by age at displacement. Workers displaced in their early fifties often see persistent differentials in earnings losses that can extend a decade after job loss, whereas those displaced in their late fifties exhibit a narrowing gap over time. Gender and industry factors (e.g., manufacturing vs. other sectors) also play roles, with men experiencing somewhat greater earnings declines on average and manufacturing job losses occasionally allowing for faster partial earnings recovery, particularly for late-fifties displacements.

B.2. Employment Effect Heterogeneity

The mean effects of displacement in the early fifties on employment are about four pp and about twice as large for displacements in the late fifties. Figures 19-21 consider heterogeneity in these employment effects. Women displaced in their early fifties face a persistent two pp greater employment penalty than men. In contrast, older women initially face a five pp greater employment penalty, but the difference

gradually falls to zero six years following displacement. Those displaced from manufacturing in their early fifties have similar employment outcomes to those displaced from other industries, but those displaced from manufacturing in their late fifties have a two pp smaller employment penalty. High earners in their early fifties at displacement initially only face half the employment reduction compared to pre-displacement low earners, but the differential gradually declines to zero eight years post-displacement. High earners displaced in their late fifties face an initially somewhat lower employment penalty than low earners, but this differential disappears after three years.

Compared to men, the persistent two pp employment gap for women displaced in their early fifties may stem from structural barriers and gendered labour market dynamics—such as occupational segregation or caregiving responsibilities—that remain especially salient in mid-career. The gender difference for this age group could also reflect that women are more likely to leave the labour market via overgangsydelse. By contrast, the initially larger gap for older women that diminishes over six years could indicate that factors such as alternative employment pathways, retirement transitions, or family circumstances become more uniformly constraining for both genders as individuals move closer to retirement age. Regarding industry effects, the smaller employment penalty for those displaced from manufacturing in their late fifties reflects protective factors that deserve further scrutiny. Lastly, the advantages that high earners enjoy in rapidly securing re-employment appear to erode with time, suggesting that while stronger professional networks and more generalizable skill sets can buffer the initial shock, age-related discrimination or skill obsolescence eventually narrows the gap between high and low earners.

Figure 20 shows that employment immediately falls more for those with lower (than sample median) income pre-displacement, a differential that gradually declines to zero seven years post-displacement for those displaced in their early fifties and to zero three years post-displacement when older. Surprisingly, there are no differences in employment effects by local unemployment in the year of displacement. While those wealthier at displacement in their early fifties have a persistent four pp fall in employment, the poorer are initially two pp less employed, but the differential reverses by ten years post-displacement. In contrast, for late fifties dis-

placements, employment reductions for the wealthier are a persistent two pp greater than for the poorer.

The initial, steeper drop in employment among lower-income individuals may reflect their more limited access to buffer resources or networks. Still, the gradual convergence to no difference suggests that lower-income workers may secure new positions or exit the labour force at similar rates in the longer term. Surprisingly, the lack of variation by local unemployment conditions highlights that, for older workers, broader individual or structural factors—such as retirement incentives, workplace age biases, or health constraints—might overshadow local labour market fluctuations. The persistent employment declines for wealthier workers in their early fifties could indicate that more substantial financial buffers enable these individuals to remain out of the labour force longer or select more suitable employment options, as evidenced by the eventual crossover in which poorer workers become relatively more employed. However, in the late fifties, these wealth effects appear to consistently deepen job losses—possibly because higher-wealth older workers have stronger incentives or the ability to retire earlier, foregoing re-employment altogether.

For the final panel of employment effects in Figure 21, we can see that displacements from smaller workplaces cause persistently greater reductions in employment than from larger workplaces. Those with longer tenures have greater reductions in employment than those with shorter tenures. There are no differences in employment effects of displacement when splitting the sample by years of schooling. These results highlight how firm-level factors and tenure exert considerable influence over older workers' post-displacement employment trajectories. The persistently larger employment losses among workers displaced from smaller workplaces could reflect the narrower networking opportunities or fewer resources available to these employees, making transitions to new jobs more challenging. Meanwhile, the greater employment reduction among longer-tenured workers may stem from specialised skill sets, entrenched work routines, or higher wage expectations not easily met by prospective employers. The absence of schooling-related differences suggests that, at later stages of one's career, educational attainment alone does not confer a significant advantage in navigating the labour market after displacement from a

private sector establishment. Instead, a worker's embeddedness in their firm and exposure to broader structural factors appear to play a more pivotal role in shaping longer-term employment outcomes.

Employment rates drop significantly after displacement, but the severity of these drops depends on factors such as firm size, tenure, and individual characteristics. Notably, workers from smaller workplaces and those with longer tenures generally face larger or more persistent employment reductions. Women displaced in their early fifties see an enduring gap in employment relative to men, while older women's employment gap initially peaks but diminishes over several years. Surprisingly, local unemployment conditions at the time of displacement do not consistently alter post-displacement employment patterns, indicating that personal and workplace-specific dynamics may outweigh regional labour market fluctuations for older displaced workers.

B.3. Total Earnings Effect Heterogeneity

The mean effects of displacement on total earnings are about -30,000 kr., with a larger fall and recovery for those displaced in their late fifties. Turning to heterogeneity in these displacement effects in Figures 22-24, we abstract from the effect of conditioning on employment by taking logs of earnings in Figures 16-18. Displacement causes men to persistently lose 10,000 kr. more earnings than women. Earnings losses by industry are initially similar; before the early fifties, manufacturing displacements regain about 10,000 kr. of their earnings losses from six years after displacements, with late fifties manufacturing displacements regaining 10,000 kr. of the loss already three years post-displacement. High pre-displacement earners lose about 20,000 kr. more than low pre-displacement earners, likely because they had more to lose. These relative earnings losses are persistent if displaced in their early fifties, but relative losses gradually shrink to zero if displaced in their late fifties.

These patterns suggest that older workers' absolute earnings losses upon displacement are closely tied to their pre-displacement earnings potential, industry affiliation, and gender. The greater fall and subsequent recovery among late-fifties displacements may reflect a combination of retirement pathways, severance ar-

rangements, or industry-specific re-hiring options that kick in sooner for older groups. The additional 10,000 kr. loss for men could be linked to men's higher average pre-displacement wages, narrower re-employment prospects, or greater specialisation, all of which may amplify the impact of losing a job. Meanwhile, the accelerated recovery among manufacturing workers—especially those in their late fifties—might be driven by firm- or sector-level support mechanisms or a quicker match in similar industries. Although high earners ultimately lose more in absolute terms, their losses remain relatively persistent when displacement occurs in the early fifties. However, they shrink markedly for late-fifties displacements, perhaps owing to the options these workers have for phased retirement or strategic re-entry into the labour market.

The second total earnings effect heterogeneity panel in Figure 23 shows that higher (than the sample median) pre-displacement income causes an immediate 20,000 kr. fall in total earnings relative to lower pre-displacement income. For early fifties displacements, this differential gradually increases to 30,000 kr. ten years after displacement, whereas for late fifties displacements, the differential decreases to 5,000 kr. There are no differences in total earnings effects by local unemployment rate. While there are initially no differences in effects by pre-displacement wealth, total earnings losses for those displaced in their early fifties with below (sample pre-displacement) median wealth gradually recover until ten years out by 15.000 kr. more than those with higher pre-displacement wealth.

The findings from Figure 23 indicate that pre-displacement income and wealth play pivotal yet distinct roles in shaping total earnings outcomes for older displaced workers. The immediate 20,000 kr. loss experienced by higher-income individuals may reflect their greater exposure to earnings shocks due to higher baseline wages. Over time, this gap widens to 30,000 kr. for early fifties displacements, suggesting that more financially established workers might face prolonged barriers to regaining earnings parity—possibly due to specialized skills or higher wage expectations. In contrast, the differential narrows to just 5,000 kr. for late fifties displacements, which may be tied to pre-retirement labour market transitions or alternative income streams that reduce the long-term earnings gulf. Interestingly, local unemployment appears to exert no discernible effect, hinting that individ-

ual characteristics or broader structural factors outweigh short-term regional labour conditions for older workers. Although wealth differences initially do not influence total earnings losses, the eventual stronger recovery among lower-wealth individuals in their early fifties—of about 15,000 kr. more than wealthier counterparts by ten years post-displacement—may reflect a necessity-driven push to return to the labour force or pursue alternative income sources more aggressively.

Figure 24 presents the final panel of total earnings heterogeneity analyses, showing that displacements from smaller (than sample median) workplaces have a persistent 20,000 kr. greater earnings loss than from larger workplaces. Total earnings loss effects are somewhat larger for displacements with longer tenure in the four years post-displacement. Splitting the sample by median schooling, those with longer education initially lose 10,000 kr. more than those with shorter education. The evolution of total earnings effects by education differs depending on age at displacement. For those displaced in their early fifties, the total earnings penalty for longer education gradually increases to 30,000 kr. ten years after displacement, whereas the education differential penalty disappears ten years out for late fifties displacements.

The persistent 20,000 kr. greater earnings loss for those displaced from smaller workplaces may reflect fewer support resources (e.g., less robust severance packages or outplacement services) and narrower re-employment networks. Additionally, longer-tenured workers' relatively larger earnings losses in the four years post-displacement could arise from wage premiums that are not easily replicated in new positions or from more specialised skills that reduce mobility. In terms of education, the initially larger 10,000 kr. drop among the more highly educated likely mirrors their higher earnings baseline. At the same time, the prolonged penalty of up to 30,000 kr. for early fifties displacements suggests that their wage expectations or specialized career paths may hinder a full recovery. Conversely, the disappearance of the education-related penalty for late fifties displacements after a decade indicates that older workers with more schooling either exit the labour force or eventually find roles that eliminate educational disparities in total earnings losses.

Analyses of total earnings, which capture changes in employment and wage adjustments, indicate substantial heterogeneity tied to pre-displacement income,

wealth, and age at displacement. While late-fifties displacements show a larger initial drop in total earnings, they often benefit from relatively quicker partial recoveries, potentially reflecting pathways into partial retirement or short-term bridging arrangements. Higher earners predictably lose more in absolute terms, but the persistence of these losses varies by age: early-fifties high earners face long-lasting wage penalties, whereas high earners in their late fifties experience a narrowing gap over time. Firm size also matters: workers leaving smaller establishments suffer a notably steeper and more enduring total earnings decline than those from larger workplaces. Unexpectedly, workers displaced from large closing firms often fare better than those from small closing firms, but several factors can help explain this outcome. Workers from large firms tend to have broader professional networks, greater visibility in the labour market, and more generalizable human capital, making their skills and experience more attractive to prospective employers.

B.4. Retirement Effect Heterogeneity

Displacement causes, on average, two pp greater retirement for those displaced in their early fifties and four pp for late-fifties displacements, with the effects increasing in time since displacement in the early fifties and increasing until five years out for late-fifties displacements. Considering heterogeneity in displacement effects on retirement in Figures 25-27, we focus on one specific (non-)employment effect of the averages in Figures 19-21. Displacement causes women to be more likely to retire than men. This differential increases to two pp seven years post-displacement for those displaced in their early fifties and four years post-displacement for late fifties displacements. There are no distinctive displacement effects from manufacturing compared to other industries. Low pre-displacement earners are one pp more likely to retire than high earners for displacements in their early fifties. In contrast, there are no differences in retirement effects by pre-displacement earnings for those displaced in their late fifties.

The results in Figure 25 highlight that displacement accelerates retirement, particularly for older individuals and for women. The more pronounced retirement effect among late-fifties workers—rising to four percentage points—suggests that nearing or reaching typical retirement ages makes returning to the labour force less

attractive or more difficult. Women's greater likelihood of retirement, which grows over time, may stem from gendered labour market dynamics, such as caregiving responsibilities or accumulated disadvantages in re-employment prospects. Interestingly, the lack of industry-specific effects, including from manufacturing, implies that structural factors—like age discrimination or pension eligibility—may overwhelm sector-level differences. Qvist, Frendrup and Larsen (2025) show that employers' perceptions of workers aged 60-plus compared to those in their forties are similar across industries. Lastly, the tendency for low pre-displacement earners displaced in their early fifties to retire slightly more than high earners highlights how diminished economic incentives to remain employed can prompt earlier exits from the labour market, an effect that diminishes by the late fifties when retirement becomes a more common pathway for displaced workers generally.

The second retirement effect heterogeneity panel in Figure 26 shows little difference in displacement effects on retirement by pre-displacement income and local unemployment rates. However, if displaced in their late fifties, those with higher (than the sample median) pre-displacement wealth are about three pp more likely to retire than the less wealthy. For those displaced in their early fifties, displacement effects on retirement do not differ by pre-displacement wealth. These findings suggest that individual wealth becomes a decisive factor in retirement decisions only when workers are closer to traditional retirement ages. The minimal differences in retirement outcomes by pre-displacement income or local unemployment rates imply that macroeconomic conditions or baseline earnings alone are not the primary drivers of early labour market exits. Instead, the three-percentage-point higher retirement likelihood among wealthier individuals displaced in their late fifties points to the enabling effect of financial resources, which can facilitate an earlier or more comfortable transition into retirement. In contrast, the absence of wealth-based differentials for those displaced in their early fifties indicates that these workers may lack sufficient financial buffers to retire or have longer time horizons before official retirement eligibility, motivating them to remain in the labour force.

Figure 27 presents the final panel of retirement heterogeneity analyses. On average, those displaced from smaller (than median size closing) workplaces are twice as likely to retire than those displaced from larger workplaces. The differential ef-

fects increase over time since displacement; for those displaced in their early fifties, the differential becomes three pp eight years after displacement, and for those displaced in their late fifties, the differential becomes two pp after four years. Those with longer (than the median) pre-displacement tenure are more likely to retire, with the differential increasing to one pp nine years post-displacement for early fifties displacements and increasing to two pp four years post-displacement for late fifties displacements. There are no differences in the effects of displacement on retirement by level of schooling.

The results from Figure 27 suggest that workplace size and tenure play a critical role in shaping older workers' decisions to retire following displacement, whereas educational attainment appears less influential. The higher retirement rates among those displaced from smaller workplaces could reflect limited opportunities for internal redeployment or re-skilling and weaker safety nets (e.g., outplacement support) relative to larger firms. Over time, the cumulative difficulties of finding comparable positions and the gradual erosion of job-search motivation can propel these workers toward retirement. Similarly, longer-tenured workers may face steeper reemployment barriers due to specialized skills or age-based discrimination, prompting earlier labour force exits. By contrast, the lack of retirement differentials by the level of schooling indicates that formal education offers limited protection against the shifting labour market dynamics experienced by older displaced workers.

Job displacement accelerates retirement for older workers, with effects generally stronger for late-fifties displacements. Gender gaps emerge, as women are more likely than men to retire after losing their jobs, and this difference can persist or even grow several years post-displacement. While industry-specific effects are not particularly pronounced, there is evidence that low earners in their early fifties are slightly more prone to retire early than high earners. Pre-displacement wealth further shapes retirement decisions in later years—wealthier individuals in their late fifties often opt for retirement sooner, hinting that financial security can facilitate an earlier exit from the labour market.

B.5. Disability Effect Heterogeneity

In a final set of heterogeneity analyses, we focus on displacement effects on a binary indicator for disability pension receipt in Figures 28-30. Labour market exit with disability benefits is a subset of the retirement outcomes considered in Figures 25-27, with most of the residual category of retirements via non-health related early pension benefit programmes (efterløn and overgangsydelse). Notice that the magnitudes are small, with disability representing about a quarter of retirement exits among those displaced in their early fifties, and about a tenth for those displaced in their late fifties. Hence, the discussion will focus only on displacements in the early fifties. Women are more likely than men to transition to disability benefits due to displacement, as are individuals displaced from manufacturing compared to other industries. Those with lower (than median pre-displacement) earnings are more likely to receive disability benefits following displacement than higher earners.

Although disability benefits constitute a relatively small fraction of overall retirements—particularly for late-fifties displacements—their disproportionate uptake among lower earners, women, and those coming from manufacturing reveals more profound structural inequities. Lower-earning individuals may be more likely to experience work-related health concerns stemming from physically demanding or precarious jobs, which can expedite transitions to disability benefits. Likewise, sector-specific exposures in manufacturing—such as repetitive tasks, higher accident risk, or toxic work environments—may exacerbate existing health limitations, further increasing the risk of exit via disability pensions. The gender differential could be a product of occupational segregation, caregiving responsibilities, or broader health-related vulnerabilities among women.

The second disability benefit effect heterogeneity panel in Figure 29 shows no differences in displacement effects on disability by pre-displacement income, local unemployment, or wealth. Figure 30 presents a final panel of heterogeneous effects on disability. While there are no differences by workplace size or schooling, individuals with higher (than median pre-displacement) tenure are more likely to receive disability benefits from their fourth-year post-displacement, with the differential increasing over time. These findings indicate that, unlike other retirement

routes, the likelihood of transitioning to disability benefits after displacement is not strongly driven by pre-displacement income levels, local unemployment conditions, or personal wealth. The absence of workplace size or schooling differences suggests that a worker's broader socioeconomic status or educational background does not significantly alter the probability of receiving disability benefits following job loss. Instead, higher pre-displacement tenure emerges as the key differentiating factor: from around four years after displacement, workers with longer tenure are increasingly prone to turning to disability benefits. This pattern may arise from a combination of accumulated health strains associated with long service, the erosion of re-employment prospects as more time passes, or a greater willingness among these workers to transition out of the labour market once faced with job displacement.

Although disability pensions account for a smaller share of post-displacement exits than other retirement pathways—especially for those nearing traditional retirement age—they remain an important subset for early-fifties displacements. Women, lower earners, and those coming from manufacturing are somewhat more likely to transition onto disability benefits, suggesting a role for both occupational hazards and broader labour market disadvantages. High tenure also elevates the risk of eventually moving to disability pensions, possibly reflecting accumulated work-related health issues or barriers to finding suitable re-employment. In contrast, factors such as pre-displacement wealth, local unemployment rate, or workplace size do not consistently predict the use of disability benefits, highlighting the specific, health-related challenges facing particular groups of displaced workers.

Overall, these five heterogeneity analyses highlight that older workers face substantial and varied consequences following job displacement, with specific subgroups bearing greater risks. Workers with higher pre-displacement incomes and wealth typically experience larger absolute earnings declines, though the persistence of these losses differs depending on whether they are displaced in their early or late fifties. Employment outcomes are noticeably worse among those from smaller workplaces, those with longer tenure, and women in their early fifties—while local unemployment rates rarely appear to play a decisive role. Integrating both wage and employment changes, total earnings effects confirm sizable and some-

times persistent reductions for high earners and smaller-firm employees. Retirement patterns reveal accelerated exits, particularly for older and wealthier workers and women; however, low-earning individuals in their early fifties also tend toward earlier retirement. Finally, disability pensions, though accounting for a smaller share of exits overall, are more common among specific subgroups—namely women, lower earners, and those displaced from manufacturing—indicating that health and occupational factors can further compound the challenges of workforce re-entry.

V. Discussion

Our findings align closely with the broader literature showing an age gradient in displacement effects. Yet, they also contribute new insights into how older workers may experience a surprisingly robust partial recovery. Consistent with Ichino et al. (2017), we observe a larger initial employment penalty for older workers who, nonetheless, rebound more quickly than expected, whereas Deelen, Graaf-Zijl and van den Berge (2018) finds that Dutch seniors not only face significant wage and employment penalties but also show more pronounced effects if they are long-tenured and in declining industries. Compared to the Norwegian context studied by Salvanes, Willage and Willén (2024), our results suggest that while older Danish workers experience a notable immediate employment penalty, the persistent adverse effects they face appear somewhat less severe than those reported in Norway.

Our analysis diverges from certain strands of the literature by highlighting heterogeneous recovery rates among older age groups post-displacement. Specifically, while many studies document a sharp and lasting decline in employment for older workers (Gulyas and Pytka, 2025), we observe that individuals displaced in their late fifties partially close the employment gap after roughly a decade, surpassing those displaced at slightly younger ages in long-run employment levels. This pattern likely reflects the interplay of shifting institutional incentives around retirement and the relatively high propensity for displaced and non-displaced older workers to exit the labour force over time, effectively diminishing the estimated causal effect in later years.

Overall, our study underscores that although older workers bear a heavier short-run burden following job displacement, the eventual recovery trajectory can vary depending on country-specific labour market institutions, pension eligibility rules, and broader macroeconomic conditions. By showing that older workers' employment outcomes can, under certain circumstances, converge toward those of slightly younger cohorts, our findings contribute to a more nuanced understanding of how age moderates the consequences of job loss, offering important implications for labour market policies aimed at safeguarding the employability of seniors.

Our results both complement and extend the growing literature on job displacement by highlighting that older displaced workers face persistent earnings penalties while experiencing only partial recovery, in line with studies such as Jung and Kuhn (2019), Lachowska, Mas and Woodbury (2020), and Fackler, Muler and Stegmaier (2021) showing that large earnings losses often arise from the destruction of firm-specific wage premia. Although these previous analyses focus primarily on identifying how much of the wage decline stems from firm- versus worker-specific capital, our findings for Denmark similarly indicate that older workers, in particular, struggle to regain their pre-displacement earnings, consistent with the notion that losing a high-quality match, especially at smaller firms, can have lasting negative effects. Importantly, our evidence that younger workers partially return to near pre-displacement wage levels while older workers remain locked into lower-paying positions resonates with the cross-country results demonstrating sizable heterogeneity in post-displacement wage trajectories.

Our analysis of changes in wealth and debt offers new insights into the broader financial consequences of job loss, dovetailing with evidence on household finances from Andersen et al. (2023*a*), Bravo and Herce (2022), Fagereng, Onshuus and Torstensen (2024), and Maczulskij et al. (2025). Similar to these studies, we observe that workers adjust their balance sheets substantially after displacement; however, in Denmark, net wealth remains relatively stable because of parallel declines in assets and debts. In contrast to contexts where large drops in consumption or inability to meet debt obligations are prominent post-displacement concerns, Danish workers appear to moderate their financial positions through reduced borrowing and reduced asset holdings. Nonetheless, this stability in net worth likely masks

potentially adverse welfare implications, particularly for older workers who may lose the opportunity to invest in real estate or other assets that could bolster their retirement security.

Taken together, our findings underscore the heterogeneous nature of displacement effects. While losing a well-paid firm match can have enduring repercussions for earnings, restricted access to debt and reduced asset accumulation pose significant challenges to financial well-being and future retirement outcomes. In comparing our results with the broader literature, institutional factors—such as Denmark's social safety nets, pension provisions, and credit market structures—play a key role in shaping both short-term and longer-run trajectories. By documenting how older workers fare disproportionately worse in earnings recovery but maintain relatively stable net wealth at the cost of lower assets and lower debt, we contribute to a deeper understanding of how age interacts with labour market shocks to influence long-term financial security.

Our findings broadly align with the existing literature demonstrating how job displacement can result in substantial and persistent earnings losses, particularly for older and long-tenured workers (Davis et al., 2011). In line with Fackler, Muler and Stegmaier (2021), who emphasize the loss of firm-specific premia after displacement, we also observe that individuals with higher pre-displacement earnings and wealth incur greater absolute declines. Notably, however, smaller workplaces can magnify negative employment outcomes, indicating that it is not solely the loss of large-firm wage premia driving displacement penalties. These results suggest that both job and worker characteristics (e.g., tenure, wage profiles, occupational risks) jointly shape the extent of post-displacement adversity, corroborating the general patterns reported by Lachowska, Mas and Woodbury (2020) and Jung and Kuhn (2019), yet underscoring additional heterogeneities—such as gender and workplace size—that can exacerbate or mitigate the earnings and employment trajectories of older workers.

Our analysis also contributes to a growing body of research exploring how job loss reverberates beyond the labour market and into household finance decisions (Bravo and Herce, 2022; Fagereng, Onshuus and Torstensen, 2024; Andersen et al., 2023*a*). Consistent with prior work documenting the retirement accelerations and

welfare implications associated with unemployment spells, we find that older and wealthier individuals often exit the labour force sooner, while lower-earning workers in their early fifties also tend to transition into retirement pathways more quickly. Although the role of local labour market conditions appears limited, differences in occupational and health characteristics—evidenced by higher disability pension take-up in specific subgroups—highlight how different vulnerabilities can amplify the long-term costs of displacement. These findings underscore the importance of policies that address immediate re-employment obstacles and mitigate the broader and often heterogeneous financial repercussions of job loss, particularly for workers approaching retirement age.

VI. Conclusion

This study underscores the pronounced short-run penalties that older workers endure following workplace closures, including large and often persistent employment and earnings losses. While the immediate employment shock is substantial for workers in their late fifties, we observe that some of this gap diminishes over time as older cohorts, both displaced and non-displaced, increasingly exit the labor market. Nonetheless, regarding wage outcomes, seniors show limited signs of a complete return to pre-displacement levels, reflecting the greater difficulty in regaining firm-specific wage premia.

Our findings reveal that these impacts extend beyond short-term labour market outcomes. Echoing the literature, we document how job loss disrupts broader household finances: assets decline while debts contract, leaving net wealth relatively stable on average. However, this stability masks potentially negative welfare implications, especially for older workers who might lose opportunities to invest in real estate or other valuable assets that could support their retirement. Thus, displacement compromises immediate earnings and reshapes workers' capacity to accumulate wealth.

This study underscores the role of both individual and firm-level factors by highlighting heterogeneities in the displacement experience—such as more severe employment penalties for those from smaller workplaces, longer-tenured workers, or

women in their early fifties. These findings dovetail with international evidence suggesting that high pre-displacement earnings, strong worker-firm matches, and later-age layoffs can exacerbate the adverse effects of job loss. In contrast, local unemployment rates and other macroeconomic indicators play a comparatively muted role in influencing workers' post-displacement trajectories.

Our results show how institutional frameworks can shape older workers' recovery paths. Denmark's combination of flexicurity arrangements, active labour market policies, and evolving retirement rules likely moderates some of the more severe earnings and employment outcomes in other countries. However, Bolvig (2025) finds that reforms delaying pensionable age often prolong the length of seniors' unemployment spells. Nonetheless, seniors' earnings remain depressed post-displacement, which indicates room for policy refinements, especially around re-skilling older employees or tailoring job placement assistance. In this light, age-targeted policies could help mitigate the persistent scarring effects undermining older workers' ability to secure comparable re-employment.

Our findings have broader implications as populations age and older adults become a larger share of the workforce. Further research might explore how different types of training programs or workplace adjustments could foster faster transitions into suitable employment and how pension reforms interact with displacement at advanced ages. In sum, our study highlights the challenges facing older workers after job loss, emphasizing that robust institutional support, well-designed re-employment initiatives, and targeted policy interventions are essential to safeguard both individual well-being and the broader economic contribution of this growing demographic group.

Acknowledgments We thank the Research Center for Retaining Seniors in the Labour Market for funding and Lars L. Andersen, Anna B. Nandrup, Stefano Lombardi, and Jeevitha Y. Qvist for their comments. The authors' interpretations, errors, and omissions are their own.

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VII. Tables and Figures

TABLE 1—Descriptive Statistics for Ages 25-59

	Treated		Control		Difference (1)-(4)	p-value
	Mean (1)	SD (2)	Mean (3)	SD (4)	(5)	(6)
Male	0.620	-	0.620	-	0.000	1.000
Age at displacement	42.341	9.770	42.341	9.770	0.000	0.988
Years of education	12.198	2.654	12.202	2.680	-0.004	0.560
Earnings	390,500	220,856	392,374	231,994	-1,875	0.002
Earnings in t-1	387,784	205,083	387,862	221,479	-77	0.891
Earnings in t-2	375,726	201,722	375,363	229,058	363	0.522
Received UI	0.109	-	0.082	-	0.027	0.000
UI duration (0-1000)	15.545	69.645	11.126	59.334	4.419	0.000
Retired	0.0042	-	0.0043	-	-0.0001	0.6864
Early pension	0.0027	-	0.0026	-	0.0001	0.4921
Disability pension	0.0015	-	0.0017	-	-0.0002	0.1199
Sickness benefits | Received	45.92	50.27	44.71	48.50	1.20	0.0239
Post-tax income	410,095	180,099	409,526	180,918	569	0.233
Assets	876,571	980,495	893,598	1,005,622	-17,027	0.0000
Debts	613,318	655,416	617,478	659,721	-4,160	0.0166
Wealth	307,305	6289,618	358,739	3,638,403	-51,433	0.0001
Years of tenure	7.667	4.679	7.658	4.756	0,010	0.428
Manufacturing	0.148	-	0.148	-	0.000	0.9941
Workplace size	134.0	277.5	123.1	302.0	10.9	0.000

Notes: The Table shows descriptive statistics for the estimation sample. We select male and female workers between 25 and 59 years of age with at least three years of tenure at the current, private-sector workplace. Treated workers are exposed to workplace closure. Control workers are selected through a 1:1 matching algorithm among selected workers with the same gender and year of birth by minimising differences in working history. Controls are matched year by year and all variables but earnings are measured in the year before workplace closure. Columns (1)-(2) display the mean and standard deviation for matched treated workers; columns (3)-(4) display the same statistics for the control group. Mean differences are reported and the associated p-value in columns (5) and (6), respectively. Monetary units are in DKK reflated to 2020 prices. See Section III for details.

TABLE 2—Descriptive Statistics for Ages 50-59

	Treated		Control		Difference (1)-(4)	p-value
	Mean (1)	SD (2)	Mean (3)	SD (4)	(5)	(6)
Male	0.631	-	0.631	-	-0.0001	0.952
Age at displacement	54.644	11.119	54.501	11.179	0.142	0.315
Years of education	11.408	2.940	11.433	2.981	-0.025	0.497
Earnings	386,692	234,952	389,509	234,667	-2,817	0.135
Earnings in t-1	391,450	226,782	391,531	243,523	-81	0.972
Earnings in t-2	387,422	224,791	385,547	239,311	1,875	0.279
Received UI	0.106	-	0.077	-	0.029	0.000
UI duration (0-1000)	17.420	76.092	13.507	64.493	3.913	0.042
Retired	0.013	-	0.013	-	-0.0001	0.945
Early pension	0.010	-	0.010	-	0.0003	0.731
Disability pension	0.003	-	0.003	-	-0.0003	0.761
Sickness benefit | received	47.194	53.723	44.754	53.396	2.440	0.168
Post-tax income	408,525	191,127	409,106	195,842	-554	0.570
Asset	1,078,562	1,140,692	1,091,300	1,172,662	-12,738	0.010
Debt	527,650	641,213	531,410	653,188	-3,761	0.017
Wealth	630,119	1,124,081	721,932	3,678,291	-91,813	0.045
Years of tenure	9.399	5.748	9.401	5.845	-0.002	0.916
Manufacturing	0.160	-	0.159	-	0.001	0.790
Workplace size	123.9	259.0	112.5	262.6	11.4	0.000

Notes: The Table shows descriptive statistics for the estimation sample. We select male and female workers between 50 and 59 years of age with at least three years of tenure at the current, private-sector workplace. See the note to Table 1 for further details.

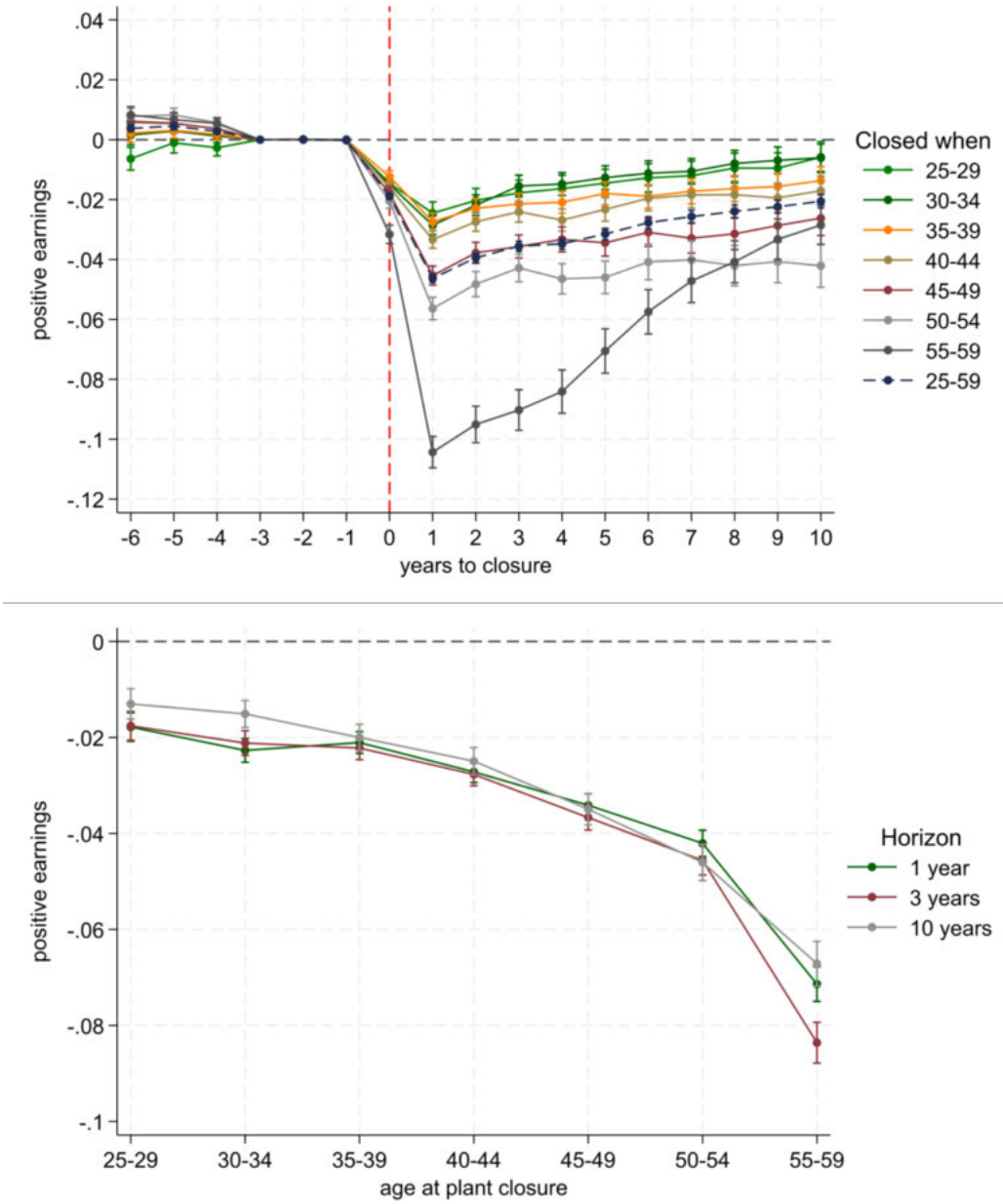


FIGURE 1. Positive Earnings

Notes: The figures show the estimated impacts of workplace closure on the probability of some employment in the year (positive earnings). The estimation sample is described in Table 1. The upper pane presents estimates of μ_l from equation (1) with associated 95% confidence intervals. Dashed blue lines report average estimates; solid lines report separate estimates by age group at workplace closure. The lower pane plots mean annual estimated impacts of workplace closure on the probability of some employment one, three, and ten years after workplace closure as a function of the age group at workplace closure. See Section IV for details.

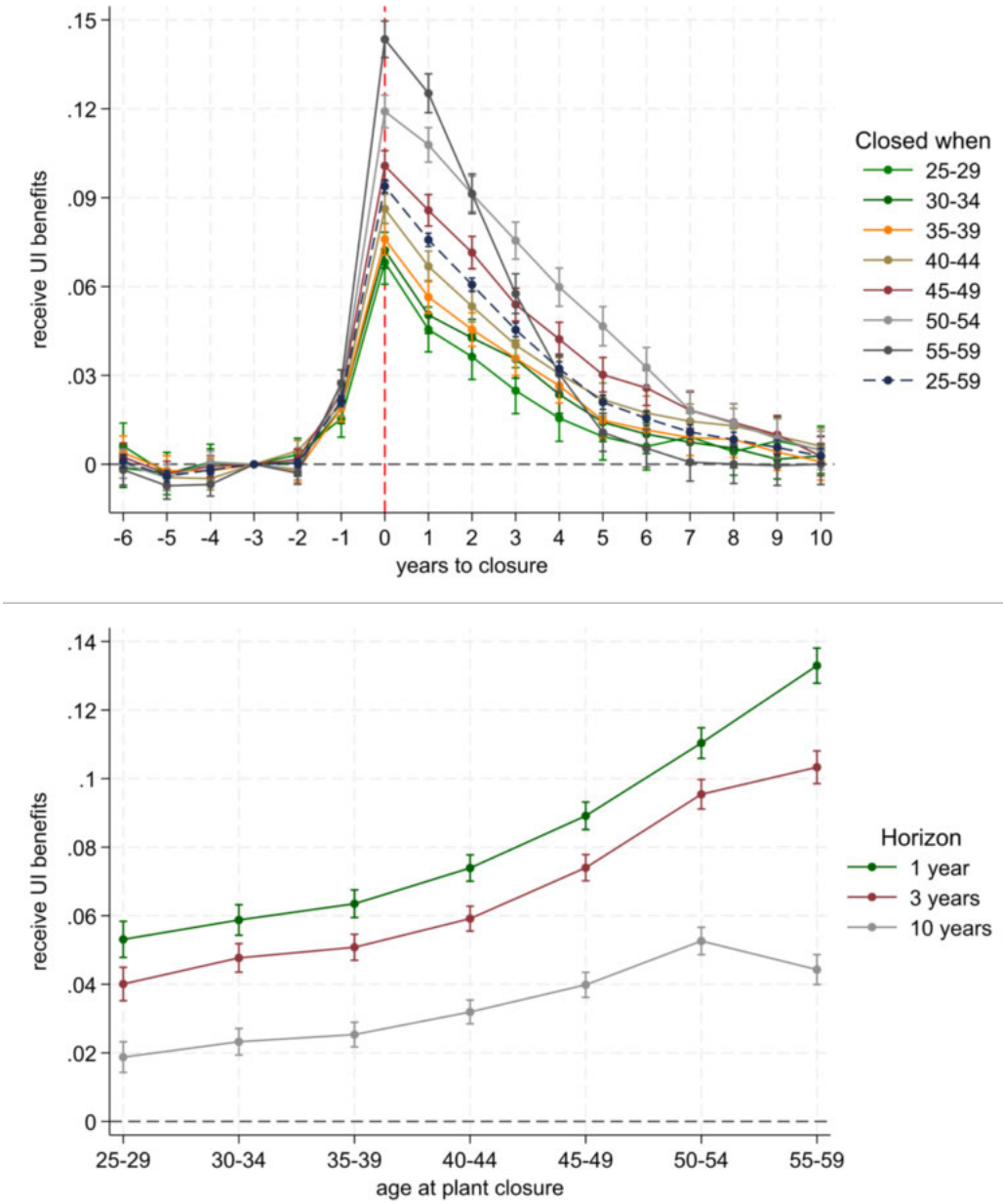


FIGURE 2. Receiving Unemployment Insurance Benefits

Notes: The figures show the estimated impacts of workplace closure on the probability of receiving unemployment benefits. Plotted estimates and specifications are analogous to Figure 1. See Section IV for details.

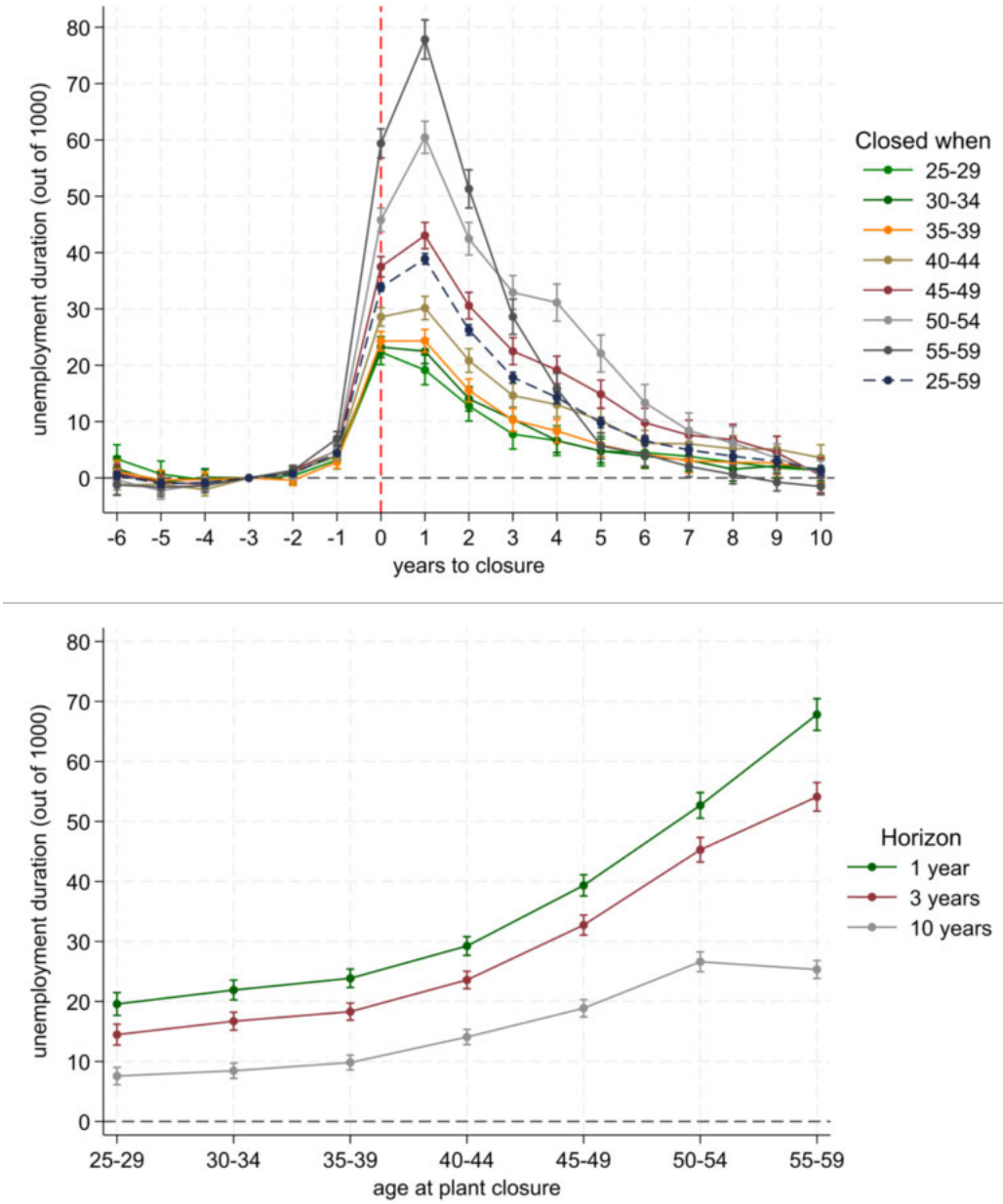


FIGURE 3. Unemployment Duration

Notes: The figures show the estimated impacts of workplace closure on the duration of unemployment benefits receipt. Unemployment duration is normalised in the interval (0,1000) in a year. Plotted estimates and specifications are analogous to Figure 1. See Section IV for details.

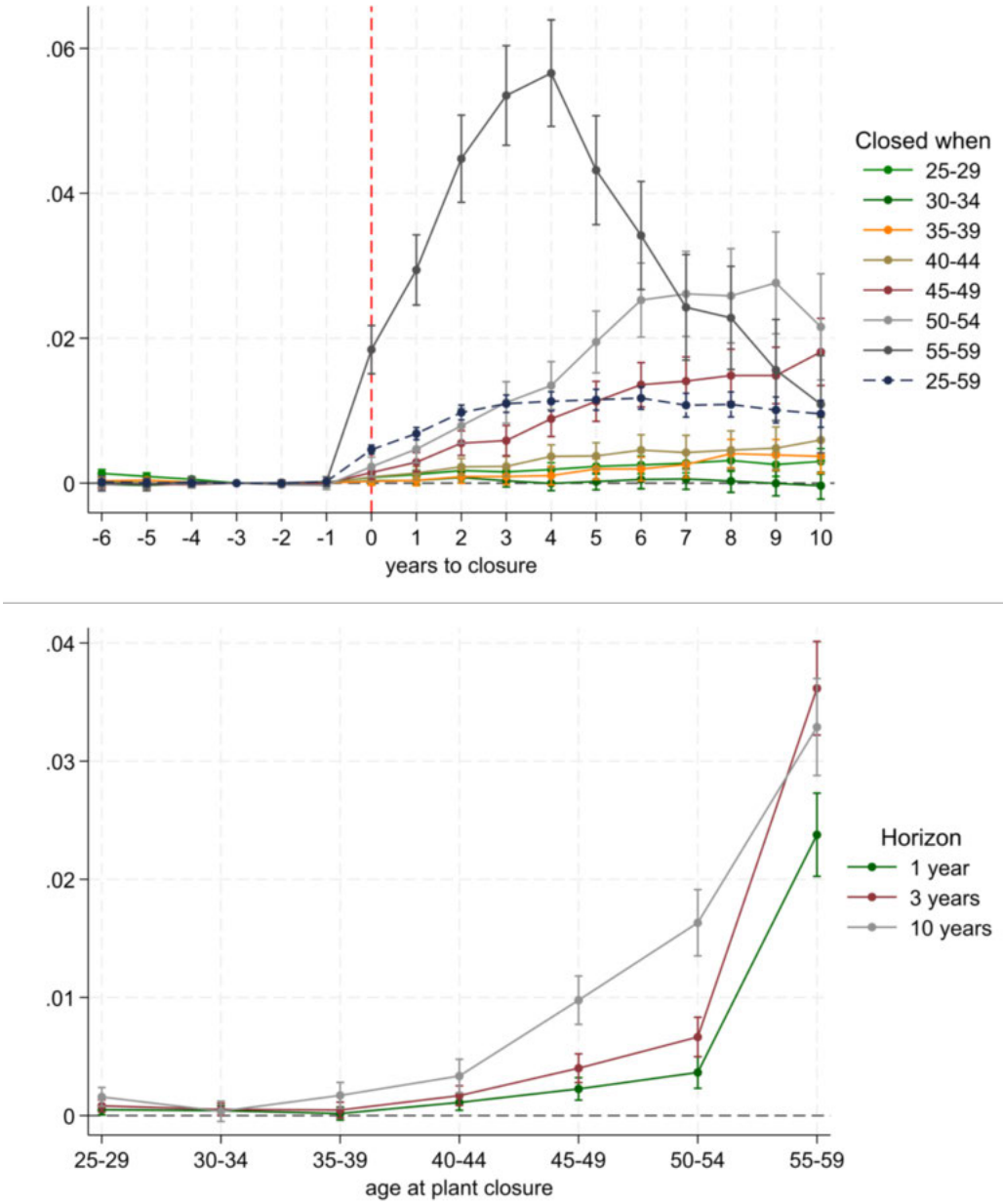


FIGURE 4. Retired

Notes: The figures show the estimated impacts of workplace closure on the probability of retirement. Retirement is measured by a dummy equal to one if any pension income was received in a year. Plotted estimates and specifications are analogous to Figure 1. See Section IV for details.

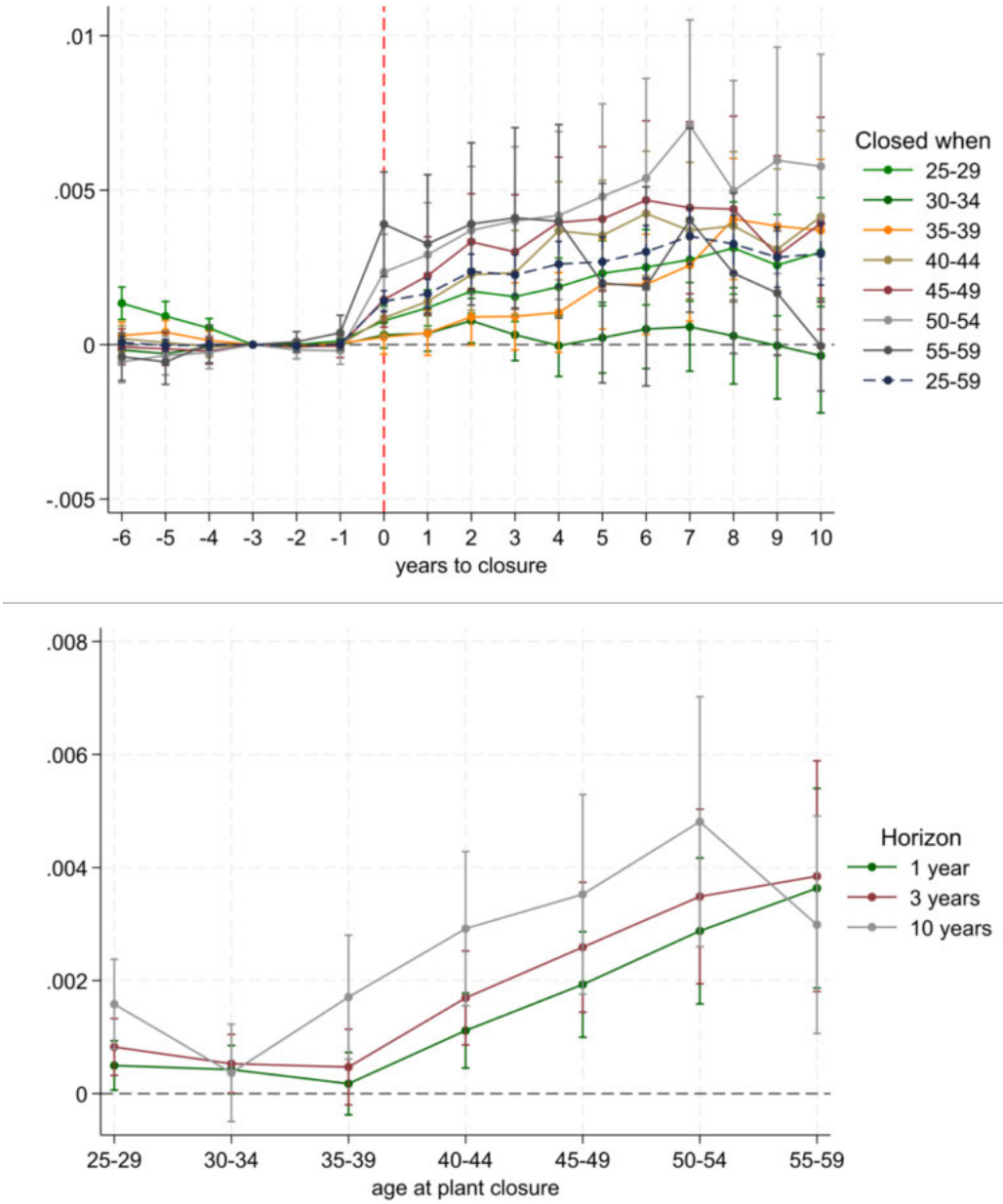


FIGURE 5. Disability Pension

Notes: The figures show the estimated impacts of workplace closure on the probability of receiving a disability pension. Retirement is measured by a dummy equal to one if any income from disability pension was received in a year. Plotted estimates and specifications are analogous to Figure 1. See Section IV for details.

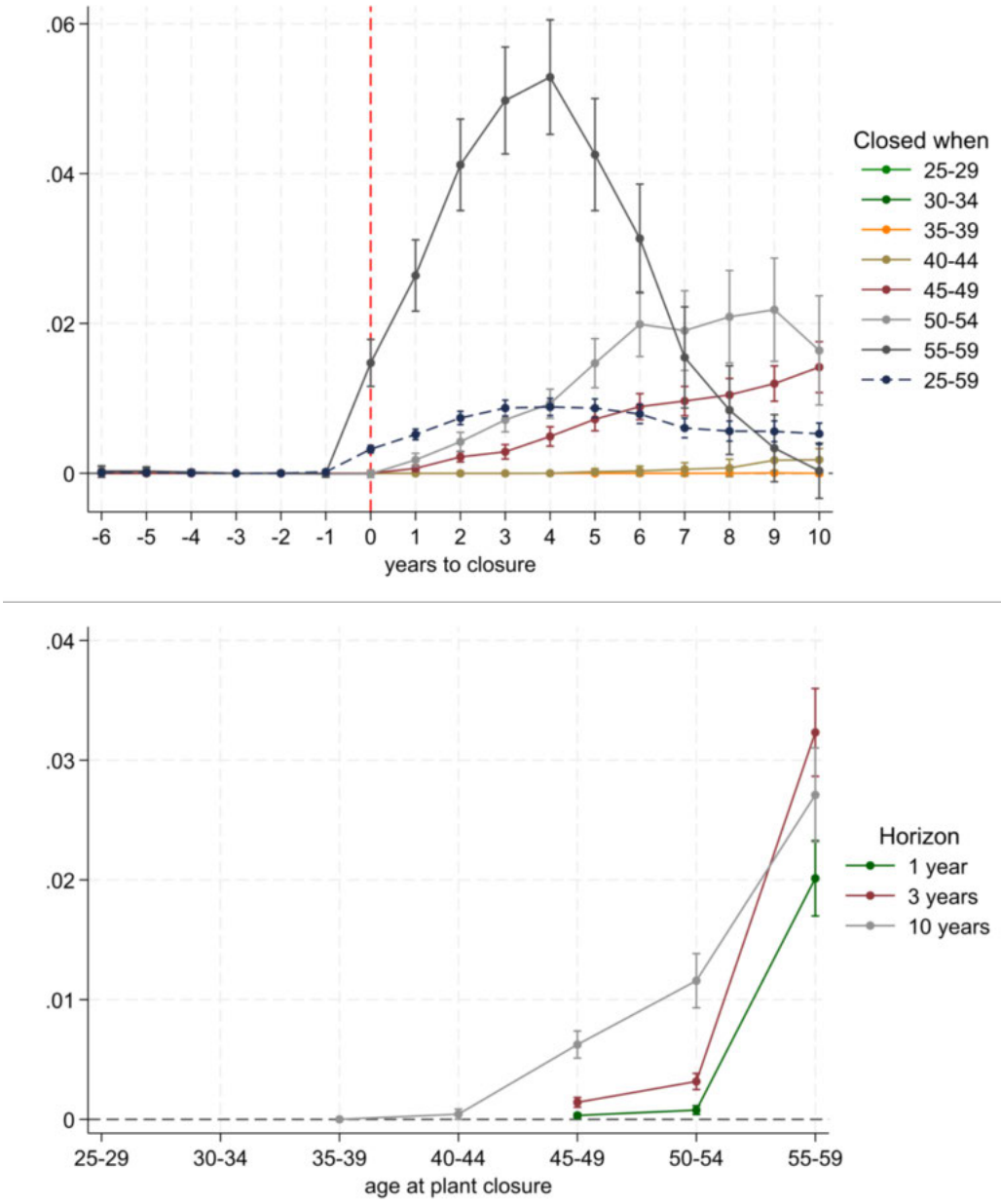


FIGURE 6. Early Retirement Pension

Notes: The figures show the estimated impacts of workplace closure on the probability of receiving an early pension. Early pension receipt is measured by a dummy equal to one if any pension income from an early retirement scheme was received in a year. Plotted estimates and specifications are analogous to Figure 1. See Section IV for details.

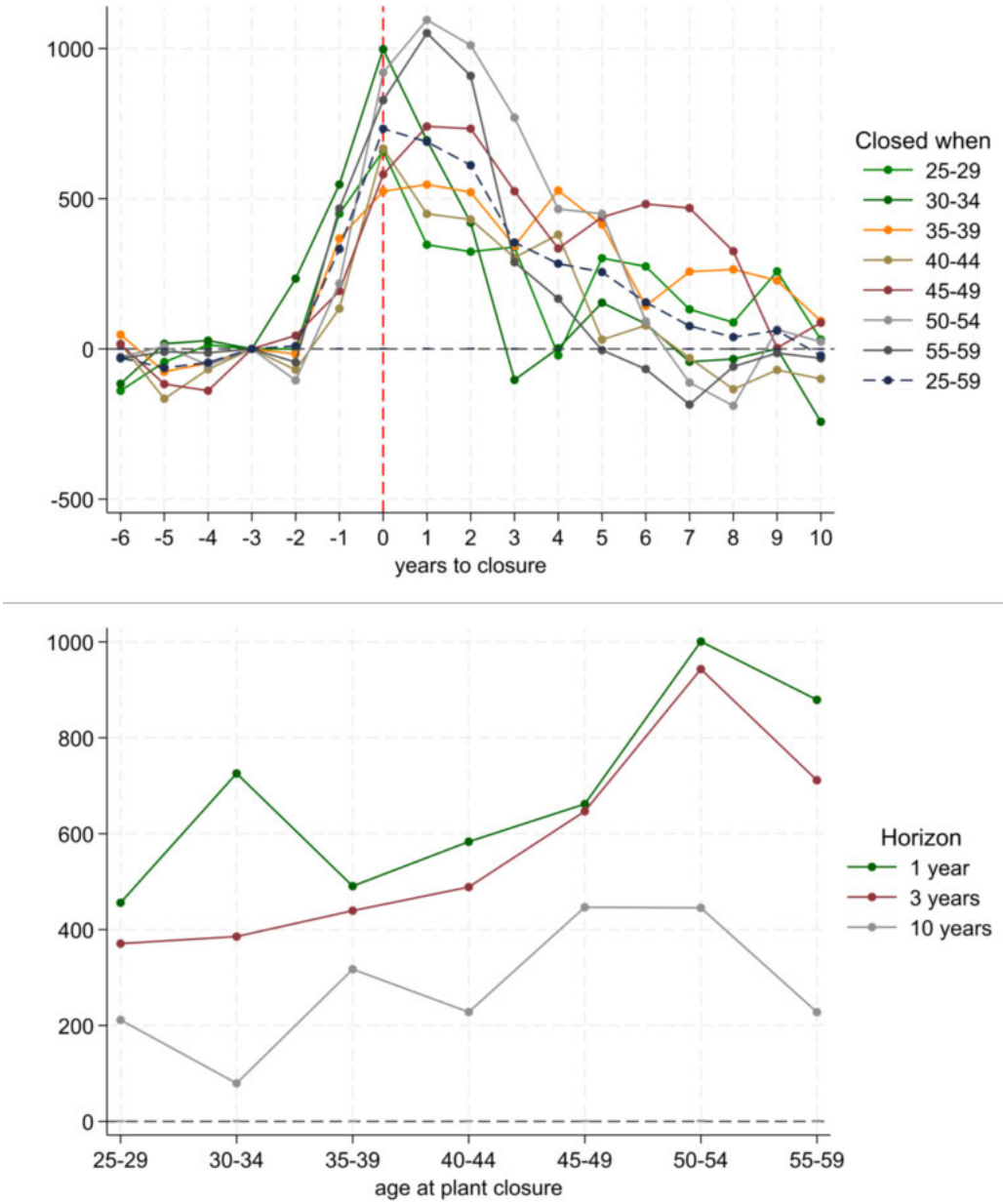


FIGURE 7. Sickness Benefits

Notes: The figures show the estimated impacts of workplace closure on the amount of sickness benefits received in a year. Sickness benefits are measured in 2020 DKK. Plotted estimates and specifications are analogous to Figure 1. See Section IV for details.

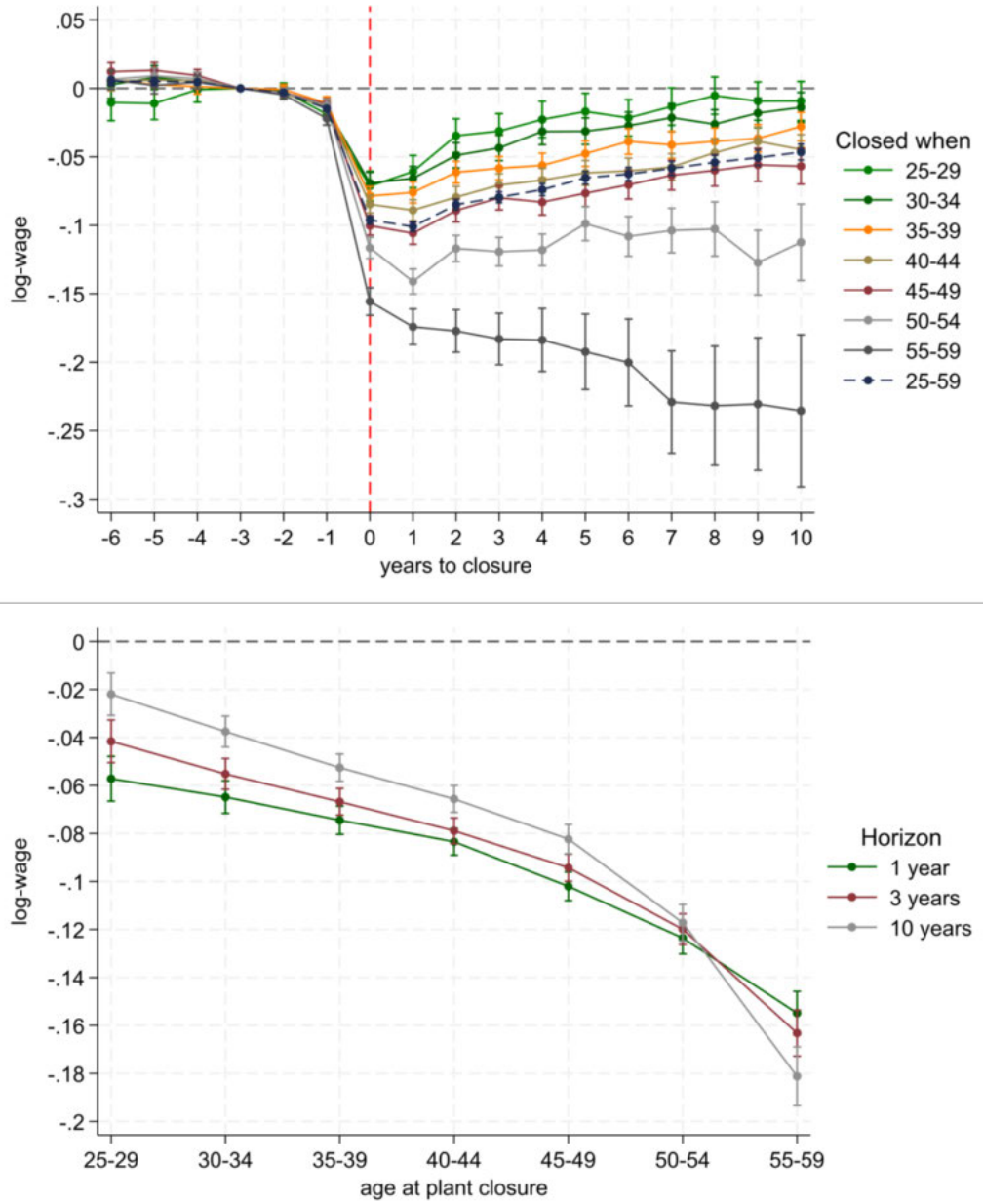


FIGURE 8. Log Earnings

Notes: The figures show the estimated impacts of workplace closure on log earnings. Plotted estimates and specifications are analogous to Figure 1. See Section IV for details.

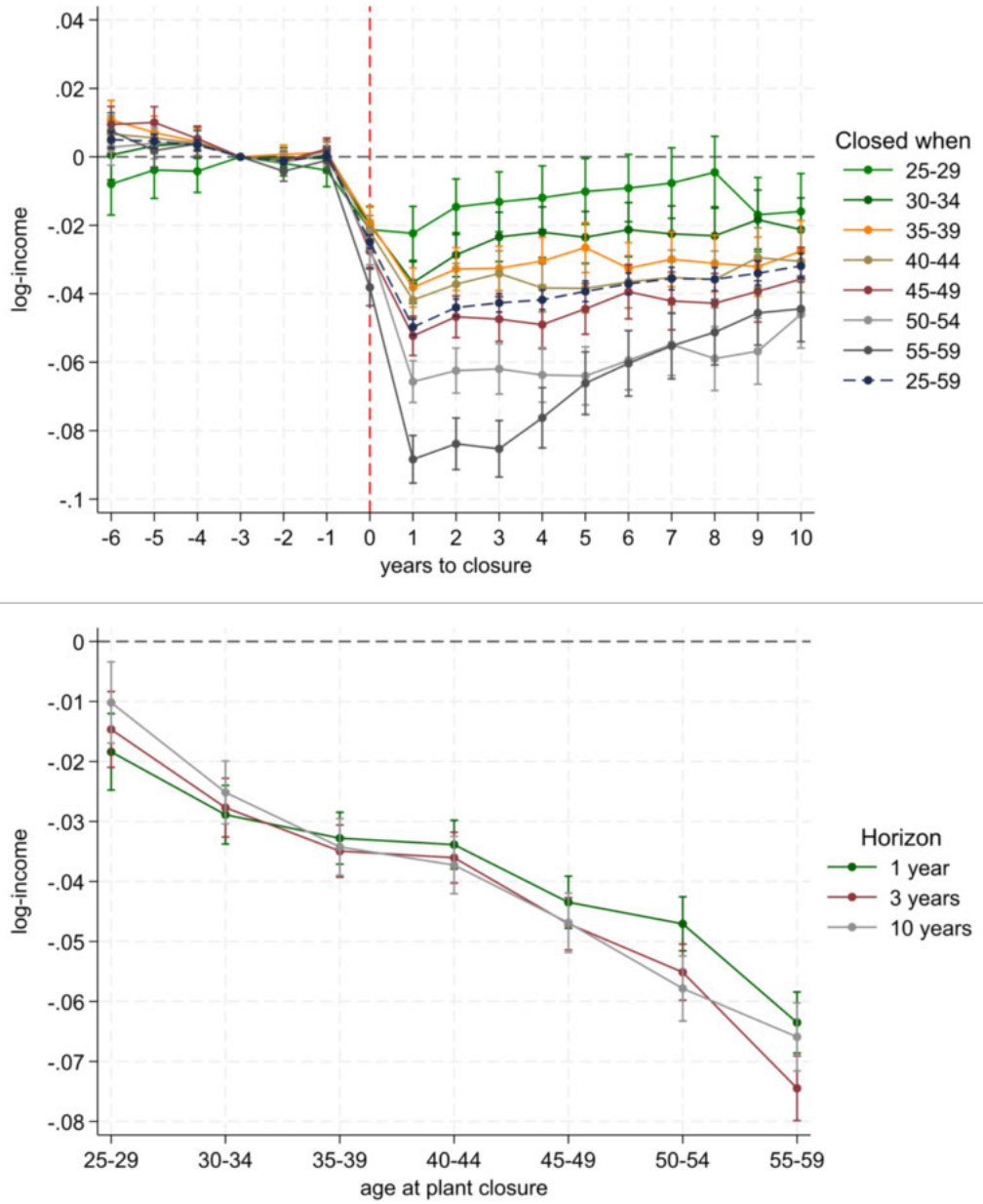


FIGURE 9. Log Income

Notes: The figures show the estimated impacts of workplace closure on log income. Plotted estimates and specifications are analogous to Figure 1. See Section IV for details.

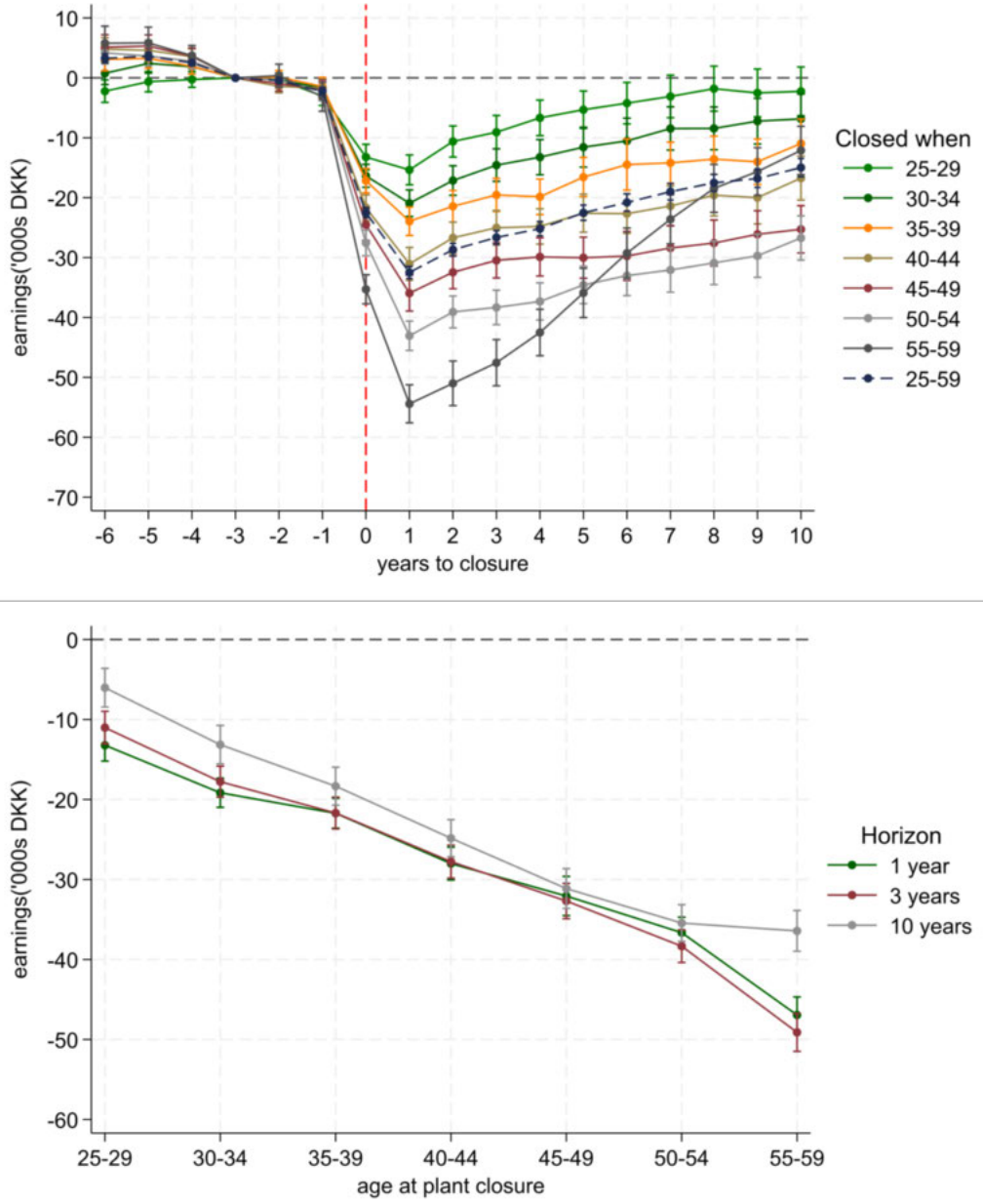


FIGURE 10. Total Earnings

Notes: The figures show the estimated impacts of workplace closure on total earnings. Plotted estimates and specifications are analogous to Figure 1. See Section IV for details.

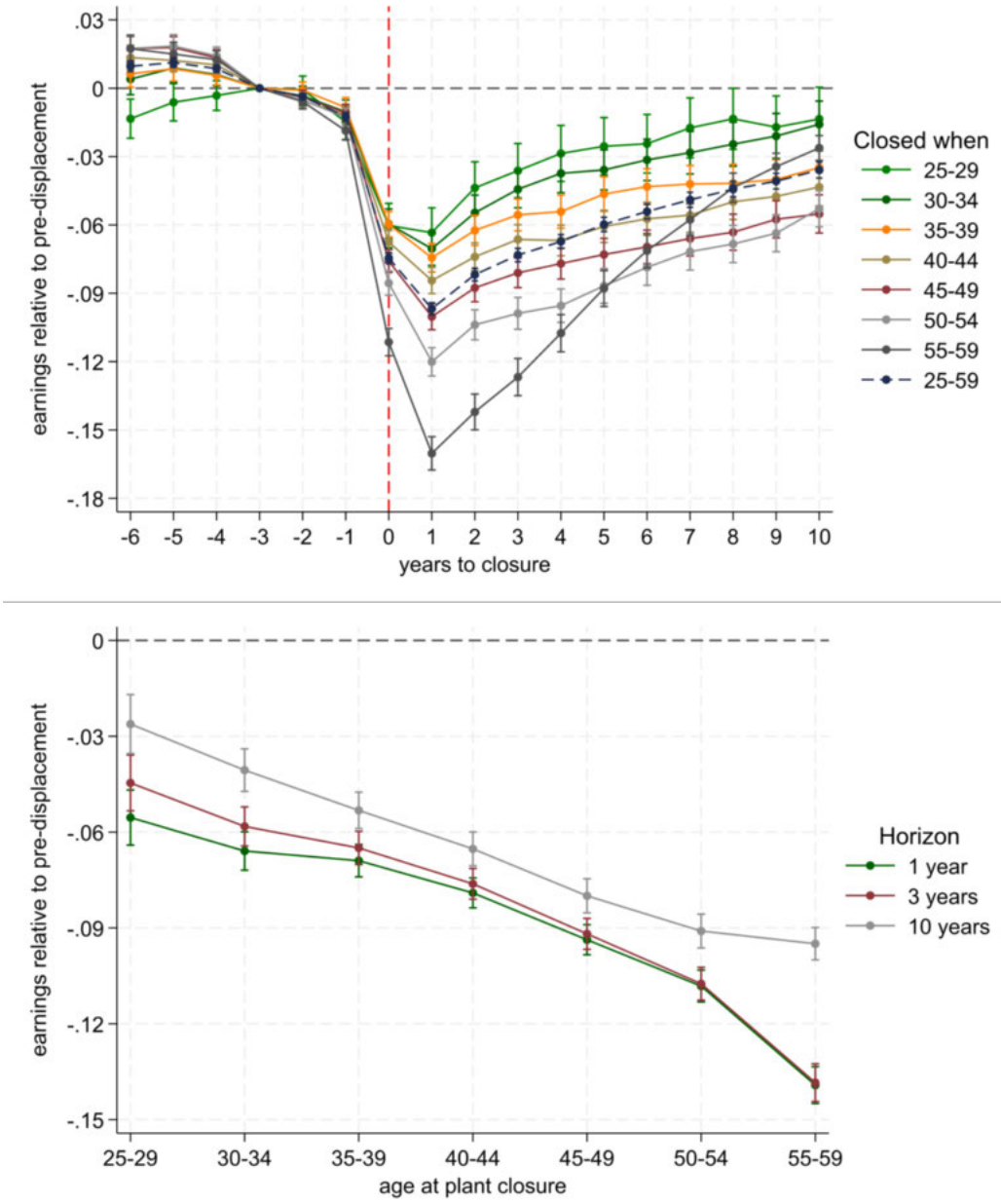


FIGURE 11. Earnings Relative to Baseline

Notes: The figures show the estimated impacts of workplace closure on earnings relative to the pre-displacement level. Plotted estimates and specifications are analogous to Figure 1. See Section IV for details.

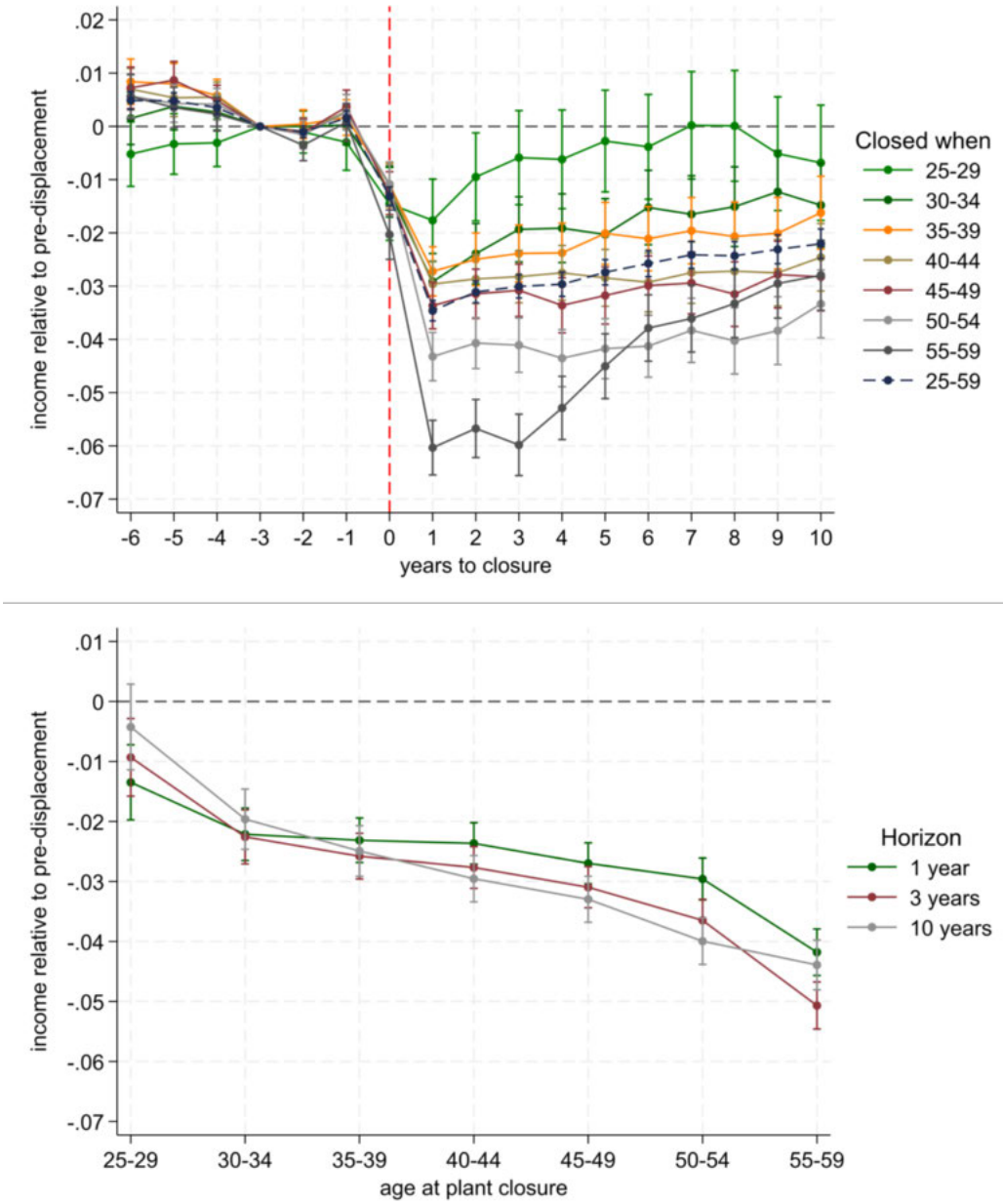


FIGURE 12. Income Relative to Baseline

Notes: The figures show the estimated impacts of workplace closure on total annual income relative to the pre-displacement level. Plotted estimates and specifications are analogous to Figure 1. See Section IV for details.

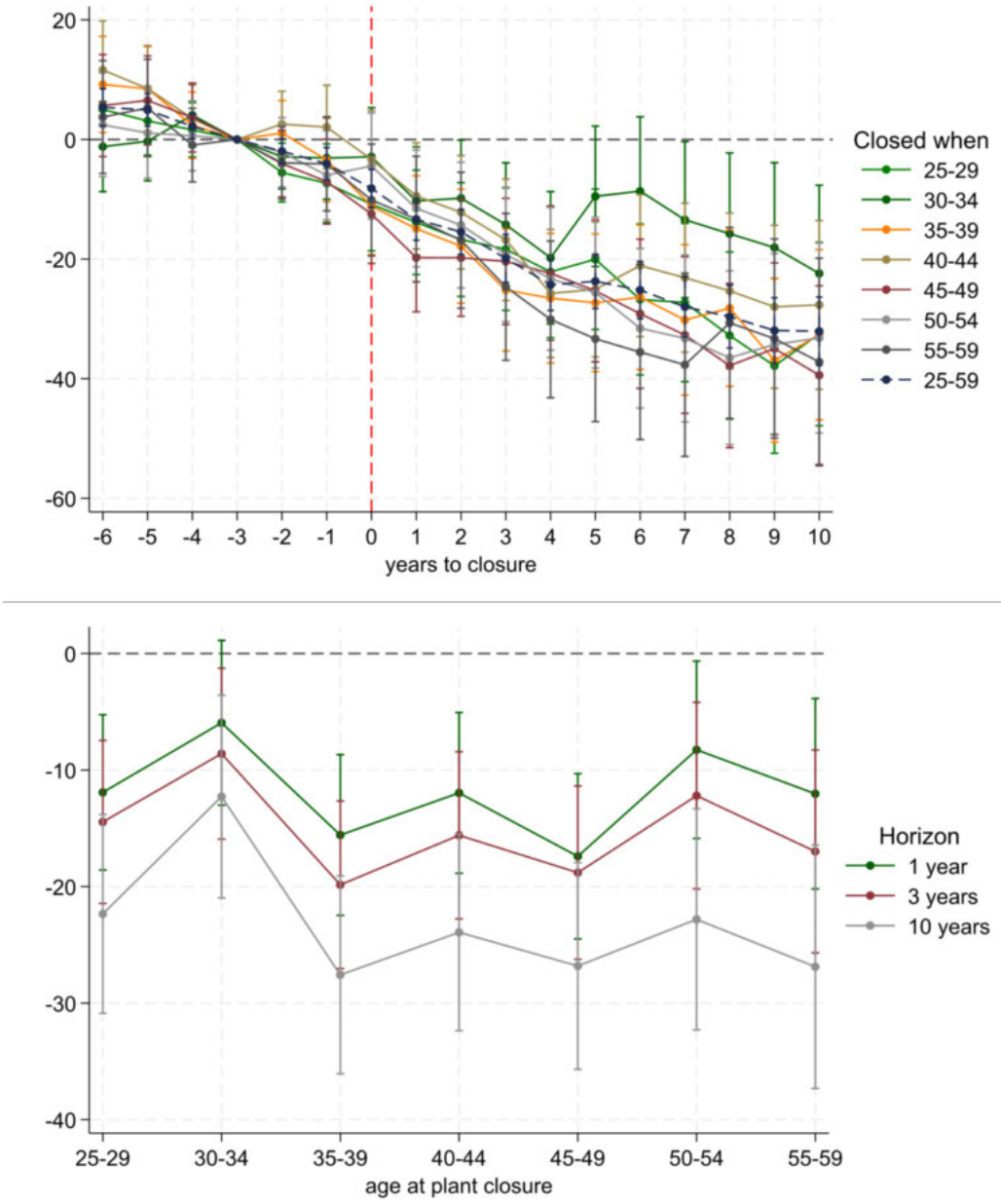


FIGURE 13. Assets

Notes: The figures show the estimated impacts of workplace closure on total assets. Assets are measured in thousands of 2020 DKK. Plotted estimates and specifications are analogous to Figure 1. See Section IV for details.

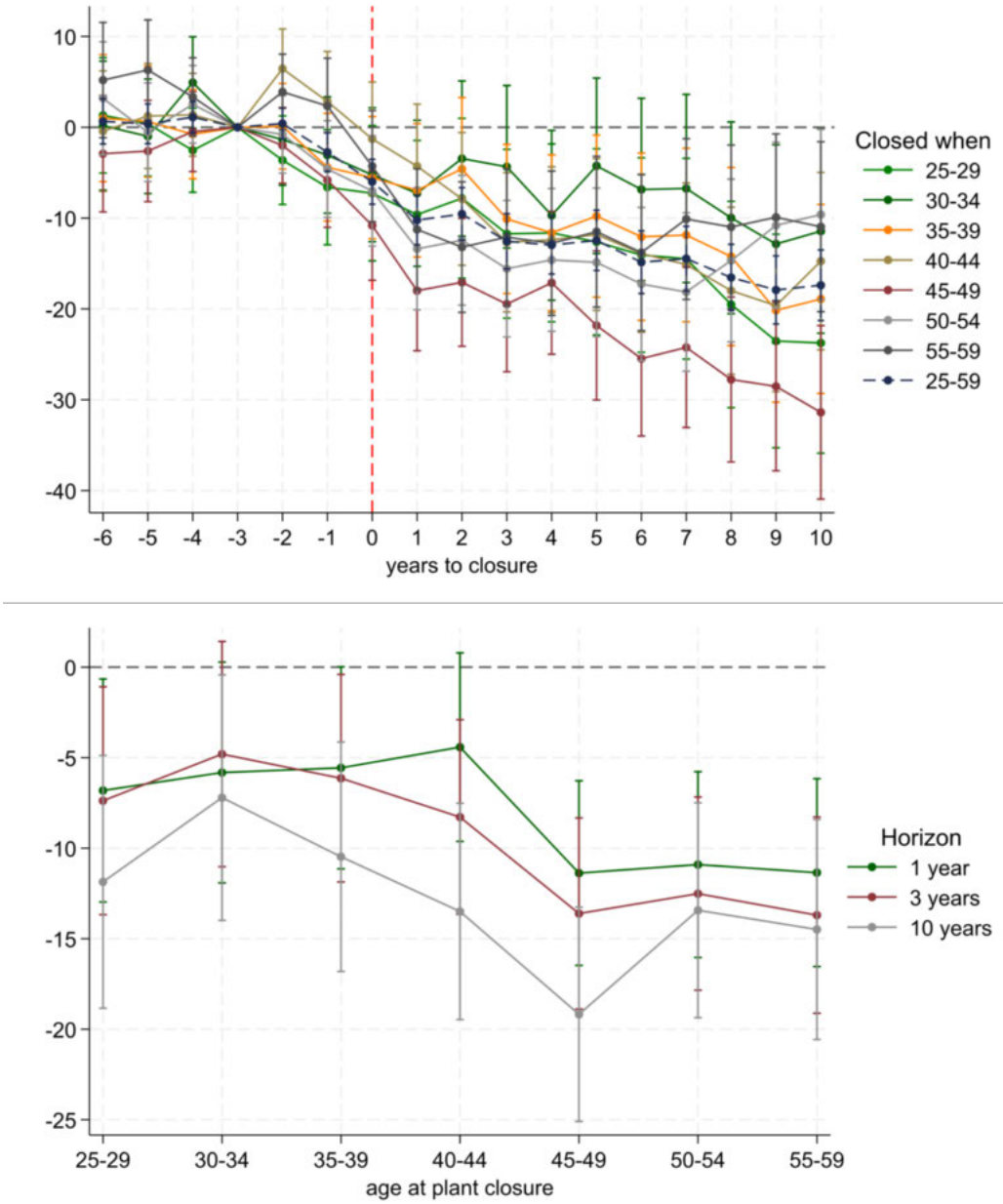


FIGURE 14. Debts

Notes: The figures show the estimated impacts of workplace closure on total debts. Debts are measured in thousands of 2020 DKK. Plotted estimates and specifications are analogous to Figure 1. See Section IV for details.

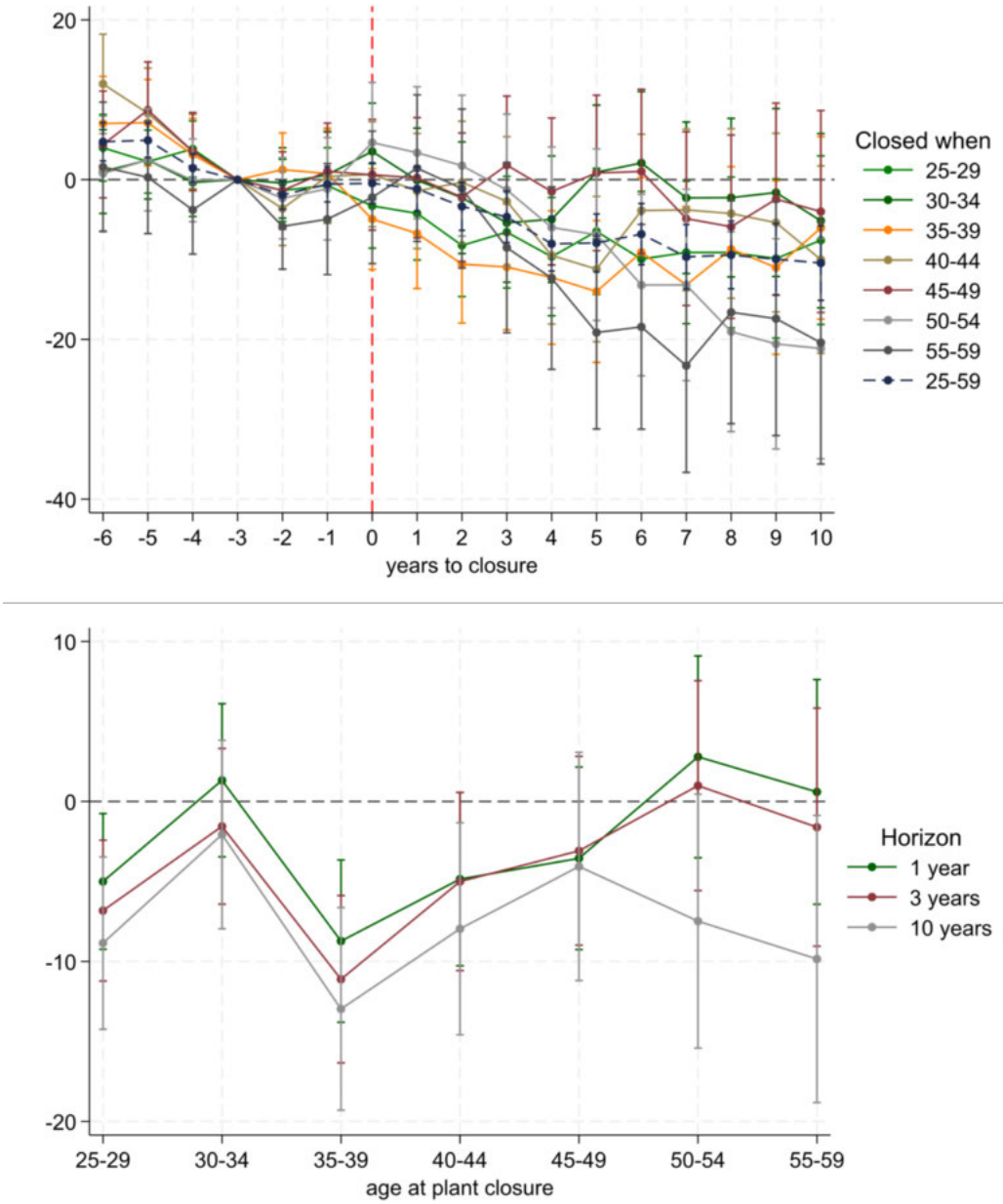


FIGURE 15. Net Wealth

Notes: The figures show the estimated impacts of workplace closure on net wealth. Net wealth is measured in thousands of 2020 DKK by subtracting debts from assets in a given year. Plotted estimates and specifications are analogous to Figure 1. See Section IV for details.

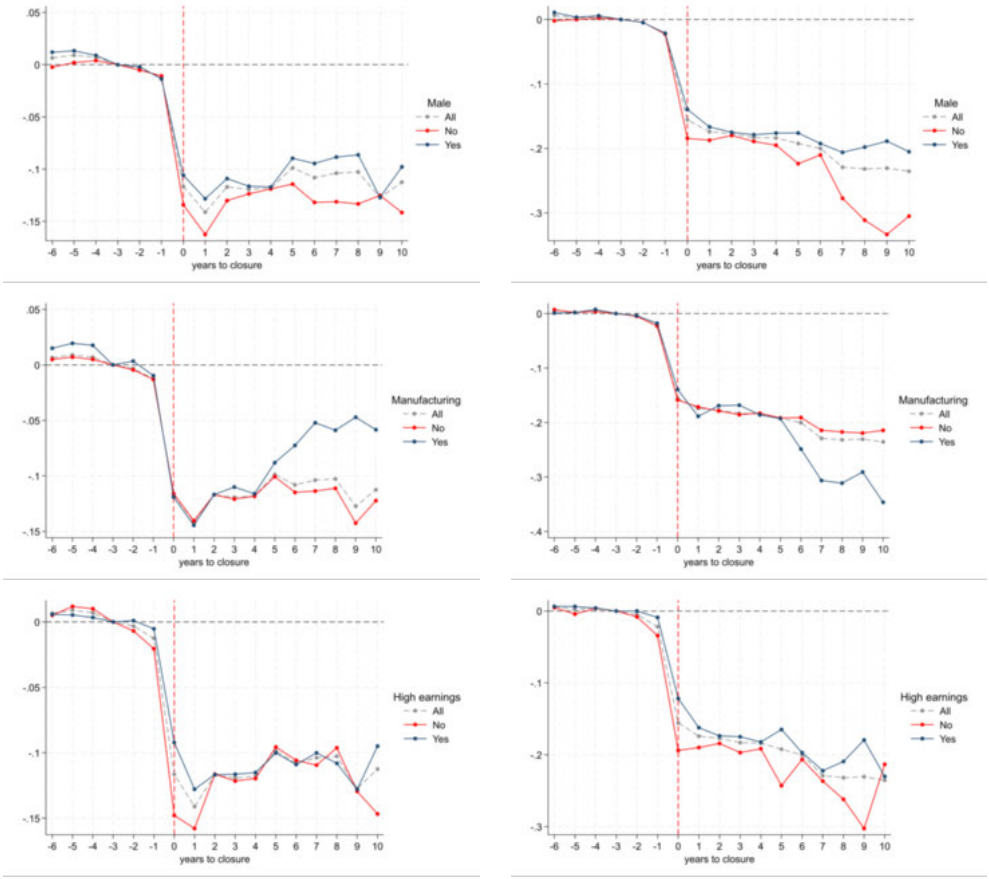


FIGURE 16. Log Earnings at 50-54 (left panes) and 55-59 by Sex, Industry and Earnings

Notes: The figures present six event studies. The panes on each row split the sample into two groups, as defined in the legends. Solid blue and red lines indicate group membership; dashed grey lines indicate sample means.

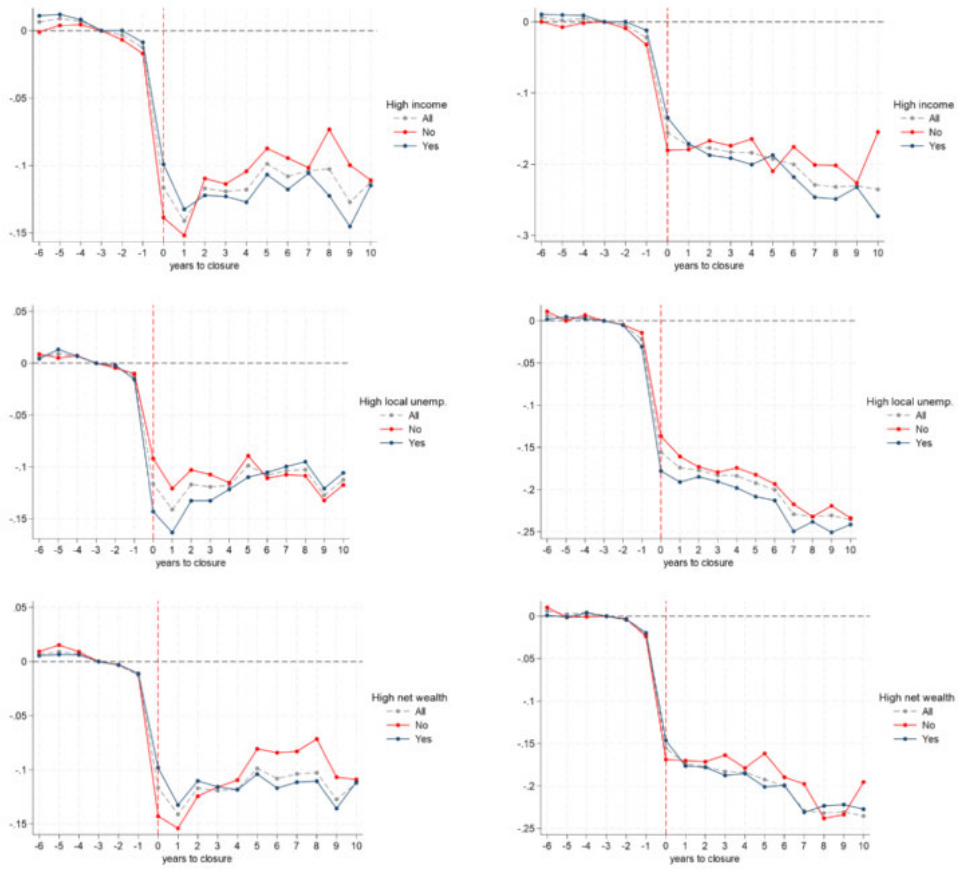


FIGURE 17. Log Earnings at 50-54 (left panes) and 55-59 by Income, Local Unemployment Rate and Net Wealth

Notes: The figures present six event studies. The panes on each row split the sample into two groups, as defined in the legends. Solid blue and red lines indicate group membership; dashed grey lines indicate sample means.

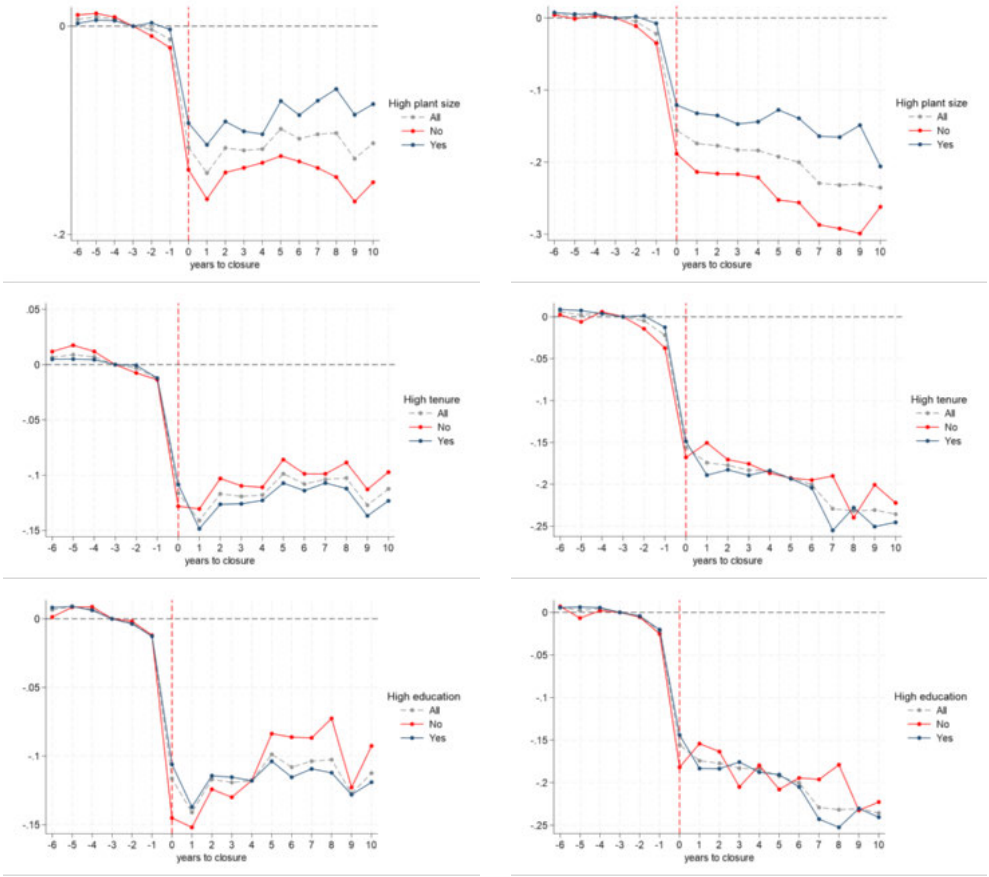


FIGURE 18. Log Earnings at 50-54 (left panes) and 55-59 by Plant Size, Job Tenure and Schooling

Notes: The figures present six event studies. Panes on the left represent ages 50-54, and panes on the right represent ages 55-59. The panes on each row split the sample into two groups, as defined in the legends. Solid blue and red lines indicate group membership; dashed grey lines indicate sample means.

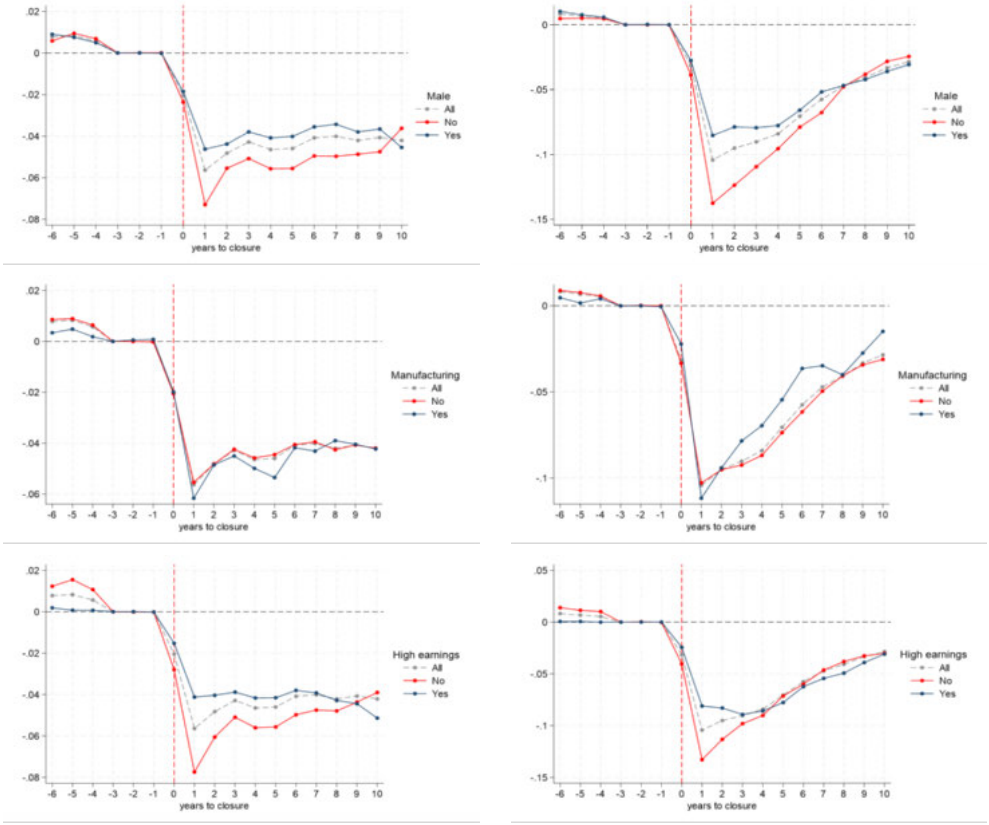


FIGURE 19. Employment at 50-54 (left panes) and 55-59 by Sex, Industry and Earnings

Notes: The figures present six event studies. The panes on each row split the sample into two groups, as defined in the legends. Solid blue and red lines indicate group membership; dashed grey lines indicate sample means.

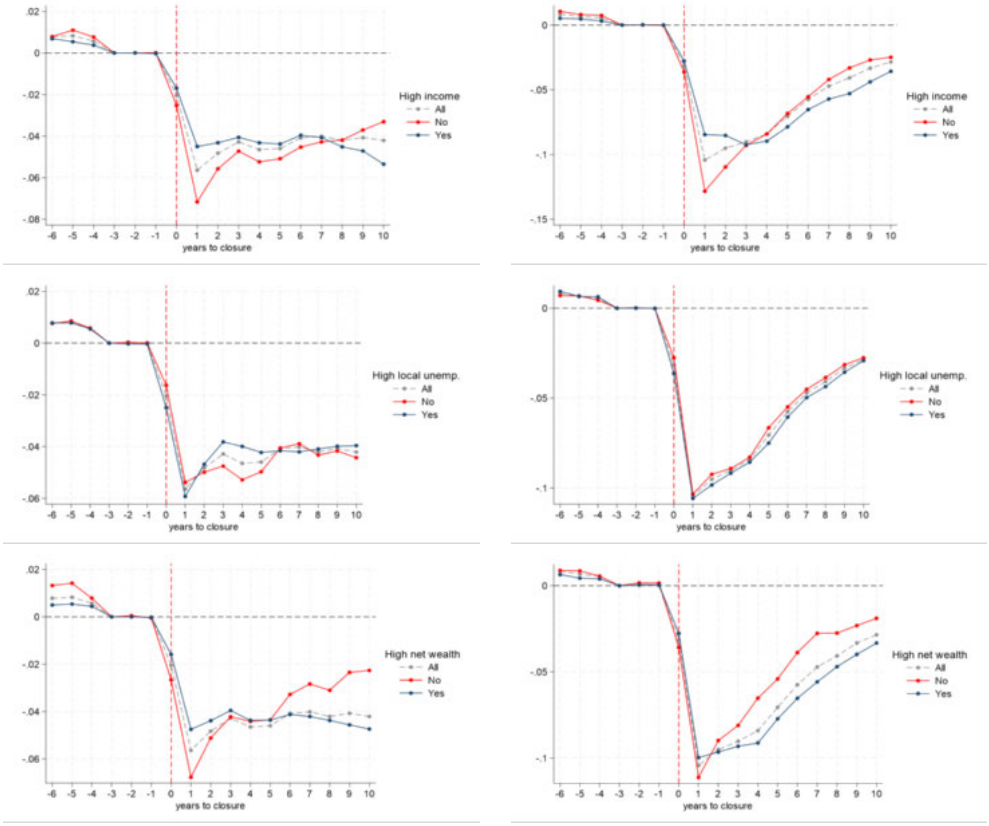


FIGURE 20. Employment at 50-54 (left panes) and 55-59 by Income, Local Unemployment Rate and Net Wealth

Notes: The figures present six event studies. The panes on each row split the sample into two groups, as defined in the legends. Solid blue and red lines indicate group membership; dashed grey lines indicate sample means.

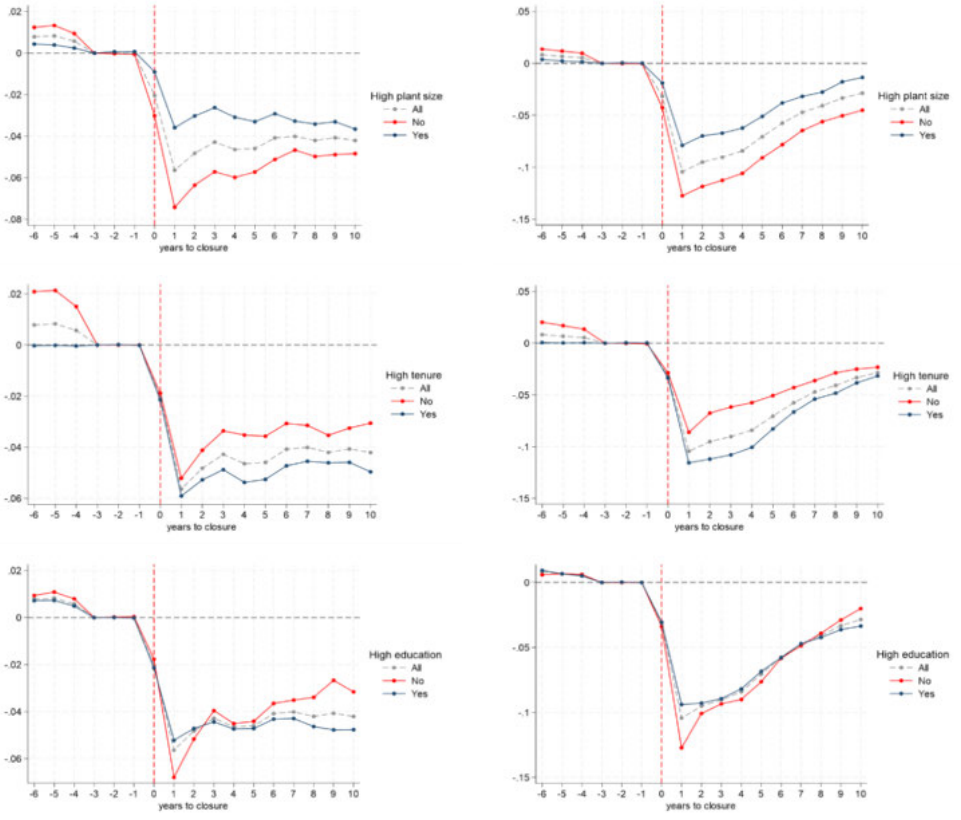


FIGURE 21. Employment at 50-54 (left panes) and 55-59 by Plant Size, Job Tenure and Schooling

Notes: The figures present six event studies. The panes on each row split the sample into two groups, as defined in the legends. Solid blue and red lines indicate group membership; dashed grey lines indicate sample means.

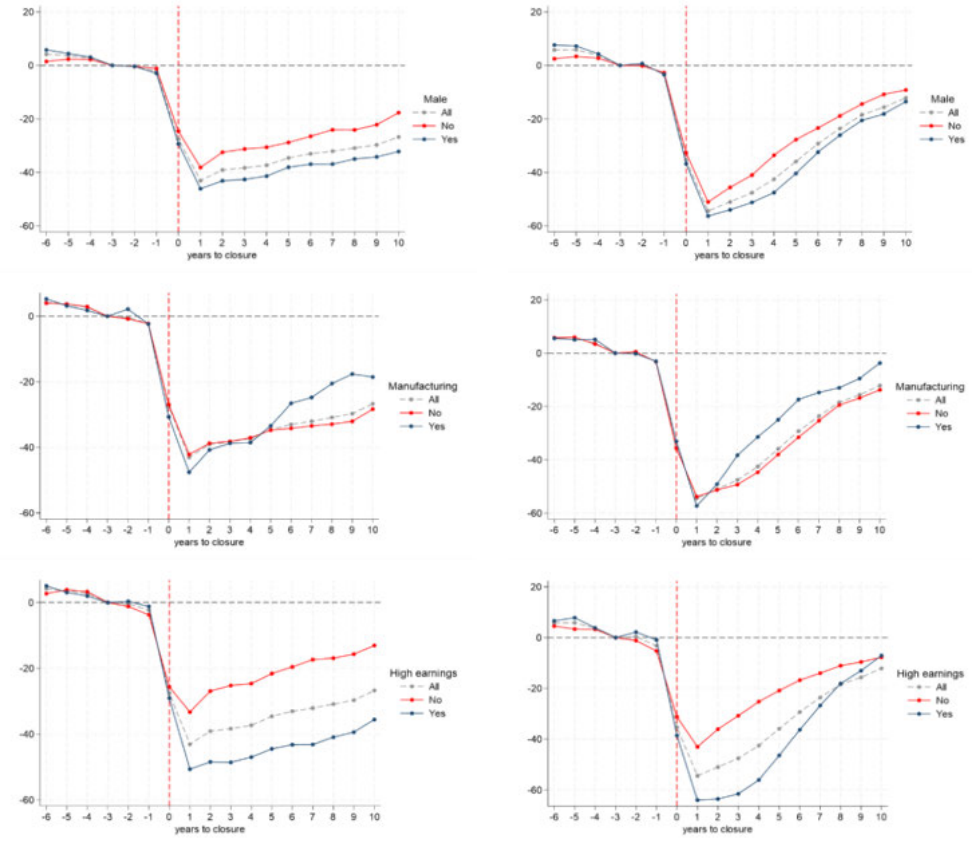


FIGURE 22. Total Earnings at 50-54 (left panes) and 55-59 by Sex, Industry and Earnings

Notes: The figures present six event studies. The panes on each row split the sample into two groups, as defined in the legends. Solid blue and red lines indicate group membership; dashed grey lines indicate sample means.

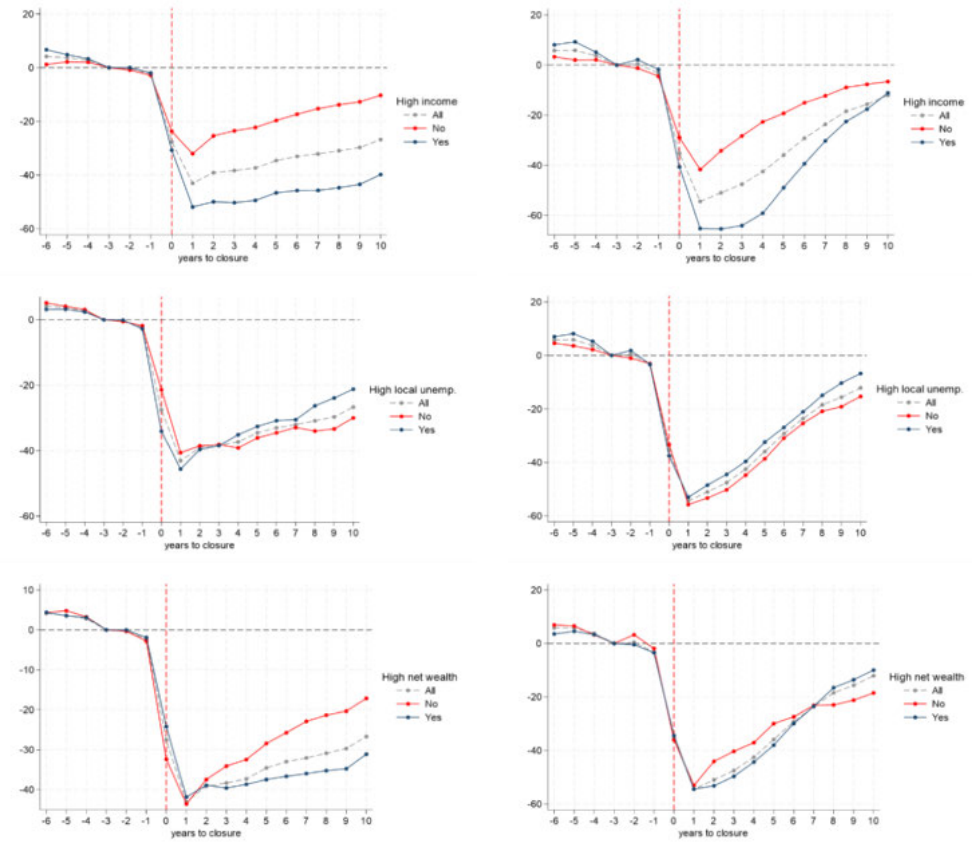


FIGURE 23. Total Earnings at 50-54 (left panes) and 55-59 by Income, Local Unemployment Rate and Net Wealth

Notes: The figures present six event studies. The panes on each row split the sample into two groups, as defined in the legends. Solid blue and red lines indicate group membership; dashed grey lines indicate sample means.

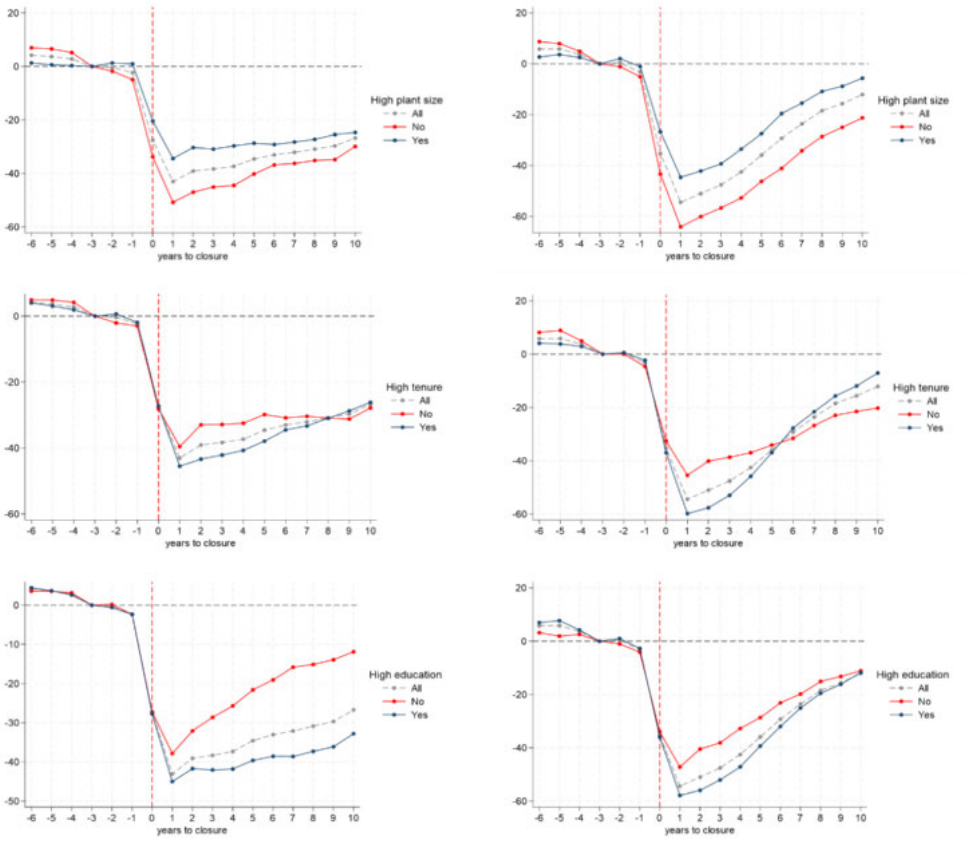


FIGURE 24. Total Earnings at 50-54 (left panes) and 55-59 by Plant Size, Job Tenure and Schooling

Notes: The figures present six event studies. The panes on each row split the sample into two groups, as defined in the legends. Solid blue and red lines indicate group membership; dashed grey lines indicate sample means.

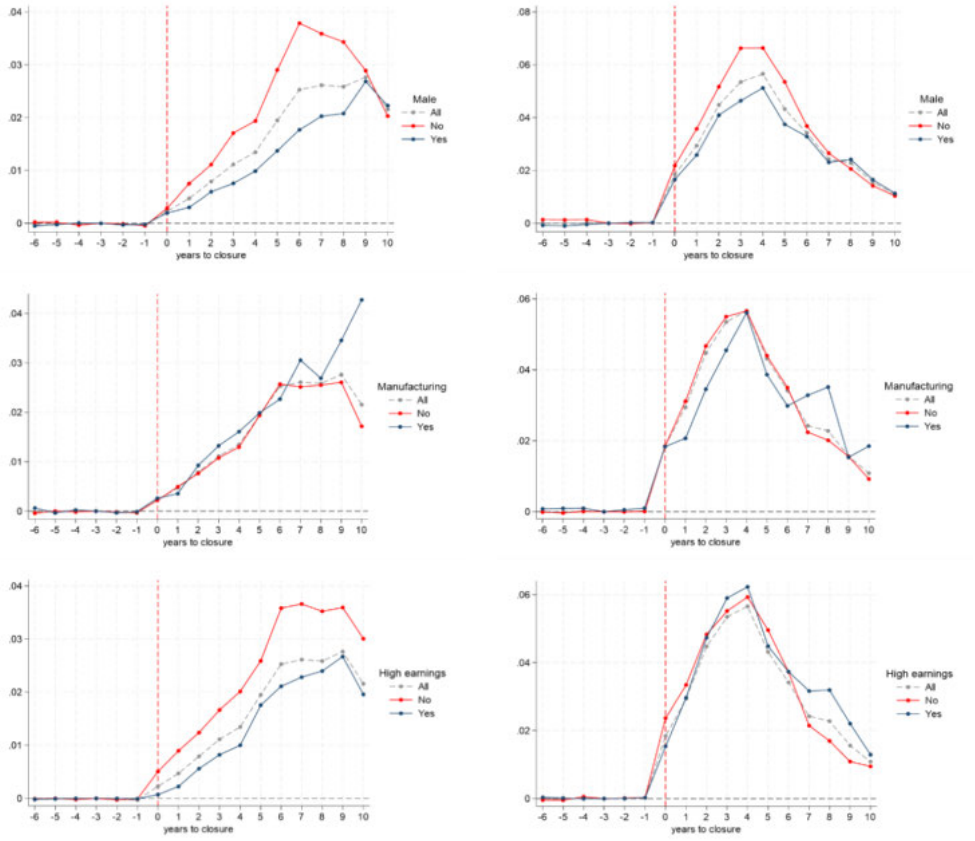


FIGURE 25. Retirement at 50-54 (left panes) and 55-59 by Sex, Industry and Earnings

Notes: The figures present six event studies. The panes on each row split the sample into two groups, as defined in the legends. Solid blue and red lines indicate group membership; dashed grey lines indicate sample means.

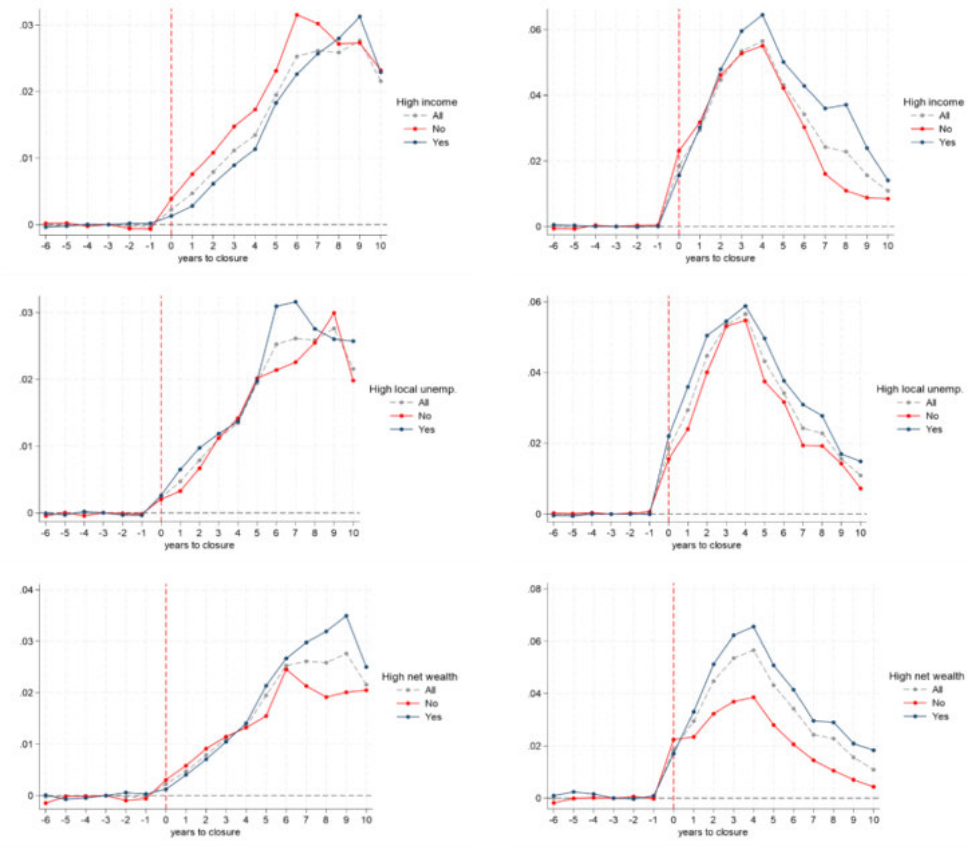


FIGURE 26. Retirement at 50-54 (left panes) and 55-59 by Income, Local Unemployment Rate and Net Wealth

Notes: The figures present six event studies. The panes on each row split the sample into two groups, as defined in the legends. Solid blue and red lines indicate group membership; dashed grey lines indicate sample means.

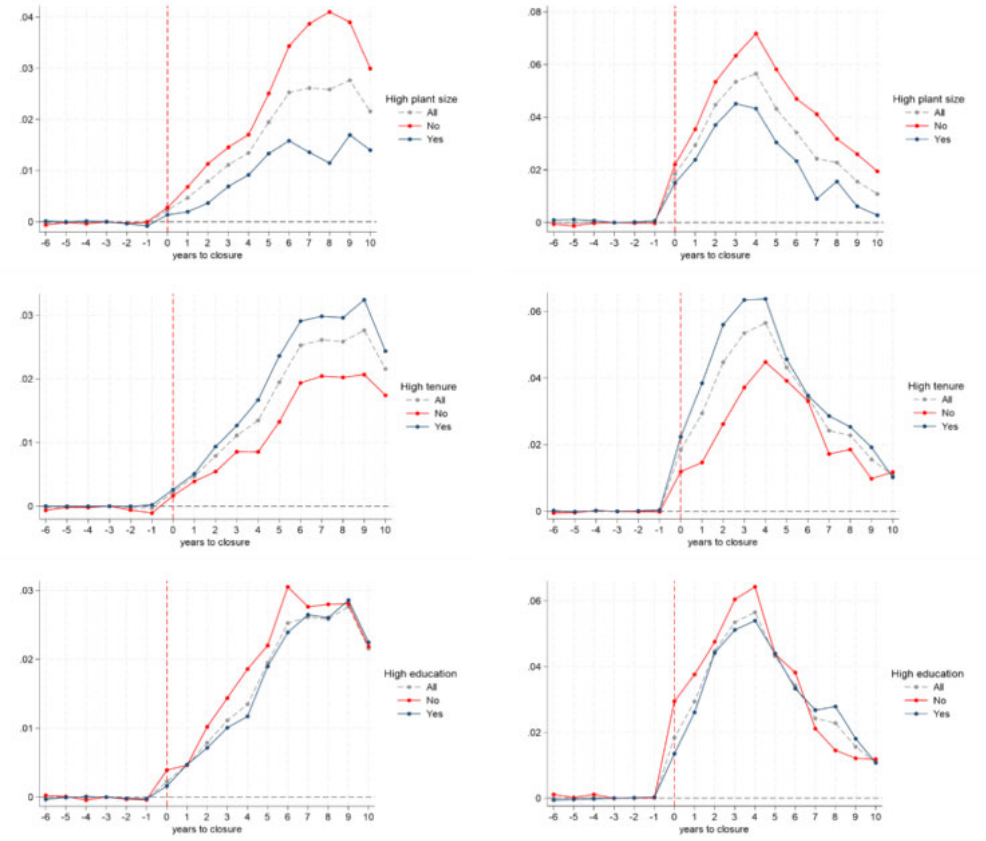


FIGURE 27. Retirement at 50-54 (left panes) and 55-59 by Plant Size, Job Tenure and Schooling

Notes: The figures present six event studies. The panes on each row split the sample into two groups, as defined in the legends. Solid blue and red lines indicate group membership; dashed grey lines indicate sample means.

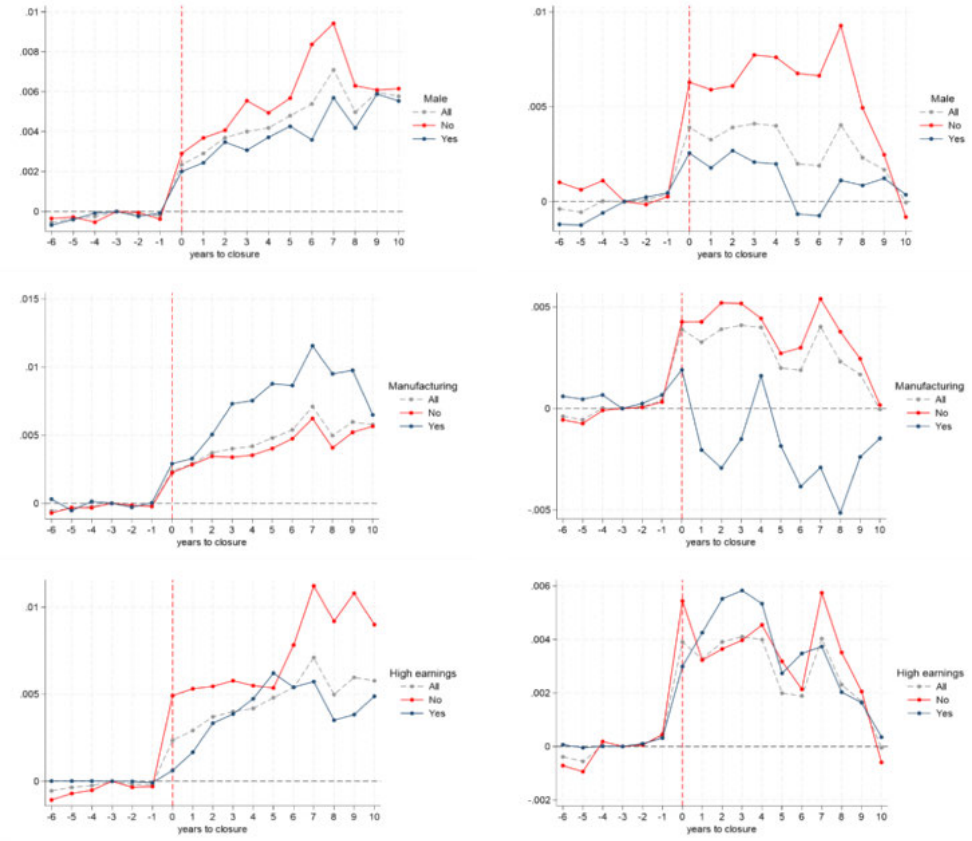


FIGURE 28. Disability at 50-54 (left panes) and 55-59 by Sex, Industry and Earnings

Notes: The figures present six event studies. The panes on each row split the sample into two groups, as defined in the legends. Solid blue and red lines indicate group membership; dashed grey lines indicate sample means.

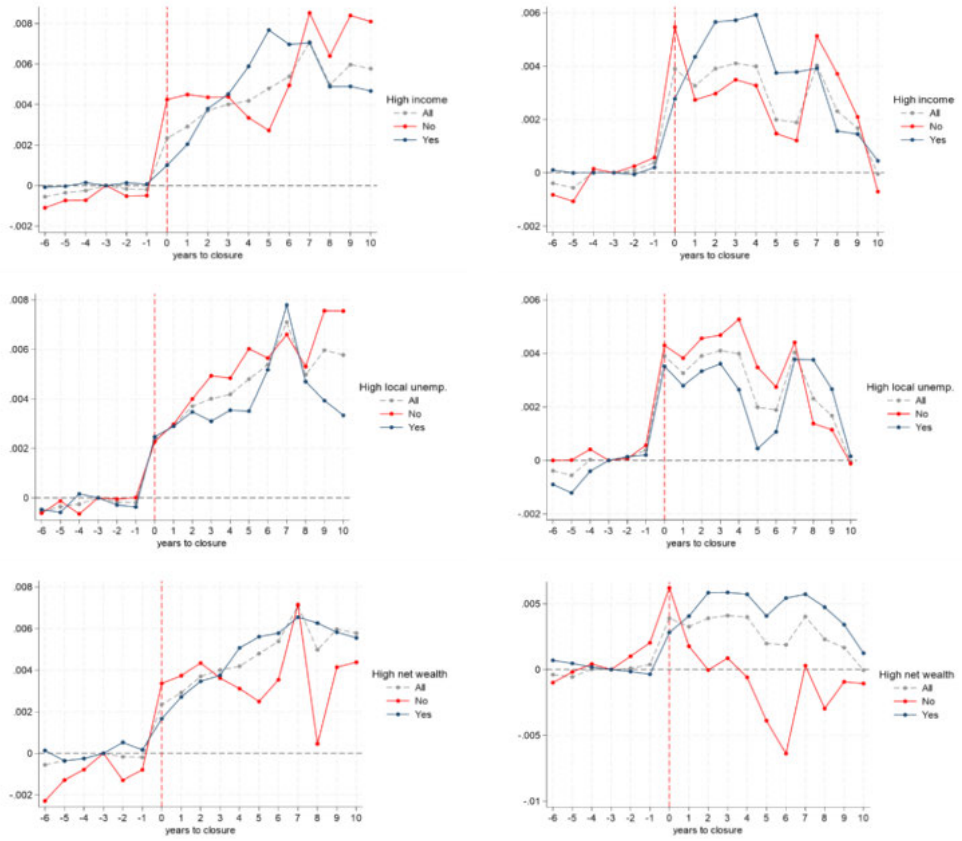


FIGURE 29. Disability at 50-54 (left panes) and 55-59 by Income, Local Unemployment Rate and Net Wealth

Notes: The figures present six event studies. The panes on each row split the sample into two groups, as defined in the legends. Solid blue and red lines indicate group membership; dashed grey lines indicate sample means.

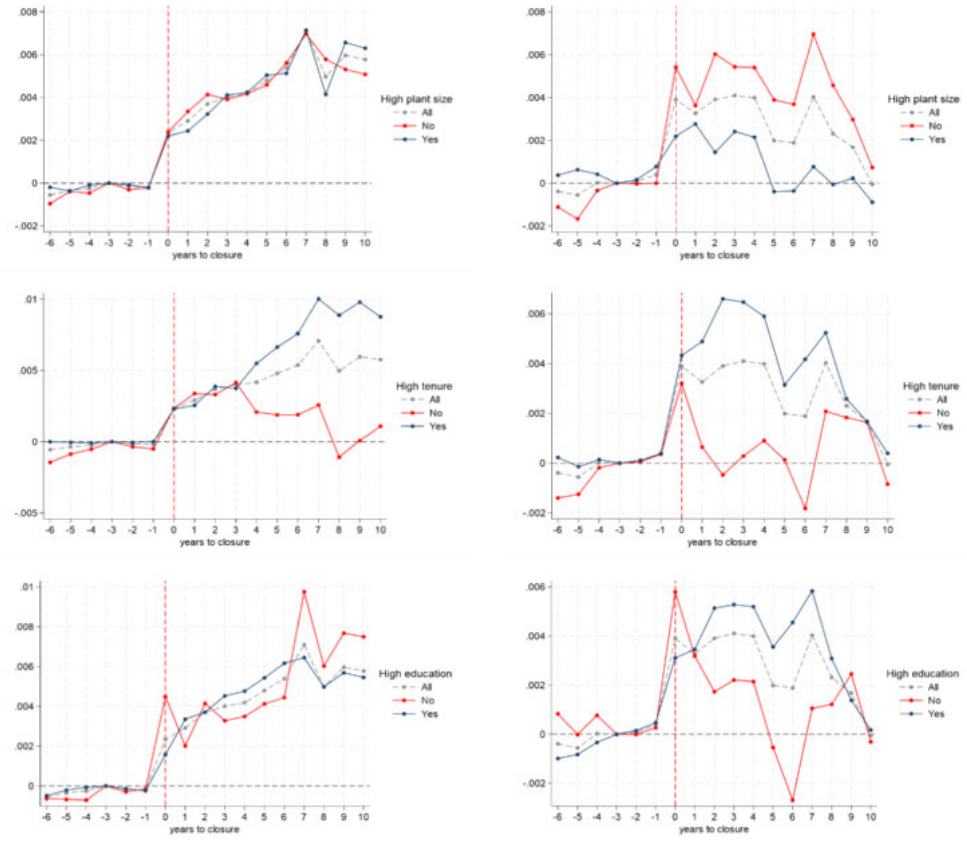


FIGURE 30. Disability at 50-54 (left panes) and 55-59 by Plant Size, Job Tenure and Schooling

Notes: The figures present six event studies. The panes on each row split the sample into two groups, as defined in the legends. Solid blue and red lines indicate group membership; dashed grey lines indicate sample means.

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