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Abstract

This paper studies how disability onset and subsequent administrative registration affect labor market trajectories in Chile, a middle-income country with a large informal sector. Using panel survey data linked to administrative records, we estimate dynamic employment and earnings effects around disability events. Disability onset generates sharp and persistent losses: Full-year employment falls by about 11 percentage points at onset and by 20 to 25 percentage points within six years, while formal wages decline by approximately 6% initially and by more than 30% five years later. Among those who remain employed, the probability of working informally rises over time while formal employment probability falls, indicating adjustment along the margin of employment quality. Registration is clearly endogenous: Individuals who certify display preexisting employment deterioration, which prevents a causal interpretation of the effects of registration.

Keywords: disability; labor market dynamics; labor market outcomes; Chile
JEL codes: J14, J21, J24

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1 Introduction

Disability is a major shock to individuals' economic trajectories. Its labor market consequences are large: Across OECD countries, employment gaps between people with disabilities (PwD) and people without disabilities (PwoD) range from 10 to 40 percentage points (Garcia-Mandico et al., 2022). Existing studies typically find that disability onset reduces employment by 9 to 11 percentage points one year after onset and by more than 20 percentage points in the medium term ((Charles, 2003, for the USA), Polidano and Vu (2015, Australia), Collischon et al. (2023, Germany), Jones and McVicar (2020, Britain), and Mani et al. (2018, Indonesia)). Most of this evidence, however, comes from high-income economies with predominantly formal labor markets. In middle-income countries with sizable informal sectors, adjustment to disability can operate along additional margins, including not only exits from work but also transitions between formal and informal employment. Further, studies that jointly observe the onset of disabilities and their subsequent institutional recognition remain scarce.

This paper combines longitudinal survey and administrative data on Chile, a middle-income country where informal employment accounts for nearly 30% of total employment, to quantify the short-, medium-, and long-run effects of disability on employment and earnings and to examine whether inclusion policies have altered these trajectories. We study two related moments. The first is disability onset, defined as the first year in which individuals report functional limitations that constrain their daily or work activities. Using the year of onset as the reference point allows us to localize the initial shock and characterize subsequent labor market adjustments across both the formal and informal sectors. The second moment is formal registration in the National Disability Registry (Registro Nacional de Discapacidad; RND), an institutional certification that generally occurs with a lag relative to onset, requires medical assessment, and activates access to targeted

benefits, accommodations, and program eligibility. Registration functions as an administrative gateway rather than a purely informational update, and it is the status that informs the monitoring and enforcement of inclusion policies. In our data, onset is self-reported in the Employment and Social Protection Survey, while registration and formal-sector outcomes are observed in linked social security and registry records. Descriptive evidence indicates that registrants tend to be individuals whose employment trajectories were already deteriorating before certification, which is important to interpret the effects of registration.

The distinction between onset and registration is central for policy evaluation. Chile's disability-inclusion agenda, including the 2010 certification reform and the 2018 labor inclusion law establishing disability-based employment quotas, assigns institutional roles to registration: verifying eligibility, channeling benefits and providing support, and monitoring compliance in the formal sector. If certification is delayed or disproportionately captures more severe cases, measured changes around registration will capture a different margin than the onset of functional limitations. From a policy perspective, the onset analysis quantifies the total loss that arises when limitations first appear, while the registration analysis informs us whether certification coincides with changes in employment trajectories. These inclusion laws apply both to individuals with recently acquired disabilities and to those with long-standing conditions. As a result, our analysis of the effects of registration may capture both groups, whereas our onset analysis is by construction restricted to trajectories following the emergence of new functional limitations.

A central challenge in interpreting the effects of registration is that certification is endogenous. Individuals will register after disability onset, when their labor market attachment has already begun to weaken, which implies that preregistration trajectories are not flat but declining. Our empirical strategy explicitly documents these pre-trends and focuses on how employment dynamics evolve relative to this declining baseline. Accordingly, our Manalysis interprets post-registration

patterns as changes in the slope of deterioration. Consistent with this interpretation, the registration analysis focuses on comparisons within the population of individuals who had already declared a disability, rather than comparisons with nondisabled individuals, onset with those associated with certification.

Empirically, we estimate dynamic effects using event-study difference-in-differences methodologies. The first specification uses the year of onset as the reference point in the survey panel to study employment and earnings—specifically, total employment, formal and informal jobs, and annual wages. The second specification centers the analysis on the year of formal registration in the administrative data. To make the two exercises more comparable, the registration analysis focuses on individuals with self-reported disability status in the social registry before certification.

We make three contributions to the literature. First, unlike work that focuses on high-income countries, we provide long-run evidence on the labor market effects of disability in a middle-income economy with a large informal sector. Second, we jointly study formal and informal employment, documenting how disability reshapes the composition of jobs among those who remain employed. Third, we use administrative records spanning 2012–22 to evaluate whether registration by affecting benefit access and policy enforcement attenuates job losses in the formal sector. Additionally, we exploit the calendar-time aggregation of treatment effects within the Callaway-Sant'Anna framework to explore whether Chile's inclusion policies (the 2010 certification reform and the 2018 quota law) are associated with systematic changes in employment outcomes over time.

We find that disability onset leads to sizable and persistent declines in employment and earnings, as well as a shift toward informal employment among those who continue working. At onset, full-year employment falls by about 11 percentage points, while informal employment declines by 5.5 percentage points and wages drop by 5.6%. Six years after onset, total employment

is 24 percentage points lower and informal employment is slightly—but not statistically significantly—higher, whereas conditional on being employed, the likelihood of holding an informal job increases by about 20 percentage points, suggesting that PwD move into informal employment as a way to cope with the shock. Six years after onset, wages are 34% lower than before onset. Employment trajectories following disability onset are broadly similar regardless of whether the disability results from an accident or an illness. In contrast, wage trajectories initially diverge by disability origin: accident-related disabilities generate sharper short-run declines, while illness-related disabilities exhibit more gradual but persistent losses. These differences, however, fade over time, with wage effects converging to similar magnitudes by four to five years after onset. Initially, individuals are more likely to report health as the main reason for leaving a job, but in the medium run, layoffs are the most common reason. Regarding formal registration, employment trajectories are already declining in the years leading up to certification, highlighting the endogenous nature of the registration decision. Following registration, we observe an attenuation of these negative pre-trends rather than a reversal. This pattern is consistent with a slowing of labor market exit among those who remain attached to employment, suggesting that certification may coincide with employment retention without fully offsetting the losses associated with disability onset. Regarding the evaluation of inclusion policies, calendar-time analysis of treatment effects shows suggestive patterns consistent with reduced employment gaps after the 2018 quota law for sporadic employment, though no clear pattern emerges for full-year employment.

The remainder of the paper is organized as follows. Section 2 describes the data. Section 3 presents the empirical strategy. Section 4 reports the main results and heterogeneity analysis. Section 5 discusses the complementary policy exercise, and Section 6 concludes.

2 Data

We rely on two complementary sources of information to analyze the relationship between disability status and labor market outcomes. The first is the Social Protection Survey (Encuesta de Protección Social; EPS), a rich longitudinal household survey that provides detailed information on socioeconomic and employment characteristics, including self-reported disability status. The EPS, linked to administrative pension contribution histories, enables us to assess the impact of disability on both total and formal/informal employment, using a long panel with rich socioeconomic controls. The second source is a set of linked administrative records that allow us to follow individuals in the formal labor market over time, including verified disability registrations. These data, covering the period 2012–22, provide an opportunity to study how formal registration as a PwD in the National Disability Registry (RND) relates to subsequent formal employment outcomes. The datasets provide complementary perspectives: The EPS captures self-reported and informal labor dynamics, while the administrative records deliver precise, externally validated measures of formal employment. We describe each dataset in turn below. Appendix A provides a detailed comparison of how disability status is defined and measured across the two sources.

2.1 Sources

Social Protection Survey Data

The EPS is a longitudinal panel survey designed to monitor the labor market and pension dynamics of Chilean households. It follows approximately 16,000 individuals across seven rounds (2002, 2004, 2006, 2009, 2015, 2020, and 2024).[1] It collects information on education, health, social security, income, and assets. Crucially, it records individuals' complete employment histories,

[1] Although the first round in 2002 included a smaller sample (since it only surveyed members of the pension system), we include it in the analysis.

which we transform into yearly measures of employment status, monthly wages, and hours worked.

Using the 2015 and 2024 waves, we construct a self-reported disability variable that identifies whether a person has a disability, its type (e.g., physical, visual, auditory), the year of onset, and its origin (e.g., accident or illness). This enables us to identify the onset of disability and compare pre- and post-onset trajectories of employment and wages. The disability questions are answered directly by the respondent, not by a proxy or another household member, which reduces potential measurement error from third-party reporting. One potential drawback of this survey is measurement error since it is conducted retrospectively. However, we observe clear and consistent changes in labor outcomes around the reported onset date, including across different types of disability, suggesting that recall error is unlikely to be a major concern. Individuals also report employment spells that include information on average wage, type of employment (formal or informal), and reason for termination.

The EPS data are linked to the Contribution History of Active Members, Pensioners, and Deceased (Historia Previsional de Afiliados Activos, Pensionados y Fallecidos), an administrative dataset maintained by the Superintendencia de Pensiones that contains monthly formal wage data. This linkage enhances the survey by providing verified information on formal employment spells and contributions, as well as monthly formal wages.

We analyze an unbalanced annual panel that combines demographic characteristics, self-reported disability status, and labor market outcomes (employment, monthly wages, and weekly hours worked). To avoid conflating disability effects with schooling or retirement, we restrict the sample to individuals aged 25–54 in each observation year. Administrative records are available from 2002 to 2024 for all individuals who completed at least one questionnaire, allowing for more comprehensive analyses using administrative data. In contrast, analyses based on survey-collected outcomes have fewer observations; focusing on specific outcomes, such as

informality, further reduces the sample. Consequently, long-run estimates for informality often have wider confidence intervals, and in some cases, we limit the event window to five years before and five years after disability onset.

Administrative Data: Registro de Información Social

We complement the EPS analysis with an analysis of administrative data from the Registro de Información Social (RIS; Social Information Registry), provided by the Chilean Subsecretaría de Evaluación Social (Undersecretary of Social Evaluation). These data allow us to examine the role of formal disability registration.

We construct a yearly worker-level panel covering the period 2012–22 using data from the Pension Fund Administrators (Administradoras de Fondos de Pensiones; AFP), which provide information on monthly wages for all formal workers affiliated with the pension system, encompassing both the private and public sectors. These records are linked to the RND, which identifies individuals formally certified as having a disability and provides the registration date. We also incorporate demographic information (gender, date of birth, and education) from Civil Registry records.

Critically, we link these data to the Registro Social de Hogares (RSH), Chile's household-based social registry used to determine eligibility for social programs. The RSH collects socioeconomic information from households applying for or receiving social benefits, including self-declared disability status. Unlike the EPS, for which disability information is collected through direct individual interviews in a survey context, the RSH records disability status based on administrative self-declarations made by households when registering for social programs. This self-declaration is independent of formal certification in the RND.

We restrict the sample to individuals aged 25–54, representing the prime working-age population. To estimate the effect of registration, we focus on individuals who had already

self-declared a disability in the RSH before registration in the RND. This restriction is central to our identification strategy: It ensures that both treated individuals (those who eventually register in the RND) and control individuals (those who declared a disability in the RSH but did not register) had comparable disability status before registration. While treated and control individuals may still differ in observable and unobservable characteristics, restricting the sample to those with prior self-declared disability helps reduce the likelihood that differences in labor market trajectories simply reflect the emergence of a new health condition rather than the effect of formal registration itself.

The extended observation window (2012–22) allows us to examine trajectories up to 10 years before and after registration, providing a comprehensive view of labor market dynamics around the certification event.

2.2 Outcomes

This section defines the labor market outcomes used in the analysis and documents their construction and sources. Table 1 summarizes variable names, definitions, and data sources and serves as the reference for all specifications below.

Employment is measured annually using two indicators that capture different intensities of labor market attachment. The first indicator determines whether the individual worked for at least one month during the year, regardless of the formality of their employment. The second indicator identifies whether the individual worked the entire year. Both indicators are constructed from the EPS, which records employment spells and allows us to distinguish extensive-margin responses of different intensity.

We distinguish between formal and informal employment based on the availability of pension contribution records. Formal employment is identified from matches between the EPS and

administrative pension contribution records (AFP) and, when relevant, from the administrative registry (RIS). Informal employment is identified in the EPS using self-reports of employment without corresponding contributions. Results present overall employment and, when applicable, the decomposition into formal and informal components as defined in Table 1.

Earnings are measured at the monthly level and aggregated to annual frequency. Two earnings measures are used. The unconditional measure assigns zero earnings to non-employed months and then averages over the year, thereby reflecting both participation and earnings among those who work at any point. The conditional measure averages monthly earnings over months with positive earnings, isolating changes among those with observed labor income. When earnings are drawn from administrative sources, they are constructed from reported pension contributions as detailed in Table 1. All amounts are expressed in constant 2024 USD using the national CPI.

For the onset analysis, annual outcomes are organized relative to the self-reported year of onset in the EPS. For the registration analysis, annual outcomes are organized relative to the year of formal registration observed in the RIS. In both cases, the alignment to the reference year follows the conventions specified in Table 1, ensuring that differences across exercises do not arise from outcome definitions or measurement.

2.3 Descriptive statistics

Table 2 presents descriptive statistics for the main variables used in the analysis, distinguishing between PwD and PwoD across the two data sources: the EPS and the RIS administrative data.

Table 2 (columns 1 and 2) reports descriptive statistics for EPS in 2017. PwoD are on average 39 years old, with just over half being women and 37% holding a college degree. Their labor market attachment is relatively strong: 78% worked at least one month during the year and 70% worked the entire year. Formal employment, recovered from administrative records, shows that

50% worked at least one month and 45% for the full year. Average annual formal wages reach USD 5,969 across all individuals and USD 9,730 among those with positive earnings, based on 5,119 respondents.

In contrast, PwD (3.3% of the sample) are older (average 45 years) and less educated (26% with a college degree) and display weaker labor market attachment. Only 61% worked at least one month in the year, and 51% worked the full year. Among PwD, 37% held a formal job for at least one month and 30% worked formally for the full year. Conditional on employment, 64% of PwoD held a full-year formal job, compared to 55% among PwD. Average annual wages were USD 2,400 across all individuals and USD 8,039 among those with positive earnings. Although the number of PwD is relatively small, these differences consistently reveal large gaps in employment and wages by disability status.[2]

Columns (3) and (4) of Table 2 present descriptive statistics from the RIS administrative data by registration status in the RND. PwoD are on average 36.8 years old, 61% are women, and 10% hold a college degree. Around 62% worked formally at least 1 month during the year, while only 35% were employed for all 12 months. Consistent with intermittent formal employment over the year, their average annual formal wage is approximately USD 6,494, and, when restricting the data to those with positive earnings, the wage is USD 11,142.

Registered PwD represent less than 1% of the sample and differ markedly from the rest of the population. They are older (average 38.2 years) and less educated (5% with a college degree), and they show significantly weaker attachment to the labor market. Only 34% worked formally at least one month during the year, and just 25% were employed the full year. Average annual formal wages are about USD 4,200 overall and USD 8,901 among those with positive earnings. These consistent

[2]The annual EPS panel includes 15,991 unique individuals and 165,996 person-year observations, of which 671 correspond to PwD and 15,320 to PwoD. When merged with administrative data, the panel expands to 18,411 individuals and 235,249 observations, with 822 PwD and 17,589 PwoD. Sample sizes in Table 2 are smaller for PwD because of the imposed sample restrictions.

gaps across employment and wage measures highlight the persistent disadvantages faced by PwD in the formal labor market.

These contrasts highlight the importance of accounting for observable characteristics, such as gender, age, and education, when comparing outcomes across disability status. They also motivate the empirical strategy described below, in which we use event-study and difference-in-differences models to isolate the causal effects of disability onset and registration.

3 Empirical Strategy

To study the impact of disability onset and registration on labor market trajectories, we implement an event-study design using the Callaway and SantAnna (2021) difference-in-differences estimator. Individuals experience onset (in the survey data) or formal registration (in the administrative records) in different years, generating a staggered treatment structure. In such settings, conventional two-way fixed-effects (TWFE) estimators may yield biased dynamic effects when treatment effects vary across cohorts or over time (Sun and Abraham, 2021; Wooldridge, 2021; de Chaisemartin and DHaultfuille, 2022; Borusyak et al., 2021). The Callaway-Sant'Anna approach avoids these issues by constructing cohort-specific counterfactuals using only not-yet-treated units and then aggregating causal effects across cohorts.

Let G_i denote the year in which individual i first reports disability onset (or first appears in the disability registry). For each individual and year, define event time as

$$k = t - G_i.$$

For each treatment cohort g and calendar year t, the estimator identifies a group-time average

treatment effect on the treated (ATT):

$$ATT_{g,t} \;=\; E[\,Y_{it}(1) - Y_{it}(0) \,|\, G_i = g,\; t \geq g]$$

Here, $Y_{it}(1)$ and $Y_{it}(0)$ denote the potential outcomes with and without treatment. Identification relies on a conditional parallel trends assumption using appropriate not-yet-treated comparison groups.

Dynamic effects are constructed by aggregating these cohort-specific effects into event-time parameters

$$\delta_k \;=\; E_{g \in \mathcal{G}_k}[\,ATT_{g,\,g+k}\,],$$

where $\mathcal{G}_k$ is the set of cohorts for which event time k is observed. We estimate δ_k using the doubly robust implementation of SantAnna and Zhao (2020).

All specifications include year dummies and controls for age, sex, and professional degree, with covariates aligned to those available in each data source (survey or administrative records). This framework allows us to flexibly trace the short-, medium-, and long-run effects of disability onset and registration while accommodating heterogeneous treatment effects and ensuring valid comparisons across cohorts.

4 Results

We next present the results of the event-study estimations. We begin by analyzing the effects of disability onset based on the self-reported date of disability declaration using the EPS survey data. This specification captures the dynamic evolution of labor market outcomes before and after individuals first report a disability. We then turn to the estimates based on the administrative

data from the RIS, where treatment is defined by the date of formal registration in the RND. This complementary approach allows us to compare how employment and earnings trajectories evolve when disability is identified through self-reports versus through official certification records.

Tables report the estimated coefficients from the event-study models, while figures display the corresponding normalized effects, expressed relative to the mean of the dependent variable in the control group for comparability.

4.1 Labor outcomes and disability onset

In this subsection, we document the substantial declines in employment and wages that follow the onset of disability. We begin with self-reported outcomes from the EPS, which allow us to capture overall employment effects and assess whether workers transition into informal employment or informal earnings as part of their adjustment. We then turn to administrative and linked EPS records to examine how disability onset affects formal employment and formal-sector wages. Next, we analyze the main reasons individuals give for ending their employment relationships, providing additional context for the observed labor market changes. Finally, we explore heterogeneity by the origin of the disability—accidents versus illnesses—to assess whether the dynamics differ across types of impairments. Taken together, these components offer a detailed and integrated view of the labor market consequences of disability onset.

4.1.1 Total and informal employment and wages

Employment patterns

Figures 1 and 2, together with Table 3, summarize the estimated effects of disability onset on total and informal employment. We observe a marked deterioration in overall employment immediately following disability onset. Up to two years before onset, the trajectories of individuals who later

report a disability are statistically indistinguishable from those of the control group, suggesting no differential pre-trends. At the time of onset ($\tau = 0$), the probability of full-year employment falls by 11.4 percentage points (24% of the control mean), while the probability of working at least one month decreases by 5.7 percentage points (9%). One year after onset, these losses increase to 14.3 and 19.9 percentage points, corresponding to relative declines of approximately 30% and 33%, respectively. By year six, the cumulative gaps widen to roughly 24 percentage points for full-year employment (51% of the mean) and 28 percentage points (46%) for working at least one month, confirming the strong and persistent adverse impact of disability on overall labor engagement.

For informal employment, the effects are smaller and confidence intervals larger, but they reveal interesting dynamics. At onset, the probability of working informally the full year declines by 5.5 percentage points (29% of its mean), while the probability of working at least one month informally falls by 4.8 percentage points (15%). Both effects remain negative and significant for up to three years after onset but gradually increase thereafter and become statistically nonsignificant. This pattern indicates that disability reduces participation in both formal and informal jobs in the first years after onset, implying a general withdrawal from the labor market rather than an immediate shift toward informality.

However, when focusing on the probability of working informally *conditional on employment*, the adjustment margins differ. As Figure 2 shows, after the fifth year following the onset, those who remain employed become increasingly likely to work in informal jobs. This tendency is more pronounced for sporadic employment, where the conditional probability of informality increases after several years, whereas for full-year employment, the effect is smaller and less precisely estimated. Hence, disability onset appears to push many individuals out of work altogether, but among those who remain active, informality becomes a more common form of participation.

Informal wages

Table 3 also reports the estimated effects on informal earnings, distinguishing between unconditional income (including nonworkers) and conditional income (restricted to those who report working). Before onset, wage trajectories are statistically parallel across groups. At onset, annual informal income that is unconditional falls by about USD 263 and income conditional on working falls by USD 571. Up to four years after onset, these losses grow to roughly USD 600 and USD 875 for unconditional wages and USD 300 and USD 400 for conditional wages, equivalent to declines of approximately 60% and 9% relative to their respective control means (see Table A.4). The milder decline in conditional wages suggests that workers who remain employed continue to earn lower, yet relatively stable, incomes compared to the broader group that includes labor market dropouts.

Overall, the results confirm that disability onset generates large and persistent declines in total and informal employment, accompanied by substantial wage losses. The evidence points to two complementary mechanisms: first, a broad withdrawal from the labor market; and second, among those who stay employed, an increasing tendency to work in informal, lower-paying jobs. As we show below, the deterioration in formal employment is even stronger, reinforcing the picture of long-term disengagement from stable, protected work among PwD.

4.1.2 Formal employment and wages (administrative data)

We take advantage of the fact that EPS can be paired with AFP data, which contain information about the employment and wages of all workers who contribute to the pension system. We measure full-year employment, sporadic employment (at least one month per year), and wages (unconditional and conditional on working). Results, presented in Figure 3 and Table 4, reveal a clear break at the moment of disability onset. Up to 2 years before, the labor trajectories of individuals who later report a disability are not statistically different from those of the control

group. However, 1 year after the onset, there is a significant decline of 5.8 percentage points in the probability of full-time employment (almost 16% relative to the mean of the sample) and of 6 percentage points (10%) in the probability of working at least one month during the year. These reductions intensify in subsequent years: 5 years after onset, the probability of full-time work falls by more than 10 percentage points (approximately 30%), and the probability of working at least one month drops by 14 percentage points (approximately 25%). The deterioration remains persistent up to 10 years after onset, with some moderation toward the end of the observed period.

The administrative records confirm a similar pattern of income losses (Panels III and IV in Figure 3 and Table 4). Prior to the onset, no systematic differences are detected. At the year of disability onset, annual wages fall by approximately USD 300 (unconditionally) and by more than USD 600 among those with positive earnings. From the first year after onset onward, losses increase substantially: By the second year, unconditional wages decline by more than USD 1,100 and conditional wages by nearly USD 2,000. These declines deepen further in subsequent years, with average losses (after disability onset) exceeding USD 1,360 (unconditional) and USD 1,550 (conditional) over the next decade.

4.1.3 Separation reasons reported in the EPS

From the EPS, we can study the main reason an unemployment spell ended, and Table 5 reports the distribution of stated reasons for job separation. Event time is defined relative to the onset reference year. Because separations are infrequent at the annual level, years are grouped into two-year intervals to improve precision and avoid small cells.

Health-related separations rise in the immediate post-period, with an increase of 0.054 at $\tau = 0, 1$ (5%). However, after disability onset, the composition shifts toward employer-initiated and health-related separations. Layoffs increase: The post-onset average effect is 0.021 (significant at

1%), and the pooled intervals remain positive and significant (0.019 at $\tau = 2, 3$, 0.025 at $\tau = 4, 5$, 0.027 at $\tau = 6, 7$). Voluntary resignations tend to decline: The post-onset average is -0.020 (not significant), and the immediate post-onset interval shows -0.022 at $\tau = 0, 1$ (10%). For context, the control-group-mean shares are 0.041 for resignations, 0.032 for layoffs, and 0.004 for health-related separations. Overall, when separations occur after onset, they are more often attributed to layoffs and health reasons than to voluntary quits.

4.1.4 Heterogeneity by disability origin

To assess the robustness of our main findings, we next explore whether the estimated effects vary by the origin of the disability. One potential concern is that in the case of chronic conditions, the reported year of disability onset may not precisely capture the timing of functional deterioration—potentially introducing measurement error if the decline in health and employment started earlier. To examine whether this issue affects our results, we exploit EPS information on the *origin* of disability, distinguishing between disabilities resulting from chronic illnesses and those caused by accidents (see Figures 4 and 5 and Tables A.2 and A.3).

The patterns across both groups are strikingly similar, showing no evidence of anticipatory behavior or differential pre-trends. Before onset, employment trajectories for both illnesses and accidents are flat and statistically indistinguishable from those of the control group. Following the onset, both types of disability result in a significant decline in employment and earnings, although their dynamics differ slightly. Disabilities arising from accidents generate sharper and more short-lived shocks, with somewhat noisier estimates and partial stabilization in later years. In contrast, disabilities caused by illnesses produce smoother but more persistent declines in labor market outcomes.

Quantitatively, the magnitudes are comparable across disability origins. The probability

of full-year employment falls by roughly 10 to 12 percentage points in the onset year and doubles within three years, regardless of origin. Wage trajectories follow a similar pattern: Both unconditional and conditional earnings drop significantly after onset, with accident-related losses appearing larger but less persistent than those associated with illnesses.

Overall, these results suggest that potential measurement error in the timing of disability onset is unlikely to be driving our main findings. The absence of pre-trends and the broadly similar post-onset patterns across disability types reinforce the interpretation that the observed deterioration in labor outcomes reflects the causal impact of disability itself rather than reporting inaccuracies or timing differences.

4.2 Labor outcomes and disability registration

The second part of our analysis examines how formal disability registration correlates with labor market trajectories using administrative data from the RIS covering the period 2012–22. Unlike the self-reported onset of disability analyzed earlier, registration in the RND is an endogenous process that may respond both to health deterioration and to institutional incentives, particularly those stemming from the 2018 Inclusion Law, which increased the benefits of formal registration, especially for formal workers. To reduce bias from these dynamics, we restrict the sample to individuals who had already declared a disability in the RSH. This restriction ensures that both treated and control individuals had comparable disability status before registration, thereby improving the homogeneity of the pre-treatment period. The extended observation window (2012–22) allows us to examine trajectories up to 10 years before and after registration, providing a comprehensive view of labor market dynamics around the certification event.

An important implication of this design choice is that our analysis does not estimate the effect of registration relative to nondisabled individuals. Because formal registration certifies an

already-existing disability rather than generating it, comparisons with PwoD would conflate the labor market consequences of disability itself with those associated with certification. Restricting the sample to individuals who had already declared a disability allows us to construct a more comparable control group and to isolate changes in labor market trajectories around the timing of registration among individuals facing similar underlying conditions.

Results from Table 6 and Figure 6 reveal clear patterns in both employment and wages around the time of registration. For employment outcomes, we observe strong negative pre-trends: Individuals who eventually register show declining formal employment in the years leading up to certification. This pattern is evident in both sporadic employment (working at least one month per year) and full-year employment measures. The presence of these pre-trends confirms that registration tends to occur among individuals whose labor market attachment is already weakening, reinforcing the endogenous nature of the certification decision.

Importantly, the post-registration dynamics should not be interpreted as a reversal of the losses associated with disability. Employment continues to decline after certification, but at a slower rate than in the preregistration period. This attenuation of negative trends is consistent with a deceleration in labor market exit rather than a recovery of employment levels. In this sense, registration coincides with a partial stabilization of trajectories among those already experiencing declining attachment, suggesting a slowing of disengagement rather than an improvement in employment outcomes.

Wage trajectories reveal a more nuanced pattern that differs between unconditional and conditional measures. For unconditional wages (which include zeros for non-employed individuals), we observe dynamics similar to employment: declining trends prior to registration followed by relative stabilization. However, for conditional wages (restricted to those with positive earnings), wages among those who remain employed continue to deteriorate after certification.

This divergence between employment stabilization and conditional wage decline is consistent with a labor market adjustment in which continued attachment occurs through lower-paying positions. Individuals may remain in or transition to jobs with reduced hours, lower skill requirements, or fewer responsibilities—positions that accommodate their disability but offer lower compensation.

Taken together, these results highlight that while registration in the RND is clearly endogenous and cannot be interpreted causally, it is associated with meaningful changes in the slope of labor market trajectories. The attenuation of preexisting employment declines following certification coincides with a slowing of labor market exit, but this stabilization occurs alongside continued deterioration in conditional wages. This pattern is consistent with a trade-off in which individuals retain employment at the cost of lower earnings, potentially reflecting the accommodations and protections associated with formal disability status under Chile's inclusion framework.

5 Discussion: Policy Evaluation

Building on our main event-study analysis of the labor effects of disability onset, we examine whether there are systematic patterns that might reflect the influence of Chile's inclusion policies—Law 20.422 (2010) and Law 21.015 (2018). Law 20.422 reformed the disability certification system by introducing standardized medical assessment criteria, centralizing records in the RND, and formalizing access to disability-related benefits, social programs, and workplace accommodations. Law 21.015 established a 1% disability employment quota for firms with more than 200 workers, later expanded to firms with more than 100 workers in 2019.

Rather than estimating event-study effects relative to onset, we exploit a complementary feature of the Callaway and SantAnna (2021) framework: the aggregation of group-time ATTs by calendar year. Specifically, the Callaway-Sant'Anna estimator produces cohort-specific ATTs

for each combination of treatment cohort g (year of disability onset) and calendar year t. These group-time effects can be aggregated not only by event time $k = t - g$ (as in our main analysis) but also by calendar year t, weighting across all cohorts that contribute observations in that year. This calendar-time aggregation yields

$$\theta_t = \sum_{g \in \mathcal{G}_t} w_{g,t} \cdot ATT(g,t). \tag{1}$$

Here, $\mathcal{G}_t$ is the set of treatment cohorts observed in calendar year t, and $w_{g,t}$ are weights proportional to cohort size. The resulting estimates θ_t capture the ATT among all treated individuals in a given calendar year, pooling across individuals at different points in their post-onset trajectory. If inclusion policies improved employment outcomes for PwD, we would expect to observe a systematic attenuation of the negative employment effects in years following the implementation of these laws.

Figure 7 and Table A.5 present the calendar-time ATT estimates for formal employment using the EPS data linked to administrative records, covering the period 2005–24. The figure displays the year-specific effects alongside the average ATT over the entire period (indicated by the red horizontal line).

For sporadic formal employment (working at least one month per year), we observe some suggestive patterns. The employment gaps appear to widen during the 2013–18 period, with point estimates becoming more negative. Following 2018—the year of the quota law's implementation—there is a pattern consistent with a gradual reduction in the magnitude of the negative effects. The post-2018 estimates tend to be smaller in absolute value than those in the preceding years, though the confidence intervals overlap substantially across periods.

For full-year formal employment, the patterns are less clear. The year-specific estimates fluctuate around the overall mean without displaying a systematic trend before or after either

policy reform. This lack of a discernible pattern suggests that if the inclusion laws affected employment outcomes, their impact may have operated primarily on the extensive margin of labor market attachment (any employment) rather than on the intensive margin of sustained year-round employment.

These calendar-time results should be interpreted with caution for several reasons. First, the estimates in each year pool individuals at different distances from their disability onset, mixing short-run and long-run effects. Second, compositional changes in the treated population across cohorts could generate spurious patterns unrelated to policy effects. Third, the confidence intervals remain wide, limiting our ability to detect modest policy effects with precision. Fourth, macroeconomic conditions and other time-varying factors may confound the comparison across calendar years.

Taken together, our analysis does not provide strong evidence that Chile's inclusion policies substantially altered employment trajectories for PwD. While there are suggestive patterns in sporadic employment following the 2018 quota law, these are not robust enough to draw firm conclusions. Complementary evidence from the administrative RIS data, presented in Figure 8 and Table A.6 in the Appendix, shows a broadly consistent pattern: Calendar-time ATT estimates for formal employment among registered individuals are negative through 2017 and then shift toward zero or slightly positive values after 2018, stabilizing in subsequent years. However, this pattern should be interpreted with caution, given the presence of pre-trends in the registration analysis documented earlier, which prevents us from interpreting patterns by RND registration as causal estimates.

Our findings are broadly consistent with those of Duryea et al. (2024), who use large-scale administrative employer-employee records and a regression discontinuity design to evaluate the 2018 law. They find that the quota policy increased the number of registered workers with

disabilities in eligible firms, partly through reclassification of incumbent workers, but the effects operate on a narrow margin relative to the substantial employment losses documented at disability onset. Our results reinforce this interpretation: While quota policies may affect the formal composition of the workforce, their scope appears limited compared to the much larger labor market penalties triggered when disability first emerges.

6 Conclusions

This paper provides new evidence on how disability affects labor market trajectories in a middle-income country with high informality. Using linked survey and administrative data, we document large and persistent declines in employment and earnings following disability onset. Total employment falls sharply and continues to decline, while among those who remain employed, the likelihood of working informally rises. Formal employment and formal wages also drop substantially, with little evidence of medium-run recovery. We find similar patterns for disabilities caused by accidents and illnesses.

We also examine how institutional mechanisms—such as formal registration in the RND and the 2010 and 2018 inclusion laws—relate to these trajectories. Using extended administrative data covering the period 2012–22, we show that individuals exhibit declining employment trajectories in the years leading up to registration; however, these negative pre-trends appear to attenuate following formal certification. Because registration is clearly endogenous, these patterns should not be interpreted causally. Rather, they indicate that certification coincides with a slowing of labor market exit among those who register. Importantly, this partial stabilization occurs alongside continued deterioration in conditional wages, consistent with a pattern in which employment retention takes place through acceptance of lower-paying positions. This trade-off

between employment stability and wage levels suggests a form of labor market adjustment in which individuals retain employment at the cost of lower earnings, potentially reflecting the accommodations and protections associated with formal disability status. Our calendar-time analysis of treatment effects reveals suggestive patterns in sporadic employment following the 2018 quota law, with some reduction in the magnitude of negative effects in the post-reform period. However, no clear pattern emerges for full-year employment, and the estimates lack the precision needed to draw firm conclusions about policy effectiveness. These findings are broadly consistent with Duryea et al. (2024), whose firm-level administrative analysis finds that the quota policy increased the number of registered disabled workers in eligible firms, partly through reclassification of incumbent workers. Our results reinforce the interpretation that while quota policies may affect the formal composition of the workforce, their scope appears limited relative to the much larger labor market penalties triggered at disability onset.

Finally, our results align with international evidence showing substantial and persistent employment declines after disability onset in high-income economies (Charles, 2003; Polidano and Vu, 2015; Collischon et al., 2023; Jones and McVicar, 2020) and in middle-income contexts such as Indonesia (Mani et al., 2018). By explicitly incorporating informal employment, we show that in a dual labor market, part of the adjustment occurs through movements into informal jobs rather than formal retention or wage recovery.

Overall, the picture that emerges is one of steep and long-lasting labor market penalties associated with disability. Administrative registration coincides with an attenuation of preexisting downward employment trends, but not with a recovery of lost employment. This deceleration in labor market exit occurs alongside a deterioration in conditional wages, indicating that continued attachment may operate through lower-paying positions. These findings suggest that certification alone is insufficient to offset the structural losses triggered at disability onset and highlight the

importance of complementary return-to-work policies and employer incentives that preserve both employment and earnings capacity.

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Tables and Figures in text

6.1 Tables

Table 1: Outcome variables and data sources

Outcome	Definition	Data source
Employment (self-reported)	Dummy variables indicating whether an individual worked (i) all 12 months in a given year or (ii) at least 1 month during the year, regardless of formality.	EPS (survey)
Informal employment (self-reported)	Analogous indicators based on whether the individual's main job lacked a formal labor contract or pension contributions, defined for (i) full-year and (ii) at least 1 month of informal work.	EPS (survey)
Informal wages	Annual labor income reported by individuals in informal jobs, computed as (i) unconditional(including nonworkers) and (ii) conditional on being employed.	EPS (survey)
Formal employment	Indicators for whether the person had formal pension contributions for (i) all 12 months or (ii) at least 1 month in a given year.	EPS matched with AFP data; RIS (administrative)
Formal wages	Sum of monthly pension contributions reported to the AFP system, calculated (i) unconditionally and (ii) conditional on having positive contributions in the year.	EPS matched with AFP data; RIS (administrative)

Notes: All outcomes are measured annually. Employment indicators take the value of one if the condition is met within the year. Wage variables are expressed in constant 2024 USD, deflated using the national CPI.

Table 2: Descriptive statistics by disability status and data source

Variable	EPS Survey (2017)		RIS Admin Data (2017)	
	Nondisabled (N=5,119)	**With Disability** (N=171)	**Not Registered in the RND** (N=132,495)	**Registered in the RND** (N=1,170)
	(1)	(2)	(3)	(4)
Demographics				
Age	38.83	44.83	36.82	38.20
Female	0.56	0.61	0.61	0.53
College degree	0.37	0.26	0.10	0.05
Labor Outcomes (all)				
Prob. work $\geq$ 1 month	0.78	0.61		
Prob. work full year	0.70	0.54		
Labor Outcomes (Formal)				
Prob. work $\geq$ 1 month	0.61	0.30	0.62	0.34
Prob. work full year	0.35	0.15	0.35	0.25
Annual formal wages (USD)	5,969	2,400	6,494	4,200
Annual formal wages ($>$ 0 USD)	9,730	8,039	11,142	8,901
Labor Outcomes (Informal)				
Prob. work $\geq$ 1 month	0.29	0.25		
Prob. work full year	0.23	0.22		

Notes: All outcomes are measured annually. Employment indicators take the value of one if the condition is met within the year. Wage variables are expressed in constant 2024 USD, deflated using the national CPI.

Table 3: Long-run effects of disability onset on self-reported employment

	Probability of employment		Probability of informal work	
	At least one month	Full year	At least one month	Full year
	(1)	(2)	(3)	(4)
Pre disability onset	0.005	0.002	0.058**	0.050**
	(0.022)	(0.025)	(0.024)	(0.022)
$\tau = -10$	0.020	-0.001	0.110**	0.100**
	(0.045)	(0.052)	(0.047)	(0.041)
$\tau = -9$	-0.001	0.006	0.073	0.101**
	(0.041)	(0.045)	(0.045)	(0.041)
$\tau = -8$	0.014	-0.040	0.087**	0.048
	(0.035)	(0.040)	(0.043)	(0.039)
$\tau = -7$	0.003	0.027	0.072*	0.042
	(0.031)	(0.037)	(0.037)	(0.036)
$\tau = -6$	0.009	0.009	0.030	0.006
	(0.031)	(0.034)	(0.034)	(0.030)
$\tau = -5$	0.011	0.003	0.047	0.055*
	(0.028)	(0.032)	(0.031)	(0.029)
$\tau = -4$	-0.011	-0.002	0.031	0.023
	(0.025)	(0.029)	(0.027)	(0.028)
$\tau = -3$	0.000	-0.002	0.053**	0.035
	(0.022)	(0.026)	(0.024)	(0.021)
$\tau = -2$	-0.001	0.021	0.014	0.041**
	(0.016)	(0.021)	(0.016)	(0.016)
Post disability onset	-0.222***	-0.174***	-0.062*	-0.045
	(0.037)	(0.035)	(0.037)	(0.029)
$\tau = 0$	-0.057***	-0.114***	-0.048**	-0.055***
	(0.019)	(0.026)	(0.020)	(0.019)
$\tau = 1$	-0.199***	-0.143***	-0.102***	-0.061**
	(0.028)	(0.030)	(0.027)	(0.025)
$\tau = 2$	-0.216***	-0.144***	-0.084***	-0.034
	(0.031)	(0.033)	(0.032)	(0.027)
$\tau = 3$	-0.258***	-0.178***	-0.103***	-0.034
	(0.039)	(0.039)	(0.040)	(0.035)
$\tau = 4$	-0.242***	-0.201***	-0.075*	-0.052
	(0.044)	(0.043)	(0.044)	(0.036)
$\tau = 5$	-0.239***	-0.212***	-0.082*	-0.070*
	(0.050)	(0.049)	(0.050)	(0.040)
$\tau = 6$	-0.275***	-0.240***	-0.073	-0.070
	(0.054)	(0.054)	(0.052)	(0.045)
$\tau = 7$	-0.282***	-0.200***	-0.077	-0.025
	(0.060)	(0.055)	(0.064)	(0.051)
$\tau = 8$	-0.235***	-0.180***	0.012	-0.002
	(0.067)	(0.061)	(0.068)	(0.050)
$\tau = 9$	-0.242***	-0.197***	-0.030	-0.057
	(0.075)	(0.075)	(0.071)	(0.055)
$\tau = 10$	-0.197**	-0.107	-0.019	-0.034
	(0.093)	(0.083)	(0.071)	(0.058)
Number of observations	142,894	142,894	142,894	142,894
Mean of dep. var. (control group)	0.794	0.635	0.314	0.200

Note: Own calculations. Data are obtained from EPS survey. * p<0.1, ** p<0.05, *** p<0.01

Table 4: Long-run effects of disability onset on formal labor market outcomes

	Probability of formal work		Wages	
	At least one month	Full year	Unconditional	Conditional
	(1)	(2)	(3)	(4)
Pre disability onset	-0.011	0.002	275.059*	475.657
	(0.015)	(0.019)	(153.731)	(390.269)
$\tau = -10$	0.005	0.018	395.082	567.529
	(0.029)	(0.033)	(284.828)	(624.459)
$\tau = -9$	-0.014	-0.004	264.084	523.889
	(0.026)	(0.031)	(252.209)	(568.128)
$\tau = -8$	-0.015	-0.021	182.137	375.709
	(0.024)	(0.027)	(212.967)	(534.394)
$\tau = -7$	-0.041*	0.010	353.425*	692.113
	(0.021)	(0.026)	(199.959)	(545.411)
$\tau = -6$	-0.013	-0.001	267.412	175.436
	(0.020)	(0.023)	(165.856)	(463.007)
$\tau = -5$	-0.016	0.013	256.231*	302.803
	(0.019)	(0.022)	(155.049)	(426.064)
$\tau = -4$	-0.013	-0.000	234.911*	534.732
	(0.019)	(0.018)	(131.664)	(373.314)
$\tau = -3$	0.005	-0.004	240.173*	418.735
	(0.015)	(0.017)	(130.855)	(345.897)
$\tau = -2$	0.001	0.009	282.072***	689.965**
	(0.011)	(0.016)	(99.254)	(275.635)
Post disability onset	-0.100***	-0.082***	-1,365.896***	-1,536.727***
	(0.019)	(0.018)	(184.961)	(526.842)
$\tau = 0$	-0.029**	-0.028*	-300.785***	-588.226**
	(0.013)	(0.015)	(102.209)	(274.482)
$\tau = 1$	-0.060***	-0.058***	-693.578***	-1,133.696***
	(0.018)	(0.018)	(162.023)	(395.655)
$\tau = 2$	-0.089***	-0.077***	-1,107.423***	-2,059.401***
	(0.019)	(0.020)	(195.002)	(503.925)
$\tau = 3$	-0.119***	-0.093***	-1,215.221***	-2,178.033***
	(0.021)	(0.021)	(198.681)	(538.594)
$\tau = 4$	-0.157***	-0.091***	-1,520.249***	-2,132.187**
	(0.025)	(0.022)	(242.947)	(872.660)
$\tau = 5$	-0.144***	-0.105***	-1,722.046***	-1,768.656***
	(0.025)	(0.024)	(287.933)	(679.100)
$\tau = 6$	-0.138***	-0.101***	-1,842.601***	-1,155.254
	(0.029)	(0.026)	(299.052)	(1,329.739)
$\tau = 7$	-0.118***	-0.100***	-1,730.284***	-859.895
	(0.030)	(0.028)	(284.341)	(838.187)
$\tau = 8$	-0.086***	-0.092***	-1,666.505***	-1,458.058
	(0.032)	(0.030)	(348.038)	(1,099.796)
$\tau = 9$	-0.093***	-0.073**	-1,482.173***	-1,357.427
	(0.033)	(0.029)	(311.669)	(1,657.935)
$\tau = 10$	-0.070**	-0.084***	-1,743.992***	-2,213.164*
	(0.032)	(0.031)	(308.747)	(1,218.123)
Number of observations	172,619	172,619	172,619	98,120
Mean of dep. var. (control group)	0.586	0.359	5,336	9,144

Note: Own calculations. Data are obtained from EPS survey and administrative records. * p<0.1, ** p<0.05, *** p<0.01

Table 5: Separation types

	Resignation	Layoff	Health
	(1)	(2)	(3)
Pre disability onset	-0.005	0.002	-0.028**
	(0.013)	(0.010)	(0.011)
$\tau = -5, -6$	-0.006	0.002	-0.033***
	(0.016)	(0.013)	(0.012)
$\tau = -3, -4$	-0.004	0.002	-0.023*
	(0.015)	(0.010)	(0.012)
Post disability onset	-0.020	0.021***	0.003
	(0.015)	(0.007)	(0.016)
$\tau = 0, 1$	-0.022*	0.012	0.054**
	(0.013)	(0.010)	(0.022)
$\tau = 2, 3$	-0.016	0.019*	0.004
	(0.013)	(0.010)	(0.018)
$\tau = 4, 5$	-0.015	0.025**	-0.018
	(0.018)	(0.010)	(0.020)
$\tau = 6, 7$	-0.028	0.027**	-0.026
	(0.028)	(0.012)	(0.023)
Number of observations	76,337	76,337	76,337
Mean of dep. var. (control group)	0.041	0.032	0.004

Note: Own calculations. Data are obtained from EPS survey. * p<0.1, ** p<0.05, *** p<0.01

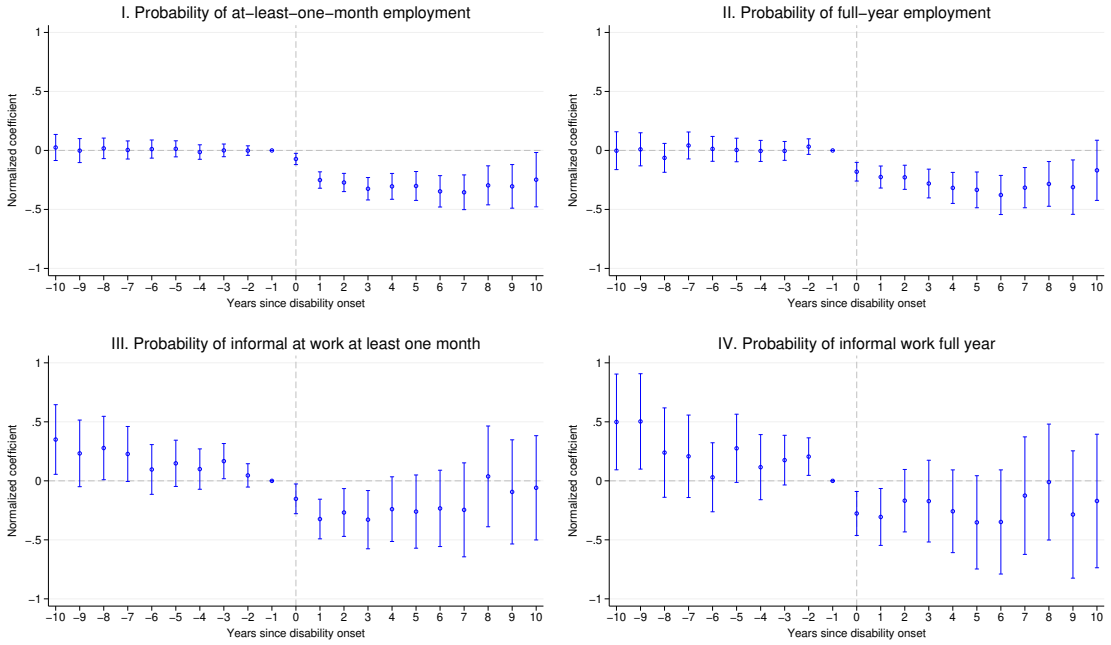
Table 6: RIS data: Formal employment and wages and disability registration (2012–22)

	Probability of formal work		Wages	
	At least one month	Full year	Annual formal wages	Annual formal wages ≥ 0
	(1)	(2)	(3)	(4)
Pre registry	0.039***	0.018***	608.591***	278.330*
	(0.004)	(0.003)	(43.659)	(157.572)
τ=-10	0.056***	0.025***	930.654***	377.736
	(0.010)	(0.007)	(97.362)	(384.726)
τ=-9	0.048***	0.018***	890.912***	498.315*
	(0.008)	(0.006)	(81.017)	(285.679)
τ=-8	0.044***	0.020***	783.676***	353.927
	(0.007)	(0.005)	(63.970)	(218.194)
τ=-7	0.039***	0.021***	618.597***	215.608
	(0.005)	(0.004)	(51.816)	(181.727)
τ=-6	0.035***	0.017***	523.237***	102.539
	(0.005)	(0.003)	(43.035)	(157.934)
τ=-5	0.035***	0.017***	456.847***	232.303*
	(0.004)	(0.003)	(36.338)	(138.095)
τ=-4	0.026***	0.012***	375.227***	173.909
	(0.004)	(0.003)	(30.903)	(123.196)
τ=-3	0.023***	0.013***	303.567***	262.675**
	(0.003)	(0.002)	(25.401)	(103.784)
τ=-2	0.015***	0.011***	191.056***	342.976***
	(0.002)	(0.002)	(16.635)	(75.158)
Post registry	-0.027***	-0.000	-969.507***	-1,078.552***
	(0.004)	(0.002)	(34.479)	(203.215)
τ=0	-0.023***	-0.008***	-321.938***	-836.672***
	(0.002)	(0.002)	(16.478)	(85.229)
τ=1	-0.033***	-0.006***	-505.820***	-847.699***
	(0.003)	(0.002)	(24.070)	(116.976)
τ=2	-0.033***	-0.001	-595.984***	-808.601***
	(0.004)	(0.002)	(28.493)	(150.866)
τ=3	-0.030***	0.000	-687.278***	-718.200***
	(0.004)	(0.002)	(32.777)	(169.426)
τ=4	-0.024***	0.004	-781.340***	-925.872***
	(0.005)	(0.003)	(37.940)	(219.085)
τ=5	-0.021***	0.005*	-881.555***	-1,117.685***
	(0.005)	(0.003)	(41.229)	(272.743)
τ=6	-0.019***	0.004	-1,017.290***	-951.667***
	(0.006)	(0.004)	(48.533)	(359.827)
τ=7	-0.018**	0.008*	-1,170.553***	-1,328.376***
	(0.007)	(0.004)	(57.760)	(449.001)
τ=8	-0.021**	0.006	-1,276.631***	-1,114.070**
	(0.008)	(0.005)	(66.251)	(480.811)
τ=9	-0.030***	0.000	-1,590.317***	-1,403.285**
	(0.010)	(0.006)	(77.905)	(562.899)
τ=10	-0.044***	-0.014*	-1,835.872***	-1,811.949**
	(0.014)	(0.008)	(101.690)	(729.307)
Number of observations	2,384,807	2,384,807	2,384,807	2,384,807

Note: Own calculations. Data are obtained from administrative records covering 2012–22. * p<0.1, ** p<0.05, *** p<0.01

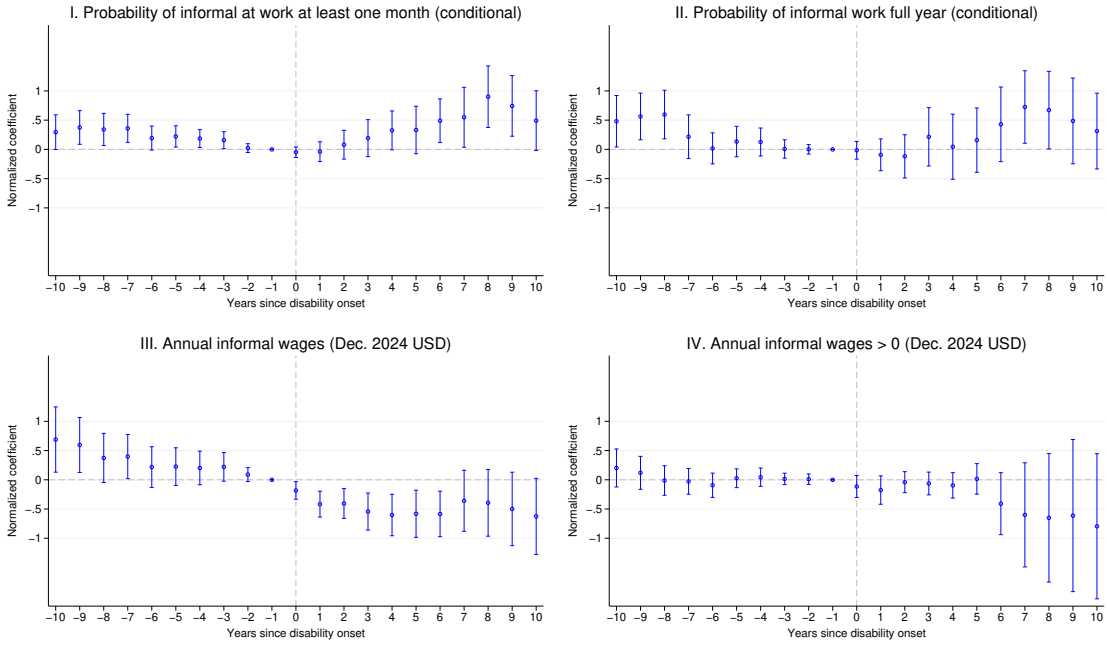
6.2 Figures

Figure 1: Effects of disability on self-reported labor market outcomes: employment and informality



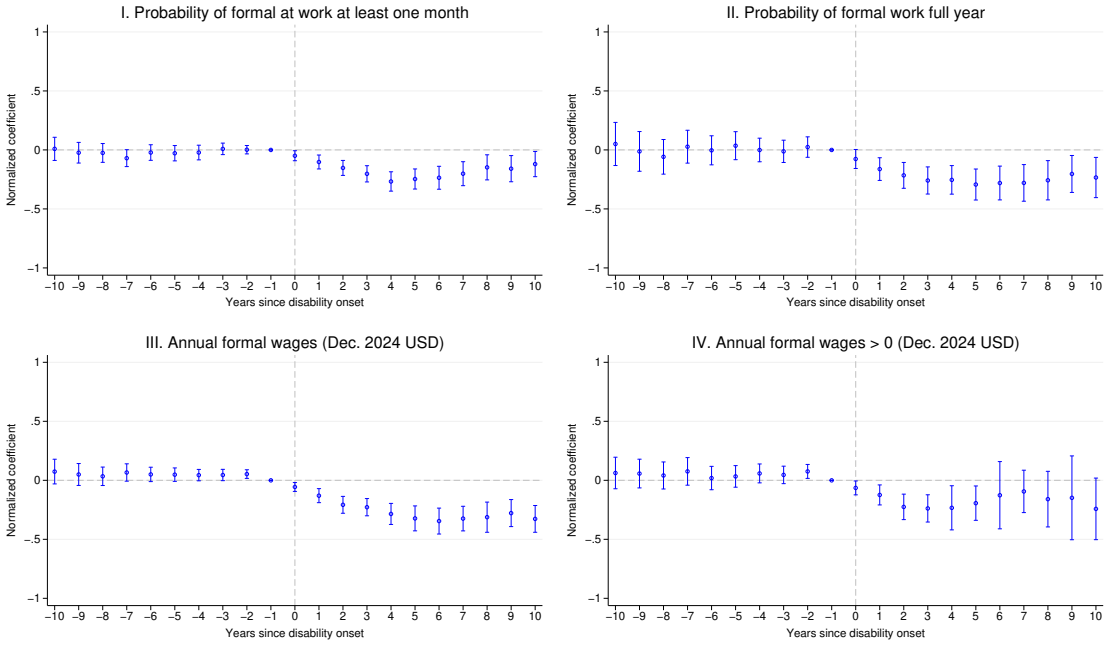
Notes: Own calculations from EPS survey. Estimates from Callaway-Sant'Anna difference-in-differences method. Shaded areas denote 95% confidence interval.

Figure 2: Effects of disability on self-reported labor market outcomes: Informality (conditional) and informal income



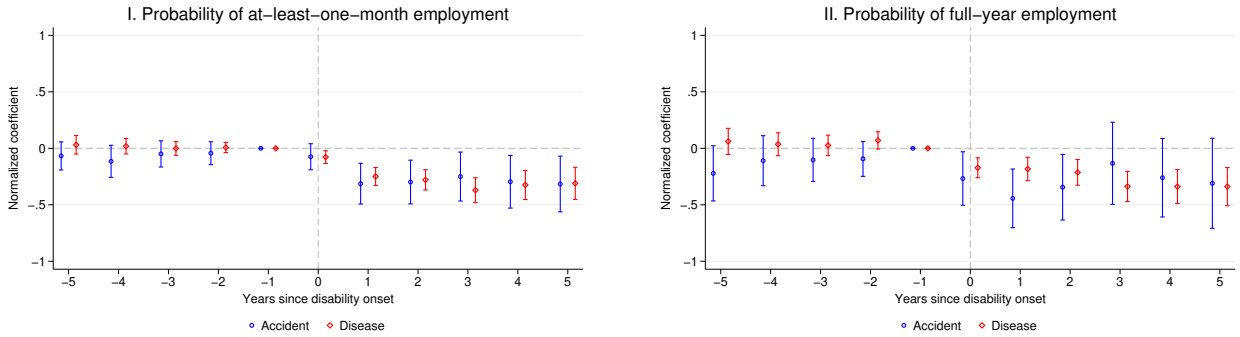
Notes: Own calculations from EPS survey.

Figure 3: Long-term effects of disability on formal labor market outcomes



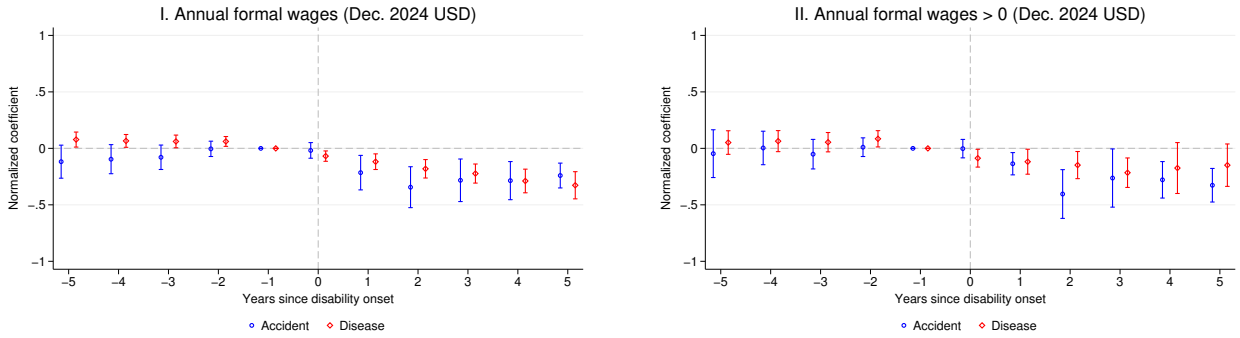
Notes: Own calculations from EPS survey and administrative records. Estimates from Callaway-Sant'Anna difference-in-differences method. Shaded areas denote 95% confidence interval.

Figure 4: Heterogeneous effects by disability origin on total employment



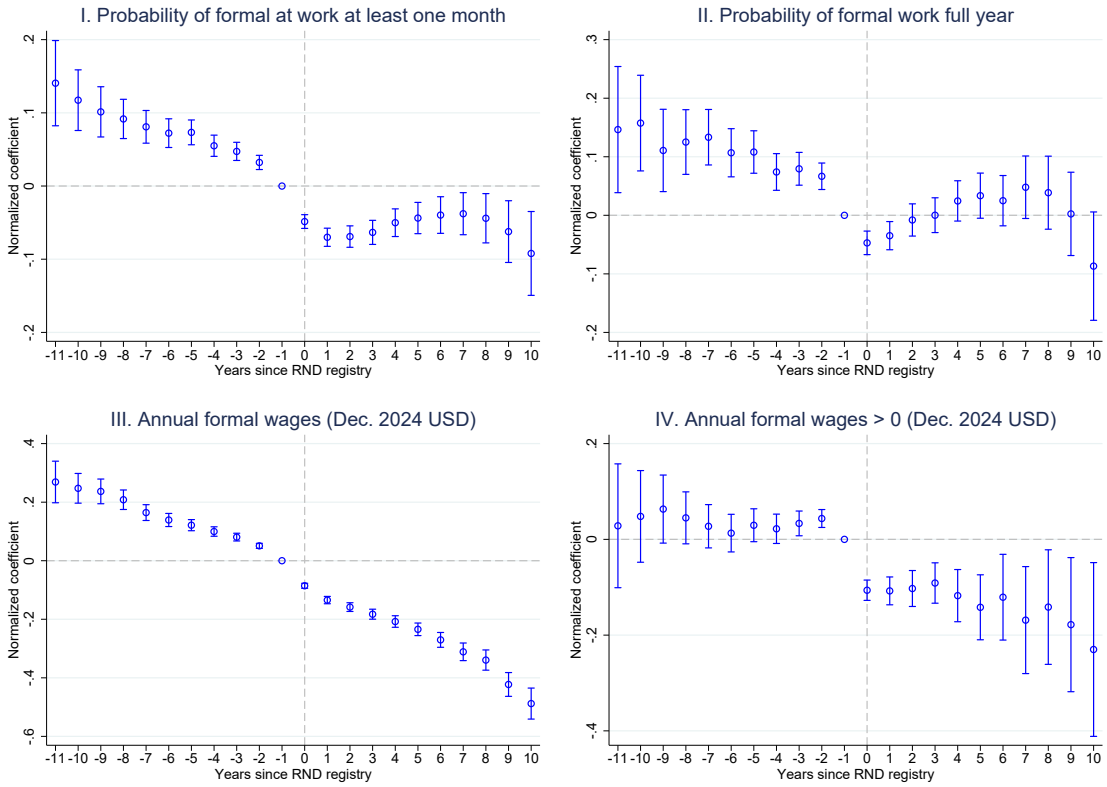
Notes: Own calculations based on EPS data. Estimates from Callaway-Sant'Anna difference-in-differences method. Shaded areas denote 95% confidence intervals.

Figure 5: Heterogeneous effects by disability origin on annual formal wages



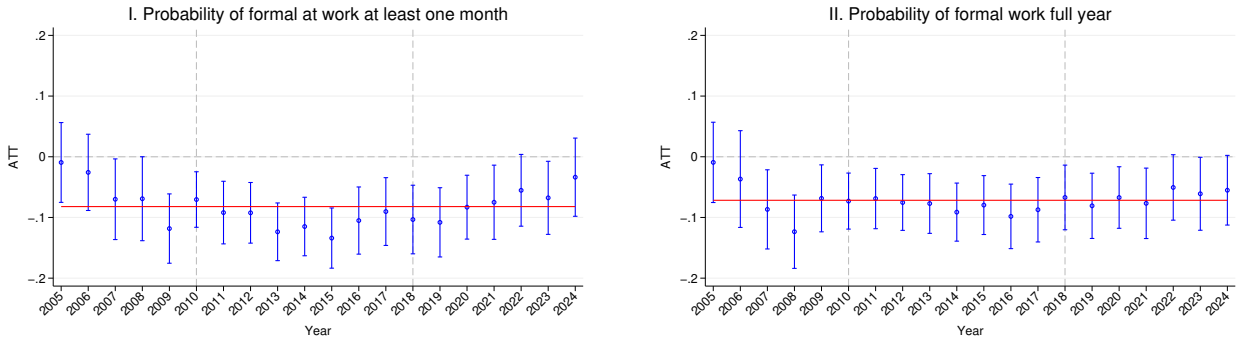
Notes: Own calculations based on EPS data. Panel (a): Wages. Panel (b): Wages conditional on employment. Estimates from Callaway-Sant'Anna difference-in-differences method. Shaded areas denote 95% confidence intervals.

Figure 6: RIS data: Formal employment and disability registration (2012–22)



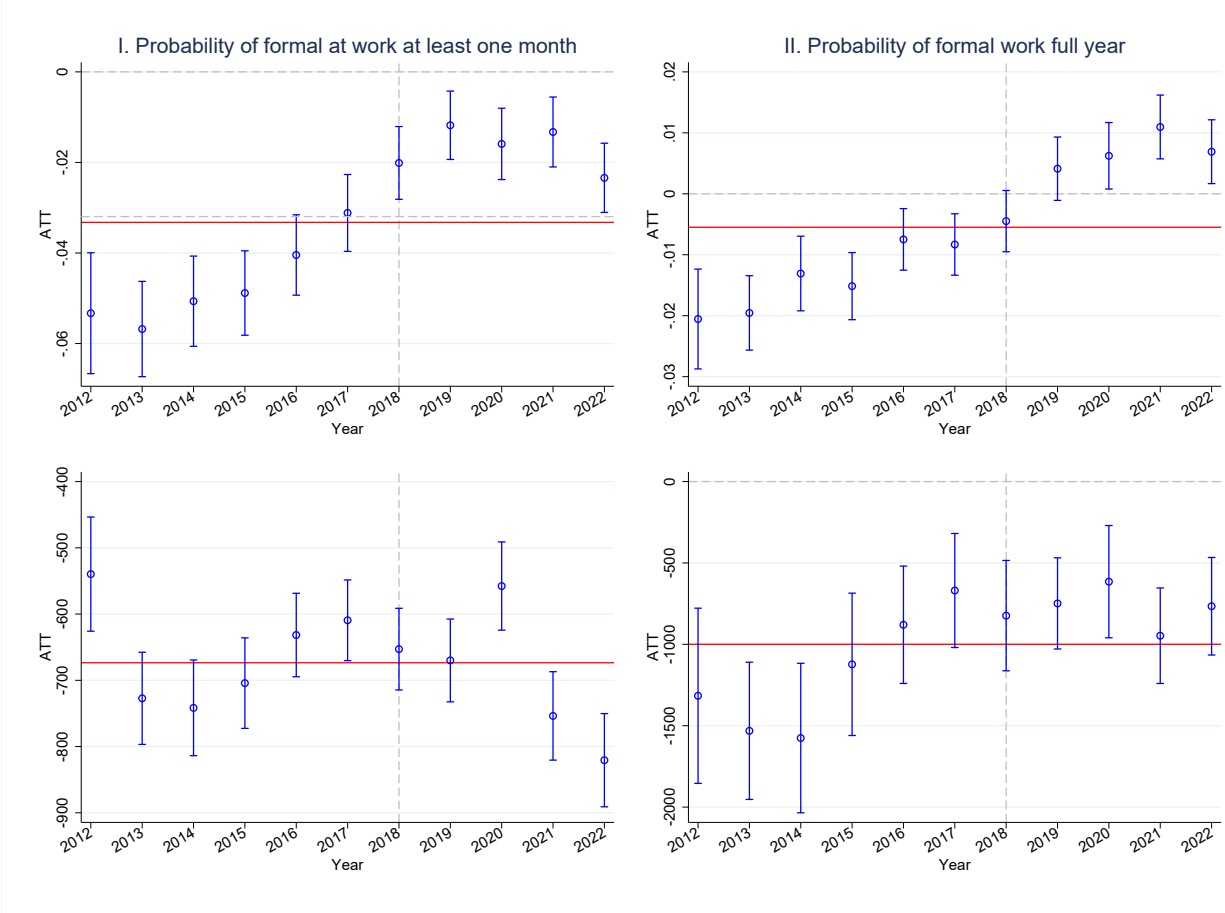
Notes: Own calculations based on RIS data covering 2012–22. Estimates from Callaway-Sant'Anna difference-in-differences method. Shaded areas denote 95% confidence interval. The figure shows employment and wage trajectories around the time of registration in the National Disability Registry. Pre-registration trends indicate declining employment before certification; these trends appear to attenuate following registration, suggesting potential stabilization effects. For conditional wages, post-registration deterioration is observed, consistent with employment retention occurring through lower-paying positions.

Figure 7: ATT estimates by calendar period



Notes: Own calculations based on EPS data. Estimates from Callaway-Sant'Anna difference-in-differences method. Shaded areas denote 95% confidence intervals. The red horizontal line denotes the average ATT over the 2005–24 period.

Figure 8: RIS Data: ATT estimates by calendar period (2012–22)



Notes: Own calculations based on RIS data covering 2012–22. Estimates from Callaway-Sant'Anna difference-in-differences method. Shaded areas denote 95% confidence intervals. The red horizontal line denotes the average ATT over the 2012–22 period.

A Disability Status Definitions Across Data Sources

This appendix clarifies how disability status is defined and measured across the different data sources used in this study. Understanding these distinctions is important for interpreting the results, as each source captures disability through different mechanisms and for different purposes.

A.1 Employment and Social Protection Survey (EPS)

In the EPS, disability status is determined through **direct individual self-report**. The survey includes a module on health and functional limitations that is answered by the respondent themselves, not by a proxy or other household member. Specifically, individuals are asked whether they have any physical, mental, sensory, or intellectual condition that limits their daily activities or work capacity. For those who report a disability, the survey collects additional information including:

- **Type of disability**: Physical, visual, auditory, intellectual, psychiatric, or multiple
- **Year of onset**: The year when the disability first appeared or was diagnosed
- **Origin**: Whether the disability resulted from an accident, illness, congenital condition, or other cause

The self-reported nature of this measure means it captures the individual's own perception and experience of disability, which may not always correspond to clinical diagnoses or administrative definitions.

A.2 National Disability Registry

The RND contains individuals who have been **formally certified as having a disability** through a standardized medical and social assessment process. Registration requires:

- A medical evaluation conducted by certified health professionals
- Assessment of functional limitations and their impact on daily activities
- Classification according to standardized criteria established by Law 20.422 (2010)

Registration in the RND is voluntary but provides access to targeted benefits, workplace accommodations, and protection under disability inclusion laws. The registered population therefore represents a selected subset of all individuals with disabilitiesthose who have chosen to undergo the certification process and who meet the formal criteria.

A.3 Registro Social de Hogares

The RSH is a **household-level administrative registry** used to determine eligibility for social programs. Disability status in the RSH is recorded through **administrative self-declaration** made by households when applying for or updating their information in the social protection system. Key distinctions from the EPS include:

- Information may be reported by any adult household member, not necessarily the individual with the disability.
- The declaration is made in an administrative context (applying for benefits) rather than a survey context.
- No medical verification is required at the time of declaration.

In our analysis, we use the RSH to identify individuals who had declared a disability prior to registration in the RND. This allows us to construct a more homogeneous comparison group by ensuring that both registered and nonregistered individuals had already reported a disability before the registration event.

A.4 Summary of Key Differences

Table A.1: Comparison of Disability Definitions Across Data Sources

Characteristic	**EPS**	**RND**	**RSH**
Reporting method	Direct individual self-report	Medical certification	Administrative self-declaration
Reporter	Individual respondent	Certified health professionals	Any adult household member
Verification	None (survey response)	Medical assessment required	None at declaration
Purpose	Research/monitoring	Access to benefits and protections	Social program eligibility
Coverage	Broad (all self-perceived disabilities)	Narrow (certified cases only)	Intermediate (declared disabilities)

B Additional tables

Table A.2: Effects of disability onset on annual formal wages by disability origin

	Annual formal wages		Annual formal wages > 0	
	Accident	Disease	Accident	Disease
	(1)	(2)	(3)	(4)
Pre disability onset	-396.169	355.217**	-193.968	581.966
	(279.671)	(138.203)	(593.848)	(382.781)
$\tau = -5$	-629.027	414.923**	-430.627	470.861
	(398.344)	(181.138)	(988.254)	(486.855)
$\tau = -4$	-511.384	351.912**	32.249	584.638
	(350.282)	(154.409)	(692.818)	(434.574)
$\tau = -3$	-421.310	327.381**	-471.307	498.927
	(294.504)	(152.694)	(611.072)	(399.160)
$\tau = -2$	-22.953	326.652***	93.811	773.438**
	(184.801)	(118.322)	(386.216)	(335.867)
Post disability onset	-1,232.743***	-1,072.873***	-2,152.891***	-1,359.674***
	(309.159)	(189.009)	(506.001)	(425.306)
$\tau = 0$	-97.367	-366.168***	-22.977	-796.019**
	(188.132)	(124.635)	(381.685)	(367.775)
$\tau = 1$	-1,147.180***	-629.949***	-1,247.494***	-1,080.812**
	(415.947)	(188.412)	(459.931)	(515.666)
$\tau = 2$	-1,834.909***	-965.803***	-3,701.263***	-1,355.500**
	(493.094)	(221.885)	(1,007.799)	(560.748)
$\tau = 3$	-1,508.637***	-1,190.198***	-2,406.191**	-1,970.766***
	(512.866)	(230.037)	(1,203.721)	(608.648)
$\tau = 4$	-1,525.196***	-1,540.799***	-2,550.492***	-1,593.489
	(459.118)	(285.146)	(754.320)	(1,051.061)
$\tau = 5$	-1,283.169***	-1,744.320***	-2,988.932***	-1,361.459
	(299.176)	(327.634)	(694.802)	(876.184)
Number of observations	166,085	170,907	96,396	97,625
Mean of dep. var. (control group)	5,336	5,336	9,155	9,145

Note: Own calculations. Data is obtained from EPS survey. * p<0.1, ** p<0.05, *** p<0.01

Table A.3: Effects on total employment by disability origin

	At least one month employment		Full year employment	
	Accident	Disease	Accident	Disease
	(1)	(2)	(3)	(4)
Pre disability onset	-0.055	0.011	-0.084	0.031
	(0.041)	(0.021)	(0.054)	(0.025)
$\tau = -5$	-0.053	0.025	-0.141*	0.039
	(0.050)	(0.033)	(0.079)	(0.038)
$\tau = -4$	-0.091	0.015	-0.069	0.023
	(0.057)	(0.028)	(0.072)	(0.033)
$\tau = -3$	-0.039	-0.001	-0.065	0.017
	(0.047)	(0.024)	(0.062)	(0.029)
$\tau = -2$	-0.035	0.006	-0.059	0.044*
	(0.041)	(0.018)	(0.050)	(0.025)
Post disability onset	-0.205***	-0.213***	-0.186**	-0.167***
	(0.058)	(0.033)	(0.080)	(0.033)
$\tau = 0$	-0.059	-0.062***	-0.170**	-0.109***
	(0.047)	(0.023)	(0.077)	(0.028)
$\tau = 1$	-0.249***	-0.198***	-0.281***	-0.116***
	(0.073)	(0.032)	(0.084)	(0.034)
$\tau = 2$	-0.237***	-0.222***	-0.218**	-0.135***
	(0.079)	(0.036)	(0.094)	(0.037)
$\tau = 3$	-0.198**	-0.295***	-0.084	-0.214***
	(0.088)	(0.045)	(0.118)	(0.043)
$\tau = 4$	-0.235**	-0.258***	-0.165	-0.215***
	(0.095)	(0.052)	(0.113)	(0.049)
$\tau = 5$	-0.251**	-0.246***	-0.196	-0.215***
	(0.100)	(0.058)	(0.129)	(0.055)
Number of observations	139,034	141,862	139,034	141,862
Mean of dep. var. (control group)	0.794	0.794	0.635	0.635

Note: Own calculations. Data is obtained from EPS survey. * p<0.1, ** p<0.05, *** p<0.01

Table A.4: Effects on self-reported labor market outcomes: informality (conditional) and informal wages

	Informal employment (conditional)		Informal wages	
	At least one month	Full year	Unconditional	Conditional
	(1)	(2)	(3)	(4)
Pre disability onset	0.094***	0.075**	481.911**	158.235
	(0.029)	(0.032)	(188.497)	(362.738)
$\tau = -10$	0.116*	0.151**	991.544**	1,009.475
	(0.060)	(0.070)	(410.051)	(825.784)
$\tau = -9$	0.148**	0.177***	857.997**	593.431
	(0.058)	(0.064)	(345.310)	(715.422)
$\tau = -8$	0.135**	0.187***	538.205*	-60.664
	(0.055)	(0.067)	(309.137)	(641.305)
$\tau = -7$	0.142***	0.068	572.370**	-132.244
	(0.048)	(0.060)	(277.866)	(557.323)
$\tau = -6$	0.077*	0.006	313.521	-465.228
	(0.041)	(0.042)	(255.355)	(526.691)
$\tau = -5$	0.088**	0.042	324.682	129.715
	(0.037)	(0.042)	(236.655)	(407.849)
$\tau = -4$	0.073**	0.040	291.735	220.635
	(0.031)	(0.038)	(211.301)	(396.913)
$\tau = -3$	0.062**	0.002	318.504*	74.881
	(0.029)	(0.025)	(180.112)	(247.872)
$\tau = -2$	0.009	0.000	128.641	54.110
	(0.015)	(0.013)	(87.003)	(225.438)
Post disability onset	0.144***	0.080	-679.608***	-1,602.331
	(0.049)	(0.052)	(251.012)	(1,176.098)
$\tau = 0$	-0.019	-0.005	-262.815**	-570.712
	(0.018)	(0.024)	(109.498)	(476.129)
$\tau = 1$	-0.015	-0.029	-599.549***	-874.635
	(0.034)	(0.044)	(162.492)	(616.052)
$\tau = 2$	0.032	-0.037	-583.863***	-201.937
	(0.050)	(0.059)	(187.320)	(456.546)
$\tau = 3$	0.076	0.067	-782.262***	-313.665
	(0.064)	(0.080)	(232.660)	(494.576)
$\tau = 4$	0.128*	0.014	-867.936***	-475.301
	(0.067)	(0.089)	(260.892)	(550.006)
$\tau = 5$	0.131	0.049	-836.520***	77.660
	(0.082)	(0.088)	(296.215)	(662.921)
$\tau = 6$	0.194**	0.135	-841.279***	-2,033.717
	(0.075)	(0.102)	(285.739)	(1,346.430)
$\tau = 7$	0.217**	0.227**	-516.778	-2,987.134
	(0.103)	(0.099)	(383.536)	(2,261.657)
$\tau = 8$	0.356***	0.211**	-566.080	-3,239.646
	(0.106)	(0.106)	(419.817)	(2,791.535)
$\tau = 9$	0.294***	0.153	-717.690	-3,047.190
	(0.104)	(0.117)	(461.510)	(3,304.713)
$\tau = 10$	0.194*	0.098	-900.920*	-3,959.363
	(0.103)	(0.104)	(478.365)	(3,152.158)
Number of observations	111,750	87,936	142,894	40,240
Mean of dep. var. (control group)	0.395	0.313	1,441	4,980

Note: Own calculations. Data is obtained from EPS survey. * p<0.1, ** p<0.05, *** p<0.01

Table A.5: ATT estimates by calendar period

	Probability of formal work	
	At least one month	Full year
	(1)	(2)
T2005	-0.009	-0.009
	(0.034)	(0.034)
T2006	-0.026	-0.037
	(0.032)	(0.041)
T2007	-0.070**	-0.087***
	(0.034)	(0.033)
T2008	-0.069*	-0.123***
	(0.035)	(0.031)
T2009	-0.118***	-0.069**
	(0.029)	(0.028)
T2010	-0.070***	-0.073***
	(0.023)	(0.024)
T2011	-0.092***	-0.069***
	(0.026)	(0.025)
T2012	-0.092***	-0.075***
	(0.025)	(0.023)
T2013	-0.124***	-0.077***
	(0.024)	(0.025)
T2014	-0.115***	-0.091***
	(0.025)	(0.024)
T2015	-0.134***	-0.080***
	(0.025)	(0.025)
T2016	-0.105***	-0.098***
	(0.028)	(0.027)
T2017	-0.090***	-0.087***
	(0.028)	(0.027)
T2018	-0.103***	-0.067**
	(0.029)	(0.027)
T2019	-0.108***	-0.081***
	(0.029)	(0.027)
T2020	-0.083***	-0.067***
	(0.027)	(0.026)
T2021	-0.075**	-0.077***
	(0.031)	(0.030)
T2022	-0.055*	-0.051*
	(0.030)	(0.028)
T2023	-0.068**	-0.061**
	(0.031)	(0.031)
T2024	-0.034	-0.055*
	(0.033)	(0.029)
Number of observations	172,619	172,619
Mean ATT	-0.082	-0.072

Note: Own calculations. Data is obtained from EPS administrative records. * p<0.1, ** p<0.05, *** p<0.01

Table A.6: RIS Data: ATT estimates by calendar period (2012–2022)

	Probability of formal work		Wages	
	At least one month	Full year	Annual formal wages	Annual formal wages ≥ 0
	(1)	(2)	(3)	(4)
T2012	-0.053***	-0.021***	-539.670***	-1,316.134***
	(0.007)	(0.004)	(43.972)	(274.648)
T2013	-0.057***	-0.020***	-727.211***	-1,531.488***
	(0.005)	(0.003)	(35.510)	(214.973)
T2014	-0.051***	-0.013***	-741.583***	-1,575.716***
	(0.005)	(0.003)	(36.868)	(234.341)
T2015	-0.049***	-0.015***	-704.225***	-1,122.882***
	(0.005)	(0.003)	(34.862)	(223.110)
T2016	-0.040***	-0.007***	-631.629***	-879.870***
	(0.005)	(0.003)	(32.153)	(183.902)
T2017	-0.031***	-0.008***	-609.357***	-669.281***
	(0.004)	(0.003)	(31.059)	(178.754)
T2018	-0.020***	-0.004*	-652.920***	-823.613***
	(0.004)	(0.003)	(31.455)	(172.962)
T2019	-0.012***	0.004	-669.997***	-748.517***
	(0.004)	(0.003)	(31.886)	(142.903)
T2020	-0.016***	0.006**	-557.695***	-614.851***
	(0.004)	(0.003)	(33.984)	(175.979)
T2021	-0.013***	0.011***	-753.755***	-947.078***
	(0.004)	(0.003)	(34.054)	(149.784)
T2022	-0.023***	0.007***	-820.590***	-766.011***
	(0.004)	(0.003)	(35.884)	(152.875)
Number of observations	2,384,807	2,384,807	2,384,807	2,384,807

Note: Own calculations. Data is obtained from RIS administrative records covering 2012–2022. * p<0.1, ** p<0.05, *** p<0.01