



# Do minimum wage increases induce changes in work behavior for people with disabilities? Evidence from the AbilityOne program

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## ABSTRACT

We provide the first evidence on the effects of minimum wage increases on labor market outcomes for people with disabilities. We use a novel dataset consisting of quarterly data on employment, earnings, and hours for workers at nonprofit firms that participate in the federal AbilityOne program. The nonprofits in this program are offered advantages in government contracting, though must primarily employ workers with disabilities. Using recent local variation in minimum wage changes, we find that increasing the minimum wage does not affect employment outcomes for workers with disabilities in this specific context, with precisely estimated null effects. However, these nonprofits respond along non-employment related margins after relatively large minimum wage increases.

## 1. Introduction

A fundamental, long-standing question within the economics literature asks how increasing the minimum wage affects employment. Decades of empirical research exists addressing this question, with competing findings. Papers like Card and Krueger (1994), Dube et al. (2010), Allegretto et al. (2011), Allegretto et al. (2017), Cengiz et al. (2019), and Deroncourt and Montialoux (2021) find no adverse effects of the minimum wage on employment, while other papers like Neumark and Wascher (1992), Aaronson and French (2007), Clemens and Wither (2019), and Jardim et al. (2022) find evidence that increasing the minimum wage reduces employment.<sup>1</sup> These latter papers often highlight that the adverse employment effects are found only when focusing on workers with relatively low skill levels. A natural group to consider on this oft-studied question is therefore people with disabilities, who to our knowledge have never been studied in this context.

Approximately 13 percent of the U.S. population lives with disabilities (U.S. Census Bureau, 2021). Although the percentage of people with disabilities who are employed has been steadily rising since 2008 (U.S. Bureau of Labor Statistics, 2024), and has increased since the pandemic (Bloom et al., 2024), employment rates remain substantially below those of workers without disabilities. Earnings among workers are also lower for people with disabilities, with a median of \$28,438, compared with \$40,948 among those without a disability.<sup>2</sup> These gaps can be attributed to various factors, such as workplace discrimination (e.g., Bellemare et al. 2023) and the substantial time and financial costs associated with managing disabilities (Morris et al., 2022).

In considering the effects of the minimum wage on workers with disabilities, it is critical to note that they can, in some circumstances, be paid subminimum wages. Section 14(c) of the Fair Labor Standards Act (the federal law that establishes the minimum wage) specifically allows workers with disabilities to be paid a wage *below* the statutory minimum.<sup>3</sup> Subminimum wages are calculated as a proportion of what an

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<sup>1</sup> These papers are of course only a small sampling of papers looking at the effects of the minimum wage on employment. Others finding no effects or even positive effects on employment include Katz and Krueger (1992), Card (1992), Bhaskar and To (1999), Schmitt (2013), Dube et al. (2016), Gittings and Schmutte (2016), and Manning (2021). Others finding negative effects on employment include Burkhauser et al., (2000), Sabia et al. (2012), Neumark et al. (2014), Meer and West (2016), Gopalan et al., (2021), Neumark and Shirley (2022), and Powell (2012), with many of these studies focused on workers in the restaurant or fast-food industry, or younger workers.

<sup>2</sup> See <https://data.census.gov/table/ACSST1Y2021.S1811?q=civilian+noninstitutionalized>.

<sup>3</sup> Section 14(c) applies only to workers with disabilities; though other workers like tipped employees, farmworkers, and students can be paid below the statutory minimum, this is not through Section 14(c).

average worker without a disability is paid, which can be the minimum wage or a higher wage. Therefore, minimum wage increases might also lead to an increasing subminimum wage, particularly if the prevailing wage for workers without disabilities is the minimum wage. Employers who want to pay subminimum wages to workers with disabilities must incur fixed costs associated with regulatory compliance. Consequently, typically only employers with many workers with disabilities pay subminimum wages. Over the past decade, the number of workers with disabilities paid subminimum wages has been declining, with several states recently banning the use of subminimum wages. To the best of our knowledge, ours is the first study in the economics literature to highlight the critical role of subminimum wages for people with disabilities.

In a perfectly competitive model of the labor market, a higher minimum wage would be expected to decrease employment. Empirically, however, the effect of minimum wage increases on workers with disabilities is ambiguous. If employers prefer to retain only higher productivity workers in response to rising minimum wages, workers with disabilities may be particularly vulnerable to adverse employment impacts from minimum wage increases. Employers may alternatively respond to minimum wage increases along other non-employment margins, such as reducing fringe benefits (Clemens et al. 2018; Clemens 2021; Hirsch et al. 2015).

To assess the effects of minimum wage increases on workers with disabilities, we study a group of nonprofit firms participating in the federal AbilityOne Program, through which qualified nonprofits provide products and services to federal customers; the program is overseen by the U.S. AbilityOne Commission, an independent federal agency. To qualify for the program, the nonprofits must account for at least 75 percent of their direct labor hours using workers with disabilities. About 40,000 workers with disabilities are employed through this program, making it an important program, albeit a small one as a share of the about 7 million workers with a disability in the US. Our results therefore are specific to those nonprofits that participate in the AbilityOne program and may not generalize to other firms (nonprofits or for-profit) that employ workers with disabilities.

Our analysis draws on a dataset containing longitudinal quarterly employment records from 2015 to 2022 from nearly 200 nonprofit firms. Our study period encompasses 259 state and local minimum wage increases. Our analysis focuses on the following four primary nonprofit-level outcomes: i) total employment at the nonprofit, ii) quarterly working hours per worker, iii) the average wage across all workers at the nonprofit, and iv) the percentage of workers affected by the minimum wage. An important contribution of our study is the use of quarterly data to assess high-frequency changes in labor market outcomes, which is particularly relevant given that workers with disabilities often have non-regular working hours, variable earnings, and intermittent employment (Kidd et al. 2000). Many existing studies examining labor market outcomes for workers with disabilities rely on annual-level wage data due to data availability constraints (e.g., Deshpande 2016; Levere 2021).

To estimate the causal effects, we employ a two-way fixed effects framework. Our approach involves comparing outcomes over time between nonprofits located in areas that increased minimum wages and nonprofits in areas that did not. Because the minimum wage can (and often does) increase multiple years in a row, we focus on narrow two-year windows for each nonprofit as our unit of observation (henceforth, a nonprofit-window). The results therefore can only capture short-term effects that occur within the first year after a minimum wage increase. Additionally, we estimate a triple-difference model to better account for the possibility that even though a nonprofit may operate in an area that increased the minimum wage, it may not be affected by this change. Specifically, we differentiate nonprofits by whether a substantial share of its workers earn at or below the minimum wage, and thus might be affected by the increase. We also distinguish large and small minimum wage changes, anticipating that any potential adverse effects would be stronger with a large minimum wage increase, consistent with evidence from Clemens and Strain (2018).

We find that the minimum wage increases did not hurt employment or hours worked by workers with disabilities at nonprofits participating in the AbilityOne program. Our event-study analysis reveals that both the number of workers and hours worked evolve in parallel for nonprofits located in areas with and without minimum wage changes during the quarters following a minimum wage increase, indicating no effects from the increase. In the quarter of the increase, the share of workers affected by the minimum wage nearly doubles, providing a reliability check on the data. Our triple difference analysis produces similar results. We also find that as the minimum wage increased, so did the worker average wage (by \$0.39 above a mean of \$10.94). Together, this shows that minimum wage increases do not adversely affect employment outcomes for workers with disabilities at these nonprofits participating in AbilityOne.

Our results are robust to a variety of model specifications. Most importantly, our results are unchanged even when we only keep non-consecutive minimum wage changes. This check is especially critical because a hallmark of minimum wage changes during our study period was small, annual increases to phase in a higher minimum wage (or to adjust for inflation).

Though employment outcomes do not change, we do find some evidence that the nonprofits adjust along other dimensions to minimum wage increases, particularly when the minimum wage increase is relatively large. For example, in response to a minimum wage increase of \$1 or more, nonprofits become 13 percent more likely to pay any workers subminimum wages. In contrast, in response to a smaller minimum wage increase, nonprofits become less likely to do so. Nonprofits also become less likely to offer fringe benefits in response to a large minimum wage increase. These adjustments along nonemployment margins are consistent with discussions of the underlying literature from Clemens (2021).

Our findings contribute to two important literatures. First, we add to the expansive literature documenting the effects of the minimum wage on employment outcomes. As noted above, where adverse employment effects from minimum wages are found, it tends to be among workers in lower skill and lower paying jobs. Workers with disabilities, who have a more tenuous connection to the labor force and often experience lower-paying jobs, might represent one such disadvantaged group. Yet we find that increasing the minimum wage does not reduce employment for workers with disabilities in the year after the minimum wage changes. To the best of our knowledge, our findings represent the first estimates of the effects of the minimum wage on this disadvantaged group. However, the results may not broadly generalize to all workers with disabilities but are specific to those employed through the AbilityOne program.

We also contribute to a literature that focuses on factors influencing work outcomes for people with disabilities. People with disabilities face numerous challenges to working, relating to the nature of their disability, systemic factors, and more (Deshpande 2016; Levere 2021; Bellemare et al. 2023; Ameri et al. 2018). Given the substantially lower rates of employment for this group, finding ways to facilitate work is critical. Recent broad trends have seen people with disabilities working at rising rates, with flexibility around remote work following the pandemic potentially playing a role (Bloom et al. 2024). Our findings suggest that an increasingly generous minimum wage may also facilitate employment for a particular group of workers with disabilities.

## 2. Background/institutional context

In this study, we use employment data of nonprofit firms that produce goods and services under contracts procured through the AbilityOne Program to understand the impact of changes in minimum wages on workers with disabilities. In this section, we document the specific employment environment for these workers.

### *Contracting through the AbilityOne Program*

We examine a particular group of nonprofit firms that are participating in the AbilityOne program. AbilityOne is a federal program,

administered by the independent U.S. AbilityOne Commission, that provides employment opportunities to people with significant disabilities, including blindness, developmental disabilities, mental illness, and others.<sup>4</sup> AbilityOne connects Federal agencies needing to buy goods and services with the Nonprofit Agencies (NPAs) that sell them, working through intermediaries, referred to as Central Nonprofit Agencies (CNAs). Our data comes from SourceAmerica, one of the two CNAs. Out of about 500 NPAs that work with AbilityOne, about 80 percent of them do so through SourceAmerica (SourceAmerica, 2022; U.S. AbilityOne Commission n.d.).<sup>5</sup>

The mission of NPAs is to provide a range of services, including training, employment, psychological counseling and social activities, to people with disabilities. In 2021, NPAs sold more than \$4 billion in products and services to the federal government through the AbilityOne Program and employed about 40,000 workers with disabilities (U.S. AbilityOne Commission 2022). NPAs must have at least 75 percent of their labor hours come from employees with significant disabilities to be eligible to compete for contracts through AbilityOne.

NPAs employing workers with disabilities have multiple goals, pursuing a mission of employing workers with disabilities and providing other services, while also needing to remain viable with revenues exceeding costs. These agencies, along with producing goods and services under contracts, commonly offer supportive services directly to people with disabilities. This provides opportunities for NPAs' clients to move between employment and other activities (such as participating in a day program) but also often requires NPAs to find revenue sources in addition to AbilityOne contracts to cover the costs of these services. For example, NPAs may receive Home and Community-Based Services funding through Medicaid. As a result, these agencies are balancing costs and revenues associated with their product and service contracts with those associated with provision of direct services to their own clients.

Federal agencies are required to buy needed goods and services that are available on the AbilityOne Procurement List from these NPAs. Some examples of goods and services are Army combat uniforms, answering services, and custodial and laundry services. The Department of Defense is the largest purchaser of goods produced through this program, but numerous other Federal agencies also purchase goods and services produced by NPAs.

### 2.1. Subminimum wages

An NPA can pay workers with disabilities subminimum wages, which is a wage below the statutory minimum wage, if it has a 14(c) certificate from the US Department of Labor. These certificates allow nonprofits to pay workers with disabilities a *commensurate* wage that is lower than what they would pay to workers without disabilities. This commensurate wage can be lower than the minimum wage, in which case it is a subminimum wage. The commensurate wage is based on the individual worker's productivity relative to the productivity of a worker without a disability doing the same type of work (U.S. DOL, 2009). In order to set the commensurate wage, employers are required to determine the prevailing wage, the wage rate at which experienced workers without disabilities in the same geographical area are paid.

To calculate the commensurate wage, an employer must follow a four-step process. The first step is for the employer to define the standard for the job under consideration: i.e., for a worker without a disability,

how much output can be produced and of what quality? The second step is to document the prevailing wage for such a worker by drawing on data across employers. The third step is calculating productivity for the worker with a disability. The productivity is calculated by expressing the output the worker with a disability can produce in the same period of time as a percentage of the output of the worker without a disability.<sup>6</sup> Finally, to calculate the commensurate wage, the prevailing wage rate is multiplied by the worker's productivity. If the commensurate wage is less than the minimum wage, it is referred to as a subminimum wage. Minimum wage increases therefore do not necessarily translate into increases in wages for those who are paid commensurate wages – if the prevailing wage is set above the minimum wage, the wage may remain constant even as the minimum wage increases. However, we find an empirically strong correlation between the minimum wage and the commensurate wage for those paid under Section 14(c) (see Appendix Fig. A1).

The rules governing AbilityOne contracts, and the wages that must be paid to workers, differ depending on whether the NPA is providing products or services. As of 2015, 60 percent of NPAs provided only services, 14 percent provided only products, and 26 percent provided both (Leverette et al., 2017). Service contracts are governed by the Service Contract Act, which specifies a given wage that must be provided for a specific type of occupation in a specific geographic area. However, two executive orders (EO13658 and EO14026) set the minimum wage that must apply to contracts covered by the Service Contract Act, which could plausibly increase the wage paid above that level. These executive orders set the minimum wage at \$12.15 for contracts entered into prior to January 30, 2022, or \$16.20 for contracts entered into after January 30, 2022.<sup>7</sup> Due to these wage determinations that are formulaically set by the government, the prevailing wage for service contracts is often higher than the applicable state or local minimum wage.

In contrast to this detailed system for determining service workers' wages, product contracts do not have any regulations governing wages beyond the applicable state and local minimum wages and 14(c) requirements. Product contracts may, therefore, need to be renegotiated if the wages paid must increase. Thought of another way, the government buys hours of work when contracting for services, whereas it is buying a good itself when contracting for products.

The process for calculating prevailing and commensurate wages can be cumbersome for employers, particularly if the job definition does not match perfectly to that of comparable jobs performed by workers without disability—for example, the worker with a disability might focus on one task while comparable workers without a disability perform multiple tasks.<sup>8</sup> In such instances, the employer might have to conduct a productivity analysis on each subpart of the job and apply the appropriate percentages to calculating the subminimum wage.

The number of workers paid subminimum wages through AbilityOne contracts has declined over time, mirroring a broader trend in the decline of workers being paid subminimum wages. Across the United States, the number of workers covered by 14(c) certificates fell from 296,000 to 122,000 from 2010 to 2019 (GAO, 2023). Use of 14(c) certificates within the AbilityOne Program therefore represents only a

<sup>4</sup> AbilityOne defines significant disability as blindness or "...a severe physical or mental impairment (a residual, limiting condition resulting from an injury, disease, or congenital defect) which so limits the person's functional capabilities (mobility, communication, self-care, self-direction, work tolerance or work skills) that the individual is unable to engage in normal competitive employment over an extended period of time."

<sup>5</sup> The other CNA is called National Industries for the Blind.

<sup>6</sup> DOL guidelines mandate that the productivity of the worker with a disability must be evaluated within one month of starting work and every six months thereafter (U.S. DOL, 2008).

<sup>7</sup> For example, someone with a job title "Janitor" in Philadelphia must be paid \$16.12 per hour in 2023, while someone with a job title "Cook I" in Philadelphia must be paid \$18.07 per hour in 2023. Given the executive orders, the Janitor position would actually need to be paid \$16.20 if the contract was established relatively recently.

<sup>8</sup> For example, a laundry worker without a disability might engage in such activities as loading, unloading, and running washing and drying equipment, folding towels, and packing the laundry for delivery, whereas a worker with a significant disability might only fold towels.

fraction of its total use throughout the country. One contributing factor to the national decline is that thirteen states have passed legislation prohibiting payment of subminimum wages; a number of other states (and the federal government) have such legislation currently under consideration (APSE, 2022). This trend reflects changing attitudes toward the productive capabilities of workers with disabilities. Additionally, after years of discussions, the AbilityOne program formally banned the payment of subminimum wages on all of its contracts in July 2022. However, this change is unlikely to affect our analyses because it only applied to new contracts (our data end in 2022). We also find similar results when only considering pre-pandemic years, which thus exclude 2022 as well.

## 2.2. Differences in objective functions for nonprofit vs for-profit firms

Nonprofits operate in a different context than that of standard for-profit, competitive firms, and may not be seeking to maximize profits. In the context of a standard perfectly competitive model of labor demand, profit-maximizing firms seek to equate the wage with the marginal revenue product of labor. Thus, when minimum wages increase, firms might be predicted to hire fewer workers, leaving only those with a relatively higher level of productivity. In contrast, the objective function of a nonprofit might include advancing a mission – in the case of the nonprofits we study, perhaps supporting workers with disabilities. Thus, even in a perfectly competitive model, a nonprofit might not reduce employment in response to the minimum wage increase because doing so would reduce the value of their objective function: a gain from higher profits might be offset by a loss from providing less support to these workers. It may instead make more sense for the nonprofits to maintain employment, appearing to ignore the minimum wage increase, even if it is in some ways reacting to it in other ways (i.e. reducing fringe benefits). These alternative reactions would be consistent with other types of nonemployment adjustments discussed in Clemens (2021).

Even within the sector of nonprofits, the objective function of each nonprofit firm could be vastly different. Using the broader nonprofit sector, Meer and Tajali (2023) found adverse employment effects of minimum wage increases. In contrast, we found no adverse employment effects among this subsample of nonprofits that employ many workers with disabilities through the AbilityOne program. One potential factor driving these contrasting findings may relate to the objectives of the different nonprofits. For example, a typical nonprofit may have objectives not related to their own employees but to the benefit of other constituencies. However, a nonprofit participating in the AbilityOne program may be especially interested in advancing employment for people with disabilities (particularly because of the requirement to perform at least 75 percent of their direct labor hours using workers with disabilities). Importantly, similar to the types of nonprofits examined by Meer and Tajali (2023), the nonprofits we study need to offer prices that are competitive – though participation in AbilityOne offers advantages in contracting, the nonprofits still go through contracting negotiations with the government to land at a reasonable and fair price.

## 2.3. Trends in minimum wages

Although the federal minimum wage has been unchanged at \$7.25 per hour since 2009, many states and localities have increased their own minimum wages (Fig. 1). The figure shows states that increased the minimum wage over each calendar year between 2015 and 2022, the years we focus on in our study. Minimum wages have increased in more than half of states over the past 10 years and nearly 50 cities and counties have raised their minimum wage to a level higher than their state level (EPI 2023).

The landscape of minimum wage increases is complex; some states have legislated automated processes for increasing the minimum wage over time while others rely on legislative action for each increase. For example, thirteen states and Washington DC now benchmark the

minimum wage to inflation.<sup>9</sup> Other states that have instituted large minimum wage increases often phase the increases in over time, for example, increasing the minimum wage by \$1 per year. Thus, we see a large number of minimum wage changes occurring over the period of this study.

Higher minimum wages can affect the labor hours of workers with disabilities through numerous channels, both through worker-induced and employee-induced considerations. Since these workers often exhibit lower productivity, depending on the magnitude of the increase, employers may find that it is no longer viable to retain workers with disabilities. This would be particularly true for those employers that do not pay workers subminimum wages. NPAs, however, are constrained by the requirement that 75 percent of hours are worked by employees with disabilities to remain eligible for AbilityOne contracts. For employees, a higher minimum wage can create issues for workers' eligibility to participate in public benefit programs. Programs like SSDI, SSI, SNAP and Medicaid include some form of earnings limits; for example, to meet the disability requirement for SSDI and SSI, non-blind beneficiaries must be unable to perform in substantial gainful activity, measured as earning more than \$1550 per month in 2024. Public benefit recipients might therefore seek to reduce hours worked so as to not surpass these earnings limits following a minimum wage increase.

## 3. Data

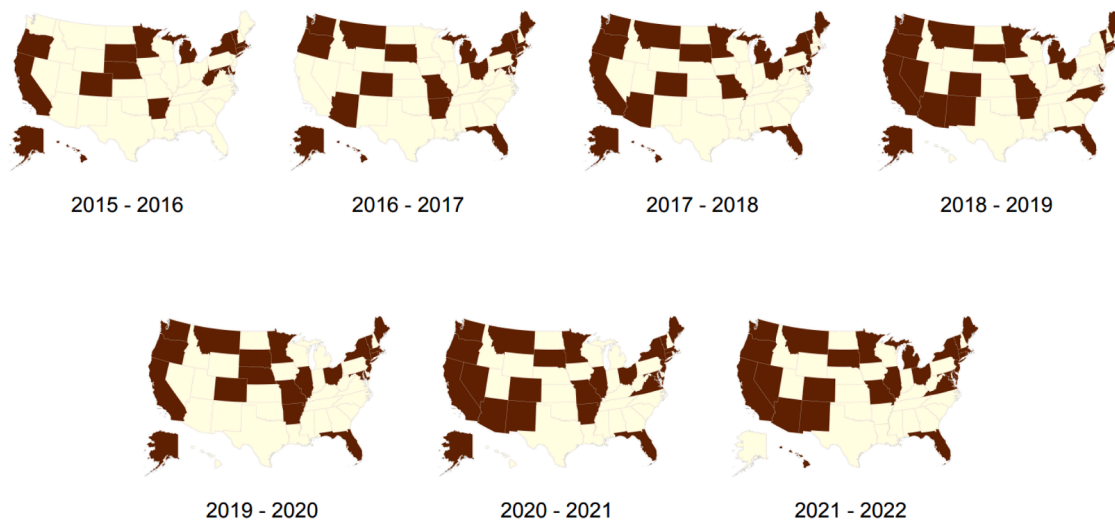
We use a novel dataset that includes quarterly employment information for approximately 200 nonprofit firms that primarily employ workers with disabilities. Each quarter, nonprofits report information on hours and wages for all of the people they employ.<sup>10</sup> This includes hours and wages worked both on AbilityOne contracts and on non-AbilityOne contracts. We focus on the total hours and wages, summing across AbilityOne and non-AbilityOne work. For workers paid subminimum wages as a result of their disability, it also includes their level of productivity. Nonprofits also report worker characteristics such as age, gender, primary disability diagnosis, race and ethnicity, and more.

Our data are collected through SourceAmerica and include a subset of nonprofits participating in the AbilityOne Program. Levere et al., 2017 show that in the fourth quarter of 2015, 42 percent of AbilityOne nonprofits reported their employment data to SourceAmerica. The nonprofits that voluntarily reported their employment data tended to employ more workers, have higher hourly wages, and greater contract revenues than those that did not report employment data. They were also more intensively involved in the AbilityOne Program: about 60 percent of total revenue came from AbilityOne work for nonprofits with employment data, as compared to 40 percent for nonprofits without employment data. Additionally, quarterly average AbilityOne revenues were nearly five times as high for firms with employment data (\$9.2

<sup>9</sup> The states include Alaska, Arizona, Colorado, Maine, Minnesota, Montana, New Jersey, New York, Ohio, Oregon, South Dakota, Vermont, and Washington.

<sup>10</sup> Though the data are a set of longitudinal quarterly extracts, they include person-level identifiers that could potentially allow us to build a panel and track individual workers over time. However, these identifiers are not always consistent, with many instances where they change. For example, nonprofits will often change the overall scheme used to identify workers. Many other instances exist where an individual with the same identifier has a change in demographic information like age, gender, or primary disability diagnosis that suggest the identifiers do not uniquely identify people. Thus, though we would like to assess how individual-level behavior changes, we cannot reliably identify people. A particular challenge relates to a measure of employment: if someone's identifier changed, leading them to fall out of the data despite the fact they continued working, this would look identical to an instance where someone left employment.





**Fig. 1.** State-level minimum wage increases, 2015–2022

Note: States with a darker red shading indicate states that increased the minimum wage in that year. States in light yellow shading did not increase the minimum wage in that year.

million versus \$1.9 million). In Appendix [Table A1](#), we reproduce a table from [Levere et al., 2017](#) to give a sense of representativeness of the nonprofits.<sup>11</sup>

Our data cover every quarter from 2015 to 2022, with the exception of unreliable data in the third quarter of 2017.<sup>12</sup> [Fig. 2](#) shows the number of nonprofits and number of workers included in the sample each quarter. A total of 177 nonprofits are included in the analysis, though the number varies over time as nonprofits occasionally do not report data. The number of workers employed in each quarter at the included nonprofits has remained fairly stable over time, ranging between 18,000 and 25,000 workers. The number of workers paid sub-minimum or minimum wages has modestly declined over time.

On average, the nonprofits in our dataset employ 104 workers ([Table 1](#), Panel A). At the average nonprofit, the number of hours worked in a quarter per worker is 361 (or 28 h per week). Average wages per worker are just over \$4000 per quarter. At the average nonprofit, about 80 percent of workers have a mental diagnosis, such as an intellectual or developmental disability. Our data cover a diverse set of workers: at the average nonprofit, 24 percent are Black, 13 percent are Hispanic, and 6 percent are another race or ethnicity besides non-Hispanic White. Nonprofits in the dataset represent all states except for Nebraska, New Hampshire, Rhode Island, and Vermont.<sup>13</sup>

We also collected information on state and local level minimum

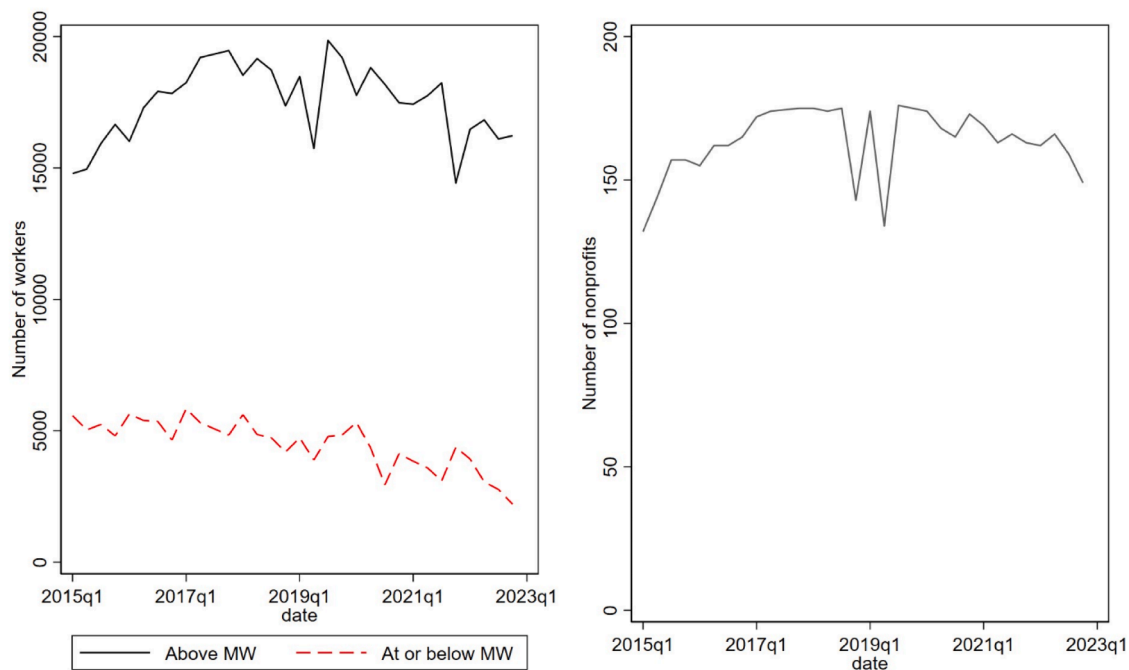
wages from 2015 to 2022. The Department of Labor maintains a database with all state-level minimum wages through 2022. We pulled additional information on local-level minimum wages from the relevant state, county, and municipality websites. When a state or local minimum wage varied depending on the number of employees, we used the number of employees in the dataset for the nonprofit in that quarter to determine which minimum wage applied at that time. When the local minimum wage depended on sales, we used the lowest value of the minimum wage as we did not have the sales figures to directly determine the correct minimum wage. During our entire study period, the federal minimum wage remained unchanged at \$7.25 per hour. As shown in Panel B of [Table 1](#), the minimum wage went up in just under half of the nonprofit-window observations in our dataset. When the minimum wage increased, the average minimum wage change was about \$0.66, with 28.1 percent of the increases being at least \$1. We focus on \$1 as a “large” annual increase because such an increase is relatively rare on a year-by-year basis, yet these \$1 increases are relatively modest in context of broader minimum wage increases during this period. During our seven-year study period from 2015 to 2022, 13 states increased the minimum wage in total by at least \$4 (the largest increase was Washington DC, which increased the minimum wage by \$6.60 during our study period). About 45 percent of the nonprofit-window observations are in places bound by the federal minimum wage of \$7.25, slightly higher than the roughly 40 percent of the labor force that lives in states bound by the federal minimum ([Bradley and Overbay 2023](#)).

During our study period from 2015 to 2022, there were 259 applicable minimum wage changes at the state and local level ([Table 2](#)). Of these, 204 were increases of at least \$0.25 (the threshold for inclusion in [Cengiz et al. \(2019\)](#)), while 59 were increases of at least \$1. Minimum wage changes often occurred year after year – for example, eight states had minimum wage increases each year between 2015 and 2022. These annual changes make assessing impacts difficult: when the minimum wage changes in consecutive years, the period before the second increase, which is critical to assess if there are anticipatory effects, is itself following a minimum wage increase. Many of the consecutive increases in our study were planned years in advance, with a number scheduled to be implemented prior to the start of our study window. For example,

<sup>11</sup> We were unable to access the additional data necessary to assess the representativeness of the data over time, and thus rely on this previous report to give a broad sense of which nonprofits are and are not included in the dataset.

<sup>12</sup> To be included in the dataset, we required that a nonprofit have missing data in no >8 quarters between 2015 and 2022 (excluding the third quarter of 2017). A total of 322 unique nonprofits ever reported data, but we dropped 145 nonprofits that had >8 quarters of missing data. These dropped nonprofits tended to be substantially smaller: in the first quarter a nonprofit reported data, those that remained in our sample had an average of 136 workers, whereas those with incomplete data had an average of 71 workers. Importantly, both included and dropped nonprofits had a minimum wage increase in 16 % of quarters. A potential concern would have been that minimum wage increases directly led nonprofits to exit the sample, in which case we would have expected the share of quarters with a minimum increase to be substantially higher for the firms that exited.

<sup>13</sup> Once we make additional restrictions to the data to get to our final analysis data, such as requiring any minimum wage increase to take place in the first quarter of a calendar year (as discussed below), we also lose observations in Minnesota, Oregon, and Washington DC.



**Fig. 2.** Sample sizes over time, nonprofits and workers

Note: To be included, a nonprofit must have missing data for no >8 quarters during the period from 2015 to 2022 (excluding the third quarter of 2017, which is missing for all). For the worker-level analysis, workers at these nonprofits are included during two-year windows in which there is no missing data. For workers included in the data, we then characterize whether their hourly salary in each quarter is above or below the minimum wage.

Maryland passed a law in May 2014 that scheduled annual minimum wage increases through 2018.<sup>14</sup> Nonprofits may have already adjusted to these sorts of previously legislated changes at the start of our study period. We therefore test the sensitivity of our findings by estimating results focusing only on non-consecutive minimum wage increases.

Additionally, though most of the minimum wage increases occurred in the first quarter of the year, a non-trivial share increased in the third quarter of the year. As discussed below, such minimum wage changes are excluded from our primary analysis. However, we show that if we instead estimate a model that includes only minimum wage increases that occur in the third quarter of each year (and drop all other minimum wage increases, including those in the first quarter of the year), the results do not change. This is important as large minimum wage changes of \$1 or more disproportionately occurred in the third quarter of the year.

#### 4. Empirical strategy

We use an event study framework to compare employment, hours, and wages over time based on whether an employer faces a minimum wage increase. We seek to compare these employment outcomes for nonprofit firms in the quarters immediately before the minimum wage changes to the quarters immediately following the minimum wage increase. To control for general temporal patterns, we benchmark this difference over time to a counterfactual group of nonprofit firms that did not experience a minimum wage change during the same calendar

quarters. Our approach therefore uses a two-way fixed effects strategy, comparing outcomes for nonprofits that did and did not experience minimum wage changes over time.

Because many states experienced multiple minimum wage changes during the study period, our unit of observation can be thought of as a *two-year window for a nonprofit* (nonprofit-window, hereafter), rather than a *nonprofit*. Consider a nonprofit located in Delaware. At the beginning of 2015, the minimum wage was \$8.25. The minimum wage increased three times during our study period: once in the first quarter of 2019 (to \$8.75), once in the first quarter of 2021 (to \$9.25), and once in the first quarter of 2022 (to \$10.50). Therefore, of the seven two-year windows during our study period (2015–2016, 2016–2017, 2017–2018, 2018–2019, 2019–2020, 2020–21, and 2021–22), the nonprofit experienced a minimum wage increase during three of them: the 2018–2019, 2020–21, and 2021–22 windows. These windows are classified as treated. In the other four two-year windows, the minimum wage remained unchanged during the second year; these windows (and any other windows where the minimum wage does not change at the start of the second year) are classified as control, even if a recent prior window had a minimum wage increase. Thus, our analysis only identifies the short-term effects of the minimum wage increases that occur within one year<sup>15</sup> – in the example noted above, even though the minimum wage changed at the beginning of 2019, the 2019–2020 window is considered untreated because the minimum wage did not change at the start of 2020. This implies that the same nonprofit located in the same state could contribute to both the treatment group *and* control group,

<sup>14</sup> Out of the 31 states that had a minimum wage increase during our study period, 21 had an instance where the minimum wage increased but the increase was scheduled to occur prior to 2015. These include a mix of states and approaches to increasing the minimum wage – some include relatively recent legislative increases like the example cited above in Maryland, some include ballot initiatives where voters directly changed the minimum wage (like Alaska, Arkansas, and Nebraska), and some included inflation adjustments made each year because of a substantially older state constitutional provision (like Colorado, Florida, and Ohio).

<sup>15</sup> That we can only measure short-run effects is an important caveat, particularly in light of evidence that the effects of the minimum wage on employment outcomes may grow over time (Sorkin 2015; Aaronson et al. 2018; Hurst et al. 2023). However, the weight of the evidence does suggest that short-run and medium-run effects are similar – see examples from Deroncourt and Montialoux (2021), Cengiz et al. (2019), and Dube et al. (2010), as well as a recent summary in Dube and Lindner (2024) which includes its own analysis of numerous minimum wage changes too.

**Table 1**  
Summary statistics.

Characteristic	Minimum wage increase	No minimum wage increase	Overall
<i>Panel A. Worker characteristics</i>			
Number of workers at the nonprofit	94.9 (132.3)	110.0 (163.2)	103.6 (150.9)
Total quarterly hours per worker	313.5 (102.0)	333.9 (184.5)	325.1 (155.0)
Total quarterly wages per worker	4278.7 (2081.1)	3878.7 (2006.7)	4049.6 (2047.4)
Male	70.6 % (13.4 %)	63.0 % (16.7 %)	66.3 % (15.9 %)
Female	29.4 % (13.4 %)	37.0 % (16.7 %)	33.7 % (15.9 %)
Black	14.8 % (17.3 %)	31.7 % (29.2 %)	24.4 % (26.2 %)
Hispanic	18.1 % (22.6 %)	8.5 % (16.9 %)	12.6 % (20.1 %)
White	59.5 % (28.0 %)	54.4 % (29.4 %)	56.6 % (28.9 %)
Other race	7.6 % (16.0 %)	5.4 % (14.7 %)	6.4 % (15.3 %)
Mental diagnosis	84.7 % (14.0 %)	78.0 % (21.2 %)	80.9 % (18.7 %)
Other diagnosis	15.3 % (14.0 %)	22.0 % (21.2 %)	19.1 % (18.7 %)
Metropolitan area	85.8 % (34.5 %)	85.0 % (36.0 %)	85.3 % (35.4 %)
Pay any workers based on productivity	51.0 % (50.1 %)	39.2 % (48.9 %)	44.3 % (49.7 %)
<i>Panel B. Minimum wage changes</i>			
Minimum wage increase	100 %	0 %	42.9 %
Average minimum wage increase (\$)	0.661	–	0.284
Minimum wage increase at least \$1 per hour	28.1 %	–	12.1 %

Note: Averages across nonprofit level observations in the last quarter with data in the first year of the two-year window. Quarterly hours per worker and quarterly wages per worker are top-coded at the 99th percentile. The sample includes 1037 nonprofit-window observations that are included in our primary analysis. In the Panel A, the number in parentheses represents the standard deviation.

**Table 2**  
Minimum wage increases.

Characteristic	Any time	First quarter of year
Any minimum wage increase	259	186
Minimum wage increase of at least:		
\$0.25	78.8 %	72.5 %
5 %	66.8 %	61.8 %
\$1	22.8 %	21.5 %
Frequency of state minimum wage changes during 2015 to 2022		
None	19	–
Every year	8	–
Followed by two years of no change	5	–
Followed by three years of no change	3	–
Single minimum during 2015 to 2022	1	–

depending on whether the minimum wage changed during some but not all of the windows. In addition, our approach means that a single calendar year can be included both in the post-period and in the pre-period (e.g., 2021 in this example would be a post-period in the 2020–21 window and a pre-period in the 2021–22 window). To the extent that minimum wage changes occur in multiple consecutive years, our pre-period may include data on nonprofits that experienced a minimum wage increase in the year immediately preceding the start of the two-year window. This would be particularly problematic in the event that the effects of minimum wage increases build up over time – then even a

window that is viewed as a control group might itself still be experiencing changes in the outcomes because of earlier minimum wage increases, understating the dynamic treatment effects or even invalidating the short-term impacts. Critically, however, we perform a robustness check test to show that our results do not ultimately rely on these complex situations: when we drop instances of consecutive minimum wage increases, our results are essentially unchanged.

Thus, our analysis compares outcomes in the four quarters before a minimum wage increase to the four quarters after a minimum wage increase. The comparison group is nonprofit-windows that did not experience a minimum wage increase. In our main analysis, we drop nonprofit-window observations where the minimum wage increased outside of the first quarter of a calendar year, leading us to drop about 12 percent of the nonprofit-window groups (the vast majority of which were third quarter minimum wage increases). Our estimator can be also characterized as a “stacked event study” estimator (Wing et al. 2024), in that we normalize four quarters before and after minimum wage change (i.e. the first quarter of a calendar year) and account for repeated inclusions of the same state across multiple nonprofit-windows. Importantly, this ensures that there is no variation in the month of treatment timing, reducing concerns around those discussed in Goodman-Bacon (2021). Additionally, we show that we get similar results if we focus only on third quarter minimum wage increases instead of first quarter minimum wage increases. However, because the minimum wage increases occur in different calendar years, some of these concerns raised in the recent literature on difference-in-differences approaches, like Goodman-Bacon (2021) and Callaway Sant’Anna (2021) may still be relevant in considering our estimates.

Our event study estimating equation is as follows:

$$y_{i w q} = \alpha + \gamma_{i w} + \theta_q + \sum_{q=-4, q \neq -1}^3 \beta_q * MWCHANGE_{i w} * (Quarter = q) + \varepsilon_{i w q} \quad (1)$$

The primary outcome,  $y_{i w q}$ , measures a labor market outcome for nonprofit  $i$  observed during the two-year window  $w$  and quarter  $q$ . We include fixed effects for both nonprofit-window (which, among other things, controls for whether or not the nonprofit-window experienced a minimum wage increase as well as all fixed factors about the nonprofit) and quarters. Our primary coefficients of interest are the event-study coefficients  $\beta_q$ , which measure the differential change in employment in quarter  $q$  for nonprofits that experienced a minimum wage increase to those that did not, relative to the difference in quarter  $= -1$ , the quarter before the potential minimum wage change. The coefficients for quarters  $q = -4$  to  $-2$  therefore represent tests of whether there are differential pre-trends, while the coefficients for quarters  $q = 0$  to  $3$  evaluate the responsiveness to the minimum wage change over the first year after the minimum wage increased. We estimate cluster robust standard errors at the nonprofit-window level.

Our four primary labor market outcomes are logged total employment at the nonprofit, quarterly hours per worker, the average wage across all workers in the nonprofit, and the percentage of workers affected by the minimum wage. For quarterly hours per worker, we minimize the sensitivity of our estimates to outliers by top-coding values above the 99th percentile at the 99th percentile. For average wage, we report the simple arithmetic mean across all workers at the nonprofit. Finally, we calculate the percentage of workers in each quarter where either the prevailing wage (if paid a commensurate wage) or the observed wage is at or below the minimum wage. We then divide this by the total number of workers at the nonprofit in that quarter to get the percentage of workers affected by the minimum wage.

In addition to the event study analysis, we also estimate a difference-in-differences model:

$$y_{i w q} = \alpha + \gamma_{i w} + \theta_q + \beta * MWCHANGE_{i w} * (Quarter \geq 0) + \varepsilon_{i w q} \quad (2)$$

This model considers the four quarters in the first calendar year of

the window ( $q = -4$  to  $-1$ ) as the pre-period and looks for differential changes in outcomes during the four quarters in the second calendar year of the window ( $q = 0$  to  $3$ ). Because our event study estimates do not suggest an evolving time trend during the post-period, we use this difference-in-differences model to build towards our primary specification that also accounts for the extent to which a nonprofit is likely affected by the minimum wage. The results show estimated average effects over the four quarters following a minimum wage increase.

We also consider several refinements to the difference-in-differences model to better account for the fact that nonprofits located in places that experienced minimum wage increases may nonetheless essentially be unaffected by the minimum wage change.

First, we refine the model by characterizing nonprofits by the percent of their workers whose wages would have to increase under the new minimum wage in the quarter immediately prior to the change. A nonprofit that already paid all its workers well above the minimum wage would likely be unaffected by the minimum wage change. A nonprofit that pays most of its workers below the minimum wage (or where the implied prevailing wage was at or below the new minimum wage) would need to adjust wages and pay its workers more. We therefore estimate a triple-difference model, comparing nonprofits by (1) whether the minimum wage increased; (2) whether most of their workers' wages would have to increase with the minimum wage;<sup>16</sup> and (3) over time. In assessing the percentage of workers whose wages would have to go up, we first must calculate prevailing wages for workers paid subminimum wages. To do this, we divide current hourly wages by reported productivity; if a worker is paid below the minimum wage but the prevailing wage is above the minimum wage, a minimum wage increase need not affect the worker's pay. However, because productivity data are not always reliably reported,<sup>17</sup> we also show that if we instead use the percentage of workers whose reported wage is below the minimum wage the results remain similar.

Second, we differentiate between large and small minimum wage increases. A hallmark of minimum wage increases over this era is adjustments for inflation that led the minimum wage to increase, but only slightly, every year.<sup>18</sup> We therefore consider two options to define a large minimum wage increase: an increase of at least (1) one dollar, or (2) 5 percent. We then estimate the effects of a large minimum wage increase, as differentiated from a small minimum wage increase or no minimum wage increase.

Finally, we estimate separate analyses where we restrict the sample to drop instances where the minimum wage had also gone up in the previous year. In these instances, the "pre" period is also a "post" period for a previous minimum wage increase, further complicating the analysis. These adjustments augment the triple difference model, which also accounts for the extent to which a nonprofit located in a state with a minimum wage increase might actually be affected by the increase.

<sup>16</sup> We consider several different ways of defining this variable, all of which lead to mostly similar results. The one we focus on in the paper is where at least 20 percent of its workers are paid at or below the minimum wage, but we also consider other cutoffs instead of 20 percent: 0 percent (any workers whose wages must increase with the new minimum wage) and 75 percent.

<sup>17</sup> A number of nonprofits (accounting for about 15 percent of all observations with non-missing productivity data) report values of productivity that are either 0 or 1, indicating that there may have been improper rounding done in the data reporting process. Several more workers have reported productivity of exactly zero, which also is implausible.

<sup>18</sup> For example, Alaska increased its minimum wage from \$8.75 to \$9.75 in 2016. It subsequently rose incrementally each year to \$10.34 by 2021 to adjust for inflation: increasing by 5 cents in 2017, 4 cents in 2018, 5 cents in 2019, 30 cents in 2020, 15 cents in 2021. However, the minimum wage did not change in 2022. These increases after 2016 would be particularly unlikely to affect employment behavior as they are intended to only reflect broader increases in prices.

## 5. Results

Minimum wage increases do not adversely affect employment or total hours worked at nonprofits that primarily employ people with disabilities, though average wages increase (Fig. 3). The point estimates in the quarters before the first calendar quarter of the year (when the minimum wage changes) are not statistically different from zero. This indicates that the number of workers and total employment hours do not exhibit differential pre-trends between nonprofits in areas that did and did not increase the minimum wage, lending credibility to the potential for our estimating strategy to generate causal estimates. In the quarters immediately following the minimum wage increase, employment and hours worked continue to evolve in parallel for nonprofits in areas with and without minimum wage changes. The quarterly point estimates on the logged number of workers and hours are both near zero and estimated precisely. In contrast, as the minimum wage goes up, so does the wage paid to the average worker at the nonprofit. These results are thus inconsistent with a perfectly competitive labor market model, which would suggest that minimum wage increases would lead to higher wages for those who remain employed, but lead to reductions in overall employment activity.

In the quarter when the minimum wage increases, the share of workers affected by the minimum wage increases by about 12 percentage points, providing an important reliability check on the data (Fig. 3, bottom right panel). Workers affected by the minimum wage are those where either the prevailing wage (if paid a commensurate wage) or the observed wage is at or below the minimum wage. Relative to the mean of 13 percent of employees affected by the minimum wage in the period immediately preceding the wage increase, this represents a near doubling. This number declines over the course of the year, suggesting that there is an ensuing upward adjustment of wages for those who were previously paid above the minimum wage but whose wages became bound by the new minimum wage. These patterns are in line with sticky wage theory, where it takes some time for wages to adjust. Interestingly, the share of workers affected by the minimum wage exhibits significant pre-trends, particularly in the first calendar quarter of the year preceding the minimum wage increase. This indicates that places that increase the minimum wage tend to do so in multiple years in a row. Many states phased in larger minimum wage increases over multiple years, and many states also adjust their minimum wage annually for inflation.<sup>19</sup> These patterns lend evidence that our data are sufficiently reliable.

Our difference-in-difference estimates confirm that minimum wage increases did not hurt employment or hours at these nonprofits (Table 3, column 1).<sup>20</sup> Our point estimate for the logged number of workers is 0.02 and is marginally significant at the 10 percent level, meaning we can rule out any meaningful decline in employment. For hours per worker, the 95 percent confidence interval indicates that we can rule out a change in either direction of >3 percent. Consistent with our event study estimates shown in Fig. 3, these difference-in-differences results indicate that as the minimum wage increased, so did the worker average

<sup>19</sup> Below, we show that excluding instances of minimum wage increases in consecutive years does not meaningfully change the results. We also show that patterns are similar whether we analyze large or small changes in the minimum wage.

<sup>20</sup> It is also possible that minimum wage increases lead nonprofits to shut down and differentially exit the dataset, which is not directly captured by either of these variables. To test for this differential attrition, we created a balanced panel and then generated an indicator variable for whether the nonprofit is "in the data" (with the opposite being that the firm had dropped out, and thus the firm had a new observation created for that quarter). We then ran a regression where the outcome variable was "whether the nonprofit is in the data" in our regression from equation (2), focusing on what happens in response to a minimum wage change. We found a small and precisely estimated zero impact of minimum wage changes on this variable. That suggests there was no differential attrition in response to a minimum wage increase.



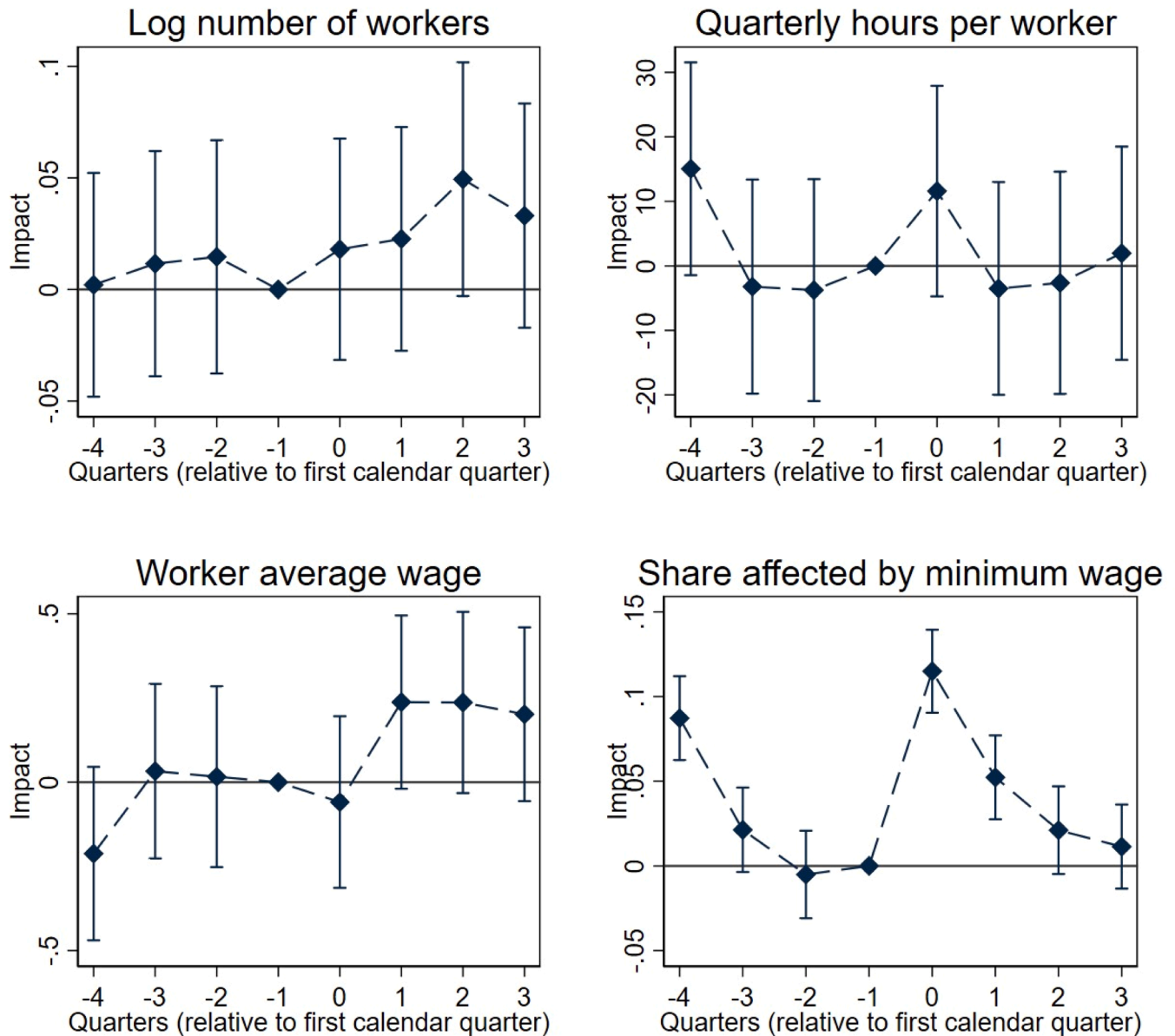


Fig. 3. Impacts of minimum wage changes on nonprofit-level outcomes

Note: Runs regressions as specified in Equation (1). Each outcome is measured at the nonprofit level, with the regression then reporting an average across all nonprofits. Quarterly hours per worker is top-coded at the 99th percentile. The worker average wage calculates the mean hourly wage across all workers employed by the nonprofit in each quarter. The share affected by the minimum wage is based on the percentage of workers in each quarter who have a prevailing wage or observed wage at or below the minimum wage.

wage (by \$0.19 above a mean of \$10.94). This represents 29 percent of the average minimum wage increase of \$0.66 (see Table 1). Additionally, the share of workers affected by the minimum wage also increased by 3 percentage points above a mean of 14 percent. This is smaller than the 12 percentage point change noted above because it averages across the four quarters following the minimum wage increase, rather than only the first quarter immediately following the increase.

When we augment the model to account for the extent to which the nonprofit is affected, we continue to find no negative impacts on employment or hours (Table 3, column 2). The coefficients now represent the change from a minimum wage increase for a nonprofit that had many workers whose wages had to increase with the change in the minimum wage. This therefore represents our preferred model specification. Correspondingly, we find substantially larger estimated increases in worker average wage and the share affected by the minimum wage in Panels C and D than from the model that did not account for

wages the nonprofit previously paid its workers. For example, the estimated increase in average wage of \$0.39 represents 59 percent of the average minimum wage increase of \$0.66. We continue to be able to rule out meaningful decreases in employment or hours. The point estimate on hours indicates that hours per worker increased by nearly 5 percent with the minimum wage increase (a 15.9 hour increase per quarter relative to the mean of 325.6 h worked). For the event study version of these outcomes using the triple-difference model, see Appendix Fig. A2. All subsequent model modifications and robustness checks build from these estimates.

Differentiating between large and small minimum wage changes still leads to the same conclusion that the minimum wage does not affect employment among workers with disabilities (Table 3, Columns 3 and 4). Column 3 shows the point estimate from a small increase (less than \$1) relative to no change in the minimum wage. Column 4 shows the point estimate from a large increase (\$1 or more) relative to no change

**Table 3**  
Impact of minimum wage increase on nonprofit-level outcomes.

Outcome	(1)	(2)	(3)	(4)
<b>Panel A: Log number of workers at the nonprofit</b>				
Minimum wage increase	0.02* (0.01)	0.01 (0.03)	0.00 (0.03)	−0.00 (0.04)
Variable average (unlogged)		105.9		
<b>Panel B: Quarterly hours per worker</b>				
Minimum wage increase	−0.08 (4.22)	15.86 (9.87)	19.13* (10.83)	10.04 (14.05)
Variable average		325.6		
<b>Panel C: Worker average wage</b>				
Minimum wage increase	0.19*** (0.07)	0.39** (0.15)	0.47*** (0.17)	0.26 (0.22)
Variable average		10.94		
<b>Panel D: Share affected by minimum wage</b>				
Minimum wage increase	0.03*** (0.01)	0.07*** (0.02)	0.03** (0.02)	0.11*** (0.02)
Variable average		0.14		
Number of nonprofit-windows		1037		
Number of observations		7513		
Model	Difference-in-differences	DDD (adding extent nonprofit affected)	DDD, small increase (< \$1)	DDD, large increase (\$1+)

Note: Runs regressions as specified in Eq. (2). Each outcome is measured at the nonprofit level, with the regression then reporting an average across all nonprofits. Quarterly hours per worker is top-coded at the 99th percentile. The worker average wage calculates the mean hourly wage across all workers employed by the nonprofit in each quarter. The share affected by the minimum wage is based on the percentage of workers in each quarter who have a prevailing wage or observed wage at or below the minimum wage.

in the minimum wage. In both instances, we can rule out meaningful reductions in employment or hours from a minimum wage increase. Additionally, the share affected by the minimum wage goes up by significantly more at nonprofits facing large minimum wage increases (11 percentage points) than at nonprofits facing small minimum wage increases (3 percentage points). If nonprofits did not proportionally raise wages for workers paid above the new minimum, then a large minimum wage increase should lead more people to be paid at the new minimum wage because more workers may have previously had wages that are at or below the new (higher) minimum wage. However, we do not find a significant difference across large and small minimum wage increases in terms of the increase in the worker average wage.

To further test the responsiveness of employment and hours to changes in the minimum wage, we estimated a model using the log of the minimum wage as the primary independent variable, rather than an indicator for if the minimum wage increased. This model can be thought of as further refining the large and small minimum wage changes by directly accounting for the magnitude of the minimum wage changes. We continue to use the nonprofit-window identification approach because considering the overall time horizon would potentially introduce bias stemming from differential treatment timing. Cengiz et al. (2019) also note potential biases when using a log minimum wage variable over a longer time period.

We find similar results to our main estimates when using a model that includes the log of the minimum wage (Table 4). Our estimates on logged number of workers and hours are not significantly different from zero in a triple difference model that accounts for the extent to which the nonprofit is affected (we find a small significant increase in employment and no significant effects on hours in the simpler difference-in-

**Table 4**  
Log minimum wage models.

Outcome	(1)	(2)
<b>Panel A: Log number of workers at the nonprofit</b>		
Minimum wage increase	0.41*** (0.15)	−0.28 (0.26)
Variable average (unlogged)		105.9
<b>Panel B: Quarterly hours per worker</b>		
Minimum wage increase	−48.24 (50.84)	−25.07 (85.90)
Variable average		325.6
<b>Panel C: Worker average wage</b>		
Minimum wage increase	1.68** (0.79)	4.96*** (1.34)
Variable average		10.94
<b>Panel D: Share affected by minimum wage</b>		
Minimum wage increase	0.58*** (0.08)	0.31** (0.13)
Variable average		0.14
Number of nonprofit-windows		1037
Number of observations		7513
Model	Difference-in-differences	DDD (adding extent nonprofit affected)

Note: Runs regressions as specified in Eq. (2), replacing the indicator for whether the minimum wage changed with the log of the current level of the minimum wage. Each outcome is measured at the nonprofit level, with the regression then reporting an average across all nonprofits. Quarterly hours per worker is top-coded at the 99th percentile. The worker average wage calculates the mean hourly wage across all workers employed by the nonprofit in each quarter. The share affected by the minimum wage is based on the percentage of workers in each quarter who have a prevailing wage or observed wage at or below the minimum wage.

differences model). However, the coefficients are estimated less precisely. We also find that higher minimum wages are associated with increases in workers' average wages and in the share of workers affected by the minimum wage.

Though workers' employment outcomes do not change, it is possible that nonprofits adjust to a rising minimum wage along other dimensions. For example, Clemens (2021) discusses the potential for passing through the wage increase to consumers in the form of higher prices or changing nonwage compensation like health insurance coverage. In Panel A and B of Table 5, we estimate the impacts of minimum wage increases on the share of workers paid health and welfare fringe benefits as well as the dollar value of such benefits. These fringe benefits are a fixed dollar rate (set by the federal government) that is added to a worker's wage to cover benefits like health insurance. In 2024, this statutorily required fringe rate was \$5.36 per hour, and it grew during our study period from \$4.02 in early 2015 to \$4.80 by the end of 2022.<sup>21</sup> Overall, minimum wage increases do not change the payment of fringe benefits, however, both the share and the dollar value of fringe benefits *decline* in response to a large minimum wage increase (Table 5 Panel A and B Column 4). These kinds of shifts to other forms of compensation are an under-studied margin of adjustments and underscore the importance of studying non-employment outcomes. Our findings are consistent with Hirsch et al. (2015), who found that restaurants absorbed the cost of minimum wage increases through other channels of adjustment, including higher prices, lower profit margins, wage compression, and higher performance standards. Clemens et al. (2018) also found that minimum wage changes decreased the likelihood of individuals having employer-sponsored health insurance, largely driven by workers in very low-paying occupations.

Another dimension along which nonprofits might adjust to higher

<sup>21</sup> Not everybody offered the fringe payments, hence, mean value in Table 5 Panel B is \$3.28, less than the federally required rates.

**Table 5**  
Impact of minimum wage increase on additional nonprofit-level outcomes.

Outcome	(1)	(2)	(3)	(4)
<b>Panel A: Share of workers paid health and welfare fringe benefits</b>				
Minimum wage increase	−0.00 (0.01)	−0.00 (0.01)	0.02 (0.01)	−0.05*** (0.02)
Variable average			0.75	
<b>Panel B: Dollar amount of health and welfare fringe benefits</b>				
Minimum wage increase	−0.02 (0.02)	0.00 (0.06)	0.11* (0.06)	−0.21*** (0.08)
Variable average			3.28	
<b>Panel C: Firm pays any worker using Section 14(c)</b>				
Minimum wage increase	−0.02** (0.01)	−0.02 (0.02)	−0.06*** (0.02)	0.06** (0.03)
Variable average			0.46	
<b>Panel D: Share paid less than the minimum wage</b>				
Minimum wage increase	0.02*** (0.01)	0.08*** (0.02)	0.05*** (0.02)	0.11*** (0.02)
Variable average			0.24	
Number of nonprofit-windows			1037	
Number of observations			7513	
Model	Difference-in-differences	DDD (adding extent nonprofit affected)	DDD, small increase (< \$1)	DDD, large increase (\$1+)

Note: Runs regressions as specified in Eq. (2). Each outcome is measured at the nonprofit level, with the regression then reporting an average across all nonprofits.

minimum wages is through the payment of subminimum wages. Through the use of Section 14(c), a nonprofit can pay its workers commensurate wages that can be below the minimum wage. Though there are fixed costs associated with regulatory compliance in paying workers commensurately, it may be more worthwhile to undertake these fixed costs as the minimum wage increases. In Panel C of Table 5, we show that, if anything, nonprofits on average make somewhat less frequent use of commensurate wages when the minimum wage increases. Yet this average effect masks substantial heterogeneity in the response to small and large minimum wage increases – nonprofits are significantly more likely to pay any workers commensurate wages after a large minimum wage increase, though significantly less likely to do so after a small minimum wage increase. Together with the findings on fringe benefits, this suggests that large minimum wage increases may be binding and lead nonprofits to respond along non-employment related margins that can nonetheless affect workers' well-being.

Our estimates are robust to several model specifications (Table 6). The first column of the table repeats our primary estimate, reproduced from column 2 of Table 3, that reflects the estimated effect of a minimum wage increase at a nonprofit that is likely to be affected by the change. In Column 2, we drop all nonprofit-windows that include quarters from 2020 onwards because of the COVID-19 pandemic. Employment patterns may have changed during this time period, which was marked by significant upheaval in the labor market, followed by the longest inflationary period in the United States in 40 years. When we only consider nonprofit-windows through 2019, our estimates are essentially unchanged. In Column 3, we exclude all nonprofit-windows in which the minimum wage increased and also increased in the immediately preceding year. In such an instance, we know that the pre-period is necessarily also following a minimum wage increase. The pre-period may therefore not represent a reliable counterfactual because it is also likely to be affected by the minimum wage increase, to the extent that minimum wage changes affect nonprofit behavior. Though this leads us to drop 32 percent of the nonprofit-windows included in the main

**Table 6**  
Impact of minimum wage increase on nonprofit-level outcomes, model sensitivity.

Outcome	(1)	(2)	(3)	(4)
<b>Panel A: Log number of workers at the nonprofit</b>				
Minimum wage increase	0.01 (0.03)	−0.06 (0.04)	0.01 (0.05)	0.06** (0.03)
Variable average (unlogged)		105.9		324.0
<b>Panel B: Quarterly hours per worker</b>				
Minimum wage increase	15.86 (9.87)	21.25 (13.21)	24.58 (16.57)	7.22 (11.41)
Variable average		325.6		359.0
<b>Panel C: Worker average wage</b>				
Minimum wage increase	0.39** (0.15)	0.36* (0.20)	0.35 (0.25)	0.18 (0.15)
Variable average		10.94		11.41
<b>Panel D: Share affected by minimum wage</b>				
Minimum wage increase	0.07*** (0.02)	0.07*** (0.02)	0.09*** (0.02)	0.06*** (0.01)
Variable average		0.14		0.13
Number of nonprofit-windows	1037	618	708	1037
Number of observations	7513	4339	5131	7513
Model	Main DDD estimate	Excluding post-pandemic data	Excluding consecutive minimum wage increases	Weighted by nonprofit number of workers

Note: Runs regressions as specified in Eq. (2). Each outcome is measured at the nonprofit level, with the regression then reporting an average across all nonprofits. Quarterly hours per worker is top-coded at the 99th percentile. The worker average wage calculates the mean hourly wage across all workers employed by the nonprofit in each quarter. The share affected by the minimum wage is based on the percentage of workers in each quarter who have a prevailing wage or observed wage at or below the minimum wage. In column 2, all quarters from 2020 and after are dropped. In column 3, any nonprofit-windows in which the minimum wage increased and also increased in the immediately preceding year are dropped.

estimating equation, we still find essentially identical results: no decreases in employment or hours following a minimum wage increase, with an increase in the share affected by the minimum wage and worker average wage (though the latter estimate is not significant). Finally, we also re-weight our data such that it is weighted by the number of workers to represent impacts from a minimum wage change for the average worker, rather than for the average nonprofit. This re-weighting does not meaningfully change the conclusions we draw from our estimates (Column 4).<sup>22</sup>

Focusing on third quarter minimum wage increases rather than first quarter minimum wage increases also does not change the primary conclusions (Appendix Table A2). To avoid some of the issues related to the two-way fixed effects literature, our main model only considers minimum wage changes in the first quarter of the year, leading us to drop 28 percent of minimum wage increases. Of these dropped non-first quarter minimum wage increases, 90 percent occur in the third quarter (alternatively, 25 percent of all minimum wage increases occur in the

<sup>22</sup> These results weighted by firm size that show increasing employment as the minimum wage increases are broadly consistent with other findings in the literature that workers are reallocated to larger firms as the minimum wage goes up (e.g., Dustmann et al. 2022).

third quarter). We therefore re-estimate our model using only third quarter minimum wage increases, while also ensuring that the timing is correctly aligned for the control group that did not have a minimum wage increase. The structure and models in Appendix Table A2 exactly mirror those in Table 3. The findings are also similar: no significant effects of a minimum wage change on workers or hours, with a significant increase in the share affected by the minimum wage. Because there are many fewer third quarter wage changes, these coefficients are not as precisely estimated. Nonetheless, because of the similarity in the pattern of the point estimates between first and third quarter minimum wage changes, it provides reassurance that the main results are robust.

Finally, we also test the sensitivity of our estimates to various modeling decisions, consistently concluding that minimum wage increases do not adversely affect employment for workers with disabilities. In Appendix Table A3, we vary the definition for what leads a nonprofit to likely be affected by the minimum wage increase. The first column repeats our main estimate, which requires that at least 20 percent of the workers must have a prevailing wage or paid wage below the minimum wage. In the second and third columns, we vary this, showing what happens if we use 0 percent or 75 percent instead of 20 percent. The results are mostly similar. In columns 4 through 6, we use the same thresholds, but only consider the paid wage rather than accounting for the prevailing wage.<sup>23</sup> This leads many more workers to be affected by the minimum wage (25 percent on average, rather than 14 percent). Despite this difference, the estimated results are similar in that we continue to be able to reject a decline in hours worked or employment. In some specifications, we even find that minimum wage increases lead to significant increases in employment. In Appendix Table A4, we change the definition for large minimum wage increases by using at least a 5 percent change (rather than a change of \$1). As shown in Columns 3 and 4, this does not change the estimated effects.

## 6. Conclusion

We find across a variety of specifications that minimum wage increases have minimal negative effects on employment and hours for workers with disabilities employed by nonprofit firms that participate in the federal AbilityOne program. If anything, minimum wage increases may slightly increase these outcomes. Using an event study and difference-in-differences approach that isolates outcomes in the year immediately prior to and following minimum wage increases, we can plausibly identify the causal effects of minimum wage increases. Our results are consistent when we add a third difference that accounts for how many workers are affected by the minimum wage; nonprofits that operate in states where the minimum wage increases, but who already pay their workers sufficiently high wages, should not be affected by the minimum wage change. However, even though these minimum wage increases did not hurt employment for workers with disabilities, we found other impacts along non-employment margins—including the payment of fringe benefits and nonprofit's use of Section 14(c) to pay subminimum wages—that may nonetheless affect workers' well-being.

These findings are especially pertinent given recent broader trends in

labor markets, especially for those with disabilities. Generally, the tight labor market following the COVID-19 pandemic has helped improve labor market outcomes for those at the bottom of the income distribution (Autor et al. 2023). Prior to the pandemic, earnings growth at the bottom of the income distribution exceeded that in the middle and at the top of the distribution only in states that had a local minimum wage above the federal minimum wage (Autor et al. 2023). This may be especially relevant for people with disabilities. Employment rates for people with disabilities following the COVID-19 pandemic have grown differentially faster than for those without disabilities, reaching the highest relative rate on record (Bloom et al. 2024). Tight labor markets may contribute to this trend, as well as changes that help to reduce the extra costs associated with having a disability, such as greater flexibility around remote work (Bloom et al. 2024). Our findings therefore show that an expanding minimum wage may further contribute to improving well-being for some workers with disabilities, a group that has historically faced discrimination and systemic disadvantage in the labor market (Bellemare et al. 2023).

Importantly, our findings may lack external validity along two critical dimensions. First, we only study nonprofits that employ workers with disabilities through the AbilityOne program. These nonprofits represent a small subset of the labor market for workers with disabilities more generally. They may also be different from other employers of workers with disabilities as these nonprofits' objective function (and hence their decision-making) may be guided by a mission of employing and supporting workers with disabilities. Second, our findings focus on small minimum wage changes and may not generalize to policy considerations that would substantially increase the minimum wage. For example, legislators recently considered increasing the federal minimum wage from \$7.25 per hour to \$15 per hour as part of the American Rescue Plan of 2021. Additionally, the elimination of Section 14(c) of the Fair Labor Standards Act, and thus the subminimum wage, could lead to even larger wage increases for some workers: a worker with productivity of 20 percent would see their wage go up by a factor of 5; about 2.5 percent of people in our dataset, or 19 percent of the people paid subminimum wages, have productivity this low. In contrast, the largest one year state minimum wage increase in our dataset is \$2.15, which occurred in 2020 in New Jersey when the minimum wage increased from \$8.85 at the beginning of 2019 to \$11 at the beginning of 2020.<sup>24</sup> Our results therefore cannot speak to the effects of much larger minimum wage increases on labor market outcomes for workers with disabilities.

## CRedit authorship contribution statement

**Jiyeon Kim:** Writing – review & editing, Writing – original draft, Resources, Methodology, Investigation, Conceptualization. **Michael Levere:** Methodology, Writing – review & editing, Writing – original draft, Resources, Investigation, Formal analysis, Data curation, Conceptualization. **Ellen Magenheimer:** Methodology, Writing – review & editing, Writing – original draft, Resources, Investigation, Conceptualization.

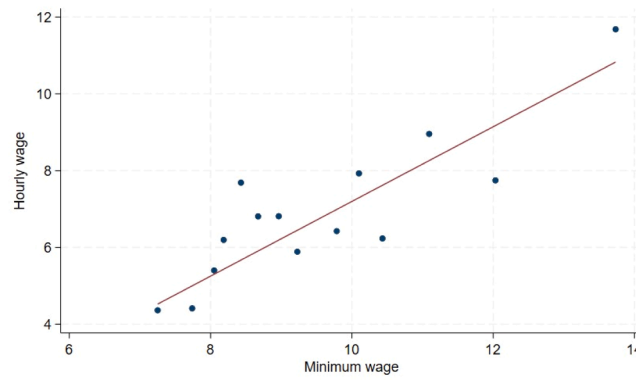
## Appendix

Figs. A1 and A2.

<sup>23</sup> Calculating the prevailing wage relies on the reported productivity data. However, as noted previously, the productivity data have some issues indicating it may not always be reliable. Using the paid wage is a simpler approach, even if it may be overly inclusive in terms of who is likely to be affected by a minimum wage change.

<sup>24</sup> Notably, this minimum wage change is not even included in our analysis because there was an intermediate wage change on July 1, 2019 to \$10.





**Fig. A1.** Correlation between minimum wages and hourly wages for those paid under Section 14(c)

Note: Presents bin scatter estimates demonstrating the relationship between the statutorily applicable minimum wage and the actual hourly wage paid among all workers in our sample who are paid under Section 14(c), thus meaning they are paid commensurate or subminimum wages.



**Fig. A2.** Impacts of minimum wage changes on nonprofit-level outcomes, triple-difference models

Note: Runs regressions as specified in Eq. (1). Each outcome is measured at the nonprofit level, with the regression then reporting an average across all nonprofits. Quarterly hours per worker is top-coded at the 99th percentile. The worker average wage calculates the mean hourly wage across all workers employed by the nonprofit in each quarter. The share affected by the minimum wage is based on the percentage of workers in each quarter who have a prevailing wage or observed wage at or below the minimum wage.

**Table A1**  
Nonprofit characteristics, by inclusion in dataset.

Variable	In data	Not in data
Total agency workforce (mean)	285	189
Average hourly wage, agency (mean)	\$9.55	\$7.52
Average hourly wage, AbilityOne (mean)	\$11.98	\$11.48
Total wages, agency (thousands, mean)	\$2465	\$875
Direct labor ratio, agency (percentage, mean)	85.3	88.3
Total contract revenues (thousands, mean)	\$12,289	\$4149
Total product revenues (thousands, mean)	\$2600	\$935
Total services revenues (thousands, mean)	\$9689	\$3214
Total AbilityOne revenues (thousands, mean)	\$9169	\$1880
AbilityOne share of revenues (percentage, mean)	60.7	40.3
Total number of nonprofits (count)	207	287

Note: Reproduces Table I.5 from [Levere et al. \(2017\)](#). Based on data from 2015Q4.

**Table A2**  
Impact of third-quarter minimum wage increases on nonprofit-level outcomes.

Outcome	(1)	(2)	(3)	(4)
<b>Panel A: Log number of workers at the nonprofit</b>				
Minimum wage increase	0.01 (0.03)	0.06 (0.06)	0.03 (0.08)	0.12 (0.10)
Variable average (unlogged)			108.4	
<b>Panel B: Quarterly hours per worker</b>				
Minimum wage increase	-5.54 (13.74)	12.10 (28.86)	-19.45 (35.60)	50.57 (44.70)
Variable average			349.2	
<b>Panel C: Worker average wage</b>				
Minimum wage increase	0.21 (0.17)	0.12 (0.35)	0.16 (0.43)	0.20 (0.54)
Variable average			10.81	
<b>Panel D: Share affected by minimum wage</b>				
Minimum wage increase	0.03*** (0.01)	0.14*** (0.03)	0.11*** (0.03)	0.19*** (0.04)
Variable average			0.11	
Number of nonprofit-windows			582	
Number of observations			4240	
Model	Difference-in-differences	DDD (adding extent nonprofit affected)	DDD, small increase ( $< \$1$ )	DDD, large increase (\$1+)

Note: Runs regressions as specified in [Eq. \(2\)](#), though rearranges nonprofit windows to be the two years surrounding the third quarter of a given calendar year. Only includes nonprofit-windows where either the minimum wage did not increase during the nonprofit-window or it increased in the third quarter of the second year (i.e., any nonprofit-window where the minimum wage increased in the first quarter of a calendar year is dropped from this analysis). Each outcome is measured at the nonprofit level, with the regression then reporting an average across all nonprofits. Quarterly hours per worker is top-coded at the 99th percentile. The worker average wage calculates the mean hourly wage across all workers employed by the nonprofit in each quarter. The share affected by the minimum wage is based on the percentage of workers in each quarter who have a prevailing wage or observed wage at or below the minimum wage.

**Table A3**  
Impact of minimum wage increase on nonprofit-level outcomes, varying extent nonprofit is affected.

Outcome	(1)	(2)	(3)	(4)	(5)	(6)
<b>Panel A: Log number of workers at the nonprofit</b>						
Minimum wage increase	0.01 (0.03)	0.01 (0.03)	0.03 (0.05)	0.02 (0.03)	0.05* (0.03)	0.04 (0.03)
Variable average (unlogged)			105.9			
<b>Panel B: Quarterly hours per worker</b>						
Minimum wage increase	15.86 (9.87)	10.94 (8.88)	41.99*** (15.96)	17.12* (9.42)	7.72 (8.83)	10.27 (11.14)
Variable average			325.6			
<b>Panel C: Worker average wage</b>						
Minimum wage increase	0.39** (0.15)	0.26* (0.14)	-0.29 (0.25)	0.27* (0.15)	0.33** (0.14)	0.16 (0.17)
Variable average			10.94			
<b>Panel D: Share affected by minimum wage</b>						
Minimum wage increase	0.07*** (0.02)	0.04*** (0.01)	0.10*** (0.02)	0.05*** (0.01)	0.06*** (0.01)	0.06*** (0.02)
Variable average		0.14			0.25	
Number of nonprofit-windows			1037			

(continued on next page)

Table A3 (continued)

Outcome	(1)	(2)	(3)	(4)	(5)	(6)
Number of observations			7513			
Model (how to define affected)	Main DDD estimate (at least 20 % with prevailing or paid wage below minimum)	Any with prevailing or paid wage below minimum	At least 75 % with prevailing or paid wage below minimum	Any paid below minimum	At least 20 % paid below minimum	At least 75 % paid below minimum

Note: Runs regressions as specified in Eq. (2). Each outcome is measured at the nonprofit level, with the regression then reporting an average across all nonprofits. Quarterly hours per worker is top-coded at the 99th percentile. The worker average wage calculates the mean hourly wage across all workers employed by the nonprofit in each quarter. The models vary in how they define the share affected by the minimum wage, and whether it is based on either the prevailing or observed wage (columns 1–3), or just the observed wage (columns 4–6).

Table A4

Impact of minimum wage increase on nonprofit-level outcomes, varying large/small definition.

Outcome	(1)	(2)	(3)	(4)
<b>Panel A: Log number of workers at the nonprofit</b>				
Minimum wage increase	0.00 (0.03)	−0.00 (0.04)	0.01 (0.04)	0.01 (0.03)
Variable average (unlogged)			105.9	
<b>Panel B: Quarterly hours per worker</b>				
Minimum wage increase	19.13* (10.83)	10.04 (14.05)	20.42 (12.43)	13.57 (11.43)
Variable average			325.6	
<b>Panel C: Worker average wage</b>				
Minimum wage increase	0.47*** (0.17)	0.26 (0.22)	0.41** (0.19)	0.37** (0.18)
Variable average			10.94	
<b>Panel D: Share affected by minimum wage</b>				
Minimum wage increase	0.03** (0.02)	0.11*** (0.02)	0.04** (0.02)	0.07*** (0.02)
Variable average			0.14	
Number of nonprofit-windows			1037	
Number of observations			7513	
Model	DDD, small increase ( $< \$1$ )	DDD, large increase (\$1+)	DDD, small increase ( $< 5\%$ )	DDD, large increase (5 %+)

Note: Runs regressions as specified in Eq. (2). Each outcome is measured at the nonprofit level, with the regression then reporting an average across all nonprofits. Quarterly hours per worker is top-coded at the 99th percentile. The worker average wage calculates the mean hourly wage across all workers employed by the nonprofit in each quarter. The share affected by the minimum wage is based on the percentage of workers in each quarter who have a prevailing wage or observed wage at or below the minimum wage. Large and small minimum wage increases are either defined in absolute terms (columns 1–2) or relative terms (columns 3–4).

## Data availability

The authors do not have permission to share data.

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