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Do minimum wage laws affect employer-sponsored insurance provision?

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ABSTRACT

Employers may respond to minimum wage increases by adjusting their health benefits. We examine the impact of state minimum wage increases on employer health benefit offerings using the 2002–2020 Medical Expenditure Panel Survey – Insurance/Employer Component data. Our primary regression specifications are difference-in-differences models that estimate the relationship between within-state changes in employer-sponsored insurance and minimum wage laws over time. We find that a $1 increase in minimum wages is associated with a 0.92 percentage point (p.p.) decrease in the percentage of employers offering health insurance, largely driven by small employers and employers with a greater share of low-wage employees. A $1 increase is also associated with a 1.83 p.p. increase in the prevalence of plans with a deductible requirement, but we do not find consistent evidence that other benefit characteristics are affected. We find no consequent change in uninsurance, likely explained by an increase in Medicaid enrollment.

Introduction

Since the 1950s, employers have played an instrumental role in private health insurance provision for employees and their dependents in the United States (Blumenthal, 2006). Today an estimated 178 million people are covered through an employer source (Keisler-Starkey and Bunch, 2022). Several factors have led to the proliferation and stability of employer-sponsored insurance (ESI) over time, including administrative economies of scale, favorable tax treatment of premiums, and a risk pooling mechanism that is predominantly for a purpose other than the purchase of insurance. Moreover, access to ESI is highly valued by individuals when they make employment choices, in part because it is a fringe benefit that confers near-term financial benefits for most employees relative to other forms of non-wage compensation (Employee Benefit Research Institute and Greenwald Research, 2022).[1]

Several factors contribute to how employers determine wage and non-wage components of compensation, including local labor market conditions, workers' preferences, and the legal environment in which firms operate. An important labor policy affecting the compensation decisions of employers includes federal[2] and state minimum wage laws. Such laws provide important financial protection for lower-wage workers and their dependents. However, minimum wage laws also have the potential to create labor market

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[1] Based on the 2022 Employer Costs for Employee Compensation Survey, non-wage compensation, including health insurance, retiree benefits, and paid leave, represents 31% of total compensation, on average (U.S. Department of Labor, 2022).

[2] Enacted in 1938, the Fair Labor Standards Act (FLSA) established a federal minimum wage for covered workers. This law was last amended in 2009 and established a minimum rate of $7.25 per hour (Congressional Research Service, 2021).

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distortions. In 2022, 30 states and the District of Columbia had minimum wage levels in excess of the federal level of $7.25 per hour; 15 states had minimum wage levels equivalent to the federal level, and five states had no established minimum wage law and are therefore subject to the federal law (U.S. Department of Labor, 2022a).

The effects of minimum wage laws on labor market outcomes have been studied extensively and continue to generate considerable debate among economists. Economic theory, under the assumption of perfectly competitive labor markets, predicts that a binding minimum wage should lead to reductions in employment. However, the empirical literature has yielded mixed evidence, including both negative as well as null effects of minimum wage increases on employment outcomes (for example: (Allegretto et al., 2011; Card and Krueger, 2000; Clemens et al., 2018; Dube et al., 2010; Manning, 2021; Neumark and Shirley, 2022; Wolfson and Belman, 2019)). Two prevailing theories may explain why some studies find null employment effects. The first is that many labor markets are not competitive and predictions made under an assumed perfectly competitive labor market may not apply (Ashenfelter et al., 2022). A second potential explanation is that employers may respond to minimum wage increases on non-employment margins, including non-wage compensation, changes to the work environment, and increased effort requirements (Clemens, 2021). As a major form of non-wage compensation, ESI may be an important margin that employers adjust in response to minimum wage increases (U.S. Department of Labor, 2022b). Relatively few studies have investigated the impact of minimum wage increases on ESI provision, however. Recent work on this topic finds small reductions in ESI coverage at the individual level (Clemens et al., 2018; Dworsky et al., 2022), but does not investigate the employer-level decision to offer ESI or the characteristics of benefits beyond the decision to offer coverage (e.g., premium contributions, deductibles).

In this study, we use the Medical Expenditure Panel Survey – Insurance/Employer Component (MEPS-IC) to investigate how changes in state and federal minimum wage laws between 2002 and 2020 have influenced employer health benefits provision (Agency for Healthcare Research and Quality, 2022). Using these data, we implement a difference-in-differences analysis that examines the relationship between within-state changes in ESI provision and within-state changes in state minimum wage laws over time. We examine the effect of minimum wages on both the extensive margin of whether employers offer any health insurance, as well as characteristics of ESI that employers may adjust on the intensive margin, including employee eligibility, premium contributions, or plan characteristics. We hypothesize that an increase in minimum wages may result in a decrease in ESI offers, but also potentially adjustments that reduce benefit generosity (e.g., higher employee premium contribution shares, higher deductibles) as employers look to offset increased labor costs.

We find that a $1 increase in state minimum wage levels is associated with a 0.92 percentage point (p.p.) decrease in the percentage of employers offering health insurance, robust to all regression specifications. Further, we show that this relationship is largely driven by small employers, with fewer than 50 employees and employers with more low-wage employees. Conditional on offering insurance, we also find that minimum wage laws are associated with a small increase in average deductibles. We do not find consistent evidence, however, that employers who offer health insurance adjust eligibility criteria or the employee contribution share of the total premium. Consistent with observed decreases in employer offers of health insurance, we find evidence from supplemental analyses of workers from the American Community Survey (ACS) of a decrease in ESI enrollment following minimum wage increases. However, we document no changes in the overall rate of uninsurance, with suggestive evidence that this discrepancy is explained by an increase in Medicaid enrollment.

Our study contributes to the empirical literature in three important ways. First, we examine the relationship between minimum wage laws and ESI provision from the perspective of the employer, which is ultimately responsible for ESI provision. In doing so, we consider how employers' responses to minimum wage law changes may differ by employer size or its distribution of employees' wages. This approach is distinct from prior studies which have used individual workers as the unit of observation to examine how ESI outcomes are affected by minimum wage laws (Clemens et al., 2018; Dworsky et al., 2022; Marks, 2011; Royalty, 2000; Simon and Kaestner, 2004). Second, once employers decide to offer health insurance as a form of non-wage compensation, they must make several additional decisions related to workers' eligibility and benefit design (e.g., plan type, cost-sharing provisions, share of total premium paid by employee). Leveraging the rich MEPS-IC data, we examine whether employers that offer ESI adjust on these additional dimensions in response to changes in minimum wage policies over time. Our findings help paint a substantially more complete picture of employer responses to minimum wage increases. Third, our long panel covers nearly two decades and includes years before and after implementation of the Affordable Care Act's major coverage provisions. Major policy effects on the ESI market resulting from the Affordable Care Act include the employer shared responsibility requirement for larger employers (fully enacted in 2016) and a comprehensive set of insurance market reforms for small employers implemented in 2014 (e.g., modified community rating, essential health benefits, and plan standardization). Prior work on this topic uses data as recent as 2016 – our approach allows for the inclusion of four additional years in the post-ACA period and we explore how the effect of minimum wage increases on ESI has changed in this post-ACA period.

Background and related literature

Employer adjustments on non-employment margins

For decades, economists have studied how minimum wage policies affect a wide variety of labor market outcomes. While much of this literature has concentrated on estimating the effects of minimum wage policies on employment-related outcomes, others have examined how employers may respond on non-employment margins.

One strategy that employers may consider is to alter personnel policies or minimum job requirements in order to replace lower-skilled workers with higher-skilled workers ('labor-labor' substitution). For example, an experiment conducted in an online labor

market demonstrates that minimum wage increases resulted in firms shifting toward the hiring of workers whose job profiles showed higher past wages (Horton, 2018). Other analyses also report findings suggestive of substitution across groups of low-skilled workers towards workers with greater productivity, experience, or skills (Clemens and Wither, 2019; Fairris and Bujanda, 2008; Giuliano, 2013; Jardim et al., 2022).

A second way in which employers may respond to minimum wage increases is to increase effort expectations and productivity. Ippolito (2003) provides a theoretical model whereby workers who place the highest value on their jobs are willing to expend more effort in order to keep them (Ippolito, 2003). Recent evidence by Coviello, Deserranno, and Persico (2022) examine workers in a large US retailer whose compensation is structured to include base pay and a commission (Coviello et al., 2022). Using three years of data and a border-discontinuity research design, they find that workers affected by minimum wage increases become more productive, on average, and that the effect is stronger for workers whose level of pay is more likely to be supported by the minimum wage. Recent work also examines changes in worker effort in response to a minimum wage increase in Florida for a sample of piece rate workers (Ku, 2022). Ku finds that workers with productivity in the bottom 40 percent of the distribution increased their productivity relatively more than those at higher percentiles, suggesting positive effort response as one mechanism by which employers can adjust to changes in the minimum wage. It is also worth noting that employers may also be able to increase workers' productivity through changes to workplace amenities, such as the adoption of employer-driven scheduling practices that dismiss workers when there is insufficient demand.

Third, employers may respond to minimum wage increases by making explicit changes to workers' non-wage compensation, including employer sponsored insurance, paid vacation, paid sick leave, or retirement contributions. Pioneering work by McKenzie (1980) and Wessels (1980) offer theoretical contributions that demonstrate how under certain conditions, reductions in non-wage compensation stemming from minimum wage policies may shift both the demand and supply curve for labor. This, in turn, may reduce worker well-being, but not necessarily lead to changes in employment (McKenzie, 1980; Wessels, 1980).[3]

Minimum wages and health benefits provision

While the empirical literature examining the relationship between minimum wage laws and ESI provision spans more than two decades, the number of studies is small and exclusively relies on analyses that examine the issue at the individual worker level.[4] Early work by Royalty (2000) uses the 1988 and 1993 Current Population Survey (CPS) to examine how low-education, full-time workers' eligibility for ESI, pensions, and paid sick leave are affected by minimum wage laws. Using variation in state minimum wages over these two time periods, she finds that raising the minimum wage is associated with a decrease in low-education workers' probability of being eligible for ESI, particularly at higher minimum wage levels or for large increases in the minimum wage. Building on this, Simon and Kaestner (2004) use the CPS data for 1979–2000 and a difference-in-differences methodology to examine three ESI outcomes: workers' receipt of ESI, whether a worker has family coverage, and whether a worker reports that their employer pays the entire premium or not (conditional on holding coverage). For their identification strategy, Simon and Kaestner define groups of workers that are likely to be 'affected' or 'unaffected' by the minimum wage changes, given their age, educational attainment, and income. The authors do not find evidence that minimum wages affect fringe benefits provision based on the ESI outcomes they examine.

Marks (2011) examines the tradeoff between minimum wages and benefits provision using a sample of working age persons (18–64) from the CPS data for 1988–1993 and 1998–2005. Marks distinguishes between workers in firms that are likely subject to Internal Revenue Service non-discrimination provisions (i.e., large employers more likely to be self-insured) from those that are not (i.e., small and medium-sized employers), suggesting that large employers are less able to tailor fringe benefit offerings to specific types of workers. Like Simon and Kaestner, she examines both receipt of employer-provided coverage and the share of the plan paid by employees (all, part, or none) for those who hold coverage. Marks finds employer-provided coverage is unchanged for large firm workers. In contrast, for low-education workers in small firms, she estimates a significant inverse relationship between minimum wages and the probability of ESI receipt for the average high school dropout. She also reports a lower probability of a zero employee contribution plan for low-education workers in small or medium size firms.

Using a quasi-experimental design, Dube et al. (2007) investigate the effects of a city-wide minimum wage increase in San Francisco on several employment and non-employment outcomes among 354 restaurants (Dube et al., 2007). Their analyses did not reveal any significant effect of the policy change on workers' health insurance coverage.

Two more recent studies by Clemens et al. (2018) and Dworsky et al. (2022) have extended the literature to include new data sources and estimation approaches. Using the 2011–2016 ACS and a difference-in-differences methodology, Clemens et al. (2018) examine whether or not a worker reports ESI enrollment. Their empirical approach includes identifying workers ages 16 to 64 that are most likely to be affected by minimum wage changes based on their occupation.[5] In their modeling, the authors control for changes in state-based economic conditions as well as access to public insurance through states' expansion of Medicaid eligibility under the ACA. Their analyses demonstrate that a $1 increase in the minimum wage lowers the probability of a worker having ESI by two percentage

[3] Employers can also affect non-wage compensation expenses indirectly by altering job structures, such as moving from hiring one full-time position to two part-time positions. In turn, this can alter workers' eligibility for non-wage compensation.

[4] For reviews of the broader literature on the effects of minimum wage laws on labor outcomes, see Manning (2021), Clemens (2021), Neumark (2018), and Wolfson and Belman (2019).

[5] The authors use the Occupational Employment Statistics data to identify occupations that are in the lowest portion of the wage distribution and therefore more likely to be subject to minimum wage laws.

points (roughly four percent) for very low-wage workers with a smaller effect on low-wage workers of 1.2 percentage points (2.5 percent). Dworsky et al. (2022) examines the minimum wage-ESI relationship using the 2005–2016 CPS-Annual Social and Economic Supplement and a sample of families with incomes up to 300 percent of the federal poverty level (FPL) to capture workers directly affected by the minimum wage and those who may be indirectly affected by coverage changes. Their analysis focuses on two outcomes – a worker's ESI enrollment and ESI enrollment by a worker's dependents. Additionally, the authors examine how overall insurance coverage and Medicaid coverage are changing at the same time to better understand potential substitution effects resulting from ESI losses due to minimum wage increases. Results from Dworsky et al. (2022) find that a $1 increase in the minimum wage is associated with a 0.99 percentage point reduction in ESI enrollment among low-income workers and their dependents. Their results are also suggestive of a $1 increase in the minimum wage increasing the probability of having Medicaid coverage by 1.1 percentage points and not changing overall rates of insurance coverage, though these findings are less robust to model specifications than their findings regarding ESI enrollment.

To summarize, the limited empirical research investigating the relationship between minimum wages and ESI provision has found small to null effects of changes in minimum wages on ESI outcomes, including a worker's eligibility for coverage, enrollment in coverage, and having a zero out-of-pocket premium requirement. While the use of federal population survey data on lower-income workers supports the selection of sampled workers likely to be affected by minimum wage policies, there are also some measurement challenges with this approach. First, the employer is the decision-maker with respect to compensation, and so there is value in examining the responses of employers (versus workers) to changes in minimum wages over time. Second, much of the prior work has used ESI enrollment as the primary outcome. This measure encompasses multiple decisions – an employer's decision to offer coverage and the specific terms of that offer as well as a worker's decision to take up the offer of coverage.

This study complements the existing literature by investigating how employers have responded to changes in state and federal minimum wage policies over nearly two decades with respect to their provision of ESI. In particular, we use data from the MEPS-IC and consider an expanded set of ESI outcomes, including dimensions of plan generosity that have not been investigated previously. Our analyses also incorporate how the ACA's Medicaid eligibility expansion affects ESI outcomes.

Wage and ESI tradeoff

This work also relates to a much more robust literature on the tradeoff between ESI and wages that is primarily focused on how increased health care costs impact employee wages. The literature stems from the initial predictions of Summers (1989), who provided a simple labor supply and demand framework to predict how government mandates of ESI would result in lower wages (and potentially lower employment) (Summers, 1989). The model has since been formalized by Gruber and Krueger (1991) and empirically examined by many studies since (Arnold and Whaley, 2020; Baicker and Chandra, 2006; Bhattacharya and Bundorf, 2009; Buchmueller and Monheit, 2009; Clemens and Cutler, 2014; Gruber and Krueger, 1991; Gruber, 1994; Kolstad and Kowalski, 2016). Identification strategies vary, including comparisons of wages between groups with higher versus lower health care costs (Bhattacharya and Bundorf, 2009; Gruber, 1994), instrumental variable approaches (Arnold and Whaley, 2020; Baicker and Chandra, 2006), and through the examination of state mandates (Buchmueller and Monheit, 2009; Kolstad and Kowalski, 2016) and public sector spending (Clemens and Cutler, 2014). Even with varied methodological approaches, the findings generally show that increases in the cost of health insurance to employers results in decreased wages.

Others have considered how employers may respond to increased health care costs by altering non-wage compensation. Sommers (2005) presents a theoretical framework that predicts that stickiness in wages, especially among low-wage insured employees, could result in lower employment and/or decreased health benefit generosity (Sommers, 2005). A more limited empirical literature examines the impact of increased health care costs on non-wage compensation (Anand, 2017; Arnold and Whaley, 2020), and finds evidence that health care costs may be absorbed, in part, by higher employee premium contributions and deductibles. We contribute to this literature by examining the tradeoff between wages and ESI in a much less commonly-studied direction. Minimum wage laws provide an opportunity to examine how increased wages, through government mandate, impact the provision of ESI. In this context, this paper examines the impact of wages on the most comprehensive set of ESI characteristics to date.

Conceptual framework

Our hypotheses that minimum wage increases may result in changes in ESI provision stems from a simple extension of Summers (1989) and other perfect competition models of labor. Minimum wage increases inherently result in potential increased wage-related labor costs for employers. Total labor costs are comprised of both wage and non-wage benefits, the latter including health insurance and other fringe benefits (e.g., retirement contributions, paid sick leave).

In the perfect competition framework, employers will offset increased wage-related costs with either a reduction in employment, a pass-through of costs to consumers, or a decrease in other non-wage compensation. Given that ESI comprises a significant and adjustable component of employers' non-wage labor costs, employers may reduce costs through modifying their health benefit offerings. The simplest way for employers to reduce such costs is to stop offering ESI. We hypothesize that minimum wage increases may therefore result in fewer employers offering health insurance. This is more likely to occur at smaller employers, whose offering decisions are generally more sensitive than large employers to labor market and regulatory conditions (Abraham et al., 2016; Gruber and Lettau, 2004). Additionally, we hypothesize that this effect may be most pronounced following the implementation of the ACA's small employer group coverage provisions in 2014, including the introduction of modified community rating and essential health benefits requirements. These policies make health insurance more expensive for many small employers, which could lead some to be more

likely to drop coverage in the face of increased minimum wages (Hall and McCue, 2018).

Given that health benefits are a valued and common form of compensation (Employee Benefit Research Institute and Greenwald Research 2022), employers may instead continue to offer health insurance but seek to reduce the cost of their health benefits through changes in benefit design or generosity. For example, an employer could require its employees to pay a larger share of the total premium out of their paycheck. Alternatively, they could offer plans with higher cost-sharing (e.g., deductibles) or narrower provider network arrangements (e.g., exclusive provider organizations), which are both associated with lower average premiums (Kaiser Family Foundation, 2022a). Therefore, we also hypothesize that increased minimum wages may be associated with higher employee premium contribution shares, higher deductibles, or narrower plan networks.

Recent literature, however, finds substantial evidence of uncompetitive labor markets (Autor et al., 2017, 2020; Azar et al., 2020, 2020). In this case, the perfect competition framework may not fully explain the impact of minimum wage increases. Thus, we expect that employers in concentrated labor markets may still seek to lower their health benefit costs, given emerging evidence that greater labor market concentration is associated with lower health benefit generosity (Meiselbach et al., 2022).

Data, measures, and empirical approach

Data and measures

Our primary data source is the Medical Expenditure Panel Survey - Insurance/Employer Component (MEPS-IC) for 2002–2020.[6] The MEPS-IC is a nationally representative, establishment-level survey of U.S. employers designed with a sampling goal to produce accurate state level-estimates (Davis, 2021).[7] Using phone and mail-based methods, the MEPS-IC collects detailed information on insurance provision, including whether the employer offers coverage, workers' eligibility, premiums, and plan attributes (e.g., provider network arrangement and cost-sharing provisions). These data also include employer and workforce characteristics. For this study, we use publicly-available, state-year level data on private sector employers generated by the Agency for Healthcare Research and Quality (Agency for Healthcare Research and Quality, 2022) merged with state-year level minimum wage and economic data from the University of Kentucky Center for Poverty Research National Welfare Data (University of Kentucky Center for Poverty Research, 2022). Nevada is excluded from all analyses as their state minimum wage law allows for lower wages if health insurance is offered by the employer (Stamm and Bhakta, 2019).

We examine six primary ESI outcomes: (1) the percentage of employers that offer insurance, (2) the percentage of employees eligible among employers offering coverage, (3) the percentage of employees that are part-time among employers offering coverage, (4) the employee share or contribution toward the total premium for single coverage, (5) the percentage of employers offering a plan that has an annual deductible, and (6) the log of the average deductible for single coverage (unconditional on having a deductible). These outcome measures were chosen because they represent significant components of ESI provision and because they are consistently available in MEPS-IC estimates over our full study period. In supplemental analyses using the ACS microdata from 2008 to 2019 limited to actively working individuals,[8] we explore whether minimum wage changes are associated with the probability that an individual is uninsured, enrolled in employer-sponsored insurance, enrolled in the individual market, and enrolled in Medicaid.

Our key explanatory variable is the minimum wage (nominal dollars), which is the maximum of the state and federal minimum wage in a given state and year (Fig. 1). Additionally, we control for the unemployment rate, Medicaid eligibility for childless adults (as a continuous percent of the FPL for a single childless adult), and median income. Fig. 2 shows the trend of our key outcome variable (the percentage of employers offering health insurance) over time and Table 1 provides summary statistics for our outcomes and independent variables.

Empirical approach

We use a difference-in-differences modeling approach that examines the relationship between within-state changes in ESI provision and within-state changes in state minimum wage laws over time.

$$Y_{s,t} = \beta_0 + \beta_1 MinWage_{s,t} + \beta_2 X_{s,t} + \alpha_s + \delta_t + \varepsilon_{s,t} \quad (1)$$

where $Y_{s,t}$ are state-year level averages of employer-sponsored health insurance outcomes for state s in year t. $MinWage_{s,t}$ is the greater of the state and federal minimum wage in that state-year and $X_{s,t}$ are a set of state-year covariates that includes the state unemployment rate, Medicaid eligibility threshold for childless adults (as a continuous percent of the FPL), and median income. Here α_s and δ_t are state and year fixed effects, respectively. $\varepsilon_{s,t}$ is the error, with wild cluster bootstrap standard errors clustered at the state level (Cameron et al., 2008). Regressions are weighted by the number of employers in a state-year.

We estimate regressions for each outcome among all employers, and separately for small (<50 employees) and large firms (50+),

[6] MEPS-IC did not produce estimates in 2007, so reference to 2002-2020 throughout excludes the year 2007.

[7] Establishments represent a particular place of work or physical location where business is conducted, services are provided, or industrial operations are performed. Separate establishments may belong to a multi-establishment firm, with multiple site locations. In this paper, we refer to establishments as employers throughout.

[8] ACS data were only available 2008-2019 within the years of our study sample.

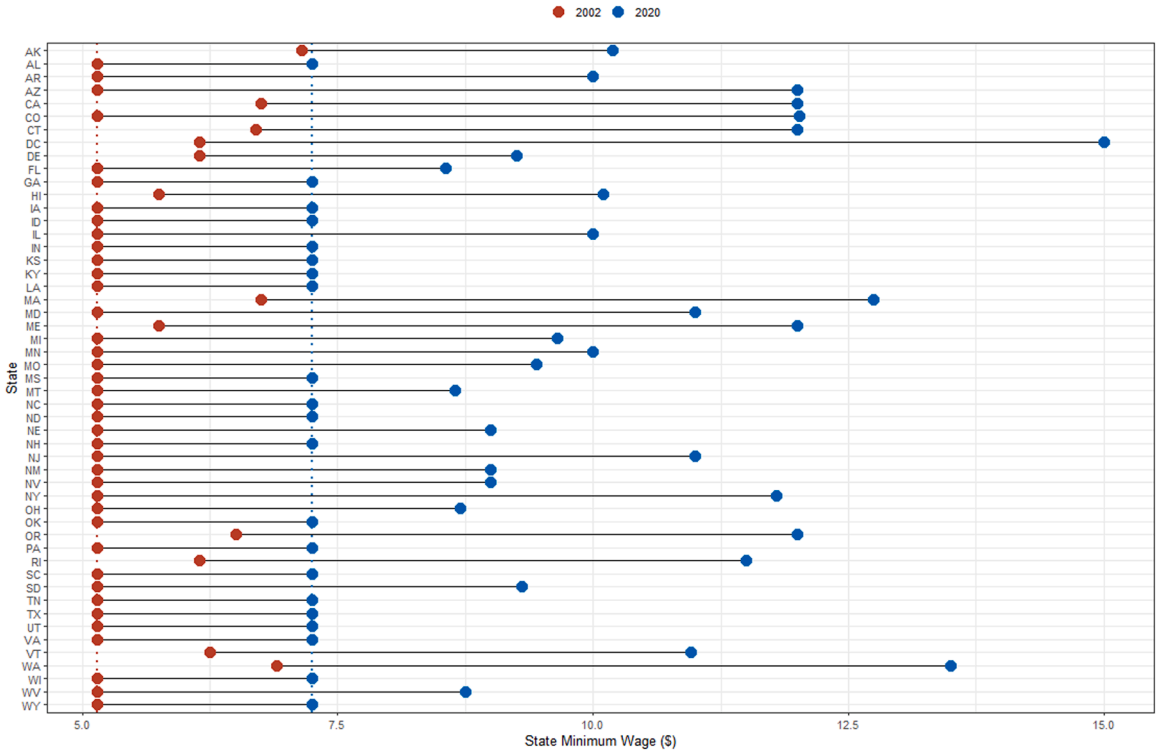

Fig. 1. Federal and state minimum wages, 2002 and 2020
Notes: State and national minimum wages are from the University of Kentucky Center for Poverty Research National Welfare Data. Red and blue dotted lines represent the federal minimum wages of $5.15 and $7.25 in 2002 and 2020, respectively.

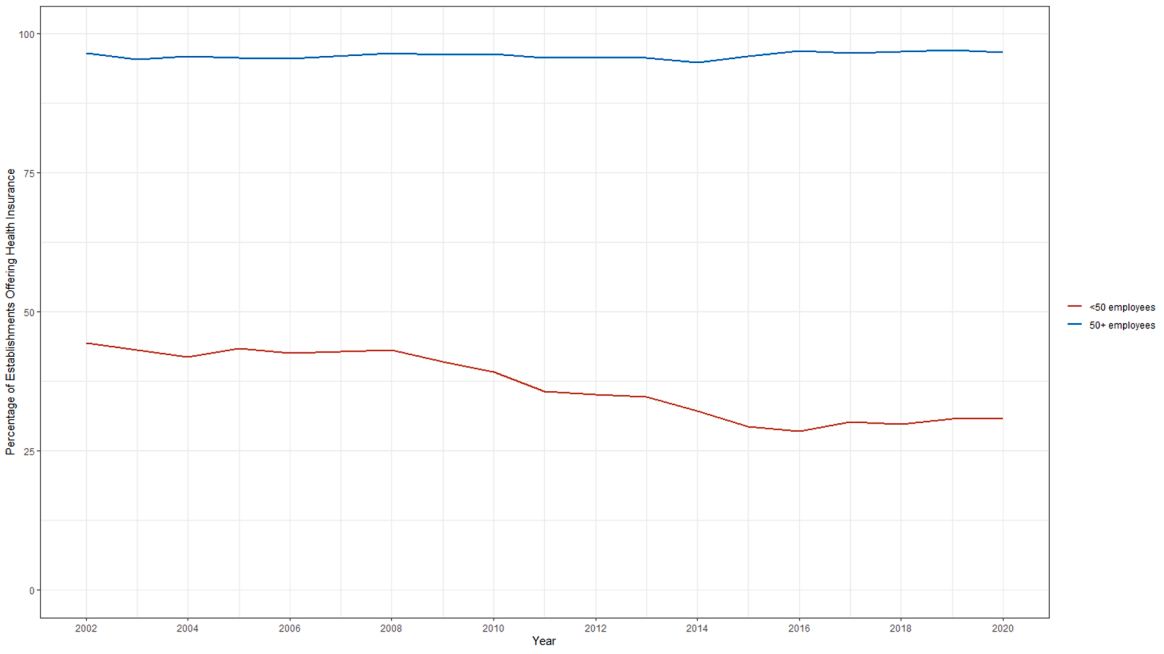

Fig. 2. Percent of private sector employers offering health insurance 2002–2020, by Employer Size
Notes: Percent of private sector employers offering health insurance is based off of national estimates from the Medical Expenditure Panel Survey – Insurance/Employer Component.

Table 1
Characteristics of state employer-sponsored insured markets 2002–2020, by employer size and wage distribution.

	All employers	Small employers (<50)	Large employers (50+)	Low-wage employers (>=50 % low-wage)	High-wage employers (<50 % low-wage)
N, state-years	892	892	892	892	892
Number of employers	135,217 (144,729)	101,209 (111,261)	34,008 (34,397)	42,473 (42,618)	90,940 (103,655)
Minimum wage ($)	7.2 (1.7)	7.2 (1.7)	7.2 (1.7)	7.2 (1.7)	7.2 (1.7)
Unemployment rate (%)	5.8 (2.0)	5.8 (2.0)	5.8 (2.0)	5.8 (2.0)	5.8 (2.0)
Median income ($)	43.4 (10.7)	43.4 (10.7)	43.4 (10.7)	43.4 (10.7)	43.4 (10.7)
Percent offering any health insurance	51.4 (8.7)	36.2 (10.9)	96.2 (2.0)	38.1 (9.2)	57.5 (9.1)
Percent of employees eligible among those offering health insurance	77.4 (3.0)	77.6 (4.6)	77.4 (3.4)	55.1 (7.7)	84.1 (3.1)
Percent of employees that are part-time	29.5 (5.8)	43.4 (10.1)	24.4 (5.3)	45.3 (7.6)	14.3 (3.6)
Average single premium ($)	5234.9 (1245.6)	5251.2 (1270.2)	5228.6 (1259.4)	4932.8 (1187.0)	5289.4 (1252.8)
Average employee premium share (%)	20.2 (3.2)	18.0 (4.9)	20.9 (3.0)	24.3 (5.0)	19.5 (3.4)
Percent enrolled in plan with a deductible	79.6 (17.5)	80.9 (18.6)	79.2 (17.6)		
Average deductible ($)	1013 (572)	1301 (710)	941 (559)		

Notes: Unweighted means are shown with standard deviation in parenetheses. State minimum wages and the unemployment rate are from the University of Kentucky Center for Poverty Research National Welfare Data, 2002–2020. All other variables are from state-year estimates based on the Medical Expenditure Panel Survey – Insurance/Employer Component, 2002–2020. Cells are empty if state-year estimates were not available for the shown variable and stratification combination.

and for low-wage (≥50 % low-wage employees) and high-wage firms (<50 %).[9] Additionally, we include an interaction term that allows minimum wage effects to differ pre- to post-2014, as 2014 is the year when the ACA's coverage expansion and insurance market regulatory reforms were implemented. The estimates from the primary specifications can be interpreted as a weighted average of the time-varying estimates, where weights are determined by the number of employers in state-year observations. Finally, we estimate industry-specific effects for outcomes where MEPS-IC provides this stratification. To generate industry-specific effects, we interact a categorical industry grouping variable with $MinimumWage_{s,t}$.

The estimated coefficient β_1 represents the difference-in-differences estimated impact of a $1 increase in the minimum wage on employer-sponsored health insurance. The key identifying assumption of our empirical approach is an extension of the typical parallel trends assumption, that states with minimum wage laws would have followed a similar trend to those without minimum wage laws had the policy not been put in place. Given the continuous nature of our treatment variable, however, the identifying assumption assumes this to be true for all "doses" of minimum wage increases (the "strong parallel trends" assumption) (Callaway et al., 2021). Though this assumption is not truly testable, we employ a number of robustness checks, described in the following section, to establish further confidence that this assumption is reasonable.

Robustness checks

To evaluate the robustness of our findings and examine the identifying parallel trends assumption of our empirical approach, we employ a series of tests common to the difference-in-differences literature. To do this, we first convert our continuous state minimum wage independent variable to a binary variable. The variable takes a value of 1 in the first year in our data that a state has a minimum wage law in place that exceeds the federal minimum wage and remains equal to 1 for all years following its implementation. The variable has a value of 0 for all other state-years in our sample.

From 2002–2020 in our sample, 15 states never had a minimum wage exceeding the federal minimum wage (i.e., "never-treated"), 7 states always had a minimum wage exceeding the federal minimum wage (i.e., "always-treated"), and the remaining 29 states and DC raised their minimum wage above the federal level at least once between 2003 and 2020. In addition, there were 13 states that had a temporary minimum wage increase where they initially had a state minimum wage above the federal minimum wage but did not have a state minimum wage above the federal minimum wage within 5 years of the initial increase. In Appendix 1, we outline the first year that each state had a minimum wage that exceeded the federal minimum wage within our MEPS-IC sample and highlight states that were always-treated or only temporarily increased their minimum wage above the federal level.

First, we employ a standard two-way fixed effects difference-in-differences regression specification identical to Eq. (1), except for the specification of $MinWage_{s,t}$ which we treat as binary (now referred to as $AnyMinWage_{s,t}$). We further estimate a modified version which accounts for the size of the state minimum wage increase, relative to the federal minimum wage:

$$Y_{s,t} = \beta_0 + \beta_1 AnyMinWage_{s,t} + \beta_2 \left(MinWage_{s,t} - FederalMinWage_t\right) + \beta_3 X_{s,t} + \alpha_s + \delta_t + \varepsilon_{s,t} \quad (2)$$

where $(MinWage_{s,t} - FederalMinWage_t)$ characterizes the size of the gap, in dollars, between the state and federal minimum wage. β_2

[9] In the MEPS-IC estimates, low-wage is defined by an upper bound of hourly wages of $9.50 from 2002-2003, rising $0.50 every two years ($12.50 in 2019-2020).

identifies the effect of a $1 increase in the state minimum wage over the federal minimum wage.

Second, we re-estimate our binary difference-in-differences models for each outcome using the Callaway and Sant'Anna estimator, which gives the average treatment effect on the treated (ATT) in the context of staggered treatment adoption. Specifically, we estimate the improved double robust difference-in-differences estimator, as in Sant'Anna and Zhao (2020).[10] State clustered standard errors are estimated using a wild bootstrap procedure with 999 repetitions. Note that, in this estimation strategy, always-treated states are excluded. We therefore re-estimate our primary specification, with the continuous treatment measure, for each outcome excluding always-treated states to assess how much the inclusion of these states affects our main estimates. Unlike the standard two-way fixed effects difference-in-differences estimator, the Callaway and Sant'Anna estimator arrives at an aggregate ATT by first calculating an ATT for each treatment cohort and then taking a weighted average of each of the group ATTs. The method resolves the core issues raised in Goodman-Bacon (2021), including that earlier treated units can be used as a control (especially in long panels) and therefore be given negative weights in the estimation of the overall difference-in-differences estimate (Goodman-Bacon, 2021). In addition, we estimate these models excluding states with temporary minimum wage increases to gauge the sensitivity of our results to the exclusion of these states.

Third, to evaluate the presence of differences in trends prior to the passage of a state's first minimum wage increase, we also obtain ATTs for each year relative to the year before the minimum wage was first increased using the Callaway and Sant'Anna estimation process. Our model can be expressed as:

$$Y_{s,t} = \beta_0 + \sum \beta_t \left((Year = t)_t * AnyMinWage_{s,t} \right) + \beta_2 X_{s,t} + \alpha_s + \delta_t + \varepsilon_{s,t} \quad (3)$$

where $(Year = t)_t$ indicates the year relative to the first passage of a state minimum wage law. $\sum \beta_t$ represents a series of coefficients, estimated for each of these years relative to treatment. Evidence in support of the parallel trends assumption would show null effects in the years prior to passage of the law, with effects (if any) revealing themselves in the years following. We also show the underlying variation in the level of minimum wages in relation to treatment timing in this specification by estimating the equivalent specification where the outcome of the regression is instead the level of the state minimum wage.

Though we conduct this analysis to assess evidence of divergent trends in states with minimum wage increases compared to those without minimum wage increases prior to the implementation of an increase, such an analysis has a number of empirical challenges in this setting. First, though many states had minimum wages above the federal level early in our study period, they also enacted larger minimum wage increases that occurred later. These states are dropped from the Callaway and Sant'Anna estimation process if their minimum wage was always above the federal level. In an additional analysis, we instead update the first treated year for these states to be the later occurring and larger minimum wage increase. Specifically, we update the first minimum wage increase for California and the District of Columbia to 2014, Alaska, Arkansas, Connecticut, Hawaii, Maryland, Massachusetts, Minnesota, New York, Oregon, Rhode Island, West Virginia to 2015, Michigan to 2016, Arizona, Colorado, Maine, Washington to 2017, and Illinois, Missouri, New Jersey, New Mexico to 2019. Florida, Ohio, and Vermont are dropped from these analyses, as each experienced consistent minimum wage increases throughout the study period. Second, as noted above, some states only temporarily increased their minimum wage and thus it may be inappropriate to consider every year as a treated year following the first minimum wage increase. Therefore, as in the above difference-in-differences models, we also estimate these time-varying ATTs excluding states with temporary minimum wage increases. Third, given the long study period and variation in treatment timing, ATTs 7 years preceding first treatment or earlier are only estimated using variation from a small group of states. We employ a specification that drops these years prior to 6 years preceding first treatment.

Finally, we test the sensitivity of our main specification to varying levels of covariate adjustment. In our primary specification, we adjust for the state-year unemployment rate, Medicaid eligibility threshold for childless adults, and median income. We alternatively estimate regressions without any covariate adjustment (beyond state and year fixed effects), with only adjustment for the Medicaid eligibility threshold, and with adjustment for state-specific linear time trends.

Non-linear effects

There is considerable variation in the size and nature of state minimum wage increases. Recent evidence suggests qualitatively different effects between small and large minimum wage increases on employment, where small increases have little to no effect on employment while larger increases are linked to negative employment effects (Clemens and Strain, 2021). In the context of ESI provision, it is ambiguous whether small or large increases would have differing effects. On one hand, ESI provision could be more responsive to large minimum wage increases, just as employment has been found to be. On the other hand, ESI provision could be more responsive to small minimum wage increases if employers are more likely to adjust on this more flexible margin in response to small changes. We explore this empirical question through the following approaches.

First, we translate the approach used in Clemens and Strain (2021) to our data. We categorize state-year observations into three distinct groups: 1) non-increasers (i.e., state minimum wage is not above the federal level and/or has not increased relative to a previous time point), 2) small increasers, and 3) large increasers. We define small and large increasers in two primary specifications,

[10] The Callaway and Sant'Anna estimation process is implemented using the csdid package in Stata 17, with state as the panel identifier, year as the time variable, the first year of treatment as the cohort identifier, and the Sant'Anna and Zhao (2020) improved doubly robust DiD estimator option ("drimp").

including one that is backward-looking (i.e., based on the difference in the current minimum wage relative to the minimum wage prior) and another that is forward-looking (i.e., based on the difference between the current minimum wage relative to the minimum wage in the future). Firms may respond to increased costs induced by minimum wage increases that have already occurred (backward-looking) or respond to future minimum wage increases, given that policies are typically phased in over multiple years (forward-looking). In either case, a large minimum wage increase is considered to be an increase of $2.50 or greater over a five-year period and a small increase is an increase below $2.50. We also consider a definition based on a two-year period, where a large increase is considered to be an increase of $1.00 or greater. We then estimate the relationship between all ESI outcomes and these two indicators for small and large increases.

In addition, we also include log-log specifications where both the outcome and minimum wages are log-transformed and a quadratic specification that includes a squared minimum wage variable.

Results

Regression analysis of health insurance offer and eligibility

We first examine the impact of minimum wage increases on the percentage of employers that offer health insurance (Table 2). Among all employers, a $1 increase in minimum wages is associated with a statistically significant 0.92 percentage point (p.p.) decrease in the percentage of employers offering health insurance (p-value = 0.043). This relationship is largely driven by decreases in the percentage of small employers (<50 employees) offering coverage. For this group, we find that a $1 increase in minimum wages is associated with a statistically significant 0.98 p.p. decrease in the percentage offering any health insurance (p-value = 0.064). In contrast, large employers, who offer insurance at much higher rates, are unaffected. Further, we see a larger effect after 2014 and among employers with a greater proportion of low-wage workers (i.e., those with 50 % or more low-wage employees). Prior to 2014, we find no relationship between minimum wage increases and health insurance offers among all employers (p-value = 0.754); in 2014 and after, a $1 increase in minimum wages was associated with a 0.93 p.p. decrease in the percentage of employers offering health insurance (p-value = 0.015). Among employers with a workforce that is 50 % or greater low-wage, a $1 increase in minimum wages is associated with a statistically significant 1.40 p.p. decrease in health insurance offers (p-value = 0.021; as compared to a 0.98 p.p. decrease among employers with less than 50 %, p-value = 0.049).

We also examine if minimum wages affect the percentage of employees eligible to take up insurance, among employers that offer it as part of compensation (Table 3). We find no statistically significant evidence that employers respond to minimum wage increases by changing the eligibility of their workforce for this fringe benefit. One indirect way that employers can adjust on this dimension is by restricting eligibility to full-time employment and then increasing the share of their workforce that is part-time. Consistent with the null results in Table 3, we largely find the percentage of employees that are part-time at an employer to be unaffected (Table 4). However, we find some evidence of a statistically significant 0.39 p.p. increase in the part-time percentage at employers with less than a 50 % low-wage workforce (p-value = 0.019), where part-time work is generally less common (14 % of the workforce in high-wage employers, on average, compared to 44 % in low-wage employers).

Table 2
Impact of state minimum wage on employer health insurance offer, by employer size and wage distribution.

Variables	(1) All employers	(2) Small employers (<50)	(3) Large employers (50+)	(4) All employers	(5) Small employers (<50)	(6) Large employers (50+)	(7) Low-wage employers (>=50 % low-wage)	(8) High-wage employers (<50 % low-wage)
State minimum wage ($)	−0.92** (−1.86 - −0.04)	−0.98* (−2.08 - 0.05)	−0.01 (−0.32 - 0.31)	0.19 (−1.03 - 1.66)	0.04 (−1.17 - 1.50)	0.52 (−0.12 - 1.28)	−1.40** (−2.60 - −0.16)	−0.98** (−1.90 - −0.00)
State minimum wage ($) X ($t \geq 2014$)				−1.12 (−3.09 - 0.75)	−1.03 (−3.12 - 0.86)	−0.52 (−1.36 - 0.18)		
Weighted Mean Y	51.26	36.18	96.17	51.26	36.18	96.17	37.75	57.10
Observations	892	892	892	892	892	892	887	892
R-squared	0.86	0.89	0.41	0.86	0.89	0.42	0.60	0.85

Notes: Difference-in-differences estimates of the impact of $1 increase in minimum wage and 95 % confidence intervals, calculated using wild cluster bootstrap standard errors clustered at the state level, are in parentheses. All models controlled for state Medicaid threshold relative to federal poverty level, median income, unemployment rate, and state and year fixed effects. Regressions are weighted by the number of employers. State minimum wages, unemployment rate, and median income are from the University of Kentucky Center for Poverty Research National Welfare Data, 2002–2020. Employer health insurance offer rates are from state-year estimates based on the Medical Expenditure Panel Survey – Insurance/Employer Component, 2002–2020. Statistical significance indicated by *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Regression analysis of premium contributions and plan benefit generosity

Next, we examine the impact of minimum wage increases on the share of premiums paid by employees and deductibles. Conditional on offering health insurance, we find no evidence that minimum wage increases affect the share of the total premium paid by employees, regardless of employer size or wage composition (Table 5).

On the other hand, we do find evidence that minimum wage increases are associated with increases in both the prevalence and size of annual deductibles (Table 6). A $1 increase in minimum wages is associated with a statistically significant 1.83 p.p. increase in the percentage of plan enrollees with a non-zero deductible among employers that offer health insurance (p-value = 0.015). This result is driven by both small employers, where a $1 increase is associated with a 1.91 p.p. increase (p-value = 0.073), and large employers (1.83 p.p., p-value = 0.009). Our results also indicate an effect of minimum wage increases on the log of the unconditional average deductible among large employers. A $1 increase in minimum wages is associated with a 4 % increase in average deductibles among large employers (p-value = 0.039). In Appendix 2 and 3, we also investigate the association between minimum wage increases and changes in plan network design as well as heterogenous effects of minimum wage increases on offers, eligibility, and premium contributions across industry groupings, respectively.

Robustness checks

Our key identifying assumption is a stronger version of the typical parallel trends assumption, which requires parallel trends across different doses of our continuous treatment variable. To examine this assumption, we convert our model specification to a typical two-way fixed effects binary difference-in-differences model with staggered treatment adoption and then employ standard tests for this specification. The main finding from these binary treatment difference-in-differences models is that the effect of state minimum wages on the percentage of employers offering any health insurance is consistent across all tests. The effect on deductibles is generally robust to nearly all specifications as well, with the exception of the initial two-way fixed effect with only the binary version of the key independent variable.

In the two-way fixed effects regression, we find that all coefficients are directionally consistent with our primary specification (Appendix 4). However, there is greater variation in the estimate. In this specification, the presence of a state minimum wage law above the federal minimum wage is associated with a 1.59 p.p. reduction in the percentage of employers offering any health insurance (p-value = 0.074). Once the size of the difference between state and federal minimum wages is accounted for, all estimated effects are consistent in sign and joint statistical significance to our primary specifications across all outcomes (Appendix 5).

We then estimate treatment effects using the Callaway and Sant'Anna estimator and find estimates consistent with our main specification for health insurance offer rates and deductibles (Appendix 6). Specifically, the presence of a state minimum wage law above the federal minimum wage is associated with a 2.24 p.p. reduction in the offer of health insurance (p-value = 0.015) and a 5.44 p.p. increase in the percentage of employers offering a plan with a deductible in this specification (p-value < 0.001). The point estimates of a minimum wage effect are qualitatively larger than our primary estimates from Tables 2 and 6, respectively; however, these estimates represent the effect of a state imposing any minimum wage increase, whereas our primary specification estimates the effect of a $1 increase. Given that these estimates exclude always-treated states, whereas our primary specification does not, we also re-estimate continuous treatment effects for each outcome (Appendix 7). We find that, even with these states excluded, our main findings are unchanged. For example, $1 increase in minimum wages is associated with a statistically significant 1.00 p.p. decrease in the percentage of employers offering health insurance excluding always-treated states compared to 0.92 p.p. in the analysis that includes these states.

We then estimate time-varying treatment effects from this specification. We find that the pre-treatment average ATT on the percent of employers offering health insurance was 0.323 (p-value = 0.135), compared to a post-treatment average ATT of −3.730 (p-value = 0.001), indicating flat treatment effects prior to the minimum wage law and negative treatment effects following the minimum wage law, consistent with the parallel trends assumption (Appendix 8). Time-varying ATTs from this specification are displayed graphically in Appendix 9, showing that health insurance offers begin to decrease roughly 3 to 4 years following the first minimum wage increase, followed by larger decreases in later years. The underlying variation in minimum wages aligning with this specification is shown in Appendix 10, where we estimate time-varying ATTs with the state minimum wage as the outcome. This graphically shows that many states enacted relatively small minimum wage increases prior to the 2007–2009 federal minimum wage increases, which led to effective minimum wages rising in untreated states relative to early-treated states. Subsequent to that, many early-treated states then enacted larger minimum wages in later years. Taken together, these findings suggest that even the relatively small early minimum wage increases were likely associated with decreases in health insurance offers.

In Appendix 11 and 12, we show the equivalent time-varying ATTs, but instead treat later-occurring minimum wage increases as the first treatment year. Appendix 11 shows that, in this specification, a somewhat sharp decline in health insurance offers begins in the fourth year following minimum wage increases and the decline steepens in the sixth and seventh years following the increase. These trends align with the steady upward increase in minimum wages following these later-occurring minimum wage increases shown in Appendix 12. After states initially increased minimum wages in this period, they continued to steadily increase minimum wages year to year.

In Appendix 13 and 14, we visually depict time-varying ATTs for the estimation of health insurance offers across specifications that exclude states that temporarily increased minimum wages and drop years prior to 6 years preceding first treatment in treated states, respectively. Across both specifications, we do not see evidence of different pre-treatment trends in the percent of employers offering health insurance.

Table 3
Impact of state minimum wage on percentage of employees eligible among employers offering health insurance, by employer size and wage distribution.

Variables	(1) All employers	(2) Small employers (<50)	(3) Large employers (50+)	(4) All employer	(5) Small employers (<50)	(6) Large employers (50+)	(7) Low-wage employers (>=50 % low-wage)	(8) High-wage employers (<50 % low-wage)
State minimum wage ($)	0.07 (−0.58 - 0.69)	−0.12 (−0.81 - 0.48)	0.07 (−0.66 - 0.76)	0.15 (−0.54 - 0.84)	−0.15 (−1.27 – 1.08)	0.21 (−0.77 - 1.08)	−0.44 (−2.21 - 1.30)	−0.27 (−0.65 - 0.16)
State minimum wage ($) X ($t \geq 2014$)				−0.08 (−0.90 - 0.73)	0.04 (−0.89 - 0.1.08)	−0.13 (−1.28 – 1.02)		
Weighted Mean Y	77.73	78.77	77.69	77.73	77.69	77.69	56.06	84.10
Observations	892	892	892	892	892	892	886	892
R-squared	0.38	0.50	0.36	0.38	0.50	0.36	0.55	0.50

Notes: Difference-in-differences estimates of the impact of $1 increase in minimum wage and 95 % confidence intervals, calculated using wild cluster bootstrap standard errors clustered at the state level, are in parentheses. All models controlled for state Medicaid threshold relative to federal poverty level, median income, unemployment rate, and state and year fixed effects. Regressions are weighted by the number of employers. State minimum wages, unemployment rate, and median income are from the University of Kentucky Center for Poverty Research National Welfare Data, 2002–2020. Percentage of employees eligible for health insurance are from state-year estimates based on the Medical Expenditure Panel Survey – Insurance/Employer Component, 2002–2020. Statistical significance indicated by *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table 4
Impact of state minimum wage on percentage of employees that are part-time, by employer size and wage distribution.

Variables	(1) All employers	(2) Small employers (<50)	(3) Large employers (50+)	(4) All employers	(5) Small employers (<50)	(6) Large employers (50+)	(7) Low-wage employers (>=50 % low-wage)	(8) High-wage employers (<50 % low-wage)
State minimum wage ($)	−0.06 (−0.63 - 0.51)	0.75 (−0.45 - 1.80)	−0.20 (−0.77 - 0.35)	−0.19 (−0.96 - 0.47)	0.67 (−1.00 – 2.02)	−0.37 (−1.44 - 0.74)	0.37 (−0.30 - 0.91)	0.39*** (0.08 - 0.67)
State minimum wage ($) X ($t \geq 2014$)				0.14 (−0.74 – 1.04)	0.09 (−1.20 - 1.22)	0.16 (−0.98 - 1.26)		
Weighted Mean Y	28.03	41.24	23.59	28.03	23.59	23.59	43.90	14.06
Observations	892	892	892	892	892	892	886	892
R-squared	0.69	0.79	0.40	0.69	0.79	0.40	0.72	0.73

Notes: Difference-in-differences estimates of the impact of $1 increase in minimum wage and 95 % confidence intervals, calculated using wild cluster bootstrap standard errors clustered at the state level, are in parentheses. All models controlled for state Medicaid threshold relative to federal poverty level, median income, unemployment rate, and state and year fixed effects. Regressions are weighted by the number of employers. State minimum wages, unemployment rate, and median income are from the University of Kentucky Center for Poverty Research National Welfare Data, 2002–2020. Percentage of employees that are part-time are from state-year estimates based on the Medical Expenditure Panel Survey – Insurance/Employer Component, 2002–2020. Statistical significance indicated by *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

In Appendix 15, we test the sensitivity of our main specification to varying levels of covariate adjustment for all outcomes. We do not find that any of the estimated effects of state minimum wage increases on the investigated outcomes are sensitive (in sign and statistical significance) to excluding all covariates from the regression, only including adjustment for the Medicaid FPL threshold, or to adjustment for state-specific linear time trends.

Non-linear effects of minimum wage increases

We evaluate potential non-linear effects of minimum wage increases on ESI provision (Table 7). The state-year categories according to the backward-looking (Panel A) and forward-looking (Panel B) specifications are shown in Appendix 16 and 17, respectively. In Panel A, we estimate the impact of small and large increases over five years prior. In this specification, we find that large minimum wage increases are associated with a 2.27 p.p. decreases in the percentage of employers offering health insurance (p-value = 0.061), while small increases are associated with a 1.12 p.p. decrease (p-value = 0.054). Given that the average minimum wage increase over this five-year span was $3.20 for large increasers and $1.15 for small increasers, these estimates do not point to substantially differing elasticities between large and small increases and there is no statistically significant difference between the two coefficients (p-value =

Table 5
Impact of state minimum wage on employee premium contribution share, by employer size and wage distribution.

Variables	(1) All employers	(2) Small employers (<50)	(3) Large employers (50+)	(4) All employers	(5) Small employers (<50)	(6) Large employers (50+)	(7) Low-wage employers (>=50 % low-wage)	(8) High-wage employers (<50 % low-wage)
State minimum wage ($)	−0.09 (−0.40 - 0.27)	−0.21 (−0.93 - 0.48)	−0.07 (−0.34 - 0.26)	0.10 (−0.59 - 0.71)	0.30 (−1.14 - 1.50)	0.09 (−0.56 - 0.76)	−0.14 (−0.55 - 0.38)	−0.09 (−0.40 - 0.26)
State minimum wage ($) X ($t \geq 2014$)				−0.19 (−0.63 - 0.26)	−0.51 (−1.33 - 0.40)	−0.16 (−0.66 - 0.34)		
Weighted Mean Y	0.77	0.63	0.67	0.77	0.63	0.67	0.36	0.76
Observations	892	892	892	892	892	892	887	892
R-squared	20.36	18.14	21.06	20.36	18.14	21.06	24.53	19.69

Notes: Difference-in-differences estimates of the impact of $1 increase in minimum wage and 95 % confidence intervals, calculated using wild cluster bootstrap standard errors clustered at the state level, are in parentheses. All models controlled for state Medicaid threshold relative to federal poverty level, median income, unemployment rate, and state and year fixed effects. Regressions are weighted by the number of employers. State minimum wages, unemployment rate, and median income are from the University of Kentucky Center for Poverty Research National Welfare Data, 2002–2020. Employee premium contribution shares are from state-year estimates based on the Medical Expenditure Panel Survey – Insurance/Employer Component, 2002–2020. Statistical significance indicated by *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table 6
Impact of state minimum wage on deductibles, by employer size.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Percent enrolled in plan with any deductible				Log(Average annual individual deductible)		
Variables	All employers	Small employers (<50)	Large employers (50+)	All employer	All employers	Small employers (<50)	Large employers (50+)
State minimum wage ($)	1.83** (0.39 - 3.01)	1.91* (−0.21 - 3.82)	1.83*** (0.57 – 2.95)	0.08 (−3.07 - 2.66)	0.03 (−0.01 - 0.07)	0.02 (−0.03 - 0.08)	0.04** (0.00 - 0.07)
State minimum wage ($) X ($t \geq 2014$)				1.76 (−1.31 – 5.47)			
Weighted Mean Y	76.18	76.32	76.93	76.18	982.1	1262	936.1
Observations	892	892	892	892	892	892	892
R-squared	0.92	0.87	0.67	0.92	0.97	0.93	0.97

Notes: Difference-in-differences estimates of the impact of $1 increase in minimum wage and 95 % confidence intervals, calculated using wild cluster bootstrap standard errors clustered at the state level, are in parentheses. All models controlled for state Medicaid threshold relative to federal poverty level, median income, unemployment rate, and state and year fixed effects. Regressions are weighted by the number of employers. Columns (4)-(6) are specified as log-linear models to account for skew in the unconditional average deductible. State minimum wages, unemployment rate, and median income are from the University of Kentucky Center for Poverty Research National Welfare Data, 2002–2020. Percent of enrollees in a plan with any deductible and the log of the average enrollee deductible are from state-year estimates based on the Medical Expenditure Panel Survey – Insurance/Employer Component, 2002–2020. Statistical significance indicated by *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

0.219). However, we find large increases in minimum wages are associated with increases in the percent of employees enrolled in a plan with a deductible and with an increase in the logged average deductible, while small increases are not, with a statistically significant difference between the two coefficients (p-value = 0.001 and 0.084, respectively). Findings are similar in alternate specifications looking forward over a five-year period (Table 7, Panel B). In the forward-looking specification, only large minimum wage increases are associated with a significant decrease in the percentage of employers offering health insurance; however, there is no statistically significant difference between the coefficients (p-value = 0.140).

In Appendix 18, we show alternative non-linear regression specifications. Findings are generally similar when looking over a two-year period for both the backward-looking and forward-looking definitions (Appendix 18, Panels A and B, respectively). In log-log models, estimates are broadly consistent with our primary specification (Appendix 18, Panel C). This specification also provides an estimated elasticity of the percentage of employers offering health insurance to minimum wage increases of 0.13, meaning that a 10 % increase in the minimum wage is associated with a 1.3 % decrease in the percentage of employers offering health insurance. We do not find strong evidence of a quadratic relationship between minimum wage increases and any of the examined ESI characteristics (Appendix 18, Panel D).

Table 7
Non-Linear Impact of State Minimum Wage on Health Insurance.

VARIABLES	(1) Percent offering health insurance	(2) Percent eligible for health insurance	(3) Percent of workers that are part-time	(4) Employee share of total premium	(5) Percent enrolled in plan with any deductible	(6) Log(average annual individual deductible)
Panel A. Large defined as≥$2.50 over last 5 years (backward-looking)						
Large increase	−2.27*	−0.08	0.70	0.33	6.79***	0.12**
	(−4.64 - 0.11)	(−1.58 - 1.42)	(−0.97 - 2.38)	(−0.74 - 1.39)	(3.34 - 10.24)	(0.01 - 0.23)
Small increase	−1.12*	−0.37	0.24	0.68**	2.13	0.06
	(−2.26 - 0.02)	(−0.91 - 0.18)	(−0.55 - 1.03)	(0.15 - 1.21)	(−0.53 - 4.79)	(−0.02 - 0.13)
Wald test p-value	0.219	0.664	0.498	0.460	0.001	0.084
Panel B. Large defined as≥$2.50 in the next 5 years (forward-looking)						
Large increase	−2.46**	−0.75	−0.08	0.46	4.98**	0.12*
	(−4.86 - −0.06)	(−1.91 - 0.42)	(−1.43 - 1.27)	(−0.28 - 1.21)	(0.76 - 9.20)	(−0.00 - 0.24)
Small increase	−0.62	−0.14	0.46	0.74***	1.37	0.03
	(−1.79 - 0.55)	(−0.61 - 0.33)	(−0.26 - 1.18)	(0.26 - 1.21)	(−1.18 - 3.91)	(−0.04 - 0.11)
Wald test p-value	0.140	0.268	0.364	0.262	0.052	0.079
Weighted Mean Y	51.26	77.73	28.03	20.36	76.18	982.1
Observations	892	892	892	892	892	892

Notes: Difference-in-differences estimates of the impact of small and large increases in minimum wage and 95 % confidence intervals, calculated using wild cluster bootstrap standard errors clustered at the state level, are in parentheses. State-year observations are categorized into three distinct groups in Panel A and B: 1) non-increasers (i.e., state minimum wage is not above the federal level and/or has not increased relative to a previous time point), 2) small increasers, and 3) large increasers. In both Panel A and B, a large minimum wage increase is considered to be an increase of $2.50 or greater over a five-year period and a small increase is an increase below $2.50. In Panel A, the definition is based on the difference in the current minimum wage relative to the minimum wage 5 years prior. In Panel B, the definition is based on the difference between the current minimum wage relative to the minimum wage 5 years in the future. All models controlled for state Medicaid threshold relative to federal poverty level, median income, unemployment rate, and state and year fixed effects. Regressions are weighted by the number of employers. Column (6) is specified as log-linear models to account for skew in the unconditional average deductible. A Wald test is performed to compare if there are statistically significant differences between small and large increases. State and federal minimum wages, unemployment rate, and median income are from the University of Kentucky Center for Poverty Research National Welfare Data, 2002–2020. All outcomes are from state-year estimates based on the Medical Expenditure Panel Survey – Insurance/Employer Component, 2002–2020. Statistical significance indicated by *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Supplemental findings on overall uninsurance and insurance coverage enrollment distribution

Given our findings that minimum wage increases are associated with a small reduction in employer offers of health insurance, we explore whether and to what extent this affects broader coverage outcomes. Using ACS microdata from 2008 to 2019 for a sample of working individuals, we estimate the effect of state minimum wage laws on the probability than an individual is: uninsured, enrolled in ESI, enrolled in the individual (non-group) market, and enrolled in Medicaid (Appendix 19). We implement a similar specification to our main specification in Eq. (1) for each of these outcomes using ACS survey weights instead of employer weights in our regression. We find that minimum wage increases are not related to the probability than an individual is uninsured, despite fewer employers offering health insurance. State minimum wage laws are associated with a 0.30 p.p. decrease in the probability that an individual is enrolled in ESI (p-value = 0.095) but a 0.55 p.p. increase in the probability of Medicaid enrollment (p-value = 0.006). Minimum wage increases are not associated with any change in the probability of enrollment in the individual market over this time period. As the ACS sample does not overlap with our full MEPS-IC sample, we also produce estimates for the impact of state minimum wages on all ESI outcomes, limiting the MEPS-IC sample to 2008–2019 (Appendix 20). In this sample, we find that a $1 increase in minimum wages is associated with a 0.78 percentage point decrease in the percentage of employers offering health insurance (p-value = 0.023).

Study limitations and future extensions

This study is subject to a number of limitations. First, our analysis relies on using the state-year MEPS-IC estimates that are available in the public domain. Given that we focus on state-level policies, these data are suitable for this analysis. However, the aggregated estimates limit to the number of dimensions on which we can explore heterogeneity in the underlying findings. While we are able to explore stratified analyses by employer size, wage distribution, and industry groupings, we are unable to explore more tailored stratifications, such as more granular industry categories, workforce attributes, self-insurance status, or geographies. Future work should consider the use of the MEPS-IC microdata to explore, for example, how the effects of minimum wage increases on ESI provision depend on local labor market conditions or unionization within employer organizations. Relatedly, the MEPS-IC estimates are produced based on establishment-level responses, but employer decisions about health benefits could be made at the firm rather than the establishment-level. The MEPS-IC microdata could also be used to investigate heterogeneity in responses to minimum wage increases across multi-establishment firms.

Second, plan characteristics are only observed for employers that offer health insurance. If the composition of employers offering

health insurance changes in a way that is correlated with specific plan characteristics, observed changes in average plan characteristics could be attributable to compositional changes and not to changes among employers continuing to offer health insurance. This is of particular concern among small employers, where we observe changes in the percentage that offer health insurance following minimum wage increases.

Third, our analysis relies on variation over time in minimum wage laws within states. Our data do not enable us to explicitly consider changes in minimum wage laws within metropolitan areas or cities. According to the Economic Policy Institute, 46 localities have adopted minimum wage laws in excess of levels defined by state policy (Economic Policy Institute, 2022). If highly correlated with state minimum wage increases, local minimum wage increases could bias the estimated impact of state minimum wage laws upwards in magnitude. Future work should investigate the effect of these localized policies with MEPS-IC microdata or other data sources with enough geographic granularity to appropriately study them.

Fourth, there may be other dimensions of health benefits that employers could modify in response to minimum wage increases. Examples include offering dependent coverage, offering dental or vision coverage, employer contributions to health savings accounts or health reimbursement arrangements, offering paid sick leave or paid time off to see a doctor, or offering supplemental wellness or disease management programming. The availability of microdata is necessary to investigate such outcomes.

Finally, as with many state policies, the choice to increase minimum wages among states is non-random and could be correlated with other policy decisions or labor market conditions. We control for state-year Medicaid policy and labor market conditions and employ several robustness checks aimed at ruling out other explanations for the estimated treatment effects from our primary specification.

Discussion and conclusion

Laws that establish minimum wage levels have the potential to influence a variety of labor market outcomes, including the provision of fringe benefits. Decisions by employers regarding their health benefits provision affect more than 175 million Americans annually (Kaiser Family Foundation, 2021; Keisler-Starkey and Bunch, 2022). Using the 2002–2020 MEPS-IC, we investigate how changes in state and federal minimum wage laws have influenced private-sector employers' health benefits provision, including outcomes characterizing offers, eligibility, benefit design, and out-of-pocket premium requirements. We find that a $1 increase in state minimum wages is associated with a 0.92 percentage point decrease in the percentage of employers offering health insurance, largely driven by small employers and employers with a greater proportion of low-wage workers. Conditional on offering insurance, we also find that minimum wage laws are associated with a 1.83 percentage point increase in the percent of employees enrolled in a plan with a deductible. However, we find no meaningful evidence that employers that offer health insurance adjust eligibility criteria or the employee contribution share of the total premium.

The finding that, on average, minimum wage increases have a negative effect on the percentage of employers offering health insurance is consistent with recent work on this topic. Using individual enrollment data from the ACS and CPS, Clemens et al. (2018) and Dworsky et al. (2022) find that minimum wage increases result in between a 1 to 2 percentage point decrease in enrollment in ESI (Clemens et al., 2018; Dworsky et al., 2022). Our findings provide evidence that the documented changes in ESI enrollment found in these papers is likely driven by employer ESI offering decisions, as opposed to changes in eligibility or individual enrollment (take up) decisions. We are also able to incorporate new estimation approaches that address recent concerns raised in the difference-in-differences econometrics literature (Goodman-Bacon, 2021), and find that this result is robust to these new approaches. Though the estimates from these newer approaches are not directly comparable to our primary specification, given that treatment is operationalized as a binary (as opposed to continuous) measure, they document a qualitatively similar relationship between minimum wage changes and ESI provision. Further, we document the types of employers where decreased rates of ESI offers are concentrated. Unsurprisingly, our results reveal that such increases disproportionately affect employers that are small, with fewer than 50 employees, and have a larger percentage of low-wage workers. This finding is consistent with prior studies that have investigated employers' price-sensitivity with respect to offering coverage (Abraham et al., 2016; Gruber and Lettau, 2004) as well as employer responses to the ACA coverage expansion (Abraham et al., 2016, 2019; Vistnes et al., 2017).

Conditional on the decision to offer ESI coverage, benefit design decisions are affected by minimum wage increases in very limited ways. We find evidence of a small increase in the percentage of enrollees with a plan deductible and the average deductible level following minimum wage increases. A 4 % increase in average plan deductibles among large employers amounts to an approximate average $37 increase in annual deductibles, which is likely to have a small impact on an enrollee's out of pocket expenditures. However, the average treatment effect may mask heterogeneity if some employers choose to make major changes to plan deductibles while others make no changes. Outside of plan deductibles, we do not find robust evidence that other benefit design dimensions are altered. Overall, these findings suggest that the decision of whether to offer coverage at all is the most important ESI outcome affected by minimum wage changes, on average, in contrast to benefit design decisions, conditional on the offering health insurance.

We further investigate evidence of potential non-linear effects of minimum wage increases, between large and small increases, as well as time-varying effects. Minimum wage increases, both large and small, are linked to decreases in the percentage of employers offering health insurance, with no evidence of non-linear effects along this dimension. The magnitude of the effects, however, appear to grow over time, with larger effects beyond the third year after a minimum wage increase is first introduced by a state. Our results also suggest that deductibles may be more responsive to large minimum wage increases.

This work has several important implications. First, we highlight that employers may adjust their health benefits in response to minimum wage increases, which is rarely considered in the minimum wage literature and policy discussion. These findings do not rule out the role of employer monopsony power in explaining the small (or null) effects of minimum wages on employment, especially since

we find the largest responses among small employers. Rather, we contribute to a more complete understanding of all the ways in which employers may respond to minimum wage increases through changes to non-wage compensation.

Second, we find no evidence of consequential spillover effect on uninsurance, despite decreased health insurance offer rates. One contributing factor may be that we find that only small employers' decisions to offer health insurance are impacted. Based on 2021 MEPS-IC estimates, small employers employ approximately 35 % of private-sector employees and 15 % of those offered and eligible for ESI.[11] As such, a 0.92 percentage point decrease in health insurance offers among small employers is unlikely to result in large population-level losses of insurance, even without alternative coverage options. In our supplemental analysis of spillover effects, we find support for the idea that Medicaid may mitigate against potential uninsurance effects from small employers dropping health coverage. However, state minimum wage increases are correlated with state Medicaid eligibility (as we control for in this paper). Among the 15 states without a minimum wage increase above the federal level in our sample, seven are among the remaining 11 states that have not expanded Medicaid under the ACA (Kaiser Family Foundation, 2022b). The potential impact of a new federal minimum wage law, as recently introduced in Congress in 2021, on uninsurance may depend on variation in the robustness of alternative sources of insurance across states, including Medicaid and the individual market (Raise the Wage Act, 2021). Given this, policymakers may consider pairing minimum wage increases with policies aimed at improving access to these alternatives, such as Medicaid expansion, subsidies for individual coverage purchased in Marketplaces, or other public insurance options.

Third, our work highlights the important interactions between labor policy and health policy. On one hand, we find that the effects of minimum wage increases on ESI offers are greatest following 2014. This is the year in which many ACA provisions affecting health insurance in the small employer group market were put in place, including the introduction of modified community rating and essential health benefits requirements. These policies, which inherently make health insurance more expensive for some small employers, may lead these employers to be more likely to drop coverage in the face of increased minimum wages. On the other hand, the ACA also expanded individuals' access to alternative sources of health insurance through the expansion of Medicaid eligibility in states choosing to do so and subsidized individual coverage through newly created Marketplaces. As discussed above, this likely mitigates potential negative consequences from small employers not offering health insurance coverage. The total welfare implications, however, depend on the relative value employees place on wages, ESI, and alternative insurance options, including Medicaid.

Fourth, policymakers should pay attention to the decline in ESI coverage among small employers, though they make up a relatively small share of the overall ESI market. While we do not find that the decline in coverage among small employers, in the context of minimum wage increases, has diminished overall coverage rates, it theoretically could in the future. The ACA's employer shared responsibility requirement does not apply to small employers, while many of its other provisions do (e.g., modified community rating, essential health benefits, and plan standardization). Other recent policy initiatives may also contribute to this trend, such as Qualified Small Employer Health Reimbursement Arrangements (QSEHRAs) and Individual Coverage Health Reimbursement Arrangements (ICHRAs) at the federal level as well as the regulation of stop loss insurance for small employers at the state level (Centers for Medicare and Medicaid Services, 2020; HealthCare.gov, 2022; U.S. Department of Labor, 2014).

This study finds evidence that minimum wage increases are associated with decreases in the rate at which small employers offer health insurance as part of compensation. While employers modestly increase deductibles in response to minimum wage increases, there is little evidence that employers broadly adjust other dimensions of benefit design, conditional on offering health insurance. Despite declines in small employers offering health insurance, minimum wage increases are unlikely to lead to higher rates of uninsurance, particularly where state Medicaid eligibility has expanded as part of the ACA. State and federal policymakers should consider the availability of alternative insurance options for low-wage workers in discussions of increases to minimum wages.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.jhealeco.2023.102825.

References

Abraham, J., Feldman, R., Graven, P., 2016a. Employers' changing economic incentives to offer health insurance under the affordable care act. Am. J. Health Econ. 2 (3), 273–299.

Abraham, J., Royalty, A.B., Drake, C., 2016b. Employer-sponsored insurance offers: largely stable in 2014 following ACA implementation. Health Aff. (Millwood) 35 (11), 2133–2137. https://doi.org/10.1377/hlthaff.2016.0631.

Abraham, J., Royalty, A.B., Drake, C., 2019. The impact of medicaid expansion on employer provision of health insurance. Int. J. Health Econ. Manag. 19 (3–4), 317–340. https://doi.org/10.1007/s10754-018-9256-x.

Agency for Healthcare Research and Quality, 2022. Medical Expenditure Panel Survey (MEPS) Insurance Component (IC). Retrieved from. https://datatools.ahrq.gov/meps-ic.

Allegretto, S.A., Dube, A., Reich, M., 2011. Do minimum wages really reduce teen employment? accounting for heterogeneity and selectivity in state panel data. Indust. Relat.: A J. Econ. Soc. 50 (2), 205–240.

[11] MEPS-IC 2021 estimates that there are 5,173,717 establishments belonging to a firm with less 50 employees, with 31.9% offering health insurance, 33,882,008 employees, and 79.7% eligible for health insurance among those that offer. MEPS-IC 2021 estimates that there are 1,869,149 establishments belonging to a firm with 50 or more employees, with 97.3% offering health insurance, 95,795,050 employees, and 80.4% eligible for health insurance among those that offer.

Anand, P., 2017. Health insurance costs and employee compensation: evidence from the national compensation survey. Health Econ. 26 (12), 1601–1616. https://doi.org/10.1002/hec.3452.
Arnold, D., Whaley, C., 2020. Who Pays for Health Care Costs? The Effects of Health Care Prices on Wages. https://doi.org/10.2139/ssrn.3657598. Rochester, NY.
Ashenfelter, O., Card, D., Farber, H., Ransom, M.R., 2022. Monopsony in the labor market: new empirical results and new public policies. J. Hum. Resour. 57 (3).
Autor, D., Dorn, D., Katz, L.F., Patterson, C., Van Reenen, J., 2017. Concentrating on the fall of the labor share. Am. Econ. Rev. 107 (5), 180–185.
Autor, D., Dorn, D., Katz, L.F., Patterson, C., Van Reenen, J., 2020. The fall of the labor share and the rise of superstar firms. Q. J. Econ. 135 (2), 645–709.
Azar, J.A., Marinescu, I., Steinbaum, M.I., Taska, B., 2020a. Concentration in US labor markets: evidence from online vacancy data. Lab. Econ. 66.
Azar, J., Marinescu, I., Steinbaum, M.I., 2020b. Labor market concentration. J. Hum. Resour.
Baicker, K., Chandra, A., 2006. The labor market effects of rising health insurance premiums. J. Lab. Econ. 24, 609–634.
Bhattacharya, J., Bundorf, M.K., 2009. The incidence of the healthcare costs of obesity. J. Health Econ. 28 (3), 649–658. https://doi.org/10.1016/j.jhealeco.2009.02.009.
Blumenthal, D., 2006. Employer-sponsored health insurance in the united states–origins and implications. N. Engl. J. Med. 355 (1), 82–88. https://doi.org/10.1056/NEJMhpr060703.
Buchmueller, T.C., Monheit, A.C., 2009. NBER Working Paper Series 14839. https://doi.org/10.3386/w14839.
Callaway, B., Goodman-Bacon, A., Sant'Anna, P., 2021. Papers 2107.02637. *arXiv.Org*.
Cameron, A.C., Gelbach, J.B., Miller, D.L., 2008. Bootstrap-based improvements for inference with clustered errors. Rev. Econ. Stat. 90 (3), 414–427.
Card, D., Krueger, A.B., 2000. Minimum wages and employment: a case study of the fast-food industry in new jersey and pennsylvania: reply. Am. Econ. Rev. 90 (5), 1397–1420.
Centers for Medicare & Medicaid Services, 2020. Individual coverage health reimbursement arrangements: policy and application overview.
Clemens, J., Cutler, D.M., 2014. Who pays for public employee health costs? J. Health Econ. 38, 65–76. https://doi.org/10.1016/j.jhealeco.2014.04.008.
Clemens, J., Strain, M., 2021. NBER Working Paper 29264.
Clemens, J., Wither, M., 2019. The minimum wage and the great recession: evidence of effects on the employment and income trajectories of low-skilled workers. J. Public Econ. 170, 53–67.
Clemens, J., Kahn, L.B., Meer, J., 2018. The minimum wage, fringe benefits, and worker welfare.
Clemens, J., 2021. How do firms respond to minimum wage increases? Understanding the relevance of non-employment margins. J. Econ. Perspect. 35 (1), 51–72.
Coviello, D., Deserrano, E., Persico, N., 2022. Minimum wage and individual worker productivity: evidence from a large US retailer. J. Polit. Econ. 130 (9).
Davis, K.E., 2021. Sample Design of the 2020 Medical Expenditure Panel Survey Insurance Component.
Dube, A., Naidu, S., Reich, M., 2007. The economic effects of a citywide minimum wage. ILR Rev. 60 (4), 522–543. https://doi.org/10.1177/001979390706000404.
Dube, A., Lester, T.W., Reich, M., 2010. Minimum wage effects across state borders: estimates using contiguous counties. Rev. Econ. Stat. 92 (4), 945–964.
Dworsky, M.S., Eibner, C., Nie, X., Wenger, J.B., 2022. The effect of the minimum wage on employer-sponsored insurance for low-income workers and dependents. Am. J. Health Econ. 8 (1), 99–126.
Economic Policy Institute, 2022. Minimum Wage Tracker. Retrieved from. https://www.epi.org/minimum-wage-tracker/.
Employee Benefit Research Institute and Greenwald Research, 2022. 2022 Workplace Wellness Survey.
Fairris, D., Bujanda, L.F., 2008. The Dissipation of Minimum Wage Gains for Workers Through Labor-Labor substitution: Evidence from the Los Angeles Living Wage Ordinance, 75. Southern Economic Association, pp. 473–496.
Kaiser Family Foundation, 2021. Health Insurance Coverage of the Total Population. Retrieved from. https://www.kff.org/other/state-indicator/total-population/?currentTimeframe=0&sortModel=%7B%22colId%22:%22Location%22,%22sort%22:%22asc%22%7D.
Kaiser Family Foundation, 2022b. Status of State Medicaid Expansion Decisions: Interactive Map.
Giuliano, L., 2013. Minimum wage effects on employment, substitution, and the teenage labor supply: evidence from personnel data. J. Labor Econ. 31 (1), 155–194.
Goodman-Bacon, A., 2021. Difference-in-differences with variation in treatment timing. J. Econom. 225 (2), 254–277. https://doi.org/10.1016/j.jeconom.2021.03.014.
Gruber, J., Krueger, A.B., 1991. The incidence of mandated employer-provided insurance: lessons from workers' compensation insurance. Tax Policy Econ. 5.
Gruber, J., Lettau, M., 2004. How elastic is the firm's demand for health insurance? J. Public Econ. 88 (7), 1273–1293. https://doi.org/10.1016/S0047-2727(02)00191-3.
Gruber, J., 1994. The incidence of mandated maternity benefits. Am. Econ. Rev. 84 (3), 622–641.
Hall, M.A., McCue, M.J., 2018. The Health of the Small-Group Insurance Market. Retrieved from. https://www.commonwealthfund.org/publications/issue-briefs/2018/oct/health-small-group-insurance-market.
HealthCare.gov, 2022. Health Reimbursement Arrangements (HRAs) for Small Employers. Retrieved from. https://www.healthcare.gov/small-businesses/learn-more/qsehra/.
Horton, J., 2018. Price floors and employer preferences: evidence from a minimum wage experiment. Unpublished.
Ippolito, R.A., 2003. The impact of the minimum wage if workers can adjust effort. J. Law Econ. 46 (1).
Jardim, E., Long, M.C., Plotnick, R., van Inwegen, E., Vigdor, J., Wething, H., 2022. Minimum-wage increases and low-wage employment: evidence from seattle. Am. Econ. J.: Econ. Policy 14 (2), 263–314. https://doi.org/10.1257/pol.20180578.
Kaiser Family Foundation, 2022a. 2022 Employer Health Benefits Survey.
Keisler-Starkey, K., Bunch, L., 2022. Health Insurance Coverage in the United States: 2021. Government Publishing Office, U.S.
Kolstad, J.T., Kowalski, A.E., 2016. Mandate-based health reform and the labor market: evidence from the massachusetts reform. J. Health Econ. 47, 81–106. https://doi.org/10.1016/j.jhealeco.2016.01.010.
Ku, H., 2022. Does minimum wage increase labor productivity? evidence from piece rate workers. J. Lab. Econ. 40 (2) https://doi.org/10.1086/716347.
Manning, A., 2021. The elusive employment effect of the minimum wage. J. Econ. Perspect. 35 (1), 3–26.
Marks, M.S., 2011. Minimum wages, employer-provided health insurance, and the non-discrimination law. Indus. Relat.: A J. Econ. Soc. 50 (2), 241–262.
McKenzie, R.B., 1980. The labor market effects of minimum wage laws: a new perspective. J. Lab. Res. 1 (1), 255–264.
Meiselbach, M.K., Eisenberg, M.D., Bai, G., Sen, A., Anderson, G.F., 2022. Labor market concentration and worker contributions to health insurance premiums. Med. Care Res. Rev. 79 (2), 198–206. https://doi.org/10.1177/10775587211012992.
Neumark, D., Shirley, P., 2022. Myth or measurement: what does the new minimum wage research say about minimum wages and job loss in the united states? Ind. Relat. (Berkeley) 61 (4), 384–417.
Text - S.53 - 117th Congress (2021-2022): Raise the Wage Act of 2021. (2021, January 26). https://www.congress.gov/bill/117th-congress/senate-bill/53/text.
Royalty, A., 2000. Do Minimum Wage Increases Lower the Probability that Low-Skilled Workers will Receive Fringe Benefits. Joint Center for Poverty Research Working Paper.
Sant'Anna, P.H.C., Zhao, J., 2020. Doubly robust difference-in-differences estimators. J. Econom. 219 (1), 101–122. https://doi.org/10.1016/j.jeconom.2020.06.003.
Simon, K.I., Kaestner, R., 2004. Do minimum wages affect non-wage job attributes? evidence on fringe benefits. ILR Rev. 58 (1), 52–70. https://doi.org/10.1177/001979390405800103.
Sommers, B.D., 2005. Who really pays for health insurance? the incidence of employer-provided health insurance with sticky nominal wages. Int. J. Health Care Finance Econ. 5 (1), 89–118.
Stamm, C., Bhakta, L., 2019. Nevada Sets Stricter Health Benefit Standard, Higher Minimum Wage.
Summers, L.H., 1989. Some simple economics of mandated benefits. Am. Econ. Rev. 177–183.
U.S. Department of Labor, 2014. Guidance on State Regulation of Stop-Loss Insurance. Retrieved from. https://www.dol.gov/agencies/ebsa/employers-and-advisers/guidance/technical-releases/14-01.
U.S. Department of Labor, 2022a. Consolidated Minimum Wage Table ( ).
U.S. Department of Labor, Bureau of Labor Statistics, 2022b. Employer Costs for Employee Compensation – June 2022 ( ).

University of Kentucky Center for Poverty Research, 2022. UKCPR National Welfare Data. Retrieved from. http://ukcpr.org/resources/national-welfare-data.
Vistnes, J.P., Rohde, F., Miller, G.E., Cooper, P.F., 2017. Substantial churn in health insurance offerings by small employers, 2014-15. Health Aff. (Millwood) 36 (9), 1632–1636. https://doi.org/10.1377/hlthaff.2017.0431.
Wessels, W.J., 1980. The effect of minimum wages in the presence of fringe benefits: an expanded model. Econ. Inq. 18 (2), 293–313.
Wolfson, P., Belman, D., 2019. 15 years of research on US employment and the minimum wage. Labour 33 (4), 488–506.

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