Disability Insurance Screening and Worker Outcomes[*]

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Abstract

We estimate the returns to more targeted disability insurance (DI) programs in terms of labor force participation, program spillovers, and worker health. To do so, we analyze workers after an acute workplace injury that experience differential levels of application screening. We find that when workers face stricter screening requirements, they are less likely to claim disability and are more likely to remain in the labor force. We observe no differences in any physical or mental health outcomes. Our findings imply that imposing stricter DI screening has large fiscal benefits but does not yield any detectable health costs, on the margin.

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I. Introduction

Disability insurance (DI) is a public expenditure program designed to provide income to individuals incapable of working due to health conditions. In many countries, DI costs and caseloads have been increasing in recent years, leading governments to consider alternative payment schemes and/or additional restrictions. Central to these discussions surrounding DI reform is whether DI is provided to people without sufficient need. In particular, one relevant policy question is whether more targeted applicant screening can play a critical role in reducing spending without harming total social welfare.

Although more effective gatekeeping can lower DI rolls and reduce financial burdens, the social costs may be large if potential recipients value DI benefits more than the fiscal cost. For example, stricter DI screening rules would be inefficient if rejected applicants must return to work but experience lifelong mental or physical health problems as a result. In this paper, we use newly linked data to assess these trade-offs and evaluate whether age-based DI screening requirements for workers experiencing a health shock affect worker labor market outcomes, health, and well-being.

For our analyses we focus on the subset of applicants at most immediate need of DI: acutely injured workers. These relatively clear-cut DI cases do not rely on subsequent appeals applications or judge leniency. This non-reliance on appeals cases is especially relevant given recent evidence that a large majority of applicants with less-severe cases receive DI based on appeal and many that are originally denied DI gain benefits due to appeal (French and Song, 2014; Maestas, Mullen, and Strand, 2021). Moreover, when analyzing the broader group of DI applicants, rejected applicants tend to be younger and experience greater labor force attachment (von Wachter, Song, and Manchester, 2011).

To overcome these limitations, we focus on male workers aged 55–62 before and after a workplace accident and leverage a 2013 reform in Austria to analyze the causal effects of changes in the DI determination process. In Austria, variation in DI screening is relative to an age cutoff, or "generous screening age" (GSA), where workers over the age threshold face more relaxed screening criteria for DI eligibility and experience higher rates of benefit receipt. Prior to 2013, the GSA ranged from 52–58, depending on a worker's birth year. By 2017, the GSA had increased to 60 for all cohorts. We focus on male workers for two reasons. First, the statutory retirement age is 60 for females, which coincides with the GSA after 2017. Second, male workers are much more likely to be injured on the job and more likely to remain in the workforce until age 65.[1]

Because of the staggered nature of the increase in the GSA, we are able to identify injured workers facing a more strict or less strict DI screening process, based on their birth cohort and time of accident. In other words, we compare male workers of the same age who are otherwise similar in terms of occupation and observable characteristics but experience a health shock during differing levels of DI screening scrutiny. We use these differences in screening levels to quantify the marginal effects of DI on measures of worker behavior and health.

Using data from the Austrian Social Security Database (Zweimüller, Winter-Ebmer, Lalive, Kuhn, Wuellrich, Ruf, and Büchi, 2009) on worker status, occupation, wages, unemployment insurance (UI) claims, and DI claims, linked with individual-level health data from the Upper Austrian Health Insurance Fund database, we find that looser screening regulations subsidize retirement by inducing injured workers to claim DI and permanently leave the labor force. We also find little systematic relationship between the likelihood of DI denial and other types of welfare program enrollment, like Unemployment Insurance (UI) and sick leave, consistent with other work (Koning and van Vuuren, 2010; Mueller, Rothstein, and von Wachter, 2016a). Importantly, we find that there are no positive mental or physical health benefits of claiming DI for workers on the margin of program entry. Estimates indicate no statistically significant effect on the take-up of opioids or antidepressants, outpatient expenditures, hospital stays, physician fees, re-injury, or mortality, suggesting that DI can create fiscal externalities.

Our findings build on an existing literature on the labor market effects of DI and their welfare consequences, and can help to inform criteria for optimal DI eligibility (Low and Pistaferri, 2015, 2020; Haller, Staubli, and Zweimüller, 2020). In particular, Haller, Staubli, and Zweimüller (2020)

[1]At age 65 male workers are no longer eligible for DI due to retirement eligibility.

analyze DI reforms in Austria and show that the 2013 screening reform was more optimal than an alternative policy of changing DI benefit generosity, but does not consider other potential welfare costs if changes in DI affects a returning worker's health. Generally, it is well-documented that DI has large disincentives for work, and previous papers have attempted to quantify this relationship. For example, existing work using randomly assigned judges to identify a marginal DI applicant shows that benefit receipt reduces labor force participation, with smaller reductions for those who are more educated (Maestas, Mullen, and Strand, 2013; French and Song, 2014; Autor, Kostøl, Mogstad, and Setzler, 2019). Such findings are consistent with work showing that DI application claiming elasticity is highest for prime-age, high-skilled, and high-income workers (Gruber and Kubik, 1997; Mullen and Staubli, 2016).

However, there is much less work on the health trade-offs of DI and whether policies can better target potential recipients. One such paper finds that providing financial incentive can induce DI recipients to return to work, indicating that this may be a fruitful avenue for reducing the fiscal burdens of the program and increasing productivity (Kostøl and Mogstad, 2014). Moreover, there is some evidence that changing the waiting periods to receive DI benefits could induce workers to continue working (Autor, Duggan, and Gruber, 2014).

Other studies linking DI to health focus on an extreme outcome—mortality—and show that DI has been successful at reducing mortality in the United States for some recipients (Gelber, Moore, Pei, and Strand, 2022), although some evidence suggests that DI can increase mortality due to reduced labor supply (Black, French, McCauley, and Song, 2017). Papers focusing on the historical introduction of pension programs also find reduced mortality rate for beneficiaries in the United Kingdom, with more muted effects for the U.S. (Jäger, 2022; Stoian and Fishback, 2010).

We build on this literature by studying multiple dimensions of more short-run physical and mental health in addition to safety net program spillovers and labor market effects. To evaluate the welfare effects of a more restrictive DI screening policy, we use a Marginal Value of Public Funds framework, which calculates both direct and indirect costs for potential screened-out beneficiaries as well as costs to the government in terms of DI payments and taxation. We find that screening out more marginal individuals has large potential fiscal benefits relative to the direct costs to workers. Consequently, our findings paint a broader picture of the comprehensive effects of DI and can help inform policy decisions regarding optimal DI regulation.

We note that the implicit price of providing DI benefits to applicants, in terms of impacts on the labor market, is larger in Austria than effects previously documented in the US (Haller, Staubli, and Zweimüller, 2020). This is not only due to the fact that replacement rates in Austria are slightly larger than in the U.S., but also because of the fact that Austria maintains some of the highest average tax rates in the world, implying that workers retiring early has large opportunity costs. Moreover, DI in the U.S. creates spillovers on other government transfer programs and often provides insurance against losses from other non-health income shocks (Deshpande and Lockwood, 2021). Nonetheless, the conclusions from our analysis are generally relevant for governments (like the U.S.) that still rely on aged-based DI policies and are especially relevant for governments in high-tax countries looking to reduce fiscal externalities associated with disability payments.

II. Disability insurance in Austria

Austria's DI program is financed by a payroll tax and provides partial earnings replacement to workers below the full retirement age. To be eligible for DI benefits, workers must have contributed to the program for at least 5 of the last 10 years and must not yet be eligible for age-dependent pension.

Disabilities must be attested by a licensed medical professional. A disability is classified as a mental or physical change in the wellness of an individual, sufficiently hindering them from gainful employment. Once benefits are awarded, DI beneficiaries receive monthly payments until their return to work, medical recovery, or death, although nearly all beneficiaries (96 percent) choose to remain out of the labor force.

DI has an approximate 70 percent replacement rate, calculated based on indexed capped earnings, age, and work experience. To determine claims, trained assessors evaluate whether an injured worker's occupational capacity has fallen by a significant margin as compared to an otherwise healthy worker. This margin of "occupational capacity" changes based on a worker's age. Assessors refer to the generous screening age (GSA), currently age 60. At the GSA, the screening criteria is more relaxed, asking whether a worker is experiencing a 50 percent reduced earnings capacity in their last occupation. For younger workers, the stricter DI criteria compares earnings capacity for *any* occupation. Therefore, older workers are much more likely to be awarded DI benefits, on average, and DI claims rise substantially after workers age into the GSA.

Until the end of 2012, the GSA was 57. However, in 2013, as part of the Stability Act, or *"Stabilitätsgesetz,"* Austria reformed these age-based screening requirements, slowly increasing the GSA from 57 to 60 over three years, making it more difficult for older workers to access DI benefits. In Figure 1 we provide a visual display of the changes in GSA after 2012. On the y-axis, we provide a selection of birth cohorts in our sample. The solid lines show in which years a worker would be subjected to stricter DI screening criteria if they experienced a health shock in that year. The dashed lines indicate when cohorts gain reduced screening eligibility. At age 65, workers no longer qualify for DI as they become eligible for regular retirement. For example, a worker born in 1956 would face stricter DI screening if injured in year 2013, when he is 57 years old. In 2014, however, that same worker would be 58 years old and would qualify for reduced screening. A worker born in 1957 (i.e., the "adjacent" cohort) would not yet qualify for reduced screening at 58 years old; his GSA would instead be 59. In other words, we consider an on-the-job injury to be an exogenous shock to a worker's potential DI eligibility and use this variation in GSA over time to compare otherwise-similar workers injured on the job.

III. Data

We use administrative data on all work accidents occurring between 2000 and 2017 from the Austrian General Accident Insurance Fund. Work accidents are unexpected injuries due to the worker's occupation, including both injuries happening both on the way to and from work and injuries at the workplace. The law requires firms to report work accidents that lead to more than three days of absence. Notably, Austrian firms do not participate in an employer's compensation program, and DI remains the primary welfare program to replace wages due to physical inability to work.[2]

The most common types of workplace injuries include falls and slips as well as wounds and superficial injuries from machines. Male workers experience nearly 73 percent of all workplace injuries in Austria. Industries with the highest counts of workplace injuries include construction, manufacturing, and trade.

We link these workplace accident data with social security records from the Austrian Social Security Database (Zweimüller, Winter-Ebmer, Lalive, Kuhn, Wuellrich, Ruf, and Büchi, 2009, ASSD). The ASSD contains employment and pension histories for the universe of Austrian workers between 1972 and 2021 as well as a limited set of demographic information, such as year and month of birth, sex, and blue- or white-collar status. These data also contain information on worker wages (up to a tax cap), retirement, and UI benefits. One limitation of these data is that while we are able to pinpoint DI claims, we are unable to observe applications or DI rejections. Therefore, we focus on the subset of workers who have an immediate need for DI to avoid any potential selection into the application or appeals process.

Additionally, we use medical claims data for one Austrian state from the Upper Austrian Health Insurance Fund (UAHIF). Upper Austria has approximately 1.5 million, or 17 percent, of the total inhabitants of Austria. The UAHIF is the statutory health insurance provider for all workers in regular employment, apart from those working in railway and mining. Workers on DI continue to be insured with the UAHIF, regardless of their former employment. The database contains all inpatient and outpatient claims for insured workers, including hospitalizations, physician visits, drug prescriptions, health care expenditures, and sick leaves. Drugs are classified according to the Anatomical Therapeutic Chemical (ATC) system. ICD-10 diagnoses are available only for hospitalizations and sick leaves (but not physician visits, unless a sick note was issued).

We restrict the sample to male workers for our preferred approach, consistent with Haller, Staubli, and Zweimüller (2020), although we later include female workers for supplemental analy-

[2]Employers are covered by accident insurance, which pays for medical fees and transportation to hospitals. However, this type of insurance does not cover wage replacement.

ses. The primary reason for this restriction is that for female workers, the statutory retirement age is 60, which coincides with the GSA threshold after 2017. For males, the retirement age is 65.[3] We also restrict the sample to workers aged 55–62 at the time of the accident to avoid comparing workers at substantially different ages and career stages. In Figure A1, we show how DI take-up varies after a workplace accident by age group. As shown here, workers under the age of 55 are much less likely to claim DI (< 5 percent) after a workplace accident, as are workers over the age of 62 that soon qualify for retirement. However, workers aged 55-62 have a 20 percent chance of being enrolled in DI within 12 quarters of a workplace accident, motivating us to focus on this group.

In Table A1, we provide summary statistics for worker characteristics, including variables that proxy for pre-accident physical and mental health status. In Columns 1 and 2 we present the mean and standard deviation, while in Columns 3 and 4 we separately show means for the groups facing stricter and more generous DI screening criterion, respectively. In Column 5 we show the difference in means between the groups and indicate whether this difference is statistically significant. We note that the group facing stricter screening requirements is approximately 2.7 years younger, on average, but has similar experience years and wages. Moreover, we note that all health outcomes for the two groups prior to the workplace accident are not statistically different.

IV. Empirical approach

To estimate effects of DI screening we use a two-way fixed effects (TWFE) model that exploits the quasi-random timing of work accidents. For each worker i in quarter t, we estimate the following models using OLS:

$$y_{it} = \alpha_i + \alpha_t + strict_{it}\delta + x_{it}\beta + \varepsilon_{it}, \tag{1}$$

[3] Indeed, we observe gender differences in work behavior driven by these different retirement incentives; for example, while we estimate no increase in regular retirement for male workers aged 55–62 after a workplace injury, we find that female workers are 10 percent more likely to retire in the three years after an accident. Therefore, we focus on those male workers who were not yet eligible for paid retirement.

where y_{it} is the outcome of interest, including DI and UI take-up, employment status, wages, health care utilization, and prescriptions. α_i and α_t are worker and relative time fixed effects. $strict_{it}$ is a dummy equal to one if i is subject to stricter DI screening criterion, which depends on the workers' age and the time of the accident, and is equal to zero if the worker is above the GSA threshold at the time of the accident. Because we compare labor market and health outcomes of workers who have accidents at different times, x_{it} includes a full set of age-in-years fixed effects. In other words, we compare same-age workers who are eligible for stricter screening after an accident based on their age relative to the GSA at the time of the accident compared to ineligible cohorts, over time.

To estimate dynamic effects, we extend Equation (1) to allow the effect of DI screening to vary 12 quarters before and 12 quarters after the work accident as follows:

$$y_{it} = \alpha_i + \alpha_t + \sum_{k=-12 \mid k \neq -1}^{12} (\tau_k \cdot strict_{it})\delta_k + x_{it}\beta + \varepsilon_{it}, \tag{2}$$

where $\tau_k = 1\{t = k\}$ indicates quarters relative to the work accident with $t = -1$ as the base period, and the post-accident coefficients $(\delta_0, \ldots, \delta_{12})$ give estimated differences in y between workers who qualify for generous and strict DI screening relative to the base period.

Identification of the above models rests on the assumption that the trends in labor and health outcomes of workers subject to more restrictive DI screening would continue along the same trend had they been eligible for a reduced level of DI screening. In other words, we consider a worker's injury to be an exogenous shock and compare otherwise similar workers subject to differential screening requirements before and after the injury. We present evidence in support of this assumption in a number of ways. First, we show there is no discontinuous increase in accidents at the age when workers would be subjected to less generous DI screening. Second, we show that the leading coefficients $(\hat{\delta}_{-12}, \ldots, \hat{\delta}_{-2})$ are statistically insignificant across outcomes. This provides some support for the notion that workers do not systematically change behavior prior to a work accident.

V. Results

V.1. Effects of Increased DI Screening on Labor Market Outcomes

We first present evidence that acute workplace injuries are associated with higher DI take-up and that the level of DI claiming varies depending on whether a worker is subjected to harsher or less harsh application screening. Figure 2 shows effects on DI take-up. In the top panel, we show the change in the probability of DI claiming after a workplace accident for all male workers aged 55–62. Importantly, take-up of DI increases steadily in the four quarters following an accident, with the largest increases occurring 1–2 quarters afterwards. We note that DI applications undergo some screening lag time, which is why we do not expect effects on DI claims to occur only in the immediate period ($t = 1$). In the bottom left panel, we plot the unconditional probability of claiming DI for both screening schemes over time relative to the accident. Prior to an accident, workers must be employed and therefore DI take-up is zero, by construction. After a worker experiences an accident, DI claims increase in both groups. However, the increase is markedly smaller for workers who qualify for stricter screening.

The bottom right panel shows dynamic estimates from Equation (2), conditional on worker and age fixed effects. Similar to the results discussed above, estimates indicate a large and statistically significant effect of stricter DI screening that increases at a decreasing rate over time. If we estimate the static model in Equation (1), we find that stricter DI screening leads to a 7.8 percentage point decrease in DI take-up, on average.[4,5,6]

Importantly, we show that this is not due to workers manipulating themselves around the screening age cutoff. In Figure A2 we plot the probability of having a work accident for the

[4] We include age fixed effects in an attempt to better compare otherwise-similar workers facing differential screening criterion. When not including age fixed effects, estimates are similar to the main results in sign and magnitude.

[5] Notably, the graphs in the right panel uses within-age variation only for the last three birth cohorts (1956, 1957, 1958), as these cohorts experienced changes to the GSA over time. If we drop earlier cohorts, estimates are nearly identical to the main results. Figures in the left panel, which present the raw data, show changes over time for all cohorts in the sample.

[6] These results are similar if we use the interaction weighted (IW) estimator by Sun and Abraham (2021) instead of standard TWFE. The IW estimator gives coefficients of -0.055 ($p < 0.001$) for DI take-up and 0.084 ($p < 0.001$) for the probability of being employed.

universe of Austrian workers by age relative to the age where they experience reduced screening. If anything, accidents decrease slightly once workers age into the GSA.

In Figure 3 we perform the same exercise for the probability of being employed and wages. Prior to the accident, the trends for the two groups overlap. After the accident, workers in both groups are more likely to leave the labor market. However, the outflow is much weaker among those that are subject to stricter DI screening. This is mirrored by the TWFE estimates in the top right panel. We find that, on average, increasing DI screening increases employment by 10.6 percentage points ($p < 0.001$), or 11.8 percentage points over 12 quarters. In our sample, this corresponds to an additional 470 workers continuing to participate in the labor market that would have otherwise retired over three years. Notably, this is almost identical to the magnitude for the take-up in DI, providing preliminary evidence that there is little substitution to other government transfer programs for these workers.

Additionally, in the bottom panel of Figure 3, we show that more targeted DI screening has longer-run effects on wages. Prior to a work accident, workers facing both stricter and more generous screening criteria have similar levels of daily wages (approximately 90 euros per day). However, estimates indicate that workers facing stricter DI screening are not only more likely to reenter the workforce, but also experience higher earnings trajectories. When estimating effects on wages, those subject to stricter DI requirements additionally earn approximately 2,075 euros per year more, on average.

One concern may be that workers subjected to reduced screening are slightly older and therefore closer to retirement. We address this in two ways. First, omitting workers 60 and older who may be eligible for retirement eliminates the worry that these individuals simply take up a different government transfer. When considering only male workers aged 55–60, our TWFE estimates are statistically similar to the baseline results. Second, we show that these effects hold only for workers eligible for DI. In Figure A3 we estimate effects for workers who do not meet the experience criterion for DI (e.g., working 5 out of the last 10 years), and therefore are ineligible to claim DI after a workplace accident. TWFE estimates on DI take-up, employment, and outpatient expenses are statistically insignificant, providing some support for the notion that differences in DI eligibility are driving our effects.[7] Taking this further, in Figure A4, we show that our findings are robust to considering several different age windows between ages 52 and 65.

V.2. Effects of Increased DI Screening on Program Substitution

Furthermore, we note that workers screened out of DI switch to other forms of welfare, which could potentially increase fiscal costs. In Figure A5 we analyze effects on UI take-up. We find that workers subjected to stricter DI screening are no more likely to claim UI in the first two years after injury but are 2 percentage points more likely to claim UI in the 8–12 quarters after a workplace accident. This is consistent with other evidence from Austria, the U.S., and the Netherlands showing that while there is substitution from UI to DI programs (Ahammer and Packham, 2020), there is little substitution of disabled individuals ending up on UI (Koning and van Vuuren, 2010; Mueller, Rothstein, and von Wachter, 2016b).

Similarly, Figure A6 presents effects on the number of sick days taken for workers who previously experienced a workplace injury. Estimates indicate that workers subject to stricter screening take 1.6 more sick days per quarter in the quarters following an injury than their counterparts, likely driven by the relative increase in the return to work.

Finally, we check whether workers are more likely to enroll in marginal employment after claiming DI. In Austria, DI beneficiaries are eligible to return to “marginal" work for a maximum of 475 euros in earnings per month. In Figure A7 we show that workers are not differentially likely to be in marginal employment if subject to more generous DI screening. Altogether, these findings suggest that there is minimal substitution towards other safety net programs when marginal workers face more hurdles in DI claiming.

[7] We have also considered a TWFE approach, using a sample of only female workers. Female workers are eligible for retirement at even earlier ages than male workers (60 years old). Female workers are still subject to the same screening ages for DI as male workers. Estimates indicate a statistically significant 4.8 percentage point increase in employment for those subjected to stricter DI screening, implying that our findings are smaller but still hold when accounting for potential earlier retirement.

V.3. Effects of Increased DI Screening on Worker Health

Next, we analyze more comprehensive effects of increasing DI screening. In particular, we provide novel estimates determining whether screening out more marginal workers affects short- or long-run health physical and mental health outcomes. In Figure 4, we provide preliminary evidence on worker health care utilization, including hospital days, physician fees, and reinjury. These data are only available for Upper Austria; hence our sample is reduced by almost 90 percent.[8]

Pre-period trends in hospital days (Panel (a)) for the treatment and comparison group overlap and track each other in the raw data. In the quarter of the accident, hospital days spike for both groups, suggesting that the accident leads to around a week-long hospital stay. After the accident, the trends converge again. TWFE estimates indicate a 0.2 day increase in hospital stays, on average, due to stricter DI screening. Although this increase is statistically significant for quarters 0 and 2, it is too small to be economically meaningful.

In Figure 4 Panels (b) and (c) we also show effects of DI screening on other measures of healthcare utilization, including physician fees and likelihood of reinjury. Estimates indicate no differential effects for the two groups for either outcome, further implying that screened out workers are no more likely to reinjure themselves when returning to work. Similarly, in Figure 5 we show effects for prescription take-up as a way to test other measures of both physical and mental health. We test effects for opioids to observe post-accident pain, antidepressants to measure poor mental health, and cardiac drugs, to proxy for adverse lifestyle choices, like smoking or poor diet. We find no statistically significant positive effects for any measure. If anything, estimates indicate a reduction in antidepressant medications, consistent with recent work showing pyschosocial benefits of working for men (Hussam, Kelley, Lane, and Zahra, 2022). When using a combined measure of healthcare utilization, total outpatient expenditures, we also find no statistically significant effects.[9]

[8]For completeness, we replicate our first stage findings with this reduced sample. Estimates follow a similar pattern to those of the full sample and indicate a 6.8 percent increase in DI take-up and a 3.5 percent increase in employment for workers facing stricter screening requirements. Estimates are significant at the 5 percent level and the respective confidence intervals overlap with our main results in Figures 2 and 3, suggesting that our health findings are relevant in this broader context.

[9]See Figure A8. The IW estimator by Sun and Abraham (2021) gives a similar coefficient estimate (8.3), which is insignificant at the 10 percent level.

These findings further reinforce the notion that, for marginal workers, more generous DI screening subsidizes retirement but yields little to no health benefits.

Lastly, in an effort to stay consistent with the existing literature, we estimate effects on mortality. One advantage of testing this outcome is that it allows us to use the full sample of Austrian workers, instead of only Upper Austrian workers. Since we cannot test for mortality pre-trends in our standard TWFE design, we instead estimate local average changes around the generous screening age cutoff using a standard regression discontinuity design. We find no effects of changes in DI screening on mortality five years after a workplace accident. However, we note that one major limitation of this design is that it inherently compares younger workers to older workers, making our preferred TWFE design more ideal for studying changes in short-term health outcomes in this setting.

VI. Measuring Welfare Effects

In this section we present the general Marginal Value of Public Funds (MVPF) framework for measuring the welfare effects of increased DI screening for marginal claimants, as suggested by Finkelstein and Hendren (2020) and Hendren and Sprung-Keyser (2020). To do so, we ask whether expanding the DI program—that is, allowing *more* individuals to claim DI on the margin—would be welfare improving. In our context, the MVPF measures the ratio between the aggregate willingness to pay for more generous DI benefit screening and the net cost of the policy to the government. In particular, the MVPF for imposing a more generous DI screening policy is as follows:

$$\text{MVPF} = \frac{\text{WTP}}{\text{Net Cost}} \tag{3}$$

This statement implies that the larger the MVPF, the more welfare the government generates per dollar spent. If the policy generates revenue that more than covers the cost, then the MVPF is equal to infinity.

We first calculate the costs of implementing a more generous DI eligibility criteria, including any direct fiscal costs and any spillover costs from foregone tax revenue, cost savings from other safety net programs, or indirect effects on healthcare spending. We then consider society's willingness to pay for such a social insurance program, based on existing risk premium estimates of other European DI programs.

To start, we calculate the denominator of the MVPF, the net DI cost per recipient, on the margin. Workers eligible for DI remain on the program as a form of retirement. In our sample, we estimate that workers claiming DI after an on-the-job injury receive an average yearly payment of 16,790. Therefore, the mechanical reduction in costs for increasing DI screening is equal to about 6.3 million euros over three years, or 2.1 million euros each year.

Furthermore, the government experiences lost tax revenue as a result of screened out workers leaving their jobs. These foregone revenues are important to consider in relatively high-tax countries, like Austria, and especially relevant in our context, as we show that wages for returning workers continue to trend upward over time. Most of our injured workers are lower-income, blue collar workers. Therefore, in an effort to be conservative, we assume these wages would be taxed at 20 percent, the lowest tax bracket in Austria. In this case, given the average wage for our sample of about 24,000 euros, we should expect that the government will give up 750,000 euros each year due to the additional DI claims.

We note that an additional potential fiscal externality is healthcare spending for screened out workers. However, we find no indirect effects of changes in DI screening on healthcare utilization, implying no savings from a more generous screening criterion. Lastly, we estimate only modest effects on UI and retirement beginning six quarters after injury, implying economically insignificant spillover costs to other programs, like UI.

Next, we calculate WTP by measuring society's willingness to pay (WTP) for a policy allowing for more generous screening. We note that the ex-ante WTP will depend heavily on assumptions about an individual's disutility of work after an accident, and therefore may be ambiguous. Nonetheless, similar to Hendren and Sprung-Keyser (2020), we calculate the WTP from the average benefit amount and reduction in earnings. Based on the fact that DI has a 70 percent replacement rate, on average, this implies that the additional workers are willing to give up 7,196 euros per year in income, or, in other words, claim 17,000 euros in DI benefits.[10] Adding up this foregone income across these marginal workers, we can estimate a willingness to pay of approximately 2.6 million euros per year (17,000 euros x 470 cases / 3 years).

Putting these two pieces together, we calculate a MVPF of reduced DI screening of 0.91. This is consistent with work by Hendren and Sprung-Keyser (2020) showing MVPF estimates for DI spending increases ranging from 0.74–0.96. Based on our estimates, tightening the screening standards for DI has fiscal benefits with minimal health and labor market effects for the marginal worker.

VII. Discussion and Conclusion

In this paper we use data from Upper Austria on worker accidents and DI claims to estimate the effects of a 2013 policy change in disability screening requirements on worker outcomes. Using linked administrative data on workers injured on the job and DI claims, we find that stricter DI screening reduces the probability of workers permanently leaving the workforce, on the margin. This induced return to work does not result in any adverse health consequences in the long run, as measured by reinjury, hospital stays, prescription drug take-up, or mortality. We calculate that stricter screening policies are cost effective, implying that inducing the marginal worker to stay on the job after recovery is welfare enhancing. These findings are especially relevant for governments looking to reduce the rising fiscal costs of disability payments without inducing lifelong health consequences for workers.

[10] In the four quarters just prior to the DI claim, our sample of workers injured on the job earn an average salary of 23,986 euros.

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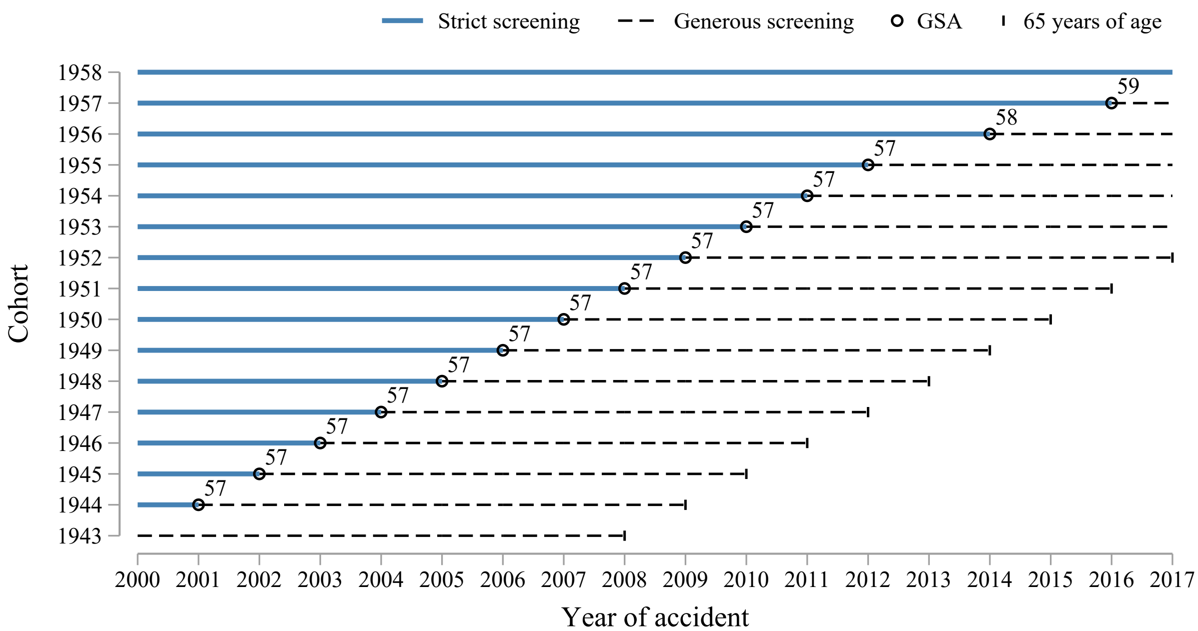
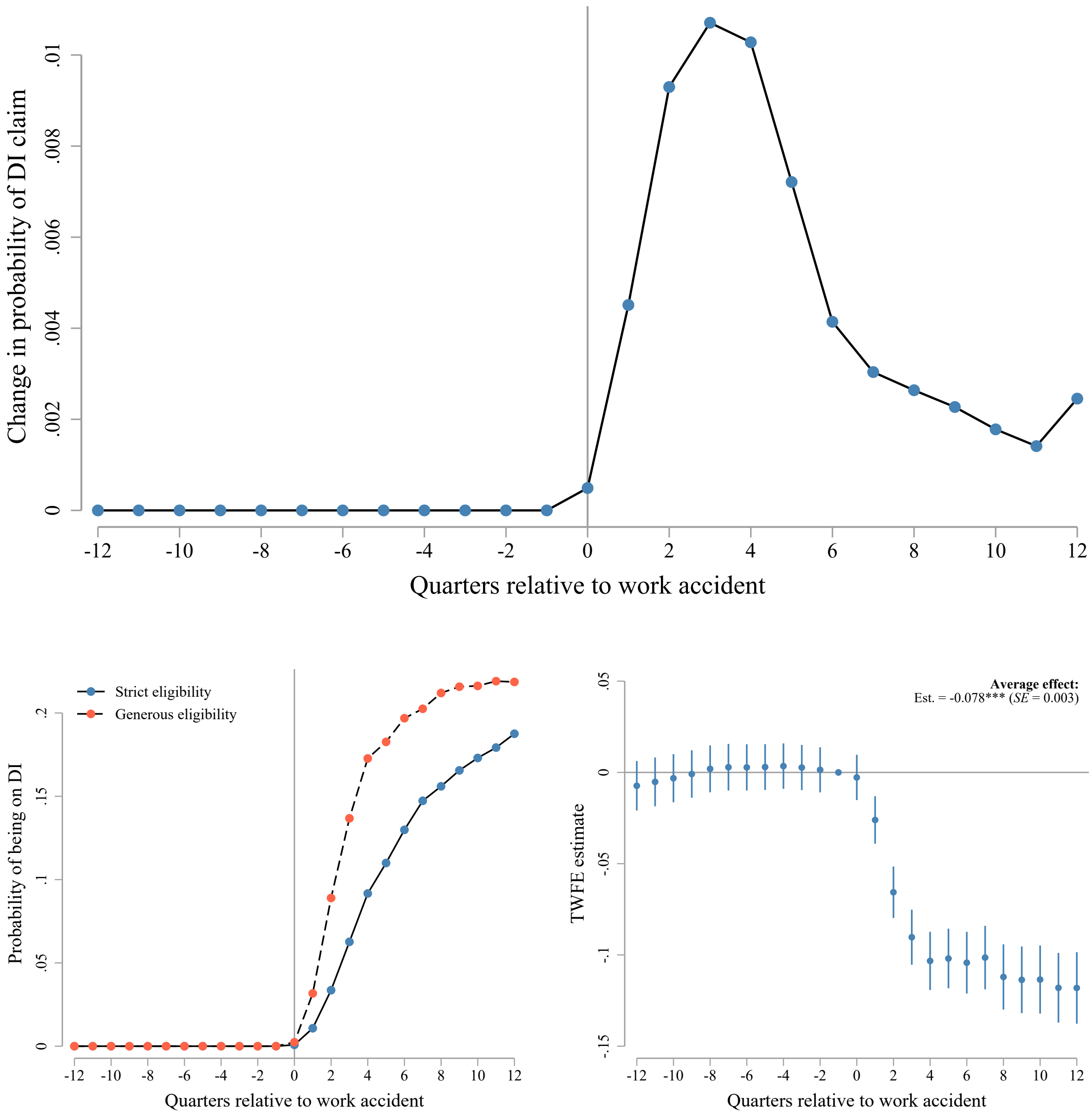
A. Figures and Tables

Figure 1 — Generous Screening Age, Based on Birth Cohorts



Notes: “Cohort" refers to the birth year of a worker. The shaded line represents years in which a worker is subjected to a stricter DI screening criteria and the dashed lines represent years in which a workers is eligible for more generous screening, based on their birth cohort and the 2013 policy reform. The GSA is 57 for workers born before December 1955, 58 for workers born between December 1955 and November 1956, 59 for workers born between December 1956 and November 1957, and 60 for workers born after November 1957. After age 65 workers are no longer eligible for DI and must instead file for normal retirement.

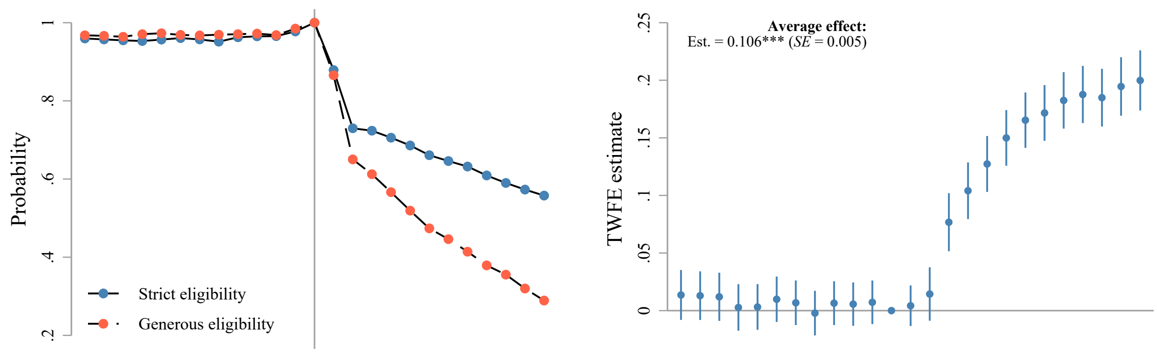
Figure 2 — Change in the Probability of Claiming DI Relative to a Work Accident



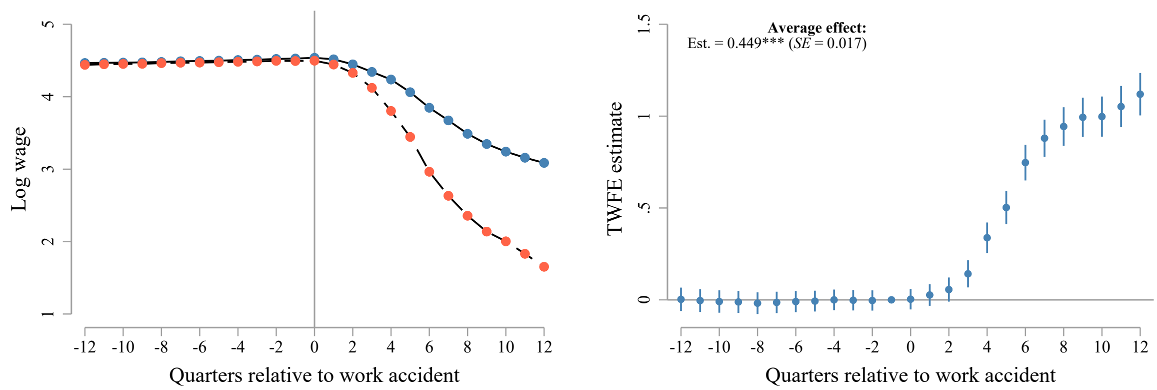
Notes: Individual-level data on workplace accidents is from the Austrian General Accident Insurance Fund. Data on DI enrollment is from the Austrian Social Security Database files. The sample includes all male workers aged 55–62 who experienced a work accident between 2000 and 2017 (N = 6,394). The top panel plots the marginal change for all workers aged 55–62 in DI claiming after a work accident. The bottom left panel plots raw probabilities for each quarter relative to the work accident for workers subjected to a more generous DI screening process based on the GSA (e.g., "Generous eligibility") and those subjected to a more strict process (e.g., "Strict eligibility"). The bottom right panel plots TWFE estimates from Equation (2).

FIGURE 3 — Probability of Being Employed and Log Daily Wages

(a) Probability of being employed



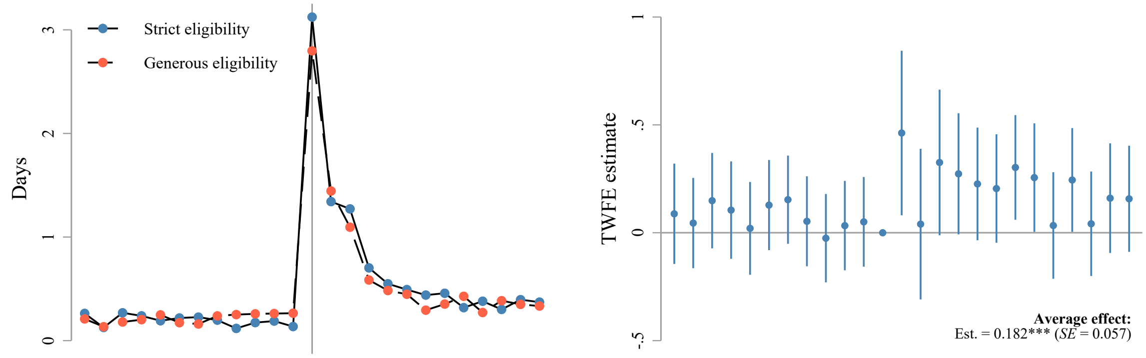
(b) Log daily wages



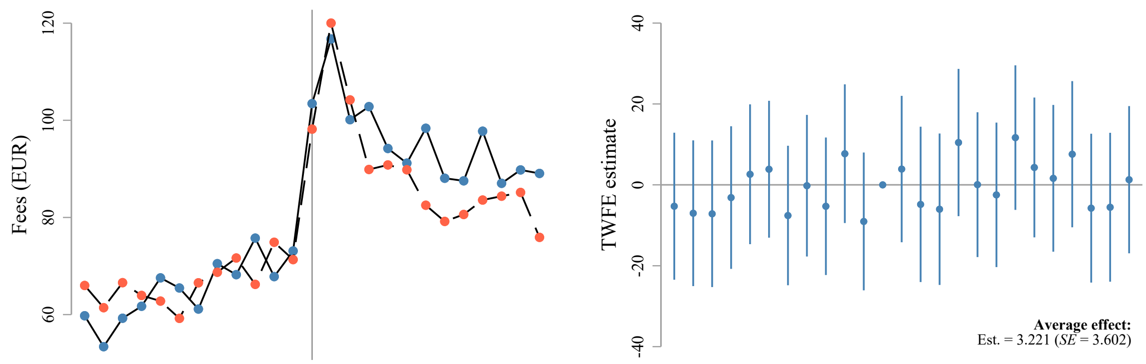
Notes: Individual-level data on workplace accidents is from the Austrian General Accident Insurance Fund. Data on DI enrollment and labor market participation and wages for Austrian workers is from the Austrian Social Security Database files. The sample includes all male workers aged 55–62 who experienced a work accident between 2000 and 2017 (N = 6,394). The left panel plots raw probabilities for each quarter relative to the work accident for workers subjected to a more generous DI screening process based on the GSA (e.g., "Generous eligibility") and those subjected to a more strict process (e.g., "Strict eligibility"). The right panel plots TWFE estimates from Equation (2).

Figure 4 — Healthcare Utilization

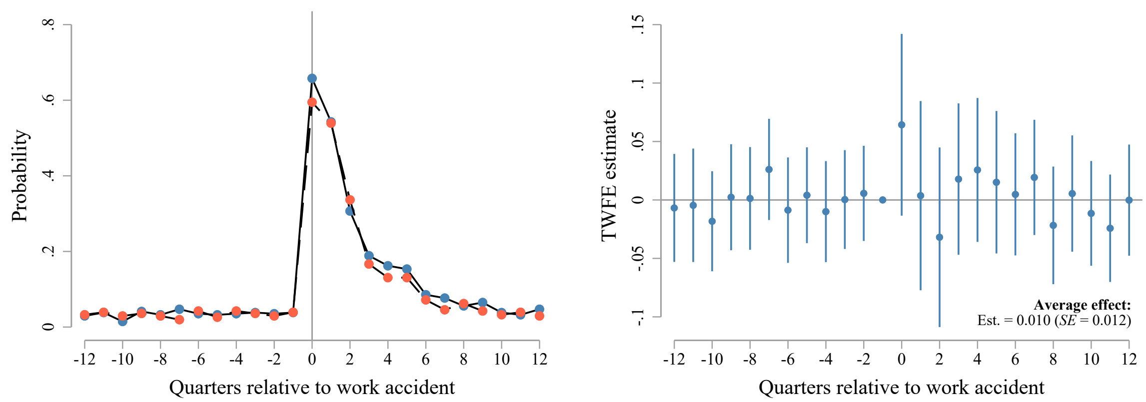
(a) Hospital days



(b) Physician fees



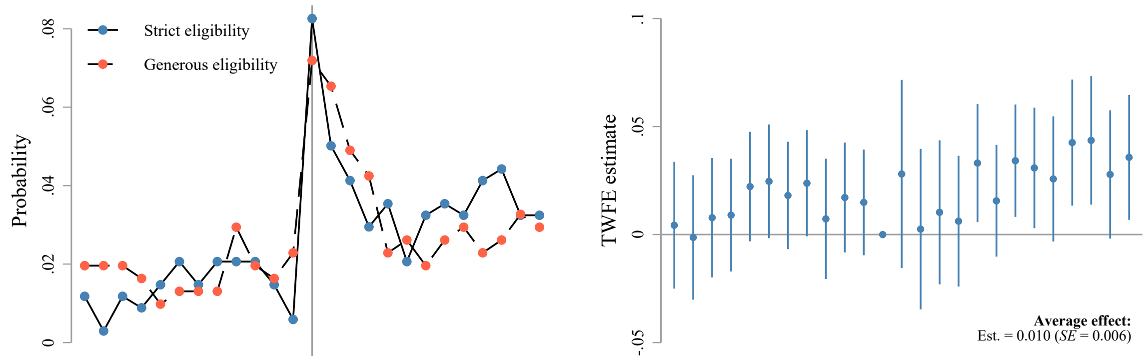
(c) Accidents or injuries



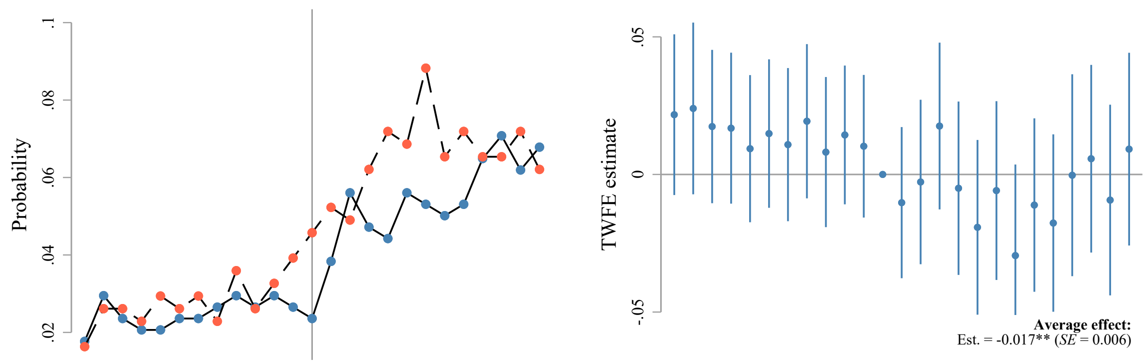
Notes: Individual-level data on workplace accidents is from the Austrian General Accident Insurance Fund. Data on health outcomes for Upper Austrian workers is from the Upper Austrian Health Insurance Fund database files. The sample includes all Upper Austrian male workers aged 55–62 who experienced a work accident between 2000 and 2017 (N = 645). The left panel plots raw probabilities for each quarter relative to the work accident. The right panel plots TWFE estimates from Equation (2).

Figure 5 — Prescription Take-Up

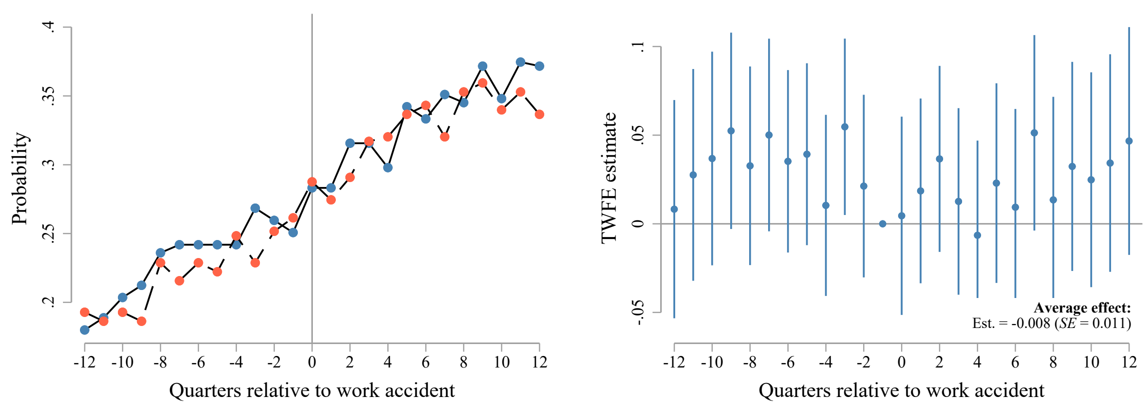
(a) Opioid prescriptions



(b) Antidepressant prescriptions



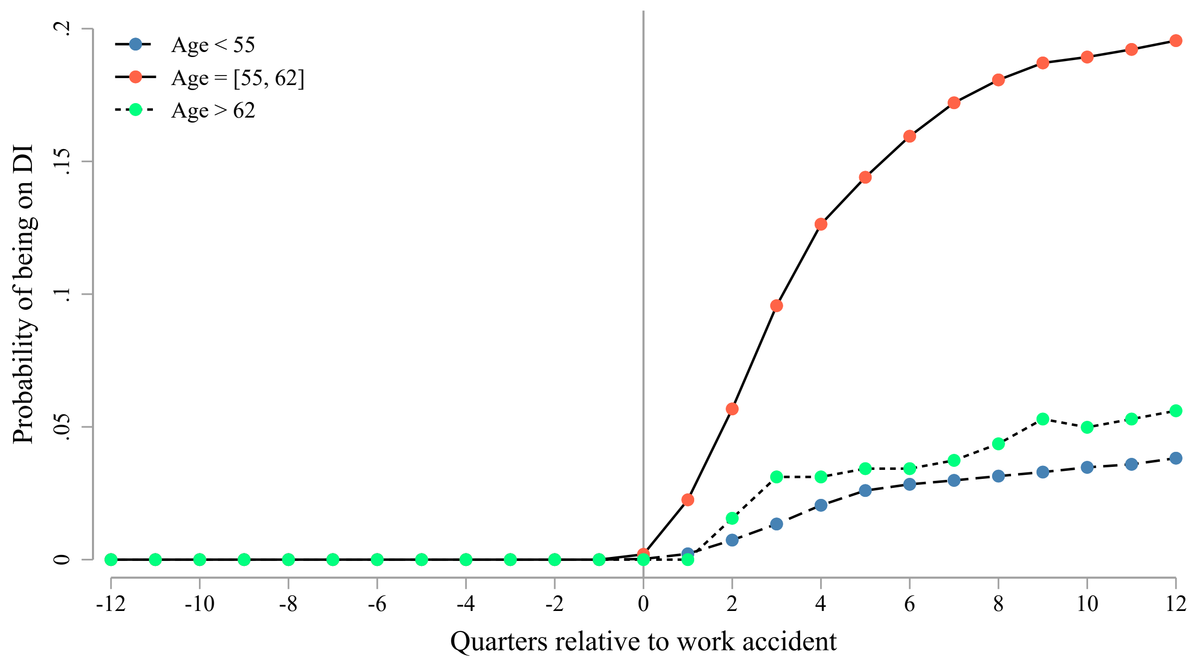
(c) Cardiac drug prescriptions



Notes: See Figure 4.

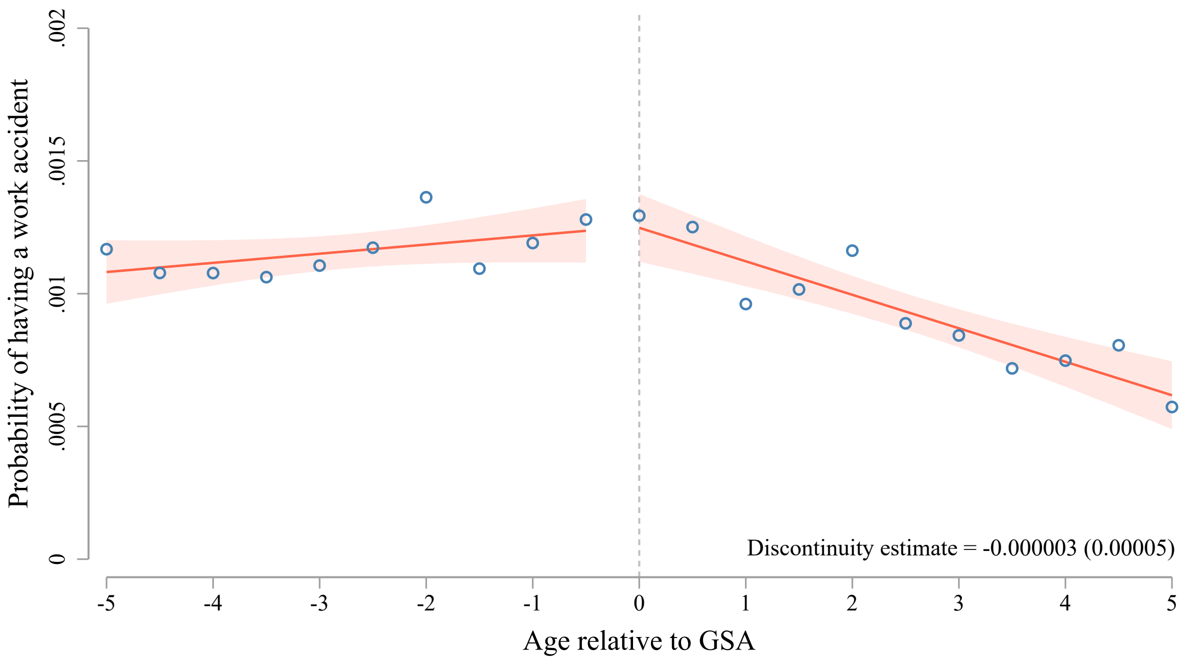
Appendix

Figure A1 — Probability of Filing DI Claim Over Time Relative to Work Accident, by Age



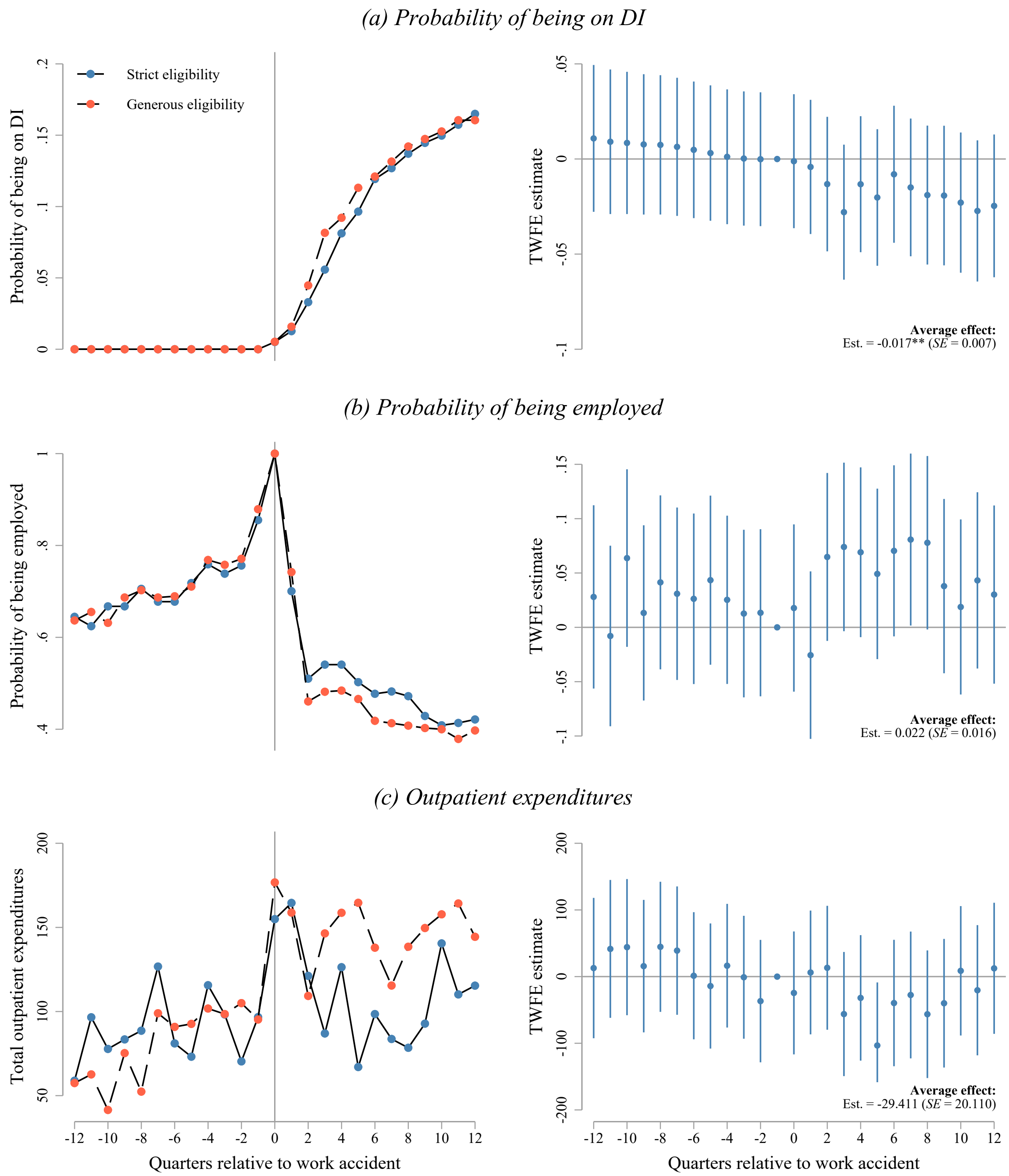
Notes: See Figure 2. The dashed line represents the probability of being on DI for workers aged less than 55, the solid line represents our main age group of interest, 55–62 year olds, and the dotted line represents workers over the age of 62.

Figure A2 — Probability of Experiencing a Work Accident by Age, Relative to the Generous Screening Age (GSA)



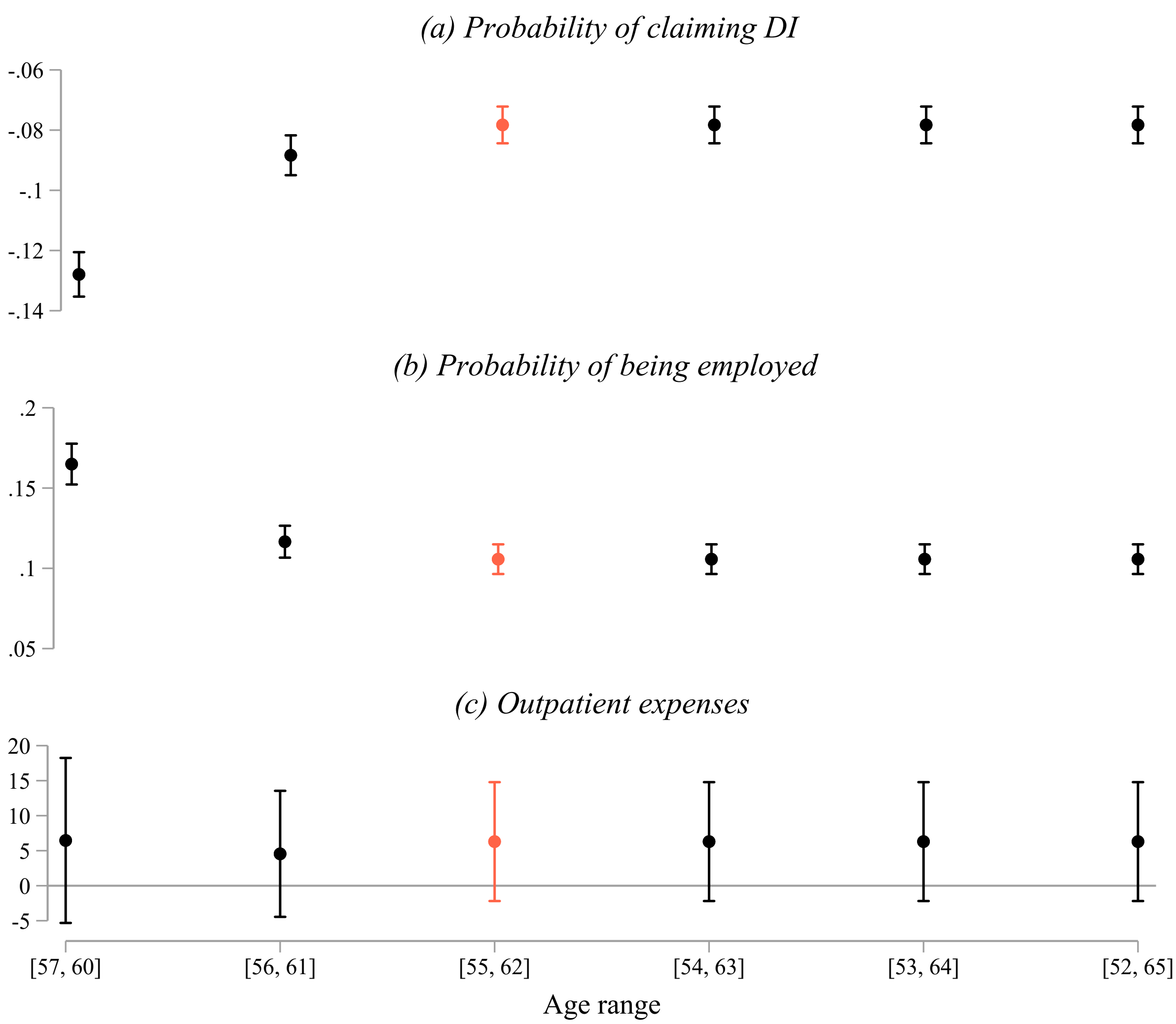
Notes: Individual-level data on is from the Austrian Social Security Database. The sample includes all male workers aged 55–62 employed at least 90 days in a given year between 2000 and 2017. The GSA is 57 for workers born before December 1955, 58 for workers born between December 1955 and November 1956, 59 for workers born between December 1956 and November 1957, and 60 for workers born after November 1957. Scatters represent the mean residual of the listed outcome variable (whether workers experience a workplace accident) net of quarter-year fixed effects for each 6-month bin. The vertical line represents the age at which workers are eligible for the GSA, based on their birth cohort and year of injury.

Figure A3 — Placebo Check: Workers who Do Not Meet the Experience Criterion



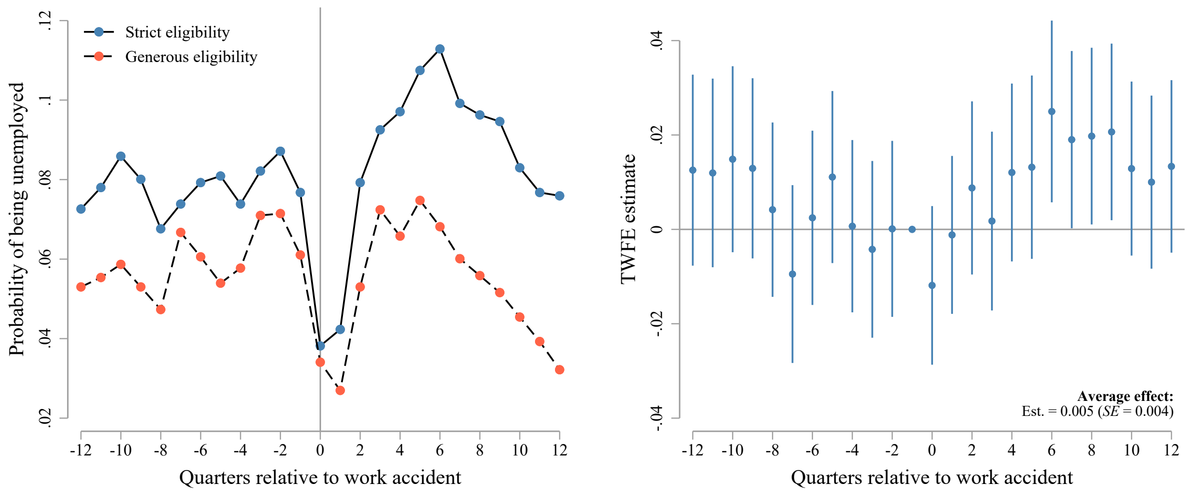
Notes: Individual-level data on workplace accidents is from the Austrian General Accident Insurance Fund. Data on DI enrollment and labor market participation and wages for Austrian workers is from the Austrian Social Security Database files. Linked data on health outcomes for Upper Austrian workers is from the Upper Austrian Health Insurance Fund database files. The sample includes workers aged 55-62 employed at the time of a workplace accident who do not meet the experience criterion to be eligible for DI (i.e., have not contributed for at least 5 of the last 10 years).

Figure A4 — Robustness to Using Different Age Windows



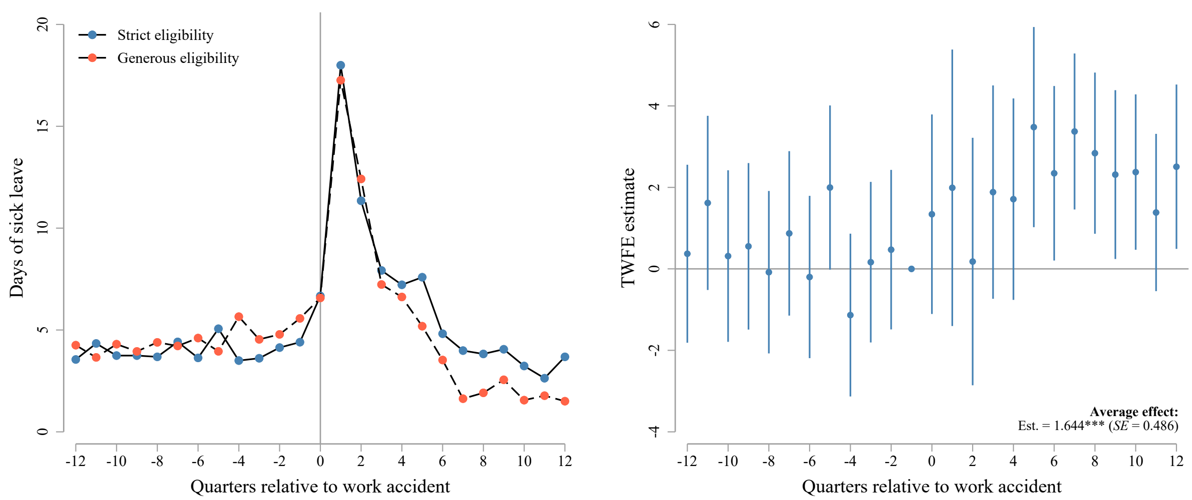
Notes: Individual-level data on workplace accidents is from the Austrian General Accident Insurance Fund. Data on DI enrollment and labor market participation and wages for Austrian workers is from the Austrian Social Security Database files. Linked data on health outcomes for Upper Austrian workers is from the Upper Austrian Health Insurance Fund database files. Coefficients and their respective 95% confidence intervals are generated from separate regressions following Equation (1) and include the sample of Upper Austrian male workers who experienced a workplace accident in the respective age ranges.

FIGURE A5 — Probability of Claiming UI Benefits



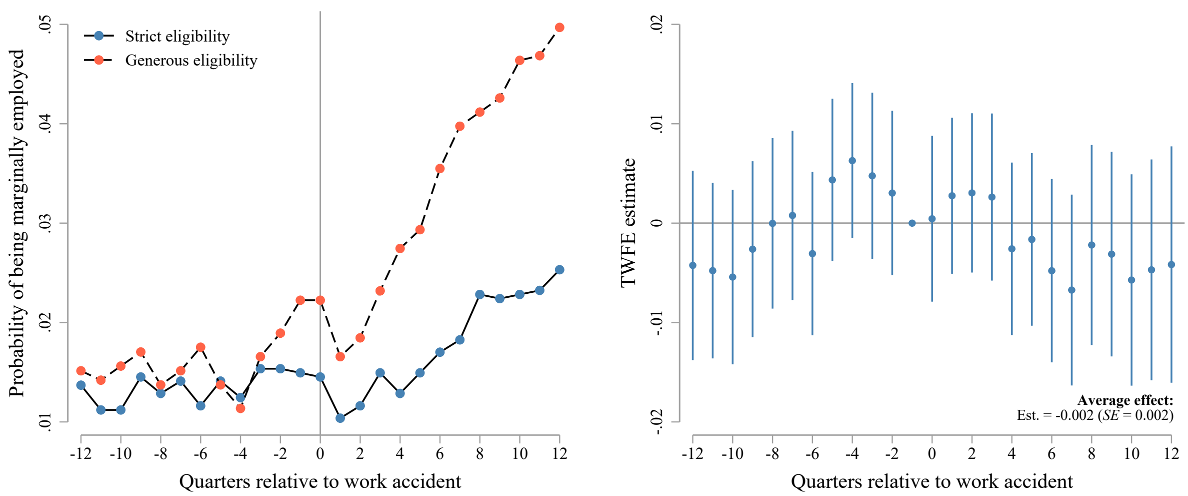
Notes: Individual-level data on workplace accidents is from the Austrian General Accident Insurance Fund. Data on UI enrollment and labor market participation is from the Austrian Social Security Database files. The left panel plots raw probabilities for each quarter relative to the work accident, the right panel plots TWFE estimates from Equation (2).

FIGURE A6 — Sick Leave Days



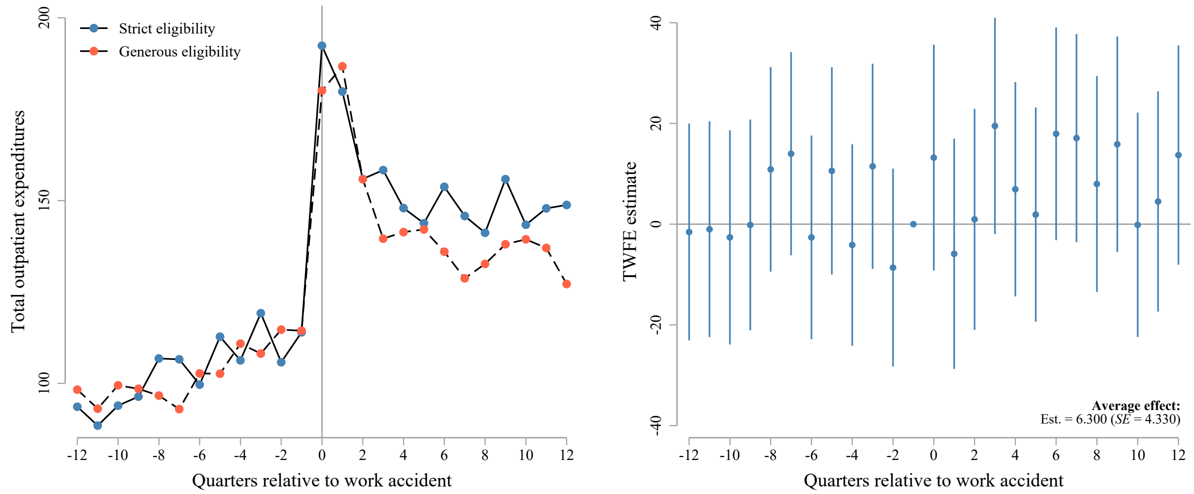
Notes: Individual-level data on workplace accidents is from the Austrian General Accident Insurance Fund. Data on labor market participation is from the Austrian Social Security Database files. The sample includes all male workers who experienced a work accident aged 55–62 between 2000 and 2017. The left panel plots raw probabilities for each quarter relative to the work accident, the right panel plots TWFE estimates from Equation (2). The outcome variable includes the number of days that a worker took sick leave in each quarter, measured only for employed workers.

Figure A7 — Probability of Being Marginally Employed



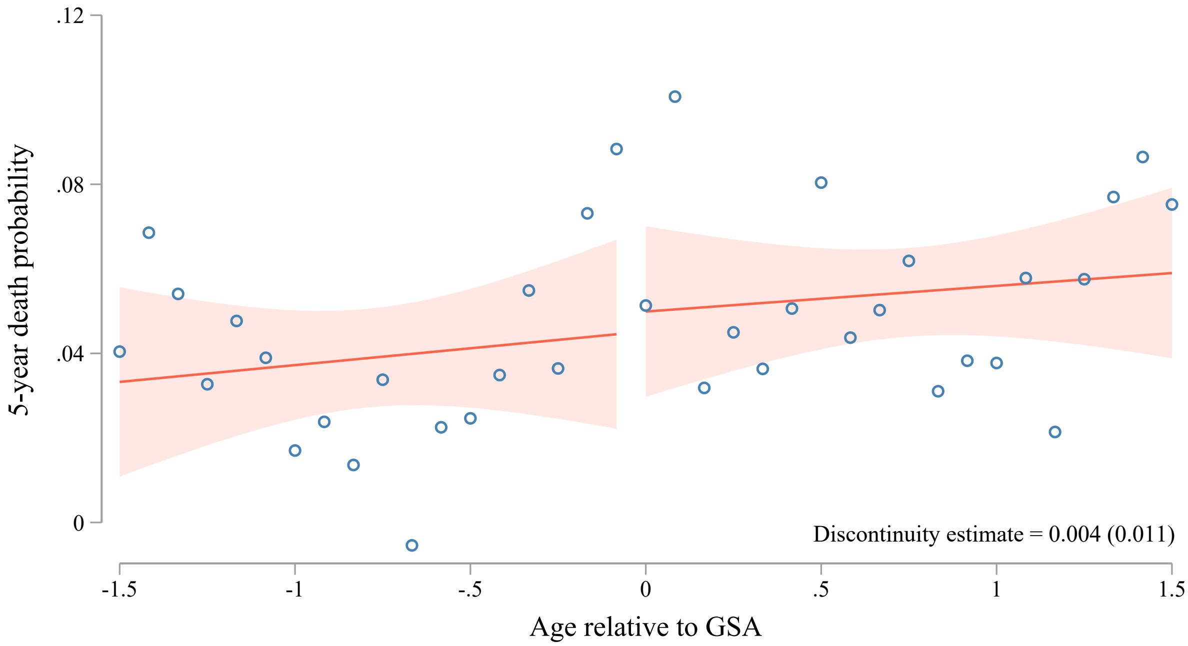
Notes: Individual-level data on workplace accidents is from the Austrian General Accident Insurance Fund. Data on DI enrollment and labor market participation and wages for Austrian workers is from the Austrian Social Security Database files. The left panel plots raw probabilities for each quarter relative to the work accident, the right panel plots TWFE estimates from Equation (2). DI recipients are eligible for marginal employment, which implies that workers can return to work for a small number of hours per month for an income not exceeding a certain threshold (475 euros as of 2021).

Figure A8 — Total Outpatient Expenditures



Notes: See Figure 4. Outpatient expenditures include prescription drug fees and physician fees.

Figure A9 — Effects on 5-year mortality, RDD using Generous Screening Age as a Cutoff



Notes: Individual-level data on workplace accidents is from the Austrian General Accident Insurance Fund. Mortality data is from the Austrian Social Security Database files. The sample includes all Austrian workers with work accidents, from January 2000 to July 2017. The running variable is age of worker, in years. The cutoff is the relevant GSA cutoff, based on a worker's birth cohort, as detailed in Figure 1. The 5-year death probabilities are adjusted for quarter-year fixed effects indicating the quarter of the work accident.

Table A1 — Summary Statistics

	Mean	Std. dev.	Strict vs. Generous Screening		
			Strict	Generous	Difference
	(1)	(2)	(3)	(4)	(5)
Age (years)	57.51	1.74	56.26	58.94	2.683***
Experience (years)	30.90	7.53	30.99	30.81	–0.173
Daily wage (EUR)	97.21	31.67	98.43	95.82	–2.611**
Upper Austrian resident	0.14	0.35	0.14	0.14	0.004
Pre-accident labor market status					
Employed	0.96	0.18	0.96	0.97	0.010***
Claiming UI benefits	0.07	0.25	0.08	0.06	–0.019***
Marginally employed	0.01	0.12	0.01	0.02	0.002*
Pre-accident healthcare utilization					
Inpatient days	0.04	0.40	0.04	0.04	0.005
Physician fees (EUR)	11.72	43.15	11.98	11.43	–0.543
Accidents or injuries	0.01	0.08	0.01	0.01	0.000
Pre-accident drug prescriptions					
Opioid prescription	0.003	0.051	0.003	0.003	0.000
Antidepressant prescription	0.005	0.073	0.005	0.006	0.001
Cardiac drug prescription	0.042	0.200	0.042	0.041	–0.002

Notes: Individual-level data on workplace accidents is from the Austrian General Accident Insurance Fund. Data on DI enrollment and labor market participation and wages for Austrian workers is from the Austrian Social Security Database files. Linked data on health outcomes for Upper Austrian workers is from the Upper Austrian Health Insurance Fund database files. Age, experience, wage, and residency are measured in the last quarter before the work accidents; labor market status, healthcare utilization, and drug prescriptions are measured over the 12 quarters preceding the work accident. Wages are set for zero for non-employed workers. Descriptive statistics include the means and standard deviations for the listed outcomes for all male workers who experience a work accident between 2000 and 2017. Columns (1) and (2) present means and standard errors for all injured workers, respectively, while Columns (3) and (4) present means for workers eligible for strict versus generous DI screening separately. In Column (5), we provide the difference in means of the respective variable between these two groups, according to a two-sample t test. N = 132,425.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.