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Effects of the Minimum Wage on Employment of Young Adults with Cognitive Disabilities

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Abstract

This study analyzes, for the first time, the effect of increases in the minimum wage on the labor market outcomes of working age adults with cognitive disabilities, a vulnerable and low-skilled sector of the actual and potential labor pool. Using data from the American Community Survey (2008-2023), we estimated effects of the minimum wage on employment, labor force participation, weeks worked, and hours worked among working age individuals with cognitive disabilities using a generalized difference-in-differences research design. We found that a higher effective minimum wage leads to reduced employment and labor force participation among individuals with cognitive disabilities but has no significant effect on labor supply at the intensive margin for this group. Adverse impacts were particularly pronounced for those with lower educational attainment. In contrast, we found no significant labor market effects of an increase in the minimum wage for individuals with physical disabilities or in the non-disabled population.

Keywords: Minimum Wage, Cognitive Disability, Employment, Labor Market Outcomes, American Community Survey

JEL Codes: J14, J2

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I. Introduction

How minimum wages (MW) affect employment is among the most hotly debated questions in economics. Reviews of the substantial literature focusing on this question in the U.S. (Brown and Hamermesh, 2019; Wolfson and Belman, 2019) and in developed countries more generally (Dube, 2019; Dube and Lindner, 2024) found mixed results, with some studies finding positive effects and others finding negative effects. These review articles stressed the importance of focusing on subpopulations that are particularly vulnerable to changes in the MW, as studying broader populations can mask effects for subgroups of individuals most likely to be affected.

In the American Community Survey, in 2023 (the most recent year of data available) over 6.5 million non-institutionalized young working age adults (ages 21-49) in the U.S. were self-reported as having cognitive disabilities (CDs), defined by the U.S. Census Bureau as having serious difficulty concentrating, remembering, or making decisions (authors' calculations). Almost half (49%) of this group was employed in 2023, up from 33% in 2008. The corresponding figures for individuals without any reported disabilities were 81% in 2008 and 83% in 2023. Employment is important for individuals with cognitive disabilities because, in addition to income, it provides structure, identity, and participation in the community, and individuals with cognitive disabilities typically want to work (Gibson et al., 2022; Kocman & Weber, 2018; Almalky et al., 2020). Additionally, alternatives to work for this group can involve costly disability-related programs and services.

Individuals with CDs have key characteristics that make them likely to be affected by an increase in the MW—low educational attainment and high rates of employment in occupations

or industries that pay at, or close to, the MW.[1] Moreover, unlike many other low-wage workers, such as teenagers and women returning to the labor market after a long absence, these characteristics persist throughout the working-age years for individuals with CDs. For these reasons, changes in the MW might be highly consequential for this group.

The current federal MW of $7.25 has not increased since 2010, but many states have implemented large increases, and MWs currently (as of June 2025) exceed the federal level in 31 states. Particularly large increases took place after 2019, when the two U.S.-focused review articles cited above were published. Is it possible that the large increases in MW in recent years triggered large declines in employment among CD individuals?

This study investigates the effects of MWs on employment, labor force participation, and earnings of individuals with cognitive disabilities. We analyze annual data from the American Community Survey from 2008, the first year for which a consistent definition of disability was established, to 2023, the most recent year for which data are available, to estimate continuous treatment difference-in-differences and event study models. Both the time period studied, which coincides with large increases in state MWs, and the focus on a group of individuals that are particularly vulnerable to changes in the MW help us to detect employment effects that may exist and to focus on an important, understudied, and policy-relevant group. We also explore the extent to which state variations in sub-MW polices, which allow school and community organizations to bypass MW laws and pay lower wages to disabled workers, moderate the impact of MWs on labor market outcomes.

[1] According to the National Core Indicators (2023) survey, the most common occupations/industries in which individuals receiving disability services were employed were food service (25%), building and grounds cleaning or maintenance (20%), and retail trade (21%).

We find that a one dollar increase in the real MW led to a 2.5 to 5.1% decrease in employment among adults with cognitive disabilities and a 2 to 3.5% decrease in their labor force participation, with the larger of these impacts for those with lower educational attainment. We also find that a corresponding increase in the MW led to about a 1.5% decrease in employment among those in the labor force, but did not affect weekly hours worked or weeks worked per year among the employed. A causal interpretation of these results is supported by the event study analyses. We further find some suggestive evidence of stronger negative effects on employment and labor force participation in states with relatively greater utilization of sub-minimum wage provisions to hire eligible workers. Overall, these findings indicate that individuals who have a cognitive disability are adversely affected in the labor market by increases in the MW.

In Section II, Background, we discuss the relevant literature regarding the MW, especially as it applies to individuals with disabilities, and in particular, cognitive disabilities. A MW model is presented in Section III, Conceptual Framework. The primary data used in the statistical analysis, as well as other control variables, are described in Section IV, Data, while the Statistical Methods are reported in Section V. The Empirical Results for the effect of increasing the MW are reported in Section VI. The Summary and Conclusions from the analysis are presented in Section VII.

II. Background

Welfare considerations

Studies have found that employment mediates the association between disability status and poor mental health (Shields et al., 2023), that meaningful work is especially important to individuals with intellectual and developmental disabilities (Gilson et al., 2022), that there is

high job satisfaction among employed individuals with intellectual disabilities (Kocman & Weber, 2018), and that employment has a positive impact on self-respect and assurance among people with intellectual disabilities (Almalky, 2020). There is also evidence that working reduces loneliness (Emerson et al., 2023; Gomez-Zuniga et al., 2023) and that community engagement through work improves depressive symptoms among persons with disabilities (Green and Vice, 2017). Thus, employment effects of the MW potentially have important implications for the well-being of this vulnerable group.

Increases in the MW also have implications for tax revenues as well as public expenditures on health insurance and Social Security programs. Riley and Rupp (2015) estimated that average lifetime expenditures up to age 65 for Social Security disability programs, Medicare, and Medicaid for individuals with intellectual disabilities were about $500,000 (in 2012 dollars) compared to about $300,000 for individuals with other types of disabilities. In addition, for individuals with CDs, an alternative activity to work is participation in costly adult day programs. For example, current daily rates (2025) for such programs for individuals with developmental disabilities in New York State (NY State Health Department, n.d.) range from $72 to $870, with a mean of $233 per day. Assuming a 5-day week and 50 weeks per year, this translates to an annual cost of almost $60,000. If increases in the MW lead to increased employment of individuals with CDs, these figures could decrease while tax revenues and individual-level well-being of this vulnerable group increase. However, if increases in the MW lead to decreased employment of individuals with CDs, public coffers and individual well-being could take a toll.

MWs and employment

The 21st century has seen large increases in U.S. MWs at the state level and an increasing divergence between state MWs and the federally mandated MW.[2] In 2000, workers in 39 states plus Washington, D.C. faced MWs equal to the federal level of $5.15 and the other states had MWs above that level. An increase in the federal MW to $7.25 was phased in between 2007 and 2009, and the federal MW has remained at that level. As of 2025, 30 states plus Washington, D.C. have MWs above the $7.25 federal level and 15 of those states have MWs over twice that level. The relevant MW for a worker is the higher of the federal or state MW in the state in which the person works.

Substantial research has investigated effects of MW on employment. Three literature reviews on the topic, all published in 2019 (Brown & Hamermesh, 2019; Dube, 2019; Wolfson & Belman, 2019), and a more recent review (Dube and Lindner, 2024) have concluded that MWs appear to have positive effects on wages, but small negative or no effects on employment. Changes in employment due to higher MWs can reflect both changes in unemployment among those originally in the labor market and changes in the pool of people wishing to work. Higher MWs could induce entry into the labor force, if an individual's current potential wage is below their reservation wage, but they could also suppress participation through a discouraged worker effect wherein individuals with CD, who may already have difficulty finding work, believe (or are told) that it will become even harder to find employment at the higher wage rate (Mincer, 1976; Finegan, 1978). According to Dube and Lindner (2024), some studies have found that higher MWs increase labor force participation, while others found the opposite—that MW hikes decrease labor force participation, with no clear consensus.[3]

[2] See Appendix Table 1 for state, federal, and effective state MWs from 2000 through 2025.
[3] Mincer (1976) demonstrates how these labor force effects may depend, in part, on how the minimum wage jobs are allocated among the larger pool of potential applicants.

Most previous studies on the topic focused on groups of people that are particularly responsive to the wage changes (usually teens, restaurant workers or recent labor market reentrants), and most used data on MWs from the 1990s through the first decade in the 2000s, before the more recent large increases. As shown in Appendix Table 1, the average effective nominal MW has increased almost 70% since 2008.

Brown and Hamermesh (2019) questioned the policy relevance of focusing on teens, who are mostly temporary low-wage workers and are largely unmarried and living with their parents. If MWs are meant to impact poor households or particularly vulnerable populations, focusing on teens may produce statistical significance without providing strong policy relevance. That said, however, there could be positive psychological effects and on-the-job training aspects of employment among teenagers that should be considered. In assessing why employment effects of MWs appear to have fallen over time, Wolfson and Belman (2019) pointed to teens accounting for a declining share of the labor force and structural changes that substitute capital for low-skilled labor that made fewer employees of restaurants sensitive to MW changes.

No previous studies of the effects of MWs on employment have identified a group of individuals that is likely in the long-term to have low skills/productivity and low income, for whom the MW is highly salient, and for whom the alternative to employment is often taxpayer-funded income support over a long period of time. Individuals with CDs have been a largely overlooked segment of the population but represent a vulnerable and highly policy relevant group. Many individuals with CDs are able and want to work (e.g., National Core Indicators, 2014), and policies that affect wages, labor force participation, and employment of this group during the working age years could have substantial implications for public expenditures.

Individuals with CDs represent a small but growing fraction of the young-to-middle adult population in the U.S. In 2023, about 6.5 million adults ages 21 to 49 years (5.5% of this population) reported having a CD. That fraction grew by over 40% (from 3.8% to 5.5%) between 2008 and 2023 (authors' calculations from the American Community Survey). This trend tracks with documented increases in children's developmental disabilities over past five or more decades (Halfon et al., 2012), which is not surprising since developmental disabilities are lifelong (Zablotsky et al., 2019). As such, the labor market participation of individuals with CDs can potentially span four or more decades and have substantial impacts on individuals, families, and public coffers.[4]

Sub-MWs

Individuals with significant impairments may be exempt from state MWs due to potential eligibility for a sub-MW under section 14(c) of the Fair Labor Standards Act. The majority of 14(c) workers are employed by community and school (non-profit) groups that are not subject to MW laws, which can then provide labor to firms via subcontracts.[5] If the use of the sub-MW reflects greater flexibility of firms to substitute sub-MW workers for others, we would expect that an increase in the MW would dampen the impact on employment of individuals with disabilities in states where the sub-MW is more widely used. An alternative possibility is that

[4] Data from the 2008-2023 American Community Survey on the fraction of the young adult population with a CD by age are consistent with the fact that most adults with CDs have had lifelong disabilities; the fraction at age 49 is only 9% greater than that at age 21 (authors' calculations). In contrast, the fraction having a physical or sensory disability (but not a cognitive disability) is very low in early adulthood, but rises steeply at greater ages, with rates four times greater for those age 49 compared to those age 21.

[5] The 14(c) program has been a target of reform. Disability rights organizations have expressed opposition to sub-MWs, and the U.S. Commission on Civil Rights (2020) proposed a phase-out of the program in all states. The number of employees covered by the 14(c) program has fallen by about 90% since 2001, with fewer than 41,000 people covered in 2024 (Barnes, 2024) and 16 states have enacted laws to eliminate or phase it out (APSE, 2024). The states are Alaska, California, Colorado, Delaware, Hawaii, Maine, Maryland, Nevada, New Hampshire, Oregon, Rhode Island, South Carolina, Tennessee, Vermont, Virginia, and Washington. In addition, Vermont, Wyoming and Washington DC had no anti sub-MW legislation but did not have any active participants in 2024.

states that rely more on 14(c) contracts are generally less disability friendly; in those states, an increase in the MW could have stronger effects on employment of individuals with CDs—for individuals who can't be hired under 14(c).

Labor market considerations for individuals with CDs

Despite numerous programs designed to transition disabled youth into adult labor force participation (Dean et al. 2019), only about half of individuals with CDs are employed (authors' calculations from the American Community Survey). On the demand side, AlFozan and AlKahtani (2021) found that low job skills and social skills, along with costs of regulatory compliance (e.g., with the Americans with Disabilities Act), discourage employers from hiring individuals with CDs. In a review of the literature, Nagtegaal et al. (2023) identified the most common barriers to employers hiring individuals with disabilities: expectations of low productivity, expectations that these hires will be costly, and lack of knowledge about disabilities. Thus, MW hikes could make hiring individuals with CDs more costly. However, Lindsay et al. (2018) found that hiring workers with disabilities for low wage jobs produces net benefits, due to lower turnover and greater reliability, punctuality, and work ethic of individuals with disabilities, including CDs, compared to workers without disabilities. There is also potential employer selectivity; i.e., employers may be more likely to hire workers with CDs for jobs in which their disability is least costly or most beneficial to the firm.

From a supply side perspective, Ali, Schur, and Blanck (2011) reported that non-working individuals with disabilities in the U.S. are as eager to work as those with no disabilities. Specifically, using data from a special module in the 2006 General Social Survey, they found that 80% of non-employed people ages 18-64 with disabilities would like to work in the present or future, compared to 78% among non-employed same-age non-disabled people, and that the rate

was especially high among people with mental impairments (90%). Additionally, Lindsay et al. (2018) found that people with CDs generally want to work and find work to be valuable, attainable, and important. In a review of the disability literature, Nord et al. (2013) concluded that most adults with intellectual/developmental disabilities "seek economic independence and self-sufficiency and include employment in the community among their top stated goals" (p. 376).

However, many individuals with CDs have low skills and thus may have low reservation wages, suggesting that the incentive to join the labor force resulting from an increased MW may not be as strong as for their non-disabled peers. Additionally, individuals with CDs may be more likely to become discouraged from participating in the labor market due to difficulties finding and retaining work (Qian, 2018). This discouraged worker effect is consistent with findings reported by Ali, Schur and Blanck (2011) that non-working individuals with disabilities were twice as pessimistic about finding a job compared to those without disabilities. Finally, over half of young adults with CDs receive health insurance through Medicaid and over one-third receive income from Social Security, both of which are means-tested programs (authors' calculations from the American Community Survey).[6] Increases in the MW could induce recipients to work fewer hours or leave the labor force altogether in order to maintain their public income support and health insurance coverage.

III. Conceptual Framework

We assume that workers are homogeneous, except that some have cognitive disabilities and others do not. Assume that there are two employment sectors: employment covered by the

[6] The two Social Security benefits programs for disabled adults are Supplemental Security Income (SSI) and Social Security Disability Insurance (SSDI). Adults with CDs may also be covered under their parents' health insurance programs and receive income support from their parents and other relatives.

MW and non-covered activities (including non-covered jobs, self-employment, illegal employment, and home production activities). There is a downward sloping demand curve for CD labor in the covered sector, where the elasticity of this curve is a function of the elasticity of substitution between workers with Cs and all other factors of production, among other determinants. An increase in the MW above the prevailing wage reduces the demand for workers with CDs in the covered sector. As a result, the higher MW reduces employment.

There is an upward rising supply of workers with CDs in the covered sector where higher wages for workers with CDs attract them from the uncovered sector. At a higher wage, the supply of workers with CDs in the covered sector would increase along the supply curve if they could all obtain employment at the MW. But, at the higher MW, the potential supply of workers with CDs exceeds the demand. The labor force (i.e., the employed plus the unemployed) of the workers with CDs may either increase or decrease depending on how the now scarcer MW jobs are allocated. For example, if the individuals with CDs who get the job on day one would retain them forever and those who do not get the job would otherwise never get the MW job and thus become discouraged workers (drop out of the covered labor force), the size of the labor force with CDs shrinks. On the other hand, if the limited number of jobs are reallocated every day randomly among the larger number of applicants with CDs and those applicants are risk neutral, then the supply of labor would be determined by the expected wage. If a worker who does not gain employment in the covered sector can retreat to the uncovered sector (including home production), the uncovered sector "wage" serves as a floor to their wage rate. The MW increases their expected wage.[7] This can induce an increase in labor force participation among individuals with CDs.

[7] If w_o is the original wage, w_m the minimum wage, and p is the probability of receiving the minimum wage, then after the minimum wage is introduced or increased, the expected wage is $E(w) = pw_m+(1-p)w_o$ which is greater than

Alternately, individuals with CDs may reduce their labor supply in response to a higher MW if the resulting increase in earnings would reduce their eligibility for public benefits. Low wage workers may not have the flexibility to reduce their work hours if necessary to maintain eligibility, or they may feel that the number of hours they would be allowed to work to maintain eligibility is not worth the fixed costs of holding down a job.

Thus, a priori, the increase in the MW would be expected to decrease employment and may increase measured unemployment, but the net impact on the size of the labor force would be ambiguous.

IV. Data

The empirical analysis is based on annual data from the American Community Survey (ACS) from 2008 to 2023 (the most recent year available), focusing on young adults with CDs ages 21 to 49 years. Advantages of the ACS are that it provides ample annual observations for each state and consistent definitions of disabilities. We exclude young adults who are in institutions (mostly correctional institutions) since the ACS (and other US Census data sets) presumes that those individuals cannot participate in the labor market and does not ask about their labor force activities. The ACS uses five categories of disability—cognitive, ambulatory, independent living, self-care, and vision or hearing difficulty—and assesses them with questions about whether the individual has specific types of impairments, as described in Appendix Table 2. If the respondent indicated "yes" to the question about cognitive difficulty ("Because of a physical, mental, or emotional condition, does this person (or you) have serious difficulty concentrating, remembering, or making decisions?"),[8] we coded them as having a CD and

w_o as long as $p>0$ and $w_m>w_o$. Under these conditions, labor force supply increases for risk neutral or risk preferring workers when the minimum wage is increased.

[8] A knowledgeable household member may answer on behalf of another in the household if that person is unable to respond.

limited our analysis to young adults in this group. As a test of robustness of our findings, we also separately examine individuals with ambulatory or sensory (hearing or vision) disabilities and those with no disabilities.

MW data, shown in Appendix Table 1, were obtained from the U.S. Department of Labor Wage and Hour Division (2025a). States may set their own MW, but employers are not allowed to pay most workers less than the federal amount.[9] Thus, the effective MW is the higher of the state or federal MW. The federal minimum was $5.85 in 2008, and phased in an increase over two years to $7.25 in 2010, where it has remained. By 2023, 31 states plus DC had MWs above the federal level, and the average effective minimum was over 50% higher than in 2008. For our main analyses, we focus on the real MW, deflated by the consumer price index (in 1982-1984 dollars) as reported by the Bureau of Labor Statistics, but we also present results based on the nominal MW and the relative MW (relative to the median hourly wage rate in the state) to assess robustness.

We use individual-level labor force variables and sociodemographic variables as reported in the ACS. Labor market outcomes include employment status, labor force (employed or unemployed) status, usual hours worked per week, annual weeks worked per year, and annual wage income. To approximate the share of the affected population, we construct a measure of whether working individuals earned wages at or near the MW, which we approximated as <= 1.25 times the effective MW in their state in a given year. The sociodemographic variables include age, marital status, education (years of schooling), sex, race, Hispanic ethnicity,

[9] There are exceptions for some specific types of workers such as tipped employees, full-time students, youth during their first 90 days of employment, and disabled workers covered under the 14(c) program. However, MWs apply to the vast majority of jobs and workers.

residence in different metro area types, and residence in group quarters (see Table 1 for specific race and metro area categories).[10]

We augmented the individual-level data from the ACS with state/year demographic, economic and policy variables and COVID death rates.[11] The demographic, economic, and policy variables include population, recipients of the Supplemental Security Income (SSI) program, whether the state had a refundable Earned Income Tax Credit (EITC) and the generosity of the EITC, poverty rate, unemployment rate, and personal income per capita.

Cognitive disabilities are the most prevalent type of disabilities among young adults (Appendix Table 2). Rates of cognitive disability in the population are relatively stable during the young adult years (between 4 and 5 percent), while rates of physical or sensory disability increase four-fold between the ages of 21 and 49 from about 1.7 percent to nearly 6.5 percent (Figure 1). The stability of the rates of cognitive disability, but not of physical or sensory disabilities, during the working age years provides indirect evidence that cognitive disabilities reflect developmental disabilities that originate early in the life course, whereas physical or sensory disabilities reflect events or circumstances that take place in adulthood. This also suggests that reported CDs are exogenous to the MW and to labor market circumstances.

Table 1 shows sample characteristics of those with CDs and with no disabilities, overall and for subsamples with less than a college undergraduate degree. Among those ages 21 to 49, the mean age and sex composition of those with a CD are similar to those of individuals with no disability. About 4.4% of individuals with CDs live in group quarters (mainly group homes),

[10] Institutionalized individuals are not included in the ACS. We include non-institutionalized individuals resident in group quarters (e.g., college dormitories) because individuals with that living arrangement may make different employment decisions compared to individuals residing in private residences.

[11] State/year demographic, economic and policy variables were obtained from the University of Kentucky Center for Poverty Research (2025, Jan.). Data on cumulative COVID death rates were obtained from https://covid.cdc.gov/covid-data-tracker/#trends_totaldeaths_select_01.

compared to 0.9 percent for the non-disabled. The average educational attainment for those with a CD is 12.0 years, lower than the 13.7 years for those with no reported disability.[12]

Over our time frame, only about 35% of young adults with CD were employed at the time of the survey, compared to about 80% of those with no disability. Among those with a CD who worked, the proportions that worked part of the year and that worked part-time were higher than the corresponding figures for those with no disability. Individuals with CDs had lower annual earnings compared to those with no disability.[13] Almost 50% of those working earned at or near the MW.

Notably, working age individuals with CDs have low levels of education, income, and employment, and are more likely to work in industries or occupations that pay at or close to the MW than their non-disabled counterparts, and therefore represent a group for whom changes in MWs would be consequential. For both individuals with CDs and those with no disabilities, labor force engagement, employment, and wages are lower for the less educated group than for the respective full samples..

V. Statistical Methods

The empirical analysis uses the 2008 to 2023 microdata for non-institutionalized people ages 21 to 49 and a reduced-form model that directly links the state-level MW to employment (and other labor market outcomes). The research design is a continuous treatment difference-in-differences (DiD) approach, estimated via a standard two-way fixed effects (TWFE) setting, and leverages variation in the effective MW across states over time. This variation comes from both state-level legislated increases as well as the most recent graduated federal increase that occurred

[12] About two thirds of those with a CD have a high school education or less compared to 39% for those with no reported disability (not shown).
[13] They were also far more likely to be poor or near-poor (authors' calculation from ACS data, not shown).

over 2007-2009. For each labor market outcome, we estimate the following regression specification:

$$E_{ist}|_{CD} = \delta MW_{st} + X_{ist}\Gamma + Z_{st}\Psi + \alpha_s + \tau_t\,[+\,\gamma_r * \tau_t] + \varepsilon_{ist} \qquad (1)$$

In equation (1), *E* denotes employment, and alternately, other measures of labor market activity (labor force status, earnings, hours worked, and weeks worked) for the i^{th} individual in state *s* and measured in survey year *t*. For our main analyses, the sample is restricted to relatively young adults (ages 21-49) with CDs.[14] *MW* is the average effective real MW over periods *t* and *t-1*; we use this two-year window since the ACS does not disclose information on the month of interview and this parameterization captures exposure to the MW that would be in effect over the past 12 months for the average respondent. The vector *X* represents individual characteristics of the respondent including age, gender, race and ethnicity, marital status, educational attainment, and residential information, and *Z* represents a set of time-varying, state-level economic and concurrent policy factors relevant for individuals with CDs over the sample period (see Table 1). Equation (1) also includes year (τ) and state (α) fixed effects to account for unmeasured secular trends and static state-specific heterogeneity. Statistical inferences are based on standard errors that are clustered at the state level to account for correlated errors across individuals and over time within states.

We extend these baseline analyses in various ways to address specific issues. First, we add region-specific year effects ($\gamma_r * \tau_t$) to control for unobserved common shocks experienced by states within Census regions. With these region-by-year fixed effects, the counterfactuals for the treated states are restricted to be within the same Census region ("proximate controls"). If

[14] We confirm that this does not result in endogenous stratification, as the MW is not associated with CD classification. Among all working-aged adults (ages 21-49), the coefficient of the real MW in a model where CD classification is the outcome is 0.00016 (p-value = 0.72); among lower educated adults, the corresponding coefficient is 0.0007 (p-value = 0.27) (results not shown).

geographically proximate states are better counterfactuals, this may yield more credible estimates; otherwise, if the restriction results in worse counterfactuals, this would exacerbate bias. In light of these tradeoffs, we examine the sensitivity of our main estimates from equation (1) to including the region-by-year fixed effects.

Next, we undertake several approaches to assess the common trends assumption underlying our identification strategy. This assumption may be violated if state-specific time-varying unobservable factors drive changes in both the MW and labor market outcomes. We first implement a standard event study framework to detect any concerning deviations in outcome trends between the treated and comparison states while also exploring dynamic effects. Specifically, we utilize the recently proposed approach in Schmidheiny and Siegloch (2023) for specifying an event-study analysis in the context of a continuous treatment, and estimate the following specification:

$$E_{ist}|_{CD} = \sum_{j=\underline{J}}^{(-2,-3)} \pi_j D_{st}^j + \sum_{j=(0,1)}^{\bar{J}} \emptyset_j D_{st}^j + X_{ist}\Gamma + Z_{st}\Psi + \alpha_s + \tau_t \,[+\gamma_r * \tau_t] + \varepsilon_{ist} \qquad (2)$$

As before, *t* denotes the survey year, with *j* representing event time, and D_{st}^j representing the state-by-year variables equal to the difference in the real effective MW between years *t* and *t-1*, that is *j* periods from the change in the MW. Event-time j = -1, corresponding to the survey year prior to the treatment, is the reference period, and the coefficient is set to zero in that period to normalize the estimates of π_j. Estimates of π_j that are close to zero in magnitude and statistically insignificant would support the common trends assumption.[15]

Recent developments in the DiD literature point to potential bias in the TWFE estimates of π_j and $\emptyset_j$ in equation (2) in the presence of treatment effect heterogeneity across time and/or

[15] We utilize two-year bins to minimize noise and any mechanical correlation in the MW changes over adjacent periods (due to our main measure being an average over periods *t-1* and *t*).

across treated cohorts (Goodman-Bacon, 2021; Sun & Abraham, 2021). To address this possibility, we also apply the approach proposed by de Chaisemartin and D'Haultfoeuille (dCDH) (2024), which is robust to potential biases from heterogeneous and dynamic treatment effects. A limitation, however, is that the treatment needs to be binned (rather than allowed to be fully continuous) in order to form appropriate counterfactuals whose treatment intensity remains unchanged over the sample period. For our binned treatments, we group them in increments of $0.50.

Finally, we assess heterogeneity in treatment effects across individual sociodemographic characteristics (age, gender), by disability status (cognitive, ambulatory/physical, no disability), and by state-level utilization of the sub-MW. For the analyses of use of the sub-MW, we used data provided by U.S. Department of Labor (2025b), which lists each current 14(c) certificate holder, along with the address and the number of employees covered. The oldest available data were compiled for October of 2021 (i.e., data were not available for periods prior to October 2021). We used data from that archive to calculate total of sub-MW workers by state and construct a state-specific rate of the number of sub-MW employees per population of adults with CDs ages 18-49. We coded states as having a high level of sub-MW usage if the rates in those states were above the state median and as having a low rate of sub-MW usage if the rate was at or below the state median. In order to preserve power, we assess differential effects through interaction terms rather than stratifying the sample.

VI. Empirical Results

Our main findings are reported in Tables 2 through 4 and Figures 2 through 4. Supplemental analyses and robustness checks are presented in appendix tables.

Table 2 presents estimated effects of the real MW on employment among young adults with CDs, based on equation (1). We start with a broad sample of all such adults without any further sample restrictions and a parsimonious specification that includes state-level policy factors but excludes state-level economic measures. The tradeoff with including state economic factors is that they may help to address confounding effects of the local economic cycle but could also be endogenous mediators or act as "bad controls." Model (2) subsequently assesses robustness to including these latter measures, and model (3) further controls for the cumulative COVID-19 death rate. Across these specifications, the point estimates are largely similar, and reveal that a one dollar increase in the real MW leads to approximately a 0.9 to 1 percentage point decrease in employment (~2.5 to 3% relative to the outcome mean).[16]

These effects are "reduced form" and should be interpreted as intention-to-treat (ITT) since only 47% of these individuals (when they work) tend to earn at or close to the MW. Under the assumption that this sub-group of close-to-MW earners is the treated population that would be most impacted by any shifts in the MW, we can inflate the ITT effect to derive a crude estimate of the effect of the treatment-on-the-treated (TOT) of ~1.9 to 2.2 percentage point decline in employment (~5.2 to 6.3% of the mean).

To further focus on the "treated" population while recognizing that not all working-aged adults with CDs are impacted by the MW, we restrict the sample to individuals with less than a college education (model 4). Expectedly, a somewhat larger share of workers in this group (53%) earns at or close to the MW and we find a larger employment response (model 4)—a 1.6

[16] Over the pandemic period (2020 and 2021), 26 states and D.C. increased their MW. While initial SSDI claims have been found to be countercyclical (Maestas et al. 2015, 2021), this relationship changed during the COVID-19 recession when applications did not increase but rather remained flat or even experienced a small decline. In order to bypass any such confounding effects of the pandemic and the post-pandemic recovery period, which may not be perfectly captured by the state economic factors, COVID-19 mortality rates, and/or period fixed effects, all models were re-estimated deleting 2020 and subsequent years. The estimates remained robust both in terms of effect magnitudes and statistical inference (not shown).

percentage point (5.1%) decline in employment associated with a one dollar increase in the MW.[17]

All estimates discussed thus far capture effects at the employment vs. non-employment margin, where non-employment means being unemployed or not in the labor force. A non-negligible subset of adults with CD is unattached to the labor market and has little to no work history; Siperstein, Parker and Drascher (2013) reported, based on a Gallup poll, that 28% of adults aged 21-64 with an intellectual disability had never worked.[18] Given their weak attachment to the labor force, these adults would not be expected to be affected by the MW. In an attempt to remove this sub-population of "never takers" and specifically estimate effects at the employment vs. unemployment margin, we further restrict the sample to individuals who are in the labor force (models 6 and 7) and, alternatively, those who are currently in the labor force and also had some work history over the past five years (model 9). We continue to find a significant reduction in the likelihood of being employed, though the employment effect is now smaller in magnitude (0.9 percentage point decline conditional on labor force participation, compared to the 1.6 percentage point decline vis-à-vis the employment vs. non-employment margin). This pattern of smaller effect sizes when conditioning on being in the labor force indicates that the MW increase is not only leading to job loss but that it is also leading some adults with CD to drop out of the labor force, a mechanism we explore more directly below.

We also estimate models that include region-by-year fixed effects (Table 2, models 5, 8 and 10) to control for unmeasured time-varying common shocks experienced by states in the same Census region and to restrict counterfactuals to be drawn from geographically proximate

[17] The implied TOT effect among this subset with lower educational attainment is approximately a 3 percentage point decline (9.5%).
[18] In the ACS sample of non-institutionalized working-aged adults (ages 21-49) with CDs, approximately 39% do not currently work and have not worked in the past five years.

states. We find very similar estimates compared to specifications that exclude these fixed effects, suggesting that the choice of counterfactuals across these alternate scenarios has little impact on the estimates.

We utilize the real MW for our main models, but also report results based on the nominal MW or the "relative MW," which normalizes the nominal MW by the median wage rate in the state (Card 1992; Clemens 2016; Wehby et al. 2020) (Appendix Table 3).[19] The rationale underlying this relative measure is to capture variation in the "bite" of the MW; if the median hourly wage rate in a state substantially exceeds the effective MW, then the MW is less binding as a price floor and may elicit smaller responses on labor demand and supply. Estimates in Appendix Table 3 show that our findings are not sensitive to how the MW is parameterized.[20]

Figures 2, 3, and 4 visually present estimates from the continuous treatment event study analyses, based on equation (2). Results from the standard TWFE analyses are presented in Figure 2, those from the standard dCDH event study analyses are presented in Figure 3, and those from the dCDH event study analyses that adjust for compositional changes in the identifying states over time (ensuring that the same states contribute variation in identifying each of the estimated lags and leads) are presented in Figure 4. While the dCDH-based estimates are

[19] We use data on annual earnings, weeks worked, and hours worked from the ACS to compute the implied hourly wage rate for all employed individuals. We divide the state's legislated MW by the start-of-sample (2007) median wage. In utilizing this time-invariant baseline measure of the median wage rate, we are bypassing any potential endogeneity concerns from the median wage rate in the state being affected by the MW. Results are not materially altered by using a time-varying measure of the state's median wage rate.

[20] Note that the coefficient magnitudes in Appendix Table 3 are expectedly different due to differences in the scale of the treatment across measures of the real, nominal, and relative MW. Standardizing these responses to an elasticity yields largely similar effects. For example, the estimated employment elasticities for the real, nominal, and relative MW among lower educated adults with a CD (model 1 in Appendix Table 3) are -0.172, -0.143, and -0.137 respectively.

expectedly less precise and lower powered than the TWFE estimates,[21] the findings are qualitatively consistent across the two approaches and across the dCDH specifications.[22]

Together, results from the event study analyses underscore three points. First, our estimates in the pre-treatment period do not indicate any substantial or significant deviation in trends between the treated and comparison groups and are consistent with the common trends assumption; the lead effects are individually and jointly insignificant in all cases and strong declines in employment only materialize subsequent to the MW increase. This suggests that the employment practices of employers with respect to workers with CD did not respond in anticipation of increases in the MW. Second, the negative employment response to a higher MW appears to become stronger over time. Such dynamic effects are consistent with employers needing time to adjust factor inputs in response to the higher MW and using attrition to reduce CD employment. Third, the common trends assumption is supported, and estimates are very similar, in models that exclude vs. include the region-by-year fixed effects; the credibility of our counterfactual assumption is thus not sensitive to region-specific time varying shocks.

Estimates in Table 2 show consistent evidence that a higher MW induces job-loss among adults with CDs, driven by shifts from employment to unemployment; again, the stronger responses at the employment to non-employment margin suggest that there are also net MW-induced declines in labor force participation. We assess responses on labor force participation

[21] This is consistent with Hollenbach and Egerod (2024) who draw attention to the increase in variance and low statistical power in the new DiD estimators due to their greater flexibility.

[22] In order to accommodate a continuous treatment, the dCDH estimator requires binning of the treatment variable; we bin the MW into increments of $0.50. Results are robust to utilizing larger bins but noisier when we utilize smaller bins (which leads to too many treatment categories). The point estimates of the average treatment effect for the treated states in Panel C are somewhat larger than the TWFE estimates; assuming linear effects and normalizing to a $1 increase in the real MW, the dCDH estimates indicate decreases in employment among the lower educated sample on the order of 1.9 to 2.2 percentage points, and declines in employment conditional of labor force participation and having working the past 5 years on the order of 2.0 to 4.4 percentage points. This pattern is consistent with dynamic heterogeneity leading to possible downward bias in the TWFE estimates. Corresponding estimates for labor force participation (Panel D) imply declines of about 0.7 to 1.6 percentage points.

more directly in Table 3, along with potential impacts on other labor market outcomes. Estimates in models 1-5 point to a higher MW having a significant and a somewhat stronger negative effect on labor force participation than on employment; for example, among lower-educated adults with CDs, a one dollar increase in the MW results in a 1.1 to 1.4 percentage point decline in labor force participation (~ 2.7-3.4% relative to the outcome mean). In comparison, the shift from employment to unemployment for a corresponding MW increase ranged from 0.8 to 0.9 percentage points (~ 1% change relative to the outcome mean) (Table 1).

The MW-induced decline in labor force participation may reflect two potential channels: (1) a higher MW may lead some workers who experience job loss and have difficulty finding employment to drop out of the labor market ("discouraged worker effect"); (2) if labor supply cannot adjust at the intensive margin (weeks or hours worked), some adults with CDs may voluntarily choose to drop out of the labor market in response to a higher MW for fear of losing means-tested public support (i.e. Medicaid, Supplemental Nutrition Assistance Program [SNAP], SSI/SSDI). Both channels may be particularly pronounced for adults with CDs and explain why the MW-induced declines in labor force participation in this group are in stark contrast with the broader MW literature, which has generally not found strong effects on labor force participation for groups other than teens (Dube and Lindner, 2024).[23]

We do not find any meaningful effects of MW increases at the intensive margin. Table 2 models 6 and 7 report estimates for hours worked and weeks worked, conditional on employment; these are small and statistically insignificant. We find a significant MW-induced reduction in earnings (model 8), although the effect is almost entirely driven by job loss; conditional on being employed, there are no significant effects of MW increases on wages.

[23] Theoretically, even if there are negative employment effects, an increase in the MW could increase labor force participation if the MW is binding but the higher expected wage attracts workers to seek covered employment.

We assess differential effects on employment and labor force participation by age and disability status in Appendix Tables 4 and 5, respectively. We find generally stronger MW responses at younger ages (ages 21-35), which may be driven by a much larger share of this population earning at or close to the MW. When considering disability status, employment and labor force participation rates are higher among adults with physical disabilities compared to those with a CD. We find that among the disabled the strongest adverse effects on employment and labor force participation are among individuals with CDs. Among adults with ambulatory or physical disabilities, there is a significant but much weaker effect on labor force participation and no significant effect on employment. Some of these differences may be explained by the fact that a much larger portion of adults with CDs are "treated" given that they earn at or close to the MW (53% of those with CDs, vs. 41% of those with physical disabilities). We also find no meaningful or large adverse effects on labor market outcomes for individuals with no disabilities – largely mimicking the general population findings in the literature.[24] In results not shown, we found significant negative effects of the minimum wage on employment for males but not females, but the estimates for males and females were not significantly different from one another.

Finally, we assess heterogeneity in the MW effects across states based on firms' utilization of the sub-MW, 14(c) program. Reported in Table 4, the point estimates suggest that the adverse effects of a higher MW are generally present for states with both relatively high and relatively low utilization of the sub-MW. Although the responses tend to be larger in states with higher utilization of the sub-MW provisions, the differences are not precise enough to reject the null hypothesis of equal coefficients.

[24] For teens (ages 16-19), we find a significant 1.8 percentage point decline in employment over our sample period. That our specifications uncover significant adverse effects for teens and little-to-no adverse effects for the general population of adults is largely consistent with the literature and adds a degree of confidence to the estimates that these models uncover for the sub-population of working-aged adults with CD.

VII. Summary and Conclusions

This is the first study of the effects of the minimum wage on the labor market outcomes of people with cognitive disabilities, a sizeable group that faces substantial barriers to employment but is generally able and willing to work. The share of the working age population with cognitive disabilities has increased over time and is now at about 5 percent, but unlike physical disabilities, cognitive disabilities are largely lifelong and therefore present throughout individuals' working-age years. We focused not only on employment, but also on labor force participation, which has rarely been a focus of studies on labor market effects of the minimum wage.

Our study bridges two distinct literatures. First, it contributes to the literature on costs of disability to taxpayers, by focusing on individuals with lifelong impairments rather than disabilities acquired in later adulthood. Second, it contributes to the literature on labor market effects of the minimum wage by focusing on a vulnerable group that has not previously been studied, one that faces barriers to work throughout the working-age years. All told, the interaction between cognitive disability and the minimum wage in shaping labor market outcomes has important implications for individuals, families, and society.

We found that an increase in the effective minimum wage leads to decreases in employment and labor force participation among individuals with cognitive disabilities, and that the negative effect is greater the lower their level of schooling, presumably reflecting their lower labor market productivity. Specifically, we found that a one dollar increase in the minimum wage leads to a 2.5 to 5.1 percent decrease in employment among those with a cognitive disabililty, and a 2.0 to 3.5 percent decrease in their labor force participation, with stronger **e**ffects for younger adults than for those in the relevant age range who are older. The effects occur primarily

at the extensive margin, as we found significant effects of the minimum wage on employment and labor force participation, but not on hours or weeks worked conditional on employment. Finally, the effects appear to be larger in states that relied more heavily on subminimum wages for disabled individuals, although those differences were not statistically significant.

Our measure of cognitive disability was based on self or proxy reports rather than clinical assessments. That said, the same measure is used in all US Census datasets (American Community Survey, Current Population Survey and Survey of Income and Program Participation) and provide national statistics. Another limitation is that some of the increases in cognitive disability over time could reflect changes in reporting, although others have found that changes in reporting cannot explain the large increases in children's developmental disabilities (which are lifelong) in the U.S. over the past 50+ years (Halfon et al., 2012). Finally, it was not possible to disentangle mechanisms underlying the negative effects of the minimum wage on employment of individuals with cognitive disabilities—i.e., whether the effects reflect having more difficulty in finding or retaining employment (and, if so, whether demand or supply side forces are responsible) or from a feared loss of access to public programs from a higher income.

The results from this study suggest that interventions to facilitate employment of individuals with cognitive disabilities could yield substantial benefits to individuals and their families, while increasing tax revenues and potentially lowering expenditures for public assistance. Dean et al. (2019) found that programs that transition disabled youth from school to work are effective in increasing both employment and earnings, and estimated a 30% rate of return in a Virginia program they evaluated. However, fewer than 10% of all disabled students receive such transition services (Kolodner, 2025), suggesting substantial unmet need. Additionally, McInnes et al (2010) found that job coaching services for adults with intellectual

and related disabilities in South Carolina more than doubled the odds of obtaining a stable job compared to those for eligible individuals who did not receive the services. The desire to work on the part of individuals with cognitive disabilities, their ability to work with appropriate supports, and their decades of potential labor force participation suggest that the net benefits could be substantial if these types of interventions were more broadly implemented.

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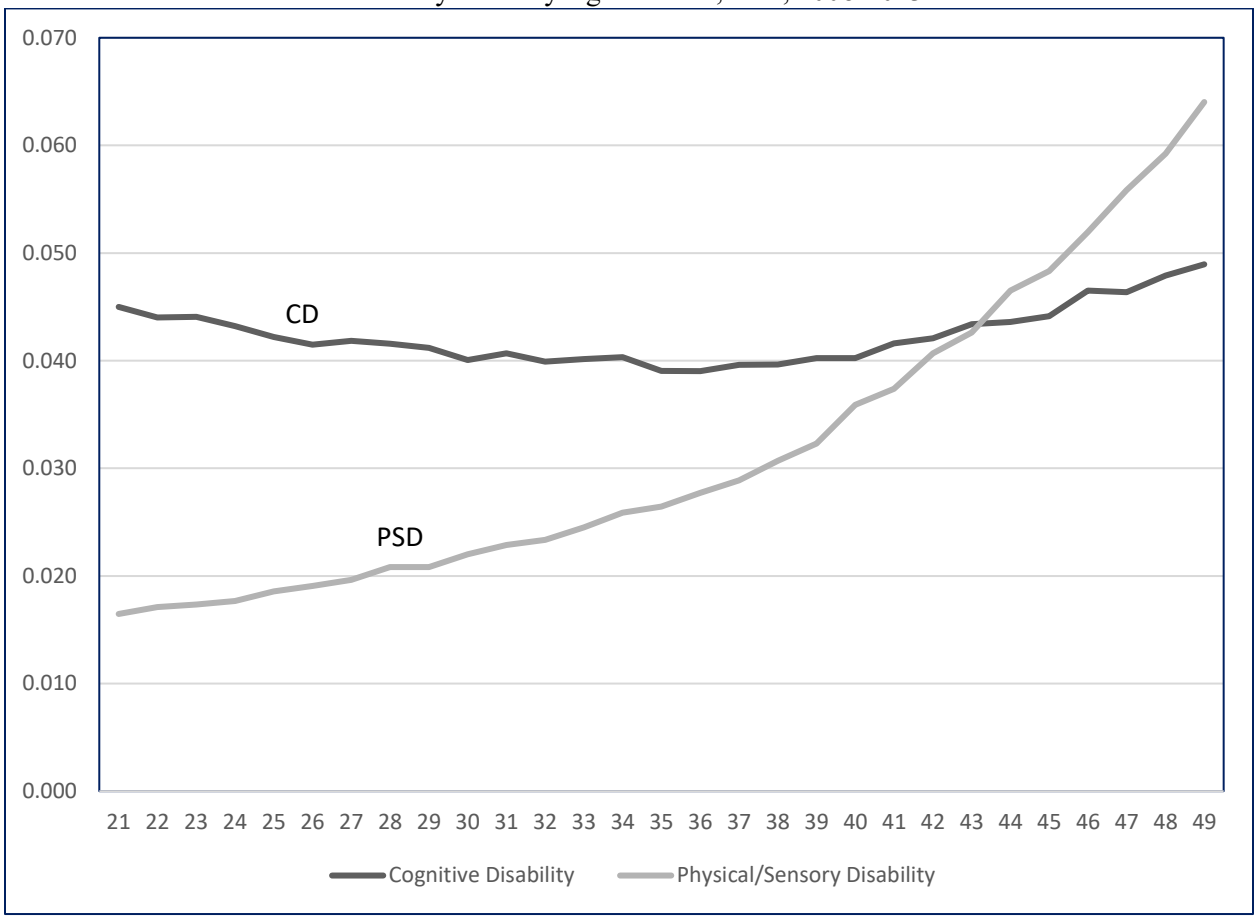
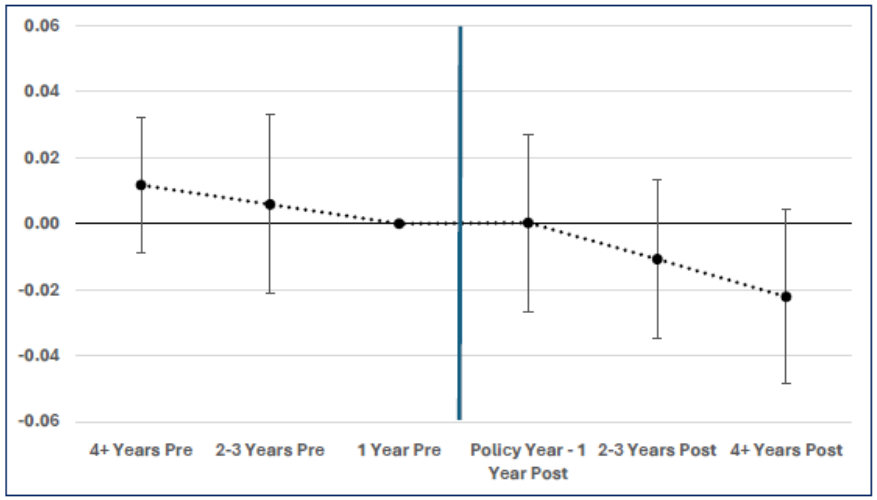
Figure 1
Disability Rates by Age in Years, U.S., 2008-2023



Notes: Individuals in each category may have multiple disabilities; however, the Physical/Sensory excludes individuals who also have a cognitive disability. Weighted averages from American Community Survey (ACS).

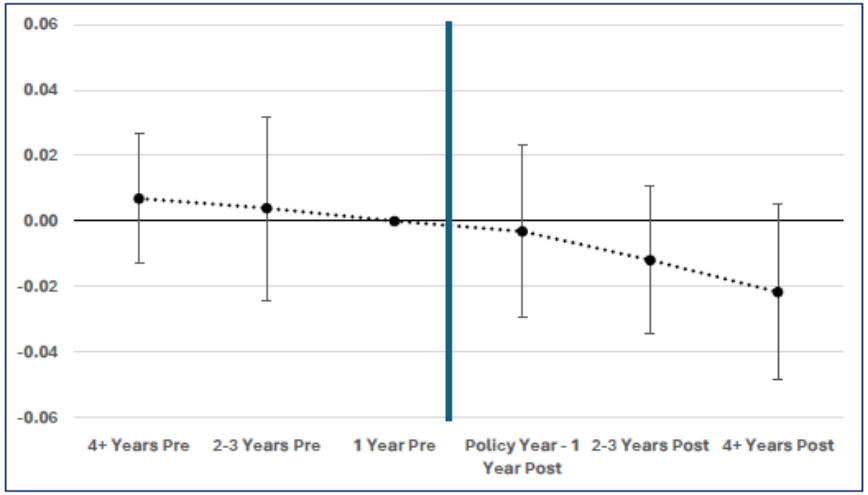
Figure 2
Event-Study Analysis of Minimum Wage and Labor Market Outcomes,
Using TWFE Estimates

Panel A: Dynamic Effects on Employment conditional on Labor Force Participation



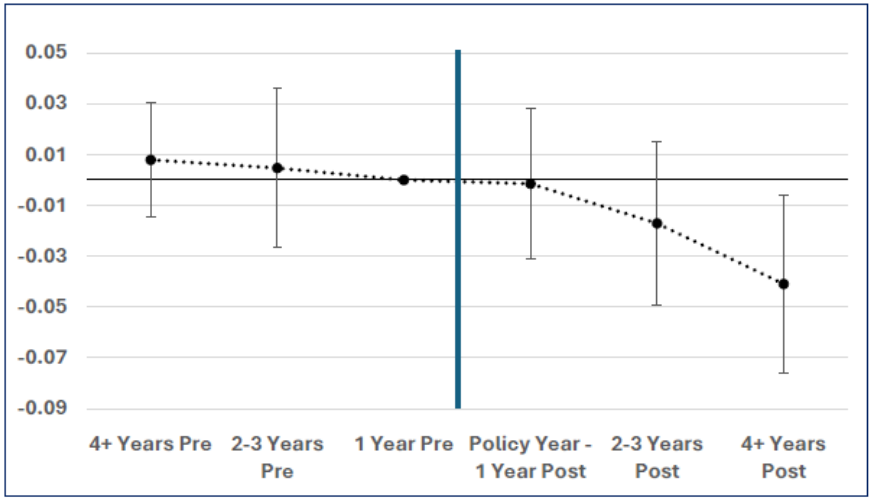
Notes: Estimates are based on the event study approach in Schmidheiny & Siegloch (2023). Bands represent the 90% confidence intervals.

Panel B: Dynamic Effects on Employment conditional on Labor Force Participation & Worked in Past 5 Years



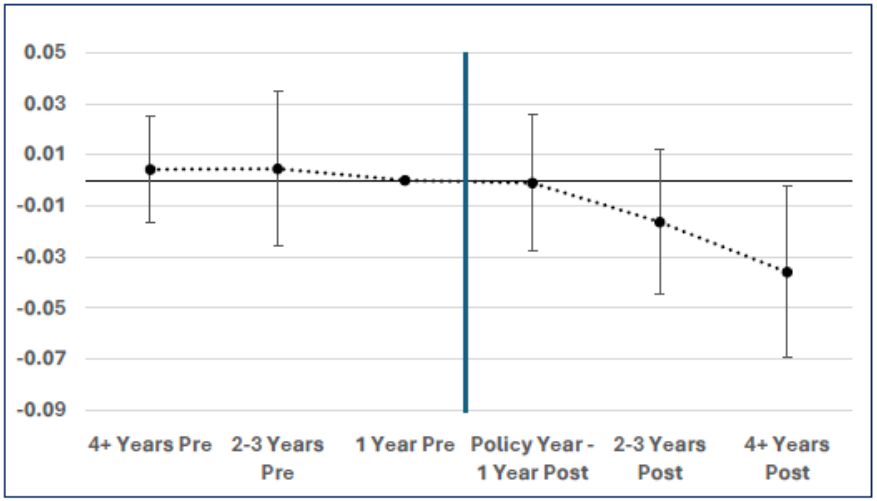
Notes: Estimates are based on the event study approach in Schmidheiny & Siegloch (2023). Bands represent the 90% confidence intervals.

Panel C: Dynamic Effects on Employment conditional on Labor Force Participation, w. Region*Year Fixed Effects



Notes: Estimates are based on the event study approach in Schmidheiny & Siegloch (2023). Bands represent the 90% confidence intervals.

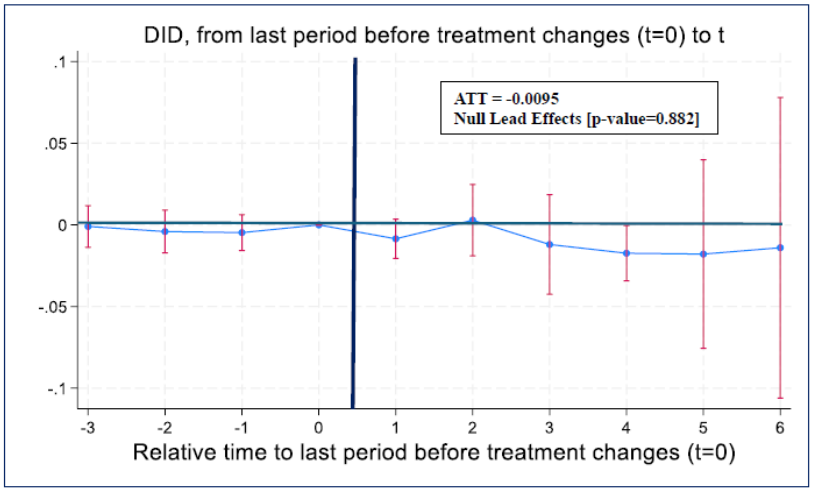
Panel D: Dynamic Effects on Employment conditional on Labor Force Participation & Worked in Past 5 Years, w. Region*Year Fixed Effects



Notes: Estimates are based on the event study approach in Schmidheiny & Siegloch (2023). Bands represent the 90% confidence intervals.

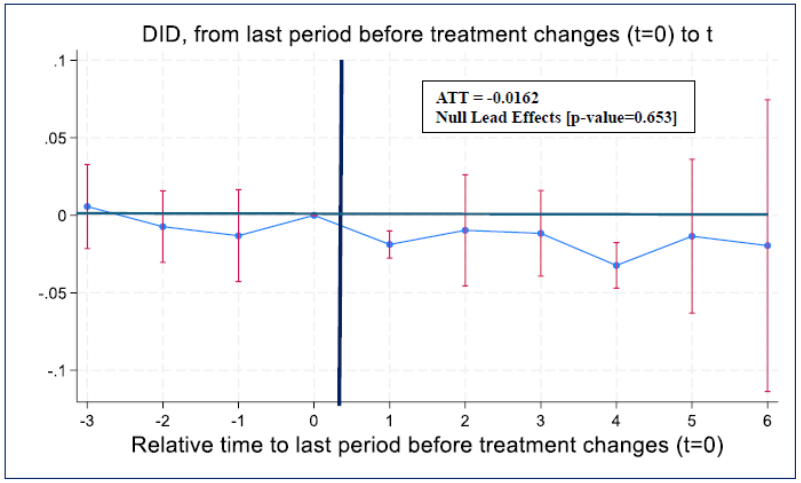
Figure 3
Event-Study Analysis of Minimum Wage and Labor Market Outcomes,
Using de Chaisemartin and D'Haultfœuille (dCDH) Estimator

Panel A: Dynamic Effects on Employment



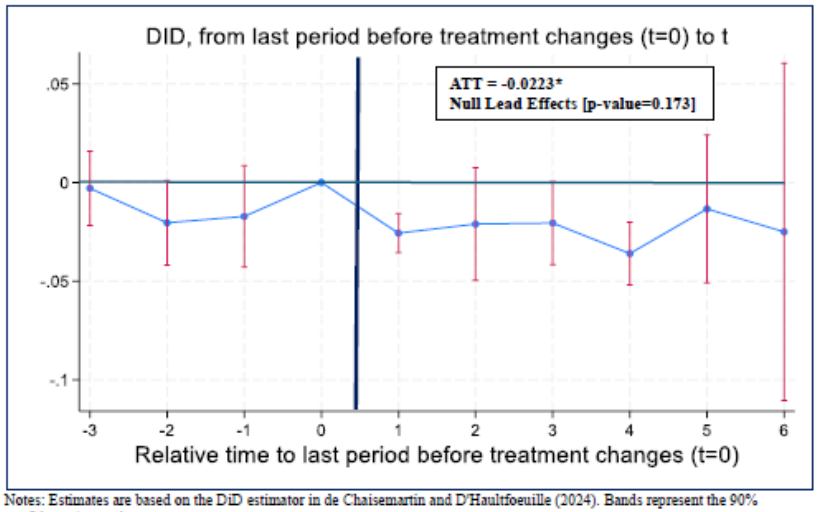
Notes: Estimates are based on the DiD estimator in de Chaisemartin and D'Haultfoeuille (2024). Bands represent the 90% confidence intervals.

Panel B: Dynamic Effects on Employment conditional on Labor Force Participation



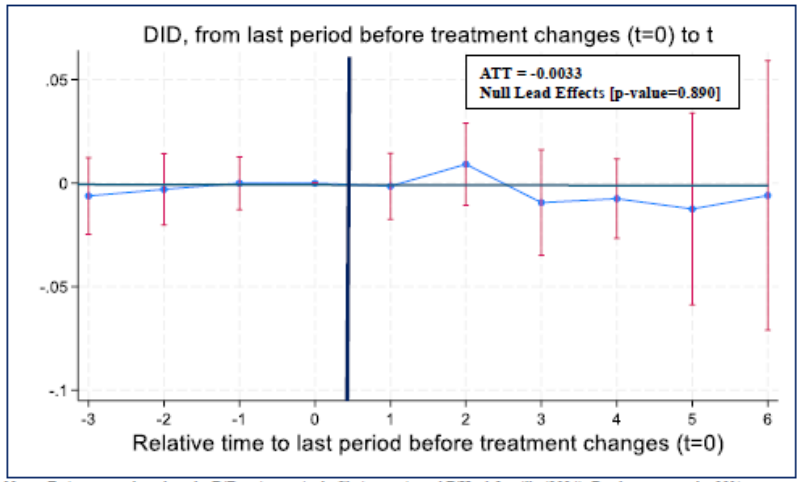
Notes: Estimates are based on the DiD estimator in de Chaisemartin and D'Haultfoeuille (2024). Bands represent the 90% confidence intervals.

Panel C: Dynamic Effects on Employment conditional on Labor Force Participation & Worked in Past 5 Years



Notes: Estimates are based on the DiD estimator in de Chaisemartin and D'Haultfoeuille (2024). Bands represent the 90% confidence intervals.

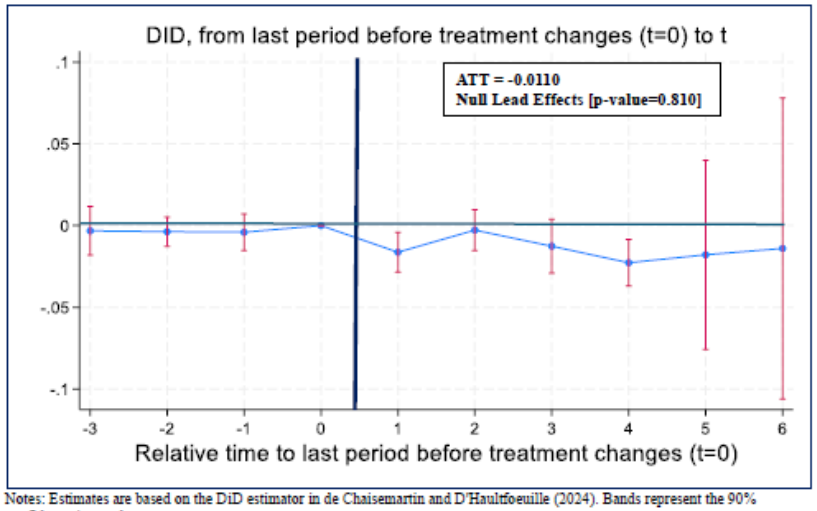
Panel D: Dynamic Effects on Labor Force Participation



Notes: Estimates are based on the DiD estimator in de Chaisemartin and D'Haultfoeuille (2024). Bands represent the 90% confidence intervals.

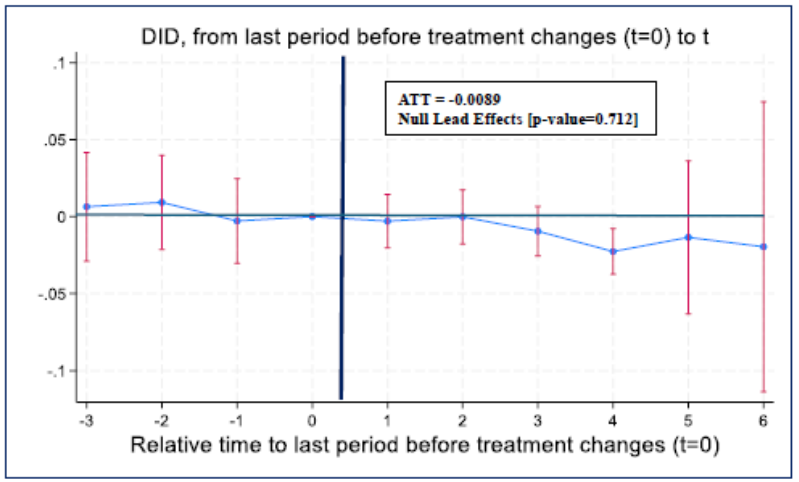
Figure 4
Event-Study Analysis of Minimum Wage and Labor Market Outcomes,
Using de Chaisemartin and D'Haultfœuille (dCDH) Estimator, Adjusting for Compositional Changes

Panel A: Dynamic Effects on Employment, adjusting for compositional changes



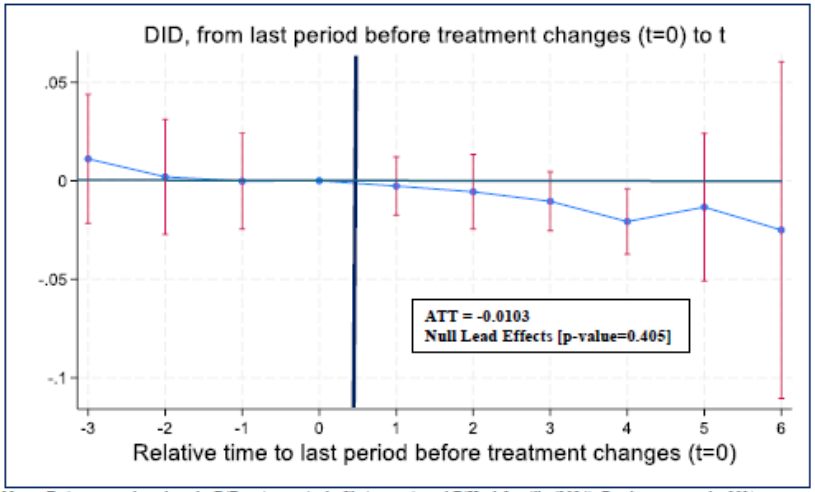
Notes: Estimates are based on the DiD estimator in de Chaisemartin and D'Haultfoeuille (2024). Bands represent the 90% confidence intervals.

Panel B: Dynamic Effects on Employment conditional on Labor Force Participation, adjusting for compositional changes



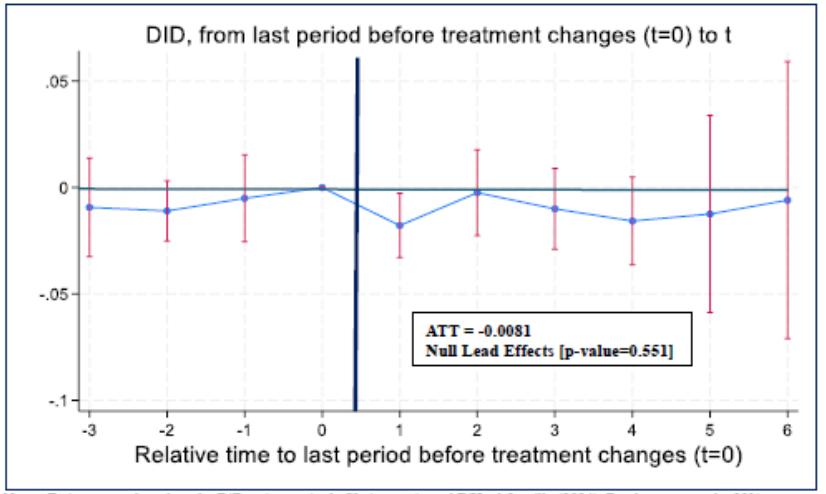
Notes: Estimates are based on the DiD estimator in de Chaisemartin and D'Haultfoeuille (2024). Bands represent the 90% confidence intervals.

Panel C: Dynamic Effects on Employment conditional on Labor Force Participation & Worked in Past 5 Years, adjusting for compositional changes



Notes: Estimates are based on the DiD estimator in de Chaisemartin and D'Haultfoeuille (2024). Bands represent the 90% confidence intervals.

Panel D: Dynamic Effects on Labor Force Participation, adjusting for compositional changes



Notes: Estimates are based on the DiD estimator in de Chaisemartin and D'Haultfoeuille (2024). Bands represent the 90% confidence intervals.

Table 1: Weighted Sample Characteristics, Young Adults with Cognitive Disability and No Disability

	Cognitive Disability		No Disability	
	All	< College	All	<College
Labor Force Characteristics				
Employed	0.354	0.319	0.803	0.767
In labor force	0.442	0.409	0.857	0.834
Usual # hours worked/week among those in labor force, mean (SD)	15.26 (19.54)	13.66 (18.78)	34.29 (17.36)	32.59 (17.87)
Usual # hours worked/week among those employed, mean (SD)*	34.12 (14.49)	33.13 (14.50)	39.68 (11.62)	38.89 (11.67)
# weeks worked past year, among those in labor force, mean (SD)	17.71 (22.57)	16.00 (21.96)	40.00 (19.06)	38.28 (20.13)
# weeks worked past year, among those employed, mean (SD)*	39.60 (16.50)	38.81 (16.88)	46.28 (11.38)	45.68 (12.06)
Annual wage income among those in labor force, mean (SD)	11,524 (27,309)	8,509 (20,212)	39,686 (53,560)	27,074 (32,101)
Annual wage income among those employed, mean (SD)	25,771 (36063)	20,632 (27,212)	45,919 (55,073)	32,309 (32,567)
Wage at or near state minimum	0.471	0.526	0.271	0.345
Other Characteristics				
Age, mean years (SD)	35.0 (8.6)	34.9 (8.7)	34.7 (8.4)	34.3 (8.6)
Education, mean years (SD)	12.0 (3.2)	11.4 (2.8)	13.7 (3.0)	12.0 (2.2)
Male	0.518	0.527	0.496	0.520
White, non-Hispanic	0.616	0.609	0.577	0.529
Black, non-Hispanic	0.155	0.163	0.123	0.143
Other race, non-Hispanic	0.081	0.076	0.101	0.075
Hispanic	0.148	0.153	0.199	0.253
Married	0.237	0.221	0.493	0.448
Lives in group quarters	0.044	0.048	0.009	0.012
Lives in metro area: central city	0.146	0.139	0.160	0.144
Lives in metro area: not central city	0.258	0.254	0.307	0.294
Does not live in metro area	0.120	0.128	0.085	0.102
Lives in metro area: central city not determined	0.349	0.344	0.356	0.108
Unknown metro status	0.128	0.135	0.093	0.352
N	726,282	640,090	15,676,834	9,883,825

Notes: Samples include only non-institutionalized individuals ages 21 to 49. Individuals with a Cognitive Disability could also have other types of disabilities. The No Disability category includes individuals with no disabilities of any kind.*Sample sizes for those employed are: 316,406 (Cognitive Disability, All). 256,610 (Cognitive Disability, < College). 13,605,613 (No Cognitive Disability, All). 8,304,556 (No Disability, < College). Figures are column proportions unless indicated otherwise.

Data source: American Community Survey (ACS) 2008-2023

Table 2: Effects of the Minimum Wage on Employment, Young Adults Ages 21-49 with Cognitive Disability, American Community Surveys (ACS) 2008-2023

Outcome	Employed									
Model	1	2	3	4	5	6	7	8	9	10
Education	All	All	All	LT college	LT college	All	LT college	LT college	LT college	LT college
Labor Force Status	Any	Any	Any	Any	Any	In labor force	In labor force	In labor force	In labor force & Worked in past 5 years	In labor force & Worked in past 5 years
Real Minimum Wage	-0.00870* (0.00476)	-0.01046** (0.00423)	-0.01045** (0.00433)	-0.01622*** (0.00496)	-0.01420** (0.00638)	-0.00645* (0.00336)	-0.00844** (0.00400)	-0.00899* (0.00507)	-0.00848** (0.00377)	-0.00865* (0.00465)
Demographic controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Economic controls	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COVID-19 deaths	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State & Period Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region*Year Fixed Effects	No	No	No	No	Yes	No	No	Yes	No	Yes
Observations	726,282	726,282	726,282	640,090	640,090	309,663	251,559	251,559	242,976	242,976
% earning close to MW	0.471	0.471	0.471	0.526	0.526	0.471	0.526	0.526	0.526	0.526
Outcome mean	0.354	0.354	0.354	0.319	0.319	0.801	0.781	0.781	0.809	0.809

***Significant at 1% level **at 5% level *at 10% level

Notes: Standard errors are clustered at the state level. Demographic controls include age, indicators for gender, race, ethnicity and marital status, educational attainment (number of years of schooling completed), and indicators for metropolitan and central city residence and group quarter residence. State controls include the natural log of the state population, natural log of disabled SSI recipients in the state, indicator for a state refundable EITC, and the state EITC generosity (percent of federal credit). Economic controls include the state's poverty rate, unemployment rate, and the natural log of personal income per capita. COVID-19 deaths include the inverse hyperbolic sine of the population scaled number of cumulative COVID-19 deaths in the state. Sample is limited to adults between the ages of 21-49 residing in non-institutional quarters. Percent earning close to MW is only observed for individuals who are working.

Data sources: ACS 2008-2023; U.S. Department of Labor Wage and Hour Division (2025a); University of Kentucky Center for Poverty Research (2025, Jan.); https://covid.cdc.gov/covid-data-tracker/#trends_totaldeaths_selec

Table 3: Effects of the Minimum Wage on Other Labor Market Outcomes, Young Adults Ages 21-49 with Cognitive Disability, American Community Surveys (ACS) 2008-2023

Outcome	Labor force participation					Ln Weekly Hours	Weeks Worked	Wage & Salary Income (Inverse Hyperbolic Sine)		
Model	1	2	3	4	5	6	7	8	9	10
Education	All	LT college	LT college	LT college	LT college	LT college	LT college	LT college	LT college	LT college
Sample restriction	-	-	-	Worked in past 5 years	Worked in past 5 years	Employed	Employed	-	In Labor Force	Employed
Real Minimum Wage	-0.00867* (0.00442)	-0.01443*** (0.00504)	-0.01119* (0.00651)	-0.01123** (0.00423)	-0.01165** (0.00479)	-0.00049 (0.00557)	-0.19468 (0.19138)	-0.12289** (0.05322)	-0.03024 (0.03917)	0.03848 (0.02335)
Demographic controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Economic controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COVID-19 deaths	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State & Period Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region*Year Fixed Effects	No	No	Yes	No	Yes	No	No	No	No	No
Observations	726,282	640,090	640,090	363,949	363,949	256,610	256,610	640,090	251,559	256,610
% earning close to MW	0.471	0.526	0.526	0.526	0.526	0.526	0.526	0.526	0.526	0.526
Outcome mean	0.442	0.409	0.409	0.686	0.686	33.1	38.8	8508.6	19739.9	20632.3

***Significant at 1% level **at 5% level *at 10% level

Note: Standard errors are clustered at the state level. Demographic controls include age, indicators for gender, race, ethnicity and marital status, educational attainment (number of years of schooling completed), and indicators for metropolitan and central city residence and group quarter residence. State controls include the natural log of the state population, natural log of disabled SSI recipients in the state, indicator for a state refundable EITC, and the state EITC generosity (percent of federal credit). Economic controls include the state's poverty rate, unemployment rate, and the natural log of personal income per capita. COVID-19 deaths include the inverse hyperbolic sine of the population scaled number of cumulative COVID-19 deaths in the state. Sample is limited to adults between the ages of 21-49 residing in non-institutional quarters. . Percent earning close to MW is only observed for individuals who are working.

Data sources: ACS 2008-2023; U.S. Department of Labor Wage and Hour Division (2025a); University of Kentucky Center for Poverty Research (2025, Jan.); https://covid.cdc.gov/covid-data-tracker/#trends_totaldeaths_select_01

Table 4: Effects of the Minimum Wage on Employment, Differential Effects by Sub-Minimum Wage Workers in the State, American Community Surveys (ACS) 2008-2023

Outcome	Employed		Labor force participation	
Model	1	2	3	4
Education	LT college	LT college	LT college	LT college
Sample restriction	-	In Labor Force	-	Worked in past 5 years
Real Minimum Wage*Above Median Sub-MW Workers	-0.01947***	-0.01055*	-0.01799***	-0.01494**
	(0.00661)	(0.00587)	(0.00636)	(0.00565)
Real Minimum Wage*Below Median Sub-MW Workers	-0.01247**	-0.00620	-0.01031*	-0.00714
	(0.00605)	(0.00527)	(0.00586)	(0.00499)
Difference [p-value]	[0.426]	[0.584]	[0.336]	[0.291]
Demographic controls	Yes	Yes	Yes	Yes
State controls	Yes	Yes	Yes	Yes
Economic controls	Yes	Yes	Yes	Yes
COVID-19 deaths	Yes	Yes	Yes	Yes
State & Period Fixed Effects	Yes	Yes	Yes	Yes
Observations	640,090	251,559	640,090	363,949
% earning close to MW	0.526	0.526	0.526	0.526
Outcome mean	0.319	0.781	0.409	0.686

***Significant at 1% level **at 5% level *at 10% level

Note: Standard errors are clustered at the state level. Demographic controls include age, indicators for gender, race, ethnicity and marital status, educational attainment (number of years of schooling completed), and indicators for metropolitan and central city residence and group quarter residence. State controls include the natural log of the state population, natural log of disabled SSI recipients in the state, indicator for a state refundable EITC, and the state EITC generosity (percent of federal credit). Economic controls include the state's poverty rate, unemployment rate, and the natural log of personal income per capita. COVID-19 deaths include the inverse hyperbolic sine of the population scaled number of cumulative COVID-19 deaths in the state. Sample is limited to adults with a cognitive disability between the ages of 21-49 residing in non-institutional quarters. Percent earning close to MW is only observed for individuals who are working.

Data sources: ACS 2008-2023; U.S. Department of Labor Wage and Hour Division (2025a); University of Kentucky Center for Poverty Research (2025, Jan.); https://covid.cdc.gov/covid-data-tracker/#trends_totaldeaths_select_01

Appendix Table 1
Nominal Hourly Minimum Wage: Federal, State Average Effective Minimum, and State Maximum, 2008-2024

Year	Federal minimum	Avg. effective minimum*	Maximum
2008	5.85	6.62	8.07
2009	6.55	7.05	8.55
2010	7.25	7.42	8.55
2011	7.25	7.46	8.67
2012	7.25	7.51	9.04
2013	7.25	7.54	9.19
2014	7.25	7.70	9.5
2015	7.25	7.95	10.5
2016	7.25	8.16	11.5
2017	7.25	8.37	11.5
2018	7.25	8.61	13.25
2019	7.25	9.12	14
2020	7.25	9.24	15
2021	7.25	9.58	15.2
2022	7.25	9.99	16.1
2023	7.25	10.49	17
2024	7.25	10.88	17.5

*The effective MW is the higher of the federal or the state minimum wage.

Data source: US Department of Labor, 2025(a).

Appendix Table 2
U.S. Census Definitions of Disability

Disability Type	**Rate***	**Definition**
Cognitive	.041	Because of a physical, mental, or emotional condition, does this person (or you) have serious difficulty concentrating, remembering, or making decisions?
Ambulatory	.027	Does this person (or you) have serious difficulty walking or climbing stairs?
Independent Living	.029	Because of a physical, mental, or emotional condition, does this person (or you) have difficulty doing errands alone such as visiting a doctor's office or shopping?
Self-Care	.012	Does this person have difficulty dressing or bathing?
Vision or Hearing	.024	Is this person (or you) deaf or does he/she have serious difficulty hearing? Is this person (or you) blind or does he/she have serious difficulty seeing even when wearing glasses?

*Rates are derived from authors' weighted calculations from the ACS 2008-2023 for individuals ages 21-49 years. Rates are the number of individuals in that category divided by the number of non-institutionalized individuals 21-49 years of age. A person may be recorded as having more than one disability.

Data source: https://www.census.gov/topics/health/disability/guidance/data-collection-acs.html.

Appendix Table 3: Effects of the Minimum Wage on Employment and Labor Force Participation, Alternate Measures of the Minimum Wage, American Community Surveys (ACS) 2008-2023

Outcome	Employed				Labor Force Participation	
Model	1	2	3	4	5	6
Education	LT College	LT College	LT College	LT College	LT College	LT College
Sample Restriction	-	-	In Labor Force	In Labor Force	-	-
Real Minimum Wage	-0.01622***	-0.01420**	-0.00645*	-0.00844**	-0.01443***	-0.01119*
	(0.00496)	(0.00638)	(0.00336)	(0.00400)	(0.00504)	(0.00651)
Nominal Minimum Wage	-0.00552***	-0.00489**	-0.00194*	-0.00267*	-0.00496***	-0.00388*
	(0.00174)	(0.00225)	(0.00115)	(0.00136)	(0.00178)	(0.00229)
Relative Minimum Wage	-0.07678**	-0.06645*	-0.02903	-0.03722*	-0.06777**	-0.05092
	(0.02911)	(0.03773)	(0.01809)	(0.02138)	(0.02967)	(0.03816)
Demographic controls	Yes	Yes	Yes	Yes	Yes	Yes
State controls	Yes	Yes	Yes	Yes	Yes	Yes
Economic controls	Yes	Yes	Yes	Yes	Yes	Yes
COVID-19 deaths	Yes	Yes	Yes	Yes	Yes	Yes
State & Period Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Region*Year Fixed Effects	No	Yes	No	Yes	No	Yes
Observations	640,090	640,090	251,559	251,559	640,090	640,090
Outcome mean	0.319	0.319	0.781	0.781	0.409	0.409

***Significant at 1% level **at 5% level *at 10% level

Note: Standard errors are clustered at the state level. Demographic controls include age, indicators for gender, race, ethnicity and marital status, educational attainment (number of years of schooling completed), and indicators for metropolitan and central city residence and group quarter residence. State controls include the natural log of the state population, natural log of disabled SSI recipients in the state, indicator for a state refundable EITC, and the state EITC generosity (percent of federal credit). Economic controls include the state's poverty rate, unemployment rate, and the natural log of personal income per capita. COVID-19 deaths include the inverse hyperbolic sine of the population scaled number of cumulative COVID-19 deaths in the state. Sample is limited to adults between the ages of 21-49 residing in non-institutional quarters.

Data sources: ACS 2008-2023; U.S. Department of Labor Wage and Hour Division (2025a); University of Kentucky Center for Poverty Research (2025, Jan.); https://covid.cdc.gov/covid-data-tracker/#trends_totaldeaths_select_01

Appendix Table 4: Effects of the Minimum Wage on Employment, Heterogeneity by Age Range, American Community Surveys (ACS) 2008-2023

Outcome	Employed		Labor Force Participation	
Model	1	2	3	4
Education Sample Restriction	Less than College In Labor Force		Less than College -	
Sample	Ages 21-35	Ages 36-49	Ages 21-35	Ages 36-49
Real Minimum Wage	-0.01363*** (0.00496)	-0.00294 (0.00437)	-0.01427** (0.00660)	-0.01369*** (0.00496)
Demographic controls	Yes	Yes	Yes	Yes
State controls	Yes	Yes	Yes	Yes
Economic controls	Yes	Yes	Yes	Yes
COVID-19 deaths	Yes	Yes	Yes	Yes
State & Period Fixed Effects	Yes	Yes	Yes	Yes
Observations	145,813	105,746	320,378	319,712
% earning close to MW	0.569	0.462	0.569	0.462
Outcome mean	0.776	0.788	0.469	0.343

***Significant at 1% level **at 5% level *at 10% level

Note: Standard errors are clustered at the state level. Demographic controls include age, indicators for gender, race, ethnicity and marital status, educational attainment (number of years of schooling completed), and indicators for metropolitan and central city residence and group quarter residence. State controls include the natural log of the state population, natural log of disabled SSI recipients in the state, indicator for a state refundable EITC, and the state EITC generosity (percent of federal credit). Economic controls include the state's poverty rate, unemployment rate, and the natural log of personal income per capita. COVID-19 deaths include the inverse hyperbolic sine of the population scaled number of cumulative COVID-19 deaths in the state. Sample is limited to adults between the ages of 21-49 residing in non-institutional quarter. . Percent earning close to MW is only observed for individuals who are working.

Data sources: ACS 2008-2023; U.S. Department of Labor Wage and Hour Division (2025a); University of Kentucky Center for Poverty Research (2025, Jan.); https://covid.cdc.gov/covid-data-tracker/#trends_totaldeaths_select_01

Appendix Table 5: Effects of the Minimum Wage on Employment, Heterogeneity across Disability Status, American Community Surveys (ACS) 2008-2023

Outcome	Employed					Labor Force Participation				
Model	1	2	3	4	5	6	7	8	9	10
Education	Less than College					Less than College				
Sample Restriction	In Labor Force					-				
Sample	Cognitive Disability	Ambulatory/ Sensory Disability	Cognitive Disability Only	Ambulatory/ Sensory Disability Only	No Disability	Cognitive Disability	Ambulatory/Sensory Disability	Cognitive Disability Only	Ambulatory/ Sensory Disability Only	No Disability
Real Minimum Wage	-0.00844** (0.00400)	-0.00267 (0.00312)	-0.00674* (0.00395)	0.00029 (0.00279)	0.00055 (0.00087)	-0.01443*** (0.00504)	-0.00838** (0.00342)	-0.01313** (0.00534)	-0.00384 (0.00329)	-0.00095 (0.00130)
Demographic controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Economic controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COVID-19 deaths	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State & Period Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	251,559	315,769	187,347	251,557	8,259,270	640,090	666,891	406,953	433,754	9,951,644
% earning close to MW	0.526	0.409	0.531	0.386	0.345	0.526	0.409	0.531	0.386	0.345
Outcome mean	0.781	0.845	0.787	0.866	0.920	0.409	0.484	0.476	0.581	0.832

***Significant at 1% level **at 5% level *at 10% level

Note: Standard errors are clustered at the state level. Demographic controls include age, indicators for gender, race, ethnicity and marital status, educational attainment (number of years of schooling completed), and indicators for metropolitan and central city residence and group quarter residence. State controls include the natural log of the state population, natural log of disabled SSI recipients in the state, indicator for a state refundable EITC, and the state EITC generosity (percent of federal credit). Economic controls include the state's poverty rate, unemployment rate, and the natural log of personal income per capita. COVID-19 deaths include the inverse hyperbolic sine of the population scaled number of cumulative COVID-19 deaths in the state. Sample is limited to adults between the ages of 21-49 residing in non-institutional quarters. . Percent earning close to MW is only observed for individuals who are working.

Data sources: ACS 2008-2023; U.S. Department of Labor Wage and Hour Division (2025a); University of Kentucky Center for Poverty Research (2025, Jan.); https://covid.cdc.gov/covid-data-tracker/#trends_totaldeaths_select_01