CENTER for RETIREMENT RESEARCH at BOSTON COLLEGE

DOES TEMPORARY DISABILITY INSURANCE REDUCE OLDER WORKERS' RELIANCE ON SOCIAL SECURITY DISABILITY INSURANCE?

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Abstract

Temporary Disability Insurance (TDI) provides workers with wage replacement while they recover from a serious medical condition. Proponents of a national paid leave program argue that these benefits allow workers to adjust to health shocks and return to the workforce, reducing reliance on Social Security Disability Insurance (DI). Yet, TDI could also encourage DI application by providing income during the lengthy qualification period. This study uses the 1992-2020 *Health and Retirement Study* to evaluate how access to TDI benefits affects the likelihood that older workers end up on DI after a work-limiting health shock. Specifically, it compares the experience of workers in states with mandated TDI benefits to those living in states without such policies.

The paper found that:

- TDI helps workers with severe impairments stay in the labor force.
- Specifically, workers who develop severe disabilities are 26 percentage points more likely to be employed and 16 percentage points less likely to apply for DI when they have TDI benefits.
- However, workers whose impairments do not qualify for DI may use TDI to facilitate early retirement.

The policy implications are:

- Expanding access to TDI may keep vulnerable older workers in the labor force and decrease applications to the DI program.
- In addition to these potential gains, TDI could create work disincentives for less vulnerable individuals.

Introduction

In recent years, state and federal policymakers have increasingly focused on expanding access to paid family and medical leave (PFML). Although calls to expand paid leave predate COVID-19, the pandemic threw a spotlight on the issue. One component of PFML, Temporary Disability Insurance (TDI), provides workers with wage replacement while they recover from a serious medical condition. Proponents of a national paid leave program often argue that TDI would allow workers to adjust to health shocks and return to the workforce, reducing reliance on Social Security Disability Insurance (DI). Yet, TDI could also encourage workers to apply for DI by providing income during the lengthy qualification period. Either way, spillovers from a national PFML program may be consequential for the DI program's finances.

This study uses the 1992-2020 *Health and Retirement Study* (HRS) to evaluate how access to TDI benefits affects the likelihood that older workers end up on DI after a work-limiting health shock. Specifically, we compare the experience of workers in states with mandated TDI benefits to those living in states without these policies. Since the workers are similar in terms of employment and demographics before the health shock, this approach is similar to a difference-in-differences design.[1]

We find that access to TDI substantially improves employment outcomes for workers with severe conditions who might otherwise end up on DI. Specifically, living in a state with mandated TDI increases the likelihood of being employed four years after disability onset by 26 percentage points, and reduces the DI application rate by 16 percentage points. For workers with less severe impairments, who are unlikely to qualify for DI, TDI seems to promote early retirement. Overall, our findings suggest that expanding access to TDI may keep vulnerable older workers in the labor force and decrease applications to the DI program, but could also create work disincentives for less vulnerable individuals.

The rest of the paper proceeds as follows. The next section provides background on the current TDI landscape, describing the patchwork of federal, state, and employer benefits as well as recent initiatives to expand coverage. The third section develops a simple conceptual framework for predicting how access to TDI affects workers' labor supply and reliance on DI

[1] The state TDI mandates in our analysis were introduced in the 1940s and 1950s, decades before our analysis period.

after a health shock. The fourth section describes the data and methodology for our empirical analysis, while the fifth section presents results. The sixth section concludes.

Background

The national paid leave landscape is a patchwork of federal legislation, state initiatives, and employer-provided benefits that leaves many workers uncovered.[2] At the federal level, the Family and Medical Leave Act of 1993 (FMLA) provides some workers with unpaid leave for a serious medical condition or family obligation, but in practice covers less than 60 percent of the workforce.[3] Workers can access *paid* leave only if they reside in states that have enacted PFML policies or if their employer offers these benefits.[4]

The limitations of the status quo became particularly evident during the COVID-19 pandemic, when many workers struggled to balance the demands of their jobs with caregiving responsibilities and a public health crisis. Federal policymakers enacted emergency measures, such as the Families First Coronavirus Response Act of 2020, that required some employers to grant COVID-related paid leave, but these measures have now expired. Consequently, PFML legislation has been top-of-mind for many policymakers, including the Biden administration, which included paid leave in its Build Back Better plan of 2021.[5]

Although PFML is a very broad concept – including leave to bond with a new child, care for an ailing family member, or grieve the death of a loved one – this paper focuses on one specific component: Temporary Disability Insurance (TDI).[6] TDI provides workers with wage replacement while they recover from a serious medical condition. Most plans are designed to replace about 60 percent of pre-disability earnings for six months, although the duration varies greatly across state programs and employers (see Table 1).[7]

Most of the state TDI programs are structured as a public program financed by a payroll tax on workers, with employers sometimes allowed to opt out and provide their own benefits.

[2] See Boyens et al. (2022) for a discussion.
[3] Rossin-Slater and Stearns (2020). The FMLA requires employers with at least 50 employees to grant 12 weeks of unpaid leave to full-time workers with at least one year of tenure.
[4] As of July 2023, 14 states (including the District of Columbia) had enacted PFML laws.
[5] Additional examples include the Family and Medical Insurance Leave (FAMILY) Act, which has been proposed in every Congress since 2013.
[6] We use TDI to refer to paid medical leave provisions in PFML laws and proposals. Private sector plans also often refer to this type of leave as Short-Term Disability (SDI).
[7] Many of the state programs have progressive benefit formulas with benefits capped for very high earners.

Employer-sponsored TDI may be self-insured or provided by an insurance company. Employer benefits also typically include job protection, whereas many of the state programs simply replace lost earnings.[8] Importantly, however, employer provision of TDI is relatively rare outside of the states with mandated benefits. For example, 43 percent of the workforce had access to employer sponsored TDI in 2022, but the share ranged from 34 percent in the South to 67 percent in the Northeast (where New York state mandates that employers provide the benefit).[9]

Proponents of a national program argue that it would allow workers – particularly older workers who are most at risk – to adjust to health shocks and resume employment, reducing reliance on long-term disability insurance programs such as DI.[10] However, others caution that TDI could instead serve as an on-ramp to DI. Workers who experience a disability must undertake a lengthy application process in order to be considered for DI benefits. In particular, applicants must not have engaged in Substantial Gainful Activity (SGA) during the past year, which in 2023 is defined as earning more than $1,470 per month.[11] Moreover, those who do end up applying face a long period with no income while their application is processed.[12] Since they are not considered earnings, TDI benefits could provide needed income during the look-back and application periods, and so encourage workers to apply.[13]

Despite growing interest in TDI programs – and the clear potential for spillovers to DI – research is quite limited.[14] Autor et al. (2013) try to link state and industry-level variation in TDI access to DI caseloads at the state level, but their data lack key control variables that are correlated with both TDI provision and DI incidence, such as industry variation in the frequency and type of worker health shocks. More indirect evidence comes from Autor, Duggan, and

[8] Of course, some workers in these states are also eligible for 12 weeks of protected leave through the FMLA. In practice, many TDI claims are pregnancy-related, but since this paper is concerned with spillovers to Social Security Disability Insurance (DI), we do not study pregnancy-related TDI.
[9] U.S. Bureau of Labor Statistics, *National Compensation Survey* (2022).
[10] Autor and Duggan (2010). This mechanism is most salient when workers also have job protection, which reduces re-entry costs. Proponents also argue that experience-rating TDI premiums – as is done in some states and all employer plans – incentivizes employers to accommodate workers (Burkhauser and Daly 2011). However, some argue that experience-rating a mandated TDI benefit could discourage employers from hiring high-risk workers to begin with (Maestas 2019).
[11] SGA increases to $2,460 for workers who are blind.
[12] Applicants whose initial claims are accepted typically wait less than five months for a decision, but rejected applicants who appeal often wait much longer (Autor et al. 2015).
[13] Autor et al. (2013, 2015).
[14] In contrast, a vast literature has studied the impact of PFML programs on maternal labor supply (see Quinby and Siliciano (2021) for a comprehensive literature review). See Appendix A for a discussion on the impact of paid family leave on caregivers' labor supply and potential spillover effects of TDI on spousal labor supply.

Gruber (2014), who show that longer waiting periods reduce claims for private long-term disability, and from Maestas, Mullen, and Strand (2013), who find that denied DI applicants often return to work.[15]

Moreover, to our knowledge, no studies examine how TDI affects the labor supply of older workers whose disabilities are insufficient to qualify for DI. Eligibility for DI is quite strict: the disability must be expected to last for at least a year or result in death; and must either be on SSA's "listing of impairments" (conditions that immediately qualify), or must be severe enough to preclude the worker from performing *any* job in the national economy.[16] Although not the main focus of our study, we include workers not likely eligible for DI in our analysis because policymakers considering a national program must understand how TDI impacts all workers who use the benefits, not just those who are DI-eligible.

The next section develops a simple conceptual framework to predict how TDI affects older workers' labor supply and decision to apply for DI after a health shock. This framework will guide our subsequent empirical analysis.

Conceptual Framework

Our framework adapts a model of labor supply after disability onset developed by Cutler et al. (2011). We consider a simple two-period case where an older worker experiences a negative health shock (i.e., disability) that leaves the worker with a remaining health stock H at the beginning of the first period and automatically enters retirement at the end of the second period. The worker can decide between working in both periods (continued work, W); not working in either period (early retirement, R); taking a break in the first period and returning to work in the second period (search, S); or not working and applying for disability insurance in the first period (DI application, D).[17]

To illustrate the worker's optimal choice between the four options, we employ a simple additively separable utility function that depends on consumption and health. In a world with no

[15] Evidence from elsewhere is mixed. In the Netherlands, TDI pushes employers to accommodate workers (Koning and Lindeboom 2015); but, in Canada, TDI income enables workers to apply for long-term DI (Stepner 2021).
[16] The medical-vocational grid considers age, education, and work history, but not geography. Workers who meet these criteria are awarded DI benefits starting on the sixth month after disability onset – with initial benefits enhanced to account retroactively for the application period – and are eligible for Medicare after a two-year waiting period.
[17] We assume that the worker faces exogenous wages, unearned income, and a negative health shock that pre-determines their health stock H.

TDI, the worker's utility from either (1) continued work or (2) early retirement is expressed as follows:

$$U_W = U(w(H) + y) + \varphi_w H \quad (1)$$

$$U_R = U(y) + \varphi_R H \quad (2)$$

where the utility of consumption has diminishing marginal returns.[18] The term $w(H)$ represents the discounted sum of market wages available to workers with health stock H until retirement. Unearned income is denoted as y. The worker values their health with a utility weight of φ_W for those working and φ_R for those at leisure in retirement; the utility functions incorporate the disutility of work conditional on health by setting $\varphi_W < \varphi_R$.

For the third option, searching and returning to work, the utility function is written:

$$U_S = U(w^S(H) + y) + \varphi_S H \quad (3)$$

For simplicity, we assume that workers are equally productive after their job search but have a lower disutility of work (for example, from finding a better job match) so that $\varphi_W < \varphi_S$. Like the previous earnings term, $w^S(H)$ represents the discounted sum of post-search earnings. We assume that $w^S(H)$ is increasing in H and accounts for the search cost (i.e., forgone earnings and consumption in the first period).

Lastly, we turn to the option of applying for DI, which awards individuals a discounted benefit denoted as B with a probability that depends on their health stock, $p(H)$. The probability is strictly decreasing in H, as healthier workers are less likely to be awarded DI benefits. For clarity, we model the DI application cost explicitly as c, giving the utility expression:

$$U_D = p(H)[U(B + y) - U(y)] + U(y) + \varphi_R H - c \quad (4)$$

While the worker can choose between all four options, there exists a health cutoff H^D such that, for those whose health is better than the cutoff ($H > H^D$), the expected utility from applying for DI is always less than the utility from early retirement ($U_D < U_R$). The intuition is that a relatively healthy worker would rather retire early than apply for DI because the likelihood of receiving benefits is sufficiently low. For these workers, the optimization problem simplifies

[18] For simplicity, the worker cannot save or borrow between the two periods and must consume their income, which may include earnings when working and unearned income that does not depend on employment status.

to: $\max\{U_W, U_S, U_R\}$. Conversely, a worker whose health falls below the cutoff optimizes to achieve: $\max\{U_W, U_S, U_D\}$. We refer to the workers with health above the cutoff as "ineligible for DI," and those with health below the cutoff as "potential DI applicants."

Next, we add a TDI program to the model. We assume that all workers are eligible and can claim TDI benefits (denoted by b) if they are not working in the first period. Since the focus of this paper is spillovers to the DI program, we first consider how TDI affects the potential DI applicants, whose utilities under each scenario become:

$$U_W^{TDI} = U(w(H) + y) + \varphi_w H \tag{5}$$

$$U_S^{TDI} = U(w^S(H) + y + b) + \varphi_S H \tag{6}$$

$$U_D^{TDI} = p(H)[U(B + y + b) - U(y + b)] + U(y + b) + \varphi_R H - c \tag{7}$$

TDI clearly increases the attractiveness of both the search and DI options relative to the continued work option. However, how TDI affects the tradeoff between job search and DI application is unclear. Intuitively, two effects are at play. First, TDI will have an income effect that reduces labor supply in the second period; secondly, it will ease the worker's liquidity constraint and make job search more tolerable, encouraging a return to work ("search effect").

To formalize the intuition, we can compare the utility gain from applying for DI instead of searching, with and without TDI: $\Delta U_{DI} \equiv U_D - U_S$ compared to $\Delta U_{DI}^{TDI} \equiv U_D^{TDI} - U_S^{TDI}$. TDI will increase DI applications if ΔU_{DI}^{TDI} is larger than ΔU_{DI}. For simplicity, let λB denote the level of DI benefits awarded with certainty that provide the same utility to the worker as the application lottery described earlier ("certainty equivalent benefits"):

$$\Delta U_{DI} = U(\lambda B + y) - U(w^S(H) + y) + (\varphi_R - \varphi_S)H - c \tag{8}$$

$$\Delta U_{DI}^{TDI} = U(\lambda B + y + b) - U(w^S(H) + y + b) + (\varphi_R - \varphi_S)H - c \tag{9}$$

Regardless of TDI, workers will choose to apply for DI ($\Delta U_{DI} > 0$) if their disutility of work is high, application costs are low relative to the probability of award, or expected future earnings are low relative to benefits. Comparing equations (8) and (9) shows that, under the assumption of diminishing marginal returns, TDI will make DI more attractive for those with relatively low DI benefits compared to labor earnings ($\lambda B < w^S(H)$). The interpretation is that the income effect dominates. However, if the disability is severe enough, then DI benefits would increase and labor earnings would decrease, tipping the scale so that the search effect dominates.

Lastly, we turn to workers who are relatively healthy and ineligible for DI benefits.

$$U_W^{TDI} = U(w(H) + y) + \varphi_w H \tag{10}$$

$$U_S^{TDI} = U(w^S(H) + y + b) + \varphi_S H \tag{11}$$

$$U_R^{TDI} = U(y + b) + \varphi_R H \tag{12}$$

Again, TDI will push workers away from the continued work option. However, because of diminishing marginal returns to income, TDI will also clearly push workers toward early retirement.

Data and Methodology

The data for our analysis come from a restricted version of the 1992-2020 HRS, which collects information on workers' health, employment, and DI status. Crucially, it also contains information on state of residence, which is necessary for understanding access to TDI.

The analysis identifies workers who experience a work-limiting health shock and follows them over time. Specifically, we flag workers who are ages 50-60 in wave *w* of the survey and who were employed full-time in the previous wave (*w-1*) without any work-limiting impairments.[19] Of this group, we then identify workers who report a new impairment that limits their paid work in wave *w*.[20] Lastly, we limit the sample to workers who are observed at least two years after they report the work-limiting impairment, or in wave *w+1*.[21] This four-year period after disability onset provides ample time for workers to submit a DI application, which takes place within a year for most applicants (although final award decisions often require a longer processing time).[22] Ultimately, these selection criteria yield 1,262 full-time workers

[19] Eighty-four percent of workers ages 50-60 were working full-time before disability onset – another 15 percent were part-timers. We focus on full-time workers in order to leave out confounding effects of health conditions that result in part-time employment. This approach allows us to estimate the effect of mandated TDI on workers with strong labor market attachment prior to experiencing health shocks. Regression analysis including part-time workers shows slightly smaller effects of mandated TDI on increasing employment and reducing DI reliance compared to our main analysis.

[20] As the HRS only surveys respondents every two years, the sample omits workers who experience a short-term health shock during a year in which they are not interviewed that resolves before the next interview. For workers with multiple reports of new disabilities, we focus on the first occurrence.

[21] Although we use all HRS waves between 1992 and 2020, workers in our sample could only have developed new work-limiting conditions between 1994 and 2018.

[22] The exact timing of disability onset could occur as early as *w-1* or as late as *w*. Variables in the HRS asking about the month and year of disability onset are not very informative – some workers claim that their new work-limiting impairment started years before they first disclose it. Messel and Strand (2019) find that the median period from onset to application is 7.6 months using Social Security administrative data. Autor et al. (2015) report that DI

experiencing a disability. Although small, this sample size is consistent with prior studies.[23] Our final sample includes 1,238 individuals with non-zero weights and non-missing information on job characteristics before disability onset. The analysis then tracks these workers from the onset of disability in two stages.

In the first stage, the primary outcomes of interest are short-run labor supply and DI application. Due to our relatively small sample, we rely on self-reported DI application status because linked administrative records provided by the Social Security Administration only cover around two-thirds of respondents.[24]

The main independent variable is the worker's access to TDI benefits. A key challenge is that the HRS (like most other surveys) does not ask respondents whether their employer provides this benefit.[25] We circumvent the issue by noting that coverage is mandatory in states with PFML legislation.[26] During our analysis period (disability occurring between 1994 and 2018), four states had longstanding TDI mandates: California, New Jersey, New York, and Rhode Island.[27] Three of these states (California, New Jersey, and Rhode Island) have public programs financed by a payroll tax, while the last (New York) requires employers to purchase private TDI. In contrast, the coverage rate for voluntary employer-sponsored TDI hovered below 40 percent during this period.[28]

applicants who appeal an initial unfavorable decision (around one-third of all applicants) often wait up to five years for a final decision.

[23] Many studies have used the question on having work-limiting conditions to identify workers' labor supply after disability onset. For example, see Kapteyn, Smith, and van Soest (2008), and Schimmel and Stapleton (2012).

[24] Moreover, Schimmel Hyde and Stapleton (2017) point out that the administrative data also have limitations. The structure of the public HRS questions on DI application changed in 2000; prior to that wave, individuals were asked about application for either DI or Supplemental Security Income (SSI), whereas later interviews asked about the two programs separately. Fortunately for this analysis, SSI applicants under age 65 must have a disability, so we assume that they are also applying for DI.

[25] Prior research addresses this issue by imputing private TDI coverage based on average coverage rates, by sector and industry, reported in the *National Compensation Survey*. However, since the HRS only records industry in fewer than 20 categories, this procedure generates too much statistical imprecision for our analysis.

[26] PFML programs also typically include paid family leave (PFL) benefits targeting caregivers. We implicitly assume no spillover effects of PFL mandates on the labor supply and DI claiming decisions of workers with new disabilities.

[27] No worker in our final sample resides in Rhode Island, so we effectively estimate the impact of TDI mandates in California, New Jersey, and New York. The District of Columbia, Massachusetts, and Washington also enacted PFML legislation in 2017-2018, but these programs turned out not to be relevant for our sample. It is worth noting that the three TDI states in our analysis subsequently implemented PFL programs (California in 2004; New Jersey in 2009; and New York in 2018).

[28] U.S. Bureau of Labor Statistics, *National Compensation Survey* (2022).

Of course, comparing workers in mandate states to all other workers (some of whom have coverage) will underestimate the direct effect of TDI. However, this approach is policy relevant as it shows how a national TDI mandate would affect aggregate labor supply and reliance on DI. Moreover, using the state mandates as a natural experiment avoids potential selection bias from workers sorting into firms based on their desire for TDI benefits.

As noted earlier, DI has very strict eligibility requirements, so not all workers experiencing a health shock are potential DI applicants. Consequently, we categorize workers based on the severity and duration of their work-limiting impairment and create a proxy indicator for potential DI applicants. In the main analysis, potential DI applicants are defined as those who expect their condition to persist beyond one year, and who either: 1) self-report being in poor health; 2) are newly diagnosed with a major health condition; or 3) experience new difficulties with Activities of Daily Living (ADLs) or Instrumental Activities of Daily Living (IADLs).[29] The other workers in our sample are much less likely to have continuing health issues four years after disability onset, and so are assumed to be ineligible for DI.[30] Reassuringly, our results are also robust to alternative classifications.[31]

With the key variables in hand, we estimate the following linear probability model for potential DI applicants and ineligible workers:[32]

$$Y_{i,w+1} = \alpha + \beta_1 \mathbb{1}(TDI\ Mandate)_s + \beta_2 X_{i,w} + \beta_3 Job_{i,w-1} + \beta_4 E_{s,w+1} + \varepsilon \qquad (13)$$

Where $Y_{i,w+1}$ represents the outcome of interest for worker *i* in wave *w+1*. In addition to DI application and receipt, we also examine whether the worker is employed in *w+1*, whether the

[29] We follow Smith (2005) and define major health shocks as having been newly diagnosed with cancer, lung diseases, a heart problem, strokes, or a psychiatric problem by a doctor. Many studies have also used the presence of limitations in ADLs and IADLs (Dunlop et al. 2007; Freedman et al. 2008; Bowen and González 2010; and Latham 2012). ADLs include five activities: walking across a room, dressing, bathing or showering, eating, and getting in or out of bed. IADLs include managing money, taking medications, shopping for groceries, and preparing hot meals. See Appendix Table B1 for a breakdown of workers reporting each type of qualifying health condition.
[30] See Appendix Table B2 for a comparison of health measures for potential DI applicants and ineligible workers.
[31] In the main analysis, we lean towards a more restrictive proxy for potential DI applicants by focusing on the most severe types of health deterioration. We relaxed this definition and replicated our analysis classifying workers as potential DI applicants if they have permanent conditions and report being in fair or poor health. The results are consistent with Tables 3-5 and are available upon request.
[32] In order to maximize our sample size, the regression includes both potential DI applicants and ineligible workers. We estimate the effect of TDI separately for each group by interacting the indicator for residing in a mandate state with an indicator for potential-applicant status. This approach improves the precision of the coefficients for the other covariates.

worker receives any employer accommodations for their disability in *w*, and whether the worker's health has improved by *w+1*.[33]

$\mathbb{1}(TDI\ Mandate)_s$ is a binary indicator for whether the worker's state of residence is among the four with PFML legislation (California, New Jersey, New York, or Rhode Island). $Job_{i,w-1}$ captures pre-disability job characteristics including earnings, industry, and other employer-provided insurance coverage such as health and long-term disability.[34] $X_{i,w}$ is a vector of demographic characteristics, such as age, race, marital status, and education. Lastly, $E_{s,w+1}$ measures state-level labor market conditions, including the state unemployment rate and the share of jobs in manufacturing, averaged between wave *w-1* and wave *w+1*.[35] Even with these controls, a concern remains that workers in states with TDI mandates are unobservably different from workers in other states, and that these differences are correlated with labor market outcomes.[36] While there is no perfect solution to this issue, we conduct several robustness checks and observe no major red flags.[37]

The second stage of the analysis considers workers' employment and DI status over a longer time horizon. We track workers for the entire length of time that they are observed in the HRS and examine the total years of work after age 50 (recall that the sample is 50-60 in wave *w*); application for DI at any point after disability onset; and ultimate receipt of DI. The regression specification and control variables are otherwise identical to the first stage.

Results

To begin, Table 2 compares workers' demographic and job characteristics in the wave before disability onset (*w-1*), splitting the sample by state of residence. Reassuringly, the workers in mandate and non-mandate states look quite similar at baseline: they experience their

[33] For employer accommodations, we use a catch-all HRS question asking whether the employer is doing anything special to help the worker stay at their job. Employer accommodations may include shortened hours, a helper, time flexibility, more rests, special transportation, special equipment, rehabilitative services, and help with learning new job skills.
[34] We also include controls for the receipt of Workers' Compensation by *w+1*, a close substitute of TDI for work-related illnesses or injuries.
[35] We include the manufacturing share because employer TDI is much more prevalent in this industry, and workers are also more likely to experience the severe disabilities that qualify for DI (U.S. Bureau of Labor Statistics, 2022).
[36] For example, they may also have access to more worker-friendly anti-discrimination laws or more generous benefits from other state-administered programs after TDI runs out.
[37] For example, Appendix Table B3 shows small and statistically insignificant differences in Unemployment Insurance claiming, benefits received, and age discrimination in the workplace by mandate status.

disability at age 57 on average, 51 percent are women, 68 percent are married, 22 percent have a college degree, and 74 percent have employer-sponsored health insurance at their previous job. Yet, a few differences are apparent: workers in mandate states are more likely to be Hispanic and have higher average earnings at their previous job, which is less likely to be in manufacturing.[38] They are also slightly more likely to receive Workers Compensation benefits after disability onset. Interestingly, only around 30 percent of those in our sample have impairments severe enough to be considered potential DI applicants.

Short-run Impacts of TDI

Turning to the main analysis, this section considers labor supply and DI application in the short run (four years after disability onset). Since our focus is on spillovers to the DI program, we begin by studying potential DI applicants.

Figure 1 plots the outcomes of interest without controlling for worker or state characteristics. The first set of bars shows the share of potential applicants employed at the end of the follow-up period, by their access to TDI benefits. The second plots the share applying for DI, while the third set plots the share receiving DI. The raw means tell a clear story. In states without mandated TDI, only 39 percent of workers were employed at the end of our follow-up period, compared to 61 percent in states with a mandate. Similarly, 39 percent of workers in non-mandate states had submitted a claim for DI, compared to 27 percent in states with a mandate. Interestingly, however, the gap narrows for DI receipt, since a large share of the applicants in non-mandate states were not awarded benefits during this period.[39]

Figure 2 performs the same exercise for workers who are ineligible for DI and finds a very different pattern, consistent with the predictions of our conceptual framework. In states without mandated TDI, 65 percent were employed at the end of the follow-up period, compared to 50 percent in states with a mandate. Reassuringly, very few of the workers we classify as being ineligible for DI apply for or receive DI benefits, increasing confidence in our proxy variable.

[38] Small differences in the share of potential DI applicants and employer long-term disability insurance coverage are statistically insignificant.

[39] This finding is consistent with marginal DI applicants being less likely to ultimately qualify, and for their cases taking longer as they go through appeal (Maestas, Mullen, and Strand 2013).

The next step is to confirm that these patterns persist after controlling for worker characteristics and state economic conditions. To this end, Table 3 presents regression results for the three short-run outcomes. The first two rows of Table 3 show how living in a mandate state affects labor supply for potential DI applicants and ineligible workers, respectively.[40] Subsequent rows report the coefficients on the control variables, which are estimated on the entire sample to maximize statistical precision.

Consistent with the descriptive statistics, we find that residing in a state with mandated TDI increases the employment of potential DI applicants by 26 percentage points and decreases the DI application rate by 16 percentage points, four years after disability onset. The effect on DI receipt is also negative, but small and statistically insignificant. Conversely, for ineligible workers, mandated TDI is associated with a 9-percentage-point *decrease* in employment (although this finding is only weakly significant). As expected, TDI does not seem to affect DI application and receipt for this group.[41]

To better understand these employment patterns, Table 4 replicates the regression with two new dependent variables: an indicator equal to one if the worker is in a job with health accommodations in wave *w*; and an indicator for improved health by *w+1*. For potential DI applicants, mandated TDI increases the rate of employer accommodations by 13.8 percentage-points, but not for their healthier counterparts. Interestingly, however, TDI does not seem to improve health in the short run for either group. Overall, Table 4 suggests that potential DI applicants use their time on TDI to find a job that matches their current capabilities, as suggested by our model, although the results are also consistent with employers being more accommodating of existing workers (possibly due to the experience-rating of TDI premiums in New Jersey and New York). Unfortunately, our sample is too small to differentiate between these two mechanisms.

Longer-Run Impacts of TDI

While the results so far align with our conceptual framework, they reflect a relatively short time horizon. Hence, this next section follows workers for as long as they can be observed

[40] Since the regression employs interaction terms, we use a linear combination to estimate the effect of living in a mandate state for potential applicants.

[41] The small negative coefficient on DI application arises because our proxy variable for DI eligibility bins workers into only two groups, rather than reflecting a continuous scale of worsening health.

in the HRS, or 11.3 post-disability years on average. Table 5 considers three related outcomes: the number of years of work after age 50, whether the worker ever applies for DI; and whether the worker ever receives DI.

The findings for potential applicants reinforce the short-run analysis. Mandated TDI has a strong and positive effect on lifetime employment, enabling 2.5 additional work years on average. The likelihood of ever applying for DI decreases by 18 percentage points and the probability of receiving DI is reduced by 7.4 percentage points – although this last result is not statistically significant due to our small sample.

The results for ineligible workers are more nuanced. Mandated TDI seems to reduce lifetime employment by only about one year, yet it is also associated with an 8.1-percentage-point reduction in the DI application rate. To reconcile these contradictory patterns with our earlier short-run findings, consider that most ineligible workers remain employed after their initial health shock, and some experience a second work-limiting health shock. At that point, their health has deteriorated to the point where they could become potential DI applicants.[42] Hence, the long-run effect of mandated TDI in our regression reflects an average of multiple distinct – and potentially countervailing – disability episodes. For this reason, we consider the short-run analysis more informative. Nevertheless, the bottom line is clear: TDI does not increase DI-reliance for this group.

Conclusion

Policymakers at the state and federal levels are increasingly focused on expanding access to PFML. While much of the discourse around this issue highlights the needs of young families with children, advocates also argue that providing medical leave to older workers (TDI) may keep them in the labor force and reduce their reliance on DI. Yet, very little empirical evidence has been presented to date.

This study helps fill the gap by comparing workers in states with longstanding TDI mandates to otherwise similar workers in states without a mandate. Focusing first on workers with severe disabilities, who are more likely to end up on DI, the analysis finds that access to TDI increases employment four years after a health shock and reduces the DI application rate.

[42] About 34 percent of the ineligible workers in our sample experience subsequent negative health shocks before their Full Retirement Age that reclassify them as potential DI applicants.

For workers with less severe impairments, who are unlikely to qualify for DI, TDI seems to facilitate early retirement.

In summary, we find that a national TDI program may improve retirement security for the most vulnerable older workers and decrease applications to the DI program. However, it could also create work disincentives for less vulnerable individuals. And of course, these are not the only trade-offs that policymakers must weigh. For instance, most proposals for a public option are financed by a payroll tax, with high-use workers (such as older workers) subsidized by their low-risk counterparts. Hence, TDI remains a promising topic for future research.

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Tables and Figures

Table 1. *TDI Program Design, 2023*

Source	Enacted	Replacement rate	Job protection	Benefit duration (weeks)	Experience rated
State PFML					
RI	1943	60%, capped	No	30	No
CA	1946	Progressive	No	52	No
NJ	1948	66%, capped	No	26	Yes
NY	1950	Progressive	No	26	Yes
DC	2017	Progressive	No	8	No
WA	2017	Progressive	No	12	Yes
MA	2018	Progressive	Yes	20	Yes
CT	2019	Progressive	Yes	12	No
OR	2019	Progressive	Yes	12	Unclear
CO	2020	Progressive	Yes	12	Unclear
MD	2022	Progressive	Yes	24	Yes
DE	2022	Progressive	Yes	12	Yes
Employer	Varies	Varies (median = 60%)	Yes	Varies (median = 26 wks)	Yes

Notes: In 2020, the NJ wage replacement rate increased to 85 percent, capped. Some states effectively experience-rate premiums by allowing employers to offer their own voluntary plans. Hawaii has also had a state TDI requirement in effect since 1969, but the program has no state fund or public option, meaning that employers are required to purchase plans on the private market or self-insure.
Sources: Monaco (2015); National Partnership for Women and Families (2022); and Quinby and Siliciano (2021).

Table 2. *Worker Characteristics Before Disability, by State of Residence, 1992-2020*

	Full sample	Resides in:	
		States with TDI mandate	States without TDI mandate
N	1,238	218	1,020
Panel A. Demographics			
Female	51.4%	51.6%	51.3%
Married	67.8	65.5	68.2
College-educated	21.9	23.9	21.5
Black	10.9	9.2	11.2
Hispanic	7.0	16.1	5.2
Age at disability onset	56.9	56.9	56.9
Panel B. Employment before disability onset			
Median earnings	$53,864	$64,043	$52,659
Employer has more than 50 employees	51.7%	52.7%	51.5%
Covered by employer-provided health insurance	74.2	74.3	74.2
Covered by long-term disability insurance	28.7	24.9	29.4
Industry of job: manufacturing	22.9	17.1	24.1
Panel C. Other			
Receives Worker's Compensation within 2-4 years of disability onset	5.9%	9.2%	5.3%
Potential DI applicants	30.2	26.6	30.9

Source: Authors' estimates from University of Michigan, *Health and Retirement Study* (HRS) (1992-2020).

Table 3. *Regression Results for the Relationship Between Living in a State with Mandated TDI and Labor Supply Four Years After Disability Onset, 1992-2020*

	(1)	(2)	(3)
	Employed	Applied for DI	Receiving DI
Mandate effect for potential DI applicants	0.260***	-0.162**	-0.019
	(0.083)	(0.074)	(0.069)
Mandate effect for workers ineligible for DI	-0.092*	-0.037	0.010
	(0.057)	(0.036)	(0.03)
Ineligible for DI	0.254***	-0.256***	-0.176***
	(0.039)	(0.035)	(0.032)
Female	-0.072*	0.010	-0.003
	(0.037)	(0.030)	(0.025)
Black	-0.114**	0.195***	0.098**
	(0.050)	(0.045)	(0.042)
Hispanic	-0.162***	0.062	-0.008
	(0.058)	(0.049)	(0.038)
Married	0.005	-0.039	-0.033
	(0.037)	(0.029)	(0.025)
College-educated	0.076*	-0.032	-0.055**
	(0.045)	(0.034)	(0.027)
Receives Workers' Compensation within 2-4 years of disability onset	-0.141**	0.090*	0.012
	(0.061)	(0.049)	(0.043)
Covered by employer LTD	-0.096**	-0.013	-0.013
	(0.042)	(0.033)	(0.025)
Covered by employer health insurance	0.064	-0.022	0.015
	(0.042)	(0.037)	(0.028)
Employer has more than 50 employees	-0.012	0.007	-0.014
	(0.034)	(0.026)	(0.022)
Age and earnings controls	Yes	Yes	Yes
Year and industry controls	Yes	Yes	Yes
State labor market controls	Yes	Yes	Yes
N	1,238	1,238	1,238
R-squared	0.151	0.174	0.127

Notes: Employment is measured at the second post-onset wave. DI application and receipt are based on self-reported information within two waves of disability onset. The regressions control for age in two-year buckets and pre-disability earnings in quintiles. Mandate effects for potential DI applicants and ineligible workers are estimated with the linear combination of interaction terms. Robust standard errors are in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Source: Authors' estimates from the HRS (1992-2020).

Table 4. *Regression Results for the Relationship Between Living in a State with Mandated TDI and Various Outcomes Four Years After Disability Onset, 1992-2020*

	(1)	(2)
	In a job with accommodations	Health improved
Mandate effect for potential DI applicants	0.138**	0.006
	(0.069)	(0.061)
Mandate effect for workers ineligible for DI	-0.010	0.017
	(0.038)	(0.048)
Ineligible for DI	0.055**	0.051*
	(0.024)	(0.031)
Female	0.006	0.008
	(0.027)	(0.032)
Black	-0.015	0.045
	(0.034)	(0.042)
Hispanic	-0.076**	0.031
	(0.033)	(0.050)
Married	0.017	-0.059*
	(0.028)	(0.034)
College-educated	-0.002	-0.026
	(0.037)	(0.042)
Receives Workers' Compensation within 2-4 years of disability onset	-0.031	-0.122***
	(0.037)	(0.035)
Covered by employer LTD	0.012	0.045
	(0.028)	(0.033)
Covered by employer health insurance	0.030	-0.028
	(0.030)	(0.033)
Employer has more than 50 employees	-0.028	-0.013
	(0.026)	(0.030)
Age and earnings controls	Yes	Yes
Year and industry controls	Yes	Yes
State labor market controls	Yes	Yes
N	1,238	1,238
R-squared	0.057	0.052

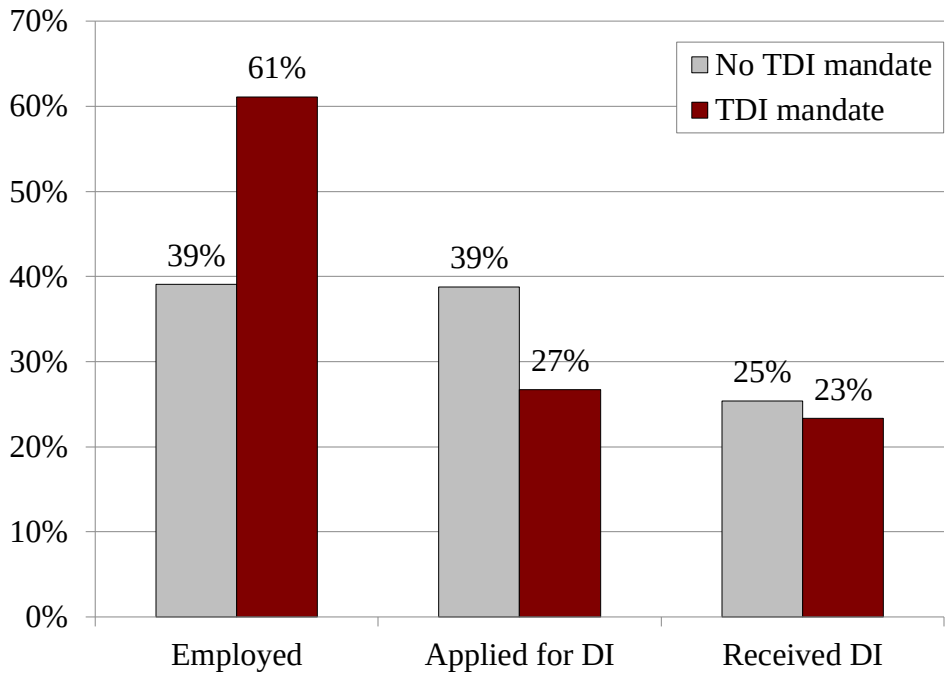
Notes: Employer accommodations are based on self-reported information at the time the worker first reports a disability. Health improvement is defined as self-reporting better health since the first post-onset wave. The regressions control for age in two-year buckets and pre-disability earnings in quintiles. Mandate effects for potential DI applicants and ineligible workers are estimated from the linear combination of interaction terms. Robust standard errors are in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.
Source: Authors' estimates from the HRS (1992-2020).

Table 5. *Regression Results for the Relationship Between Living in a State with Mandated TDI and Labor Supply in the Longer Run, 1992-2020*

	(1)	(2)	(3)
	Years worked after age 50	Ever applied for DI	Ever received DI
Mandate effect for potential DI applicants	2.450***	-0.184**	-0.074
	(0.768)	(0.077)	(0.074)
Mandate effect for workers ineligible for DI	-0.772	-0.081*	-0.018
	(0.546)	(0.044)	(0.041)
Ineligible for DI	2.711***	-0.238***	-0.202***
	(0.346)	(0.039)	(0.038)
Female	0.064	0.014	0.011
	(0.341)	(0.036)	(0.033)
Black	-0.466	0.166***	0.132***
	(0.460)	(0.047)	(0.048)
Hispanic	-0.708	0.041	-0.022
	(0.479)	(0.054)	(0.046)
Married	0.187	-0.018	-0.006
	(0.327)	(0.033)	(0.030)
College-educated	0.977**	-0.054	-0.077**
	(0.405)	(0.040)	(0.036)
Receives Workers' Compensation within 2-4 years of disability onset	-0.715	0.088	0.057
	(0.609)	(0.058)	(0.057)
Covered by employer LTD	-0.977***	-0.030	-0.032
	(0.340)	(0.038)	(0.033)
Covered by employer health insurance	0.296	-0.016	0.016
	(0.367)	(0.040)	(0.034)
Employer has more than 50 employees	0.071	-0.019	-0.003
	(0.312)	(0.032)	(0.030)
Age and earnings controls	Yes	Yes	Yes
Year and industry controls	Yes	Yes	Yes
State labor market controls	Yes	Yes	Yes
N	1,238	1,238	1,238
R-squared	0.264	0.157	0.115

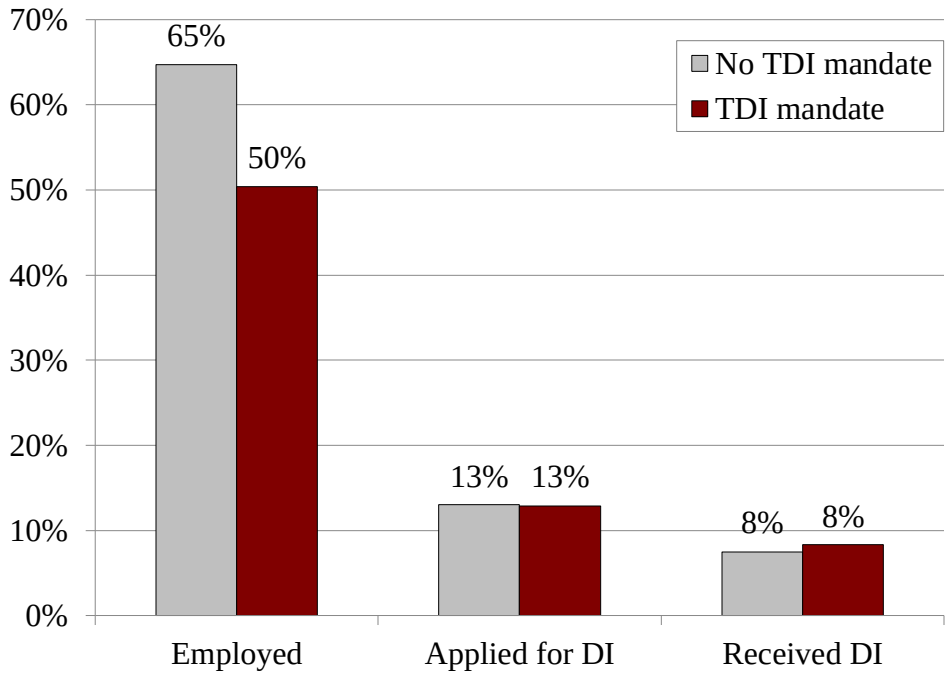
Notes: Years worked is based on self-reports between 1992 and 2020. DI application and receipt are also based on self-reports between 1992 and 2020. The regressions control for age in two-year buckets and pre-disability earnings in quintiles. Mandate effects for potential DI applicants and ineligible workers are estimated from the linear combination of interaction terms. Robust standard errors are in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.
Source: Authors' estimates from the HRS (1992-2020).

Figure 1. *Employment and DI Application Rate of Potential DI Applicants, Four Years After Disability Onset, by State of Residence, 1992-2020*



Source: Authors' estimates from the HRS (1992-2020).

Figure 2. *Employment and DI Application Rate of Workers Ineligible for DI, Four Years after Disability Onset, by State of Residence, 1992-2020*



Source: Authors' estimates from the HRS (1992-2020).

Appendix A. Effects of Mandated TDI on Spousal Labor Supply

PFML programs are frequently discussed as potential policy remedies for caregivers.[43] A number of recent studies have examined the direct impact of paid family leave on caregivers whose family member experiences a health shock.[44] These studies typically find positive employment effects for caregivers. No study to our knowledge has examined how the TDI component could potentially affect caregivers of workers who develop work-limiting disabilities through providing additional income for the household. As a supplement to our main analysis, this appendix section evaluates the spillover effects of TDI on the labor supply of spouses, i.e. the assumed caregiver in the household.

Our conceptual framework and main analysis focus on the worker's own labor supply and DI claiming decisions. However, for the two-thirds of our sample who are married, a major health shock likely impacts their spouse as well, as spouses may compensate for a partner's reduced earnings capacity. Specifically, the spouse faces reduced household income and may also need to begin caring for the worker depending on the severity of the disability. Since the income effect should increase spousal labor supply while the caregiving effect would reduce it, the overall impact of a health shock is ambiguous. TDI benefits will mitigate the income effect but may have limited impact on caregiving if the benefits are insufficient to hire professional help. Hence, we expect TDI to reduce spousal labor supply on net.

We follow the same approach outlined in the methodology section to evaluate how mandated TDI affects spousal employment and earnings, relative to the period before disability. We implement this test by restricting our sample to workers who are married in the three consecutive waves before and after disability onset (*w-1* to *w+1*), resulting in a sample of 782 worker-spouse pairs. The effect of mandated TDI on the spouse's employment and earnings is estimated using equation (13), with additional controls for the spouse's age, education, and employment status prior to disability onset. It is worth noting that the three largest TDI states in our analysis also implemented paid family leave (PFL) during this period, which may have positive employment effects for the spouse. Consequently, we also control for the availability of PFL at the onset of the worker's disability.

[43] See Jacobs (2020) for a summary of the paid leave policy landscape.
[44] Kang et al. (2019), Anand et al., (2022), Braga et al. (2022), Coile et al. (2022), and Bartel et al. (2023).

Figures A1 and A2 show the spouse's employment status before and after the worker's health shock, for potential DI applicants and ineligible workers respectively.[45] The spouses of potential DI applicants are less likely to work after disability onset, suggesting that caregiving needs dominate the income effect (Figure A1). However, as expected, this reduction in spousal employment is slightly stronger in states with TDI mandates. Interestingly, TDI seems to have a stronger impact on the spouses of ineligible workers (see Figure A2). In states without TDI mandates, the rate of spousal employment holds steady after the worker's health shock (likely because caregiving needs are fewer), but it drops in states with mandated TDI. Regression results in Appendix Table A1 seem to support this interpretation, particularly for the spouses of ineligible workers, but unfortunately our sample is too small to draw firm conclusions.[46]

[45] Spouses in states with mandated TDI may have been eligible for PFL if they were working in later periods, the impact of which is incorporated in the raw means for TDI mandate states.

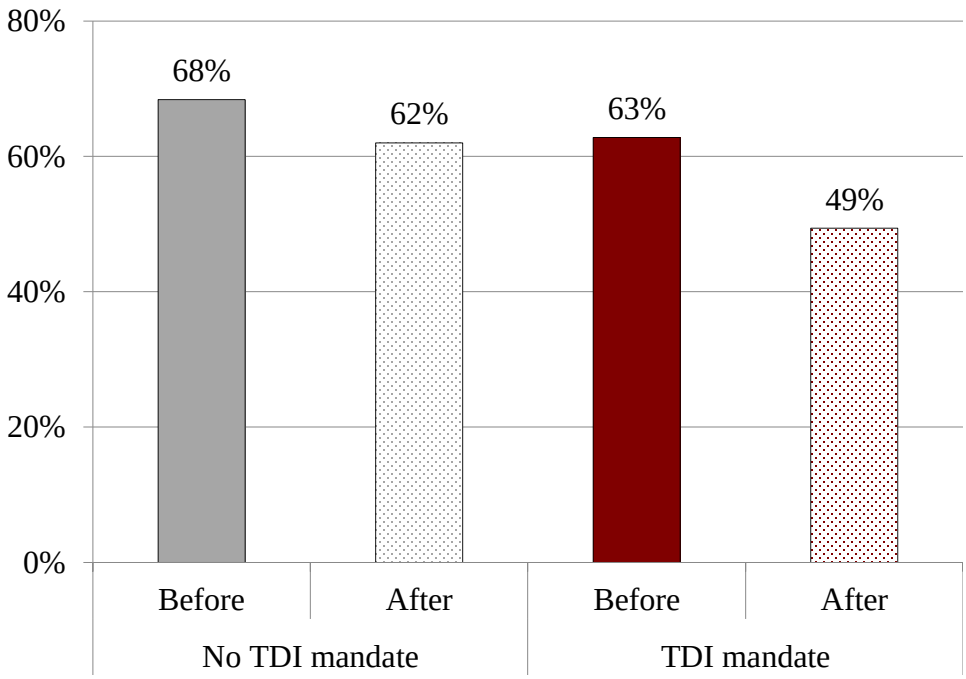
[46] Additionally, we find a small negative effect on the spousal earnings of ineligible workers. However, while we have information on 782 spouses, fewer than 70 percent of them were working before or after the worker's disability and had non-missing information for the control variables.

Table A1. *Regression Results for the Relationship Between Living in a State with Mandated TDI and Spouse's Labor Supply Four Years After Disability Onset, 1992-2020*

	(1)	(2)
	Spouse is employed post-disability	Log spousal earnings
Mandate effect for potential DI applicants	-0.005	1.904*
	(0.089)	(1.016)
Mandate effect for workers ineligible for DI	-0.092*	-0.634
	(0.052)	(0.576)
Spouse characteristics:		
Spouse is college-educated	0.014	-0.257
	(0.043)	(0.552)
Spouse is employed pre-disability	0.679***	
	(0.034)	
Worker characteristics:		
Ineligible for DI	0.073*	0.210
	(0.038)	(0.356)
Female	-0.013	0.185
	(0.038)	(0.443)
Black	-0.112**	-0.270
	(0.045)	(0.477)
Hispanic	-0.001	0.025
	(0.046)	(0.643)
College-educated	-0.036	0.660
	(0.041)	(0.512)
Receives Workers' Compensation within 2-4 years of disability onset	0.042	-0.849
	(0.058)	(0.610)
Covered by employer LTD	-0.050	-0.164
	(0.036)	(0.364)
Covered by employer health insurance	-0.054	-0.053
	(0.036)	(0.370)
Employer has more than 50 employees	-0.008	0.200
	(0.031)	(0.339)
Spouse age controls	Yes	Yes
Spouse pre-disability earnings controls	No	Yes
State paid family leave mandate controls	Yes	Yes
N	782	782
R-squared	0.561	0.563

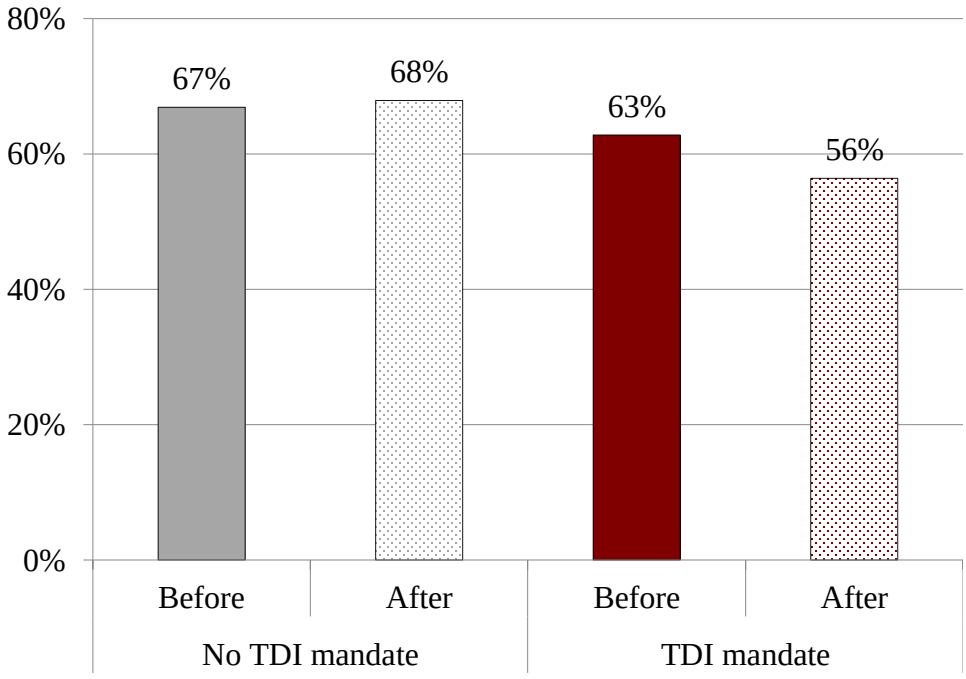
Notes: Spouse's employment and earnings are recorded within two waves after the worker's disability onset. Log spousal earnings are the log of one plus average earnings after the worker's disability onset. The regressions also follow specification in the main analysis and control for the worker's age in two-year buckets, pre-disability earnings in quintiles, pre-disability industry, year, and state labor market conditions. Mandate effects for marginal applicants and other workers are calculated based on interactions of their group status and the mandate state indicator. Robust standard errors are in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.
Source: Authors' estimates from the HRS (1992-2020).

Figure A1. *Employment of Spouses of Potential DI Applicants, Before and Four Years After Disability Onset, by State of Residence, 1992-2020*



Source: Authors' estimates from the HRS (1992-2020).

Figure A2. *Employment of Spouses of Ineligible Workers, Before and Four Years After Disability Onset, by State of Residence, 1992-2020*



Source: Authors' estimates from the HRS (1992-2020).

Appendix B. Appendix Tables

Table B1. *Health Status of Workers After Disability Onset, by Assumed Eligibility for DI*

Condition	Potential DI applicants	Ineligible for DI
Expecting the condition to be permanent	100.0%	70.7%
Self-reported health is poor	27.1	2.7
Experienced major health shocks	37.9	5.4
Developed new difficulties with ADLs/IADLs	67.3	8.3

Source: Authors' estimates from the HRS (1992-2020).

Table B2. *Health Outcomes of Workers Four Years After Disability Onset, by Assumed Eligibility for DI*

Condition	Potential DI applicants	Ineligible for DI
Continue to experience working-limiting conditions	60.9%	40.2%
Condition keeps the individual from working altogether	34.5	13.6
Still reporting poor health	19.9	4.7
Experienced new major health shocks	14.2	8.5
Continue to develop new difficulties with ADLs/IADLs	30.2	14.1
Continue to experience working-limiting conditions	60.9	40.2

Source: Authors' estimates from the HRS (1992-2020).

Table B3. *Receipt of Unemployment Insurance Benefits and Age Discrimination at the Workplace, by State of Residence*

	Resides in:	
	States with mandated TDI	States without mandated TDI
N	218	1,020
Panel A. UI participation post-disability		
Average UI benefits	$372	$397
Share of workers receiving UI	8.8%	8.7%
Panel B. Age discrimination at workplace pre-disability		
Experienced discrimination regarding promotion	21.3%	21.0%
Experienced pressure to retire	20.1	16.7

Source: Authors' estimates from the HRS (1992-2020).