PATHWAYS BETWEEN MINIMUM WAGES AND HEALTH:

THE ROLES OF HEALTH INSURANCE, HEALTH CARE ACCESS AND HEALTH CARE UTILIZATION

Otto Lenhart [a]

[a] University of Strathclyde
Department of Economics
Duncan Wing, Strathclyde Business School
199 Cathedral Street, Scotland, UK
Email: ottolenhart@gmail.com

Running Head: Pathways between Minimum Wage and Health

Abstract

This study contributes to recent work on the relationship between minimum wages and health by examining potential underlying mechanisms. Specifically, the roles of health insurance, health care access and utilization are explored. By analyzing Current Population Survey data for the years 1989 to 2009 and by estimating DD models, I find that higher minimum wages increase health insurance coverage, in particular individually purchased insurance, among low-educated individuals. By estimating data from the Behavioral Risk Factor Surveillance System for the same period, I furthermore provide evidence for improvements in health care access/affordability and increased health care utilization following minimum wage increases.

JEL Codes: I1, I12, I13

Keywords: Minimum Wages; Health; Pathways; Health Care Access; Health Behaviors

INTRODUCTION

The minimum wage has entered national spotlight over the past few years, reaching a pinnacle in former President Obama's 2014 State of the Union Address. Obama strongly advised Congress to raise the federal minimum wage from $7.25 to $10.10, arguing that this policy change would provide much-needed additional income for 28 million Americans and thereby contribute to a reduction in earnings inequality. While the State of the Union failed to change the federal minimum wage, which has remained unchanged since 2009, several states have raised their wage floors considerably higher in recent years. Between 2015 and 2017, 61 increases in state-level minimum wages were implemented across the U.S. In July 2019, the House of Representatives passed and forwarded the Raise the Wage Act, which outlines a gradual increase of the federal minimum wage to $15 by 2025. While the U.S. Senate appears to currently not have immediate plans to raise the federal minimum wage [Fernández Campbell, 2019a], it seems likely that the minimum wage will continue to be an important topic of political discussions in the upcoming years. The majority of Democratic candidates for the 2020 presidential election supporting an increase to $15 per hour [Fernández Campbell, 2019b].

While economists have extensively analyzed the effects of minimum wages on employment [see overview by Neumark et al., 2014] and poverty [e.g. Card and Krueger, 1995; Neumark and Wascher, 2002; Burkhauser and Sabia, 2007], uncertainty remains about how minimum wages affect labor market outcomes. In recent years, several studies have expanded the focus and examined potential effects of minimum wage increases on health outcomes of affected workers [e.g. Wehby et al., 2016; Horn et al., 2017; Averett et al., 2017; Lenhart, 2017a]. This study contributes to this literature by examining potential pathways through which minimum wage can affect the health of low-wage workers in the U.S. Understanding the pathways through which

minimum wages affect non-employment outcomes such as health will allow policymakers to design efficient policies that can improve the overall well-being of society.

Based on economic theory, minimum wage increases can either improve health by providing a boost in income or worsen health if some people lose their employment [Wehby et al., 2016]. Recent studies have shown mixed evidence on the effects of minimum wages on health outcomes – some researchers provide evidence for health improvements [Wehby et al., 2016; Lenhart, 2017a and b; Reeves, 2017; Du and Leigh, 2018], while others have found no or mixed effects [Averett et al., 2017; Horn et al., 2017; Kronenberg et al., 2017]. Given that it might take some time before health changes are observable, especially among younger workers in low-wage jobs, evidence on potential pathways through which increases in minimum wages might affect present and future health outcomes can add to the existing literature and provide evidence for potential long-run effects on health.

This study estimates difference-in-differences models to examine the role of three potential mechanisms underlying the link between minimum wages and health: 1) health insurance coverage, 2) health care access, and 3) health care utilization. I analyze U.S. data for the years 1989 to 2009, a period during which there were 295 changes to state-level minimum wages. Controlling for state-specific time trends, the analysis provides evidence that higher minimum wages increases health insurance coverage, health care access and utilization for low-educated working age individuals. Specifically, this study finds that a 10% increase in minimum wages is associated with a 4.44% increase in individually purchased insurance coverage, which translates to a 1.86% increase when using a typical increase in minimum wages (2008 to 2009). Additionally, individuals are 2.19% less likely to not be able to afford necessary doctor visits and 0.65% more likely to have a routine health checkup following a 10% increase in minimum

wages. When examining heterogeneous effects, I find that the results are largest for low-educated individuals between the ages 18 and 29, a group that is most likely to be earning minimum wages.

RELATED LITERATURE

A growing number studies have in recent years examined the relationship between minimum wages and health. While these existing studies have improved the understanding of how minimum wage changes affect society beyond potential employment-related effects, the evidence is fairly mixed. A possible explanation for the lack of consensus in previous work is the fact that health is a multifaceted object and that several mechanisms are likely at play for the various health outcomes researchers have examined so far. One limitation of studies working on this topic is that they are often not able to isolate workers who experience employment changes following minimum wage increases. Given that different employment changes will likely lead to different health effects, the observed estimates thus depend on the shares of the observed population experiencing different labor market changes.

On the one hand, several studies have provided evidence that higher minimum wages can lead to health improvements. Using U.S. birth record data, Wehby et al. [2016] find evidence for increases in birth weight following minimum wages changes. When exploring potential channels, the authors provide evidence that mothers spend more time on prenatal care and are less likely to drink during pregnancy when minimum wages are higher. Examining the first introduction of minimum wage across all sectors of the economy in the U.K. in 1999, two studies find evidence that higher wages are associated with improved physical [Lenhart, 2017a] and mental health [Reeves et al., 2017]. Lenhart [2017a] shows that changes in physical activity, smoking, and financial stress might explain the observed health improvements to some extent.

Du and Leigh [2018] document that higher minimum wages are associated with lower rates of illness-related absence from work for lower-educated workers. Using aggregate data from 24 OECD countries, Lenhart [2017b] finds that more generous minimum wages are correlated with improved population health outcomes, while suggesting that access to health care and health behaviors (e.g. smoking and nutrition) might be channels underlying the link between minimum wages and health.

On the other hand, a number of studies have found negative or no effects on health outcomes as well as mixed results for different groups of the population. Meltzer and Chen [2011] find that higher minimum wages are correlated with increases in body weight. Similarly, Andreyeva and Ukert [2018] show that minimum wages increase the probability of being obese, while decreasing the number of days with functional limitations. Using U.S. data between 1993 and 2014, Horn et al. [2017] find declines in general health following minimum wages increases among lesser-skilled individuals, while providing evidence for improvements in mental health among women. Averett et al. [2017] show that minimum wages are associated with improvements in self-reported health among white women, while being correlated with health declines among Hispanic men. Adams et al. [2012] report increases in alcohol-related traffic fatalities among teens, while Sabia et al. [2018] find no evidence for increases in alcohol consumption for this age group when expanding the sample period. In contrast to Reeves et al. [2017], Kronenberg et al. [2017] find that the first nationwide minimum wage in the U.K. did not lead to improvements in mental health outcomes.

A small number of existing studies have examined whether the level of minimum wage in the U.S. are associated with the provision of fringe benefits. These findings have also been mixed. Simon and Kaestner [2004] find no evidence for negative effects on health insurance and

employer pension coverage due to higher minimum wages for low-skilled workers, while Royalty [2000] shows that less educated individuals are less likely to be eligible for pensions or to be covered by health insurance at higher levels of the minimum wage. Finding by Marks [2011] suggest that minimum wages only have negative effects on employer-sponsored insurance coverage for low-skilled employees working at firms that are not covered by non-discrimination laws governing the provision of health insurance.

Aaronson et al. [2012] examine the association between minimum wages and expenditures. Using four different data sets, the authors show that while household income of families with minimum wage workers rises on average by about $250 per quarter following a minimum wage hike, spending increases by around $700 per quarter for these families. Aaronson et al. [2012] find that this increase is driven by higher spending on durable goods, such as vehicles, whereas the expenditure changes are to some extent financed through higher collateralized debt.

MINIMUM WAGE AND HEALTH CARE ACCESS/UTILIZATION

One potential pathway between minimum wages and health that this study examines is the role of health insurance. Higher minimum wages make labor more costly to the employer, which might lead to the employer responding in several ways. To some extent, this is comparable to the Summers model [1989], which looks at possible employer responses following the introduction of mandated benefits, which also make labor more costly to the employer. With respect to employer-sponsored insurance, employers might decide to cut back the provision of coverage [Marks, 2011] or increase the employee cost sharing following increases of minimum wages. Both actions would lead to some workers losing employer-sponsored insurance. While some of these workers might be uninsured following such cutbacks by employers, others might purchase private health insurance coverage in order to avoid having no insurance. On the other hand, if

higher minimum wages actually lead to employment losses or reductions in hours worked, this might make some individuals eligible to qualify for public insurance due to reductions in income. Finally, low-wage workers might also substitute away from employer-sponsored coverage to private coverage following increases in earnings after minimum wage hikes. Thus, the effects of minimum wages on health insurance coverage is ambiguous and remains an empirical question.

Another channel through which minimum wages could affect health outcomes is through changes in health care utilization. This is in line with the Grossman model of the demand of health [1972], which states that individuals inherit an initial stock of health that depreciates over time but can be positively influenced through gross investments. An example of such investment would be receiving more frequent health checkups in order to avoid serious conditions that could be avoided through regular doctor visits. Given that health care might become more affordable for individuals through increased earnings and potentially lower costs due to better insurance coverage following minimum wages increases, the Grossman model [1972] predicts that both increase demand for and the quantity demanded of health care might increase. Given that it appears likely that there is a delay between increases in minimum wages and health-related outcomes, the study also estimates models using one-year lagged minimum wage information. Grossman [1972] establishes the possibility of a delay before health investments translate into improved health outcomes.

DATA

Current Population Survey (CPS)

The study uses CPS data for the years 1989 to 2009 to examine whether minimum wages affect health insurance coverage of affected individuals. Using CPS data in order to test for the

role of insurance is beneficial since it provides extensive information on different types of health insurance coverage, whereas the BRFSS only includes information if the respondent has any type of insurance. Due to the cross-sectional nature of both the BRFSS and the CPS, I am not able to follow individuals, who might directly be affected by the policy changes, over time. I follow the approach taken by previous studies and focus on low-educated respondents, a group that is most likely to earn minimum wages [Wehby et al., 2016; Horn et al., 2017]. Using data from the CPS, Table 1 provides evidence that less educated individuals are more likely to be affected by changes to minimum wages. 25.6 % of individuals between the ages 18 and 64 who received at most a high school degree are paid an hourly wage at or close to the minimum wage (< 125% of the minimum wage). In comparison, only 12.5% of individuals with at least some college earn at or close to the minimum wage, with the shares being even smaller for college graduates (7.6%) and those with advanced degrees (4.3%).

Behavioral Risk factor Surveillance System (BRFSS)

The study also uses repeated cross sections from the Behavioral Risk Factor Surveillance System (BRFSS), a large, nationally representative annual telephone survey that is conducted by the Centers for Disease Control and Prevention (CDC) since 1984. The data set includes many variables related to the health of respondents, including information on indicators of health care access and utilization. Thus, the survey is commonly used within the economics literature to study health-related outcomes [e.g. Courtemanche 2009; Courtemanche 2011; Helliwell and Huang 2014; Adams, Cotti, and Tefft 2015; Horn, Maclean, and Strain, 2017; Sabia, Pitts, and Argys 2018].

I use data for the years 1989 to 2009, a period during which there were 295 state-level changes to the minimum wage in the U.S. The main analysis focuses on a sample of working-age

individuals (ages 18 to 64) who have received at most a high school degree. Besides restricting the sample by age and education, I furthermore exclude individuals with missing information on personal characteristics that are used as control variables in the estimation. These restrictions provide the analysis with a sample size of 1,281,680.[1] Given that the BRFSS is a telephone survey, one potential limitation of the data set is measurement error. However, measurement error is of a slightly larger concern when using self-reported health outcome variables rather than the potentially more objective BRFSS outcomes variables used in this study, which are discussed in the next section.

Outcome Variables

Health Insurance When estimating the effects of variations in minimum wages on health insurance outcomes, I use data from the CPS, which allows checking for the effects on different types of health insurance coverage: Specifically, I estimate how minimum wages affect being covered by: (1) any insurance; (2) employer-sponsored insurance; (3) privately purchased insurance; (4) public insurance. These estimates can provide evidence on how both employers and employees react in response to minimum wage changes. The main goal of the Affordable Care Act (ACA), which was signed into law on March 23, 2010 and provided the largest overhaul of the U.S. health care system since the 1960, was to extend insurance coverage to some of the estimated 15% of the population lacking coverage prior to the ACA. While the majority of ACA provisions were implemented in 2014, some of the ACA provisions, such as the dependent coverage mandate, were implanted in 2010 already. Given that the inclusion of

[1] Several states were missing in the BRFSS in the early years of the analysis: Alaska (1989-1990), Arkansas (1989, 1990, and 1992), Colorado (1989), Delaware (1989), the District of Columbia (1995), Kansas (1989-1991), Louisiana (1989), Mississippi (1989), Nevada (1989-1991), New Jersey (1989-1990), Rhode Island (1994), Vermont (1989), and Wyoming (1989-1993). In additional specifications, I find that the results remain similar when using a balanced panel, which suggests that the main estimates are not driven by different compositions of the control group states.

post-ACA years in the analysis would create challenges with respect to distinguishing whether the observed effects are driven by changes in minimum wages or by ACA provisions, I only include pre-ACA years (1989 to 2009) in the CPS analysis.

Health Care Access/Utilization Next, I examine whether minimum wages affect the affordability of health care by testing whether individuals in the BRFSS are more likely to respond yes to the following question following minimum wage changes: "Was there a time in the past 12 months when you needed to see a doctor but could not because of cost?" The last outcome related to health care utilization uses information about the length of time that has passed since respondents had their last routine checkup with a doctor. The BRFSS asks respondents to indicate one of the following five categories for how long ago they had their last checkup: less than one year, between one and two years, between 2 and 5 years, more than five year, or never. Among individuals that report having had checkups, I test whether minimum wages affect the likelihood with which individuals had a checkup in the last two years.

Minimum Wages

Minimum wage data are obtained from the U.S. Department of Labor.[2] The effective minimum wage is defined as the higher of the state and the federal minimum wage in each state. Table 2 provides an overview of all minimum wage changes at both the state and federal level during the period of this study. In total, there were 295 changes to the effective minimum wage during the sample period. In 2009, 23 states plus DC had minimum wages that were set higher than the federal hourly wage floor of $7.25. I convert nominal minimum wages to 2009 dollars wages using the Consumer Price Index – Urban Consumers and use the log value of the one-year

[2] See: https://www.dol.gov/whd/state/stateminwagehis.htm.

lagged minimum wage. This takes into account that the effects of minimum wages are not necessarily linear and that it might take some time before these effects become noticeable following the policy changes.

Control Variables

The analysis controls for a set of individual characteristics that are potentially related to health care access and health care utilization, such as age, gender, and race. Given that changes in demographics and other unobservervable characteristics may be correlated with changes in minimum wages, all specifications estimated in the analysis control for linear state-specific time trends.

Additionally, I follow the approach by two recent studies examining the association between minimum wages and health outcomes [Wehby et al., 2016; Horn et al., 2017] and include controls for several time-varying, state-level policies, which could also be associated with both minimum wages and health care access and utilization of less educated individuals. These include indicators for state EITC regulations through three measures: 1) an indicator for whether the state had an EITC program; 2) an indicator for whether this state's EITC is refundable; and 3) the percentage of the state EITC compared to the federal EITC level.[3] In 2009, 26 states had state-level EITC programs in place on top of the federal credit. In 22 of these states, the EITC is refundable. Furthermore, the analysis accounts for policy changes during the welfare reform in the late 1990s, such as statewide variations in the timing of TANF implementations as well as the presence of state waivers regarding welfare time limits, sanctions, and work requirements.[4]

[3] The data for state-level EITC programs is obtained from Tax Credits for Working Families, Tax Policy Center of the Urban Institute and Brookings Institution, and the National Conference of State Legislatures.
[4] The data for the timing of TANF and for statewide waivers is obtained from the U.S. Department of Health & Human Services.

Summary Statistics

Table 3 provides descriptive statistics for the main BRFSS and CPS samples analyzed in this study. The BRFSS sample is slightly older and has a higher share of white respondents compared to the CPS sample. The statistics show that 18.1% of respondents report that they could not afford a necessary doctor visit over the last 12 months, while around 80% of individuals had a routine health checkup in the two years prior to the interview. The CPS statistics show that 74.1% of individuals have some sort of health insurance coverage, with the majority being covered by employer-sponsored insurance. Only 7.1% of individuals report that they purchased their own private health coverage.

METHODS

This study follows previous research on potential health effects of higher minimum wages [Wehby et al., 2016; Horn et al., 2017] and estimates difference-in-differences (DD) models to provide evidence for "intent-to-treat" effects on health insurance, health care access and health care utilization. Equation (1) shows the main specification that is estimated:

$$Y_{ist} = \alpha_0 + \alpha_1 MW_{st} + \alpha_2 X_{ist} + \alpha_3 P_{st} + \phi_s + \gamma_t + \psi_{st} + \varepsilon_{ist} \quad (1)$$

Y_{ist} represents measures for health insurance, health care access/utilization for individual *i* in state *s* surveyed in year *t*. MW_{st} is the measure of minimum wage for each state and year. While this measure is the log of real minimum wages in the baseline specifications, I also estimate models using the one-year lagged value of this measure (MW_{st-1}) to allow for the policy change to adjust for some time. X_{ist} represents a set of individual characteristics, such as age, gender, and

race.[5] The inclusion of P_{st} takes into account state-specific economic factors (state unemployment rates and state-level GDP) that could drive both changes in health insurance/utilization rates and minimum wage policy changes. In additional specifications, P_{st} includes additional state-level policies that could affect health-related outcomes of low-educated individuals (state-level EITC and generosity/timing of welfare reforms). ϕ_s and γ_t are vectors of state and year fixed effects, while ψ_{st} is control for state-specific linear time trends, which are included to account for state-level factors that are not observed in the data.[6] Finally, ε_{ist} is a random error term.

The parameter of interest, α_1, captures the reduced-form effects of higher minimum wages on the outcomes of interest. In 2009, the federal minimum wage of $7.25 was also the effective minimum wage in 27 states. These states serve as control states in the analysis, while the states that experienced increases in their wage floor during the sample period form the treatment group.

In the main analysis, I estimate linear probability models rather than nonlinear models for all the outcome variables for two reasons. First, it is difficult to compare parameter estimates across nonlinear regression models with different set of covariates [Norton 2012; Maclean, Webber, and Marti 2014; Horn, Maclean, Strain, 2017]. As mentioned above, I estimate several additional specifications that include controls to account for other differences across states besides minimum wages. Second, logit and probit models are vulnerable to the incidental parameters problem in the presence of fixed effects [Greene 2004; Ullman 2017; Horn, Maclean, Strain, 2017].[7]

[5] In additional specification, I control for marital status, which is excluded from the main models since it could be argued that it is potentially an outcome of minimum wages and therefore a "bad control" [Angrist and Pischke, 2009]. The results remain unchanged when including marital status from the analysis.
[6] In additional models, I replace state-specific linear time trends with state-specific quadratic time trends. In line with previous work by Horn et al. (2017), the results the estimates remain very similar.
[7] In line with previous work on health-related effects of minimum wages [Horn, Maclean, and Strain, 2017], the results in my study are robust to the use of nonlinear model.

Besides the main DD analysis, I also estimate equation (1) separately for different age groups and by gender to examine whether the effects differ across subgroups of the population. This adds to recent work that tested whether minimum wages have different effects on health outcomes across gender [Wehby et al., 2016, Horn et al, 2017, Averett et al. 2017], race/ethnicity [Wehby et al., 2016, Averett et al., 2017], education [Wehby et al., 2016], age [Wehby et al., 2016], and marital status [Wehby et al., 2016]. As shown Table 1, the share of low-wage workers varies substantially across age, gender, race and marital status, suggesting that different demographic groups are more or less likely to be affected by minimum wage variations. For example, lower educated individuals between the ages 18 to 29 are more than twice as likely to earn wages below 110% of the effective minimum wage compared to lower educated individuals between the ages 30 to 45 and 46 to 64. From a policy perspective, it is of interest to examine whether these different levels of exposure to minimum wages across different subgroups also translates into different effects on health insurance, health care access and health care utilization. These findings can provide further evidence for how minimum wages potentially impact the well-being of society and whether different channels play a more or less important role for different population groups.

In additional robustness checks, I estimate two triple difference (DDD) models that account for potential biases in the DD results due to other policies or state-level changes that might occur simultaneously with minimum wage increases. The DDD analysis uses two different within-state comparison groups: 1) retired adults who are 70 years or above with no more than a High School degree; 2) college-educated adults between the ages 18 to 64. This setup is almost identical to the DDD analysis conducted by Horn et al. [2017].[8] Individuals who are at least 70 years old should

[8] While Horn et al. [2017] use the same first comparison group, their second group consists of college-educated adults between the ages 18 to 54.

not be affected by minimum wage changes in terms of labor market outcomes and they are eligible for insurance coverage through Medicare. Furthermore, the individuals in this group have the same level of education as the main treatment group of the study. Thus, this groups should serve as a valid placebo group. A limitation of using elderly individuals as a control group in the analysis is that they have different health care needs than working-age individuals. Based on the descriptive statistics shown in Table 1, the second group also serves as a valid placebo group. The statistics show that only 5.70% and 3.34% of individuals with a college or advanced degree earn less than 110% of the minimum wage, respectively. A potential limitation of this second within-state comparison group is the fact that minimum wage increases can potentially have spillover effects across the wage distribution [DiNardo et al., 1996; Lee, 1999; Autor et al., 2016]. Thus, the DDD estimates, while serving as a test for the robustness of the main DD results, should be interpreted with caution.

RESULTS

Health Insurance

Table 4 provides CPS estimates for the effects of minimum wages on health insurance coverage of individuals with no more than a completed high school degree. Panel A shows that a 10% increase in minimum wages is associated with a 0.474 percentage point increase in the likelihood of having any health insurance coverage ($p<0.05$). Relative to the sample mean (0.747), this coefficient corresponds to a 0.63% change. Panel B shows that this increase becomes larger when using one-year lagged minimum wage data to allow for an adjustment period of the policy change. When examining whether this increase is driven by a certain type of insurance, Table 4 provides evidence for increases in privately purchased health insurance and public insurance as well as a reduction in employer-sponsored coverage. The baseline estimates

in Panel A indicates that a 10% increase in minimum wages is associated with a 0.315 percentage point increase in individually purchased coverage ($p<0.01$) and a 0.322 percentage point reduction in employer sponsored coverage ($p<0.10$). Compared to the sample means, these effects corresponds to changes of 4.44% and 0.58%, respectively. All estimates are robust to the inclusion of additional time-varying controls.[9]

To put the observed increase in privately purchased health insurance in perspective, I compare expected increases in earnings following minimum wage increases with the costs of premiums for insurance. The average increase in hourly minimum wages in states that changed their state-level wage floor between 2008 and 2009 is $0.30, which corresponds to an annual increase in earnings of $604 using the average number of hours worked in these states. Average annual costs for individually purchased insurance were $4,824 in 2009. Thus, the mean increase in annual earnings from a typical minimum wage change only covered 12.52% of the annual costs of premiums. While Table 4 shows the effects of a 10% increase in minimum wages, converting the observed estimate to the actual change of $0.30 corresponds to an increase in the likelihood of purchasing private insurance by 1.86% and a decline in employer sponsored coverage by 0.24% in response to a typical minimum wage increase.

Previous work has shown that employer-sponsored coverage has declined in the U.S. over the period of this study, with the decline being more than twice as large for workers in the lowest wage quintile compared those in the highest [Rho and Schmitt, 2010]. Part of this reduction in employer-sponsored coverage is likely due to an increase in premiums. Cutler [2003] shows that costs of premiums doubled from the late 1980s to the late 1990s, while Vistnes et al. [2012]

[9] When using lead minimum wage rates, I find that the results are substantially smaller while still showing the same direction. The only outcome for which the estimate shows any statistical significance ($p<0.10$) is individually purchased coverage. The analysis of leads in the framework of this study is not ideal to capture pre-treatment trends and potential anticipatory effects because states with effective minimum wages above the federal level increased their rates several times throughout the study period.

show that single premiums increased from $507 to $701 between 2000 and 2008 [Vistnes et al., 2012].[10] Cutler [2003] furthermore provides evidence that these increased costs were the main reason for why many workers decided not to enroll in insurance plans that they were offered. In line with findings by Simon and Kaestner [2004], who show that find that minimum wages increases do not impact the employer's contribution to the premiums or whether insurance is offered, the findings in Table 4 suggest that the increases in costs could explain the observed reductions in employer-sponsored coverage to some extent.

The magnitudes of the observed estimates suggest that some individuals lose their employer-sponsored coverage, while others might substitute away from employer coverage to private health insurance. The observed increases in individually purchases health insurance coverage are in line with findings by Aaronson et al. [2012] who show that households with minimum wage workers increase spending on durable goods by far more than their incomes increase following minimum wage increases. According to the Grossman model [1972], increases in purchases of private health insurance coverage can be viewed as investments into one's health production function.

Health Care Access/Utilization

Table 5 presents the results for the effects of minimum wages on three outcomes related to health care access and health care utilization. The estimates provide evidence that higher minimum wages significantly increase the likelihood that individuals can afford necessary health care. I find that a 10% increase in minimum wages decreases the likelihood of not being able to afford necessary doctor visits by 0.396 percentage points ($p<0.05$), which corresponds to a 2.19% change relative to the sample mean (0.181). While the effects remain when using lagged

[10] These numbers correspond to employee single contributions for all firm sizes using and are obtained using data from the Medical Expenditure Panel Survey – Insurance Component (MEPS-IC).

minimum wages, the results lose statistical significance when controlling for additional state-level confounding policy changes.

Table 5 also shows that, among people who have had routine health checkups, higher minimum wages increase the frequency of these checkups. I find that a 10% increase in minimum wages increases the likelihood of having a routine checkup in the last two years by 0.514 percentage points ($p<0.10$). This effect increases to 0.640 percentage points ($p<0.05$) when using one-year lagged minimum wage data. Relative to the sample mean (0.796), these effects correspond to changes of 0.65% (current minimum wages) and 0.80% (lagged minimum wages). The estimates are robust to the inclusion of additional time-varying state controls.[11]

Heterogeneous Results

Table 6 shows the effects of minimum wages on health insurance, health care access and health care utilization for several subgroups of the population. As shown in Table 1, the share of people affected by minimum wages differs substantially across different groups of the population. Individuals with at most a completed High School degree between the ages 18 and 29 are more than twice as likely to earn less than 110 percent of the minimum wage compared to lower educated people between 30 to 44 and 45 to 64. Table 6 provides evidence that there are differences in the magnitudes of the observed effects across age groups.

The results show that the positive association between minimum wages and having any health insurance is largest for the youngest age group, which has the smallest share of insured people (65.52%, compared to 74.41% for individuals between 30 and 44 and 81.89% for those

[11] In additional tests for of exogeneity, I find that minimum wages are not impacted by any of the outcome variables examined in this study or by state unemployment rates, which suggests that reverse causality is not driving the main findings of the analysis. These results are not shown in the paper, but are available upon request.

between 45 and 64). While the overall effect on having any insurance is small for individuals between the ages 45 to 64, the results indicate a 0.672 percentage point reduction in employer-sponsored coverage ($p<0.01$) and a 0.447 percentage point increase in privately purchased coverage ($p<0.01$) for this group following a 10 percent increase in minimum wages. The decline in employer-sponsored insurance could be the result of employment changes or changes in the type of plans employers offer people in this age group. The BRFSS results across age groups furthermore show that the effects on health care affordability are largest for individuals between the ages 18 to 29. These estimates are in line with the fact that this group has the highest share of directly affected people following minimum wage changes (Table 1).

Table 6 also shows that the effects on both insurance coverage and health care access/utilization are larger for women than for men. The female estimate for individually purchased insurance is twice as large as the male estimate, while the effect on health checkups is almost three times the magnitude. A possible explanation for the latter finding is that women (82.40%) are more likely to have routine health checkups than men (72.66%) are.

ROBUSTNESS CHECKS

The triple difference estimates are presented in Table 7. As expected, minimum wages have no effects on the likelihood of having any health insurance coverage for elderly retired individuals. Thus, the DDD effects when using this placebo are in line with the main DD results from Table 4 and provide evidence for statistically significant increases in health insurance ($p<0.05$) following increases in minimum wages. The results for the second placebo group consisting of adults (18-64) with college education show statistically insignificant increases in insurance for this group. While the effects are smaller than for the main treatment group and only statistically significant ($p<0.10$) when using lagged minimum wages, they provide further

evidence for the validity of the main DD findings. Potential spillover effects of minimum wages to higher (and more educated) earners might explain the small positive effects for this comparison group.

The BRFSS DDD estimates obtained from using both comparison groups confirm the DD results findings statistically significant effects of higher minimum wages on health care affordability and utilization. Overall, while confirming the main DD estimates of this study, the DDD results in Table 7 should be viewed with caution due (smaller) effects of minimum wages on higher educated individuals and due to different health care needs for elderly individuals.

DISCUSSION AND CONCLUSIONS

The findings in this study contribute to the growing literature examining health-related effects of minimum wage increases. While several recent studies have focused on health outcomes, this analysis explores potential pathways underlying the relationship between minimum wages and health. Using CPS data, I provide evidence that higher minimum wages increases the likelihood of having health insurance coverage, with the majority of this increase being driven by changes in privately purchased coverage. Additionally, using data from the BRFSS, the study finds increases in the ability to afford necessary health care, and the frequency of routine health checkups.

The finding of increased private health insurance supports the idea that some workers use their increased earnings to purchase insurance coverage. The analysis of different types of insurance plans adds to previous work by Simon and Kaestner [2004], which focuses on the effects of minimum wages on employer-sponsored coverage. Similar to their results, this study finds no evidence for negative effects of employer-provided insurance, with the exception being for adults between the ages 45 to 64. The observed positive effects of minimum wages on the

affordability of necessary health care is also in line with the increases in individually purchased health insurance coverage. The finding that individuals increase the frequency of health checkups is in agreement with results by Wehby et al. [2016], which show that higher minimum wages are associated with increased prenatal care use during pregnancies. Increases in health care utilization following minimum wage increases support the Grossman model [1972], which states that people will use additional income to invest in their health stock therefore increase the demand for health care. Additionally, people's decisions to take invest in their health could be related to declines in stress and improvements in mental health, two outcomes that have recently been shown to be associated with increases in minimum wages [Lenhart, 2017a; Reeves et al., 2017].

This study examines the effects of minimum wages of health care access and utilization before the implementation of the ACA in 2010, which significantly changed the health care landscape in the U.S. The number of uninsured individuals below the age of 65 decreased from 46.5 million in 2010 to 27.4 million in 2017 [Kaiser Family Foundation, 2018]. Relating this substantial decline to the findings of this study, one might assume that the effects of minimum wages on health insurance coverage are smaller following the ACA implementation. While this might be true, I believe there are several reason suggesting that minimum wages increases would still affect access to health care in today's ACA environment. In a recent overview of uninsurance and the ACA, Garfield et al. [2019] show that low-income individuals still make up the vast majority of uninsured. The authors show that 47% of the remaining uninsured population in 2017 has family income below 200% of the poverty level, and another 35% has family income between 200 and 399%. Furthermore, Garfield et al. [2019] show that 77% of the uninsured have at least one full-time worker in their family, while 10% had a part-time worker in

their family. While this suggests that many workers continue to lack access to coverage through their job, the authors also provide evidence that affordability of offered coverage remains a serious issue. They find that 45% of uninsured nonelderly adults in 2017 report that they lacked coverage because it was too expensive [Garfield et al., 2017]. This suggests that, while access to health care has improved for many Americans since 2010, barriers to accessing affordable care remain. Zipperer [2018] shows that single parent working full-time and earning the federal minimum wage in 2017 would be below the federal poverty threshold for two-person households. The evidence in this study provides evidence that increases in minimum wages can further improve the health care access and utilization of low-income households.

Adler and Newman [2002] point out that a socioeconomic gradient in health care access and health behaviors exists, and suggest that these can explain differences in health outcomes to some extent. Adler and Newman [2002], among others, show that lower educated individuals are much more likely to be uninsured and to smoke than higher educated people. This study finds that higher minimum wages can be a powerful policy tool to address this gap in health care access and health care utilization among more vulnerable groups of the population. My analysis shows that the effects are strongest for low-educated individuals between the ages 18 to 29, the group that is most likely to earn minimum wages. Given that better health care access and health behaviors can lead to improved health outcomes both immediately and in later stages of life, these results provide suggestive evidence that minimum wages can improve the well-being of society and reduce existing inequalities in wages and in health.

REFERENCES

Aaronson, D., Agarwal, S., French, E. (2012). The Spending and Debt Response to Minimum Wage Hikes. American Economic Review, 102(7), 3111-3139.

Adams, S., McKinley, L.B., Cotti, C (2012). Minimum Wages and Alcohol-Related Traffic Fatalities among Teens. The Review of Economics and Statistics, 94(3), 828–840.

Adams, S., Cotti, C., Tefft, N. (2015). Seatbelt Use among Drunk Drivers in Different Legislative Settings. Economic Inquiry, 53(1): 758–72.

Adler, N.E., Newman, K. (2002). Socioeconomic Disparities in Health: Pathways and Policies. Health Affairs, 21(2), 60-76.

Andreyeva, E., Ukert, B. (2018) The Impact of the Minimum Wage on Health. International Journal of Health Economics and Management, 18(4): 337-375.

Angrist, J.D., Pischke, J. (2009) Mostly Harmless Econometrics: An Empiricist's Companion, Princeton, NJ, Princeton University Press, 2009.

Autor, D.H., Manning, A., Smith, C.L. (2016). The Contribution of the Minimum Wage to US Wage Inequality over Three Decades: A Reassessment. American Economic Journal: Applied Economics, 8(1), 58-99.

Averett, S.L., Smith, J.K., Wang, Y. (2017). The Effects of Minimum Wages on the Health of Working Teenagers. Applied Economics Letters, 24(16), 1127-1130.

Burkhauser, R.V., Sabia, J.J. (2007). The Effectiveness of Minimum-Wage Increases in Reducing Poverty: Past, Present, and Future. Contemporary Economic Policy, 25(2), 262-281.

Card, D. (1992). Using Regional Variation in Wages to Measure the Effects of the Federal Minimum Wage. Industrial and Labor Relations Review, 46(1), 22-37.

Card, D., Krueger, A.B. (1995). Myth and Measurement: The New Economics of the Minimum Wage. Princeton, NJ: Princeton University Press, 1995.

Courtemanche, C. (2009). Rising Cigarette Prices and Rising Obesity: Coincidence or Unintended Consequence? Journal of Health Economics, 28(4): 781–98.

Courtemanche, C. (2011). A Silver Lining? The Connection between Gasoline Prices and Obesity. Economic Inquiry, 49(3): 935–57.

Cutler, D.M. (2003). Employee Costs and the Decline in Health Insurance Coverage. In *Frontiers in Health Policy Research* 6. Cambridge, MA: MIT Press.

DiNardo, J, Fortin, N., Lemieux, T. (1996). Labor Market Institutions and the Distribution of Wages, 1973-1992: A Semi-Parametric Approach. Econometrica, 64(5), 1001-44.

Du, J., Leigh, J.P. (2018). Effects of Minimum Wages on Absence from Work due to Illness. The B.E. Journal of Economic Analysis & Policy, 2018. doi: 10.1515/bejeap-2017-0097.

Fernández Campbell, A. (2019a). The $15 minimum wage bill has all but died in the Senate. Vox, accessed September 16, 2019. https://www.vox.com/2019/8/16/20807610/raise-the-wage-act-15-minimum-wage-bill.

Fernández Campbell, A. (2019b). Where the 2020 Candidates Stand on Raising the Federal Minimum Wage. Vox, accessed September 16, 2019. https://www.vox.com/2019/6/26/18715588/democratic-candidates-minimum-wage-2020.

Garfield, R., Orgera, K, Damico, A. (2019). The Uninsured and the ACA: A Primer – Key Facts about Health Insurance and the Uninsured amidst Changes to the Affordable Care Act. Kaiser Family Foundation. https://www.kff.org/report-section/the-uninsured-and-the-aca-a-primer-key-facts-about-health-insurance-and-the-uninsured-amidst-changes-to-the-affordable-care-act-who-remains-uninsured-after-the-aca-and-why-do-they/

Greene, W. (2004). The Behaviour of the Maximum Likelihood Estimator of Limited Dependent Variable Models in the Presence of Fixed Effects. The Econometrics Journal, 7(1): 98–119.

Grossman, M. (1972). On the Concept of Health Capital and the Demand for Health. Journal of Political Economy, 80 (2), 223-255.

Helliwell, J.F., Huang, H. (2014). New Measures of the Costs of Unemployment: Evidence from the Subjective Well-Being of 3.3 Million Americans Economic Inquiry, 52(4): 1485–502.

Horn, B.P., Maclean, J.C., Strain, M.R. (2017). Do Minimum Wage Increases Influence Workers Health? Economic Inquiry, 55(4), 1986-2007.

Kaiser Family Foundation (2018). Key Facts about the Uninsured Population. https://www.kff.org/uninsured/fact-sheet/key-facts-about-the-uninsured-population/.

Kronenberg, C., Jacobs, R., Zucchelli, E. (2017). The Impact of the UK National Minimum Wage on Mental Health. SSM – Population Health, 3 (December), 749-755.

Lee, D.S. (1999). Wage Inequality in the United States During the 1980s: Rising Dispersion or Falling Minimum Wage? Quarterly Journal of Economics, 114(3), 977-1023.

Lenhart, O. (2017a). Do Higher Minimum Wages Benefit Health? Evidence from the UK. Journal of Policy Analysis and Management, 36(4), 828-852.

Lenhart, O. (2017b). The Impact of Minimum Wages on Population Health: Evidence from 24 OECD Countries. The European Journal of Health Economics, 18(8), 1031-1039.

Maclean, J.C., D.A. Webber, Marti, J. (2014). An Application of Unconditional Quantile Regression to Cigarette Taxes. Journal of Policy Analysis and Management, 33(1): 188–210.

Marks, M.S. (2011). Minimum Wages, Employer-Provided Health Insurance, and the Non-Discrimination Laws. Industrial Relations, 50(2), 241-262.

Meltzer, D.O., Chen, Z. (2011). The Impact of Minimum Wage Rates on Body Weight in the United States. National Bureau of Economic Research, Volume Title: Economic Aspects of Obesity. Chapter URL: http://www.nber.org/chapters/c11815.

Neumark, D., Wascher, W. (2002). Do Minimum Wages Fight Poverty? Economic Inquiry, 40(3), 2002, 315–333.

Neumark, D., Salas, J.M., Wascher, W. (2014). Revisiting the Minimum Wage – Employment Debate: throwing Out the Baby with the Bathwater? Industrial and Labor Relations Review, 67(3 suppl.), 608-648.

Norton, E.C. (2012). Log Odds and Ends. NBER Working Paper No. 18252. Cambridge, MA: National Bureau of Economic Research.

Reeves, A., McKee, M., Mackenbach, J., Whitehead, M., Stuckler, D. (2017). Introduction of a National Minimum Wage Reduced Depressive Symptoms in Low-Wage Workers: A Quasi-Natural Experiment in the UK. Health Economics, 26, 639-655.

Rho, H.J., Schmitt, J. (2010). Health-Insurance Coverage Rates for US Workers, 1979-2008. Center for Economic and Policy Research. http://cepr.net/documents/publications/hc-coverage-2010-03.pdf.

Royalty, A.B. (2000). Do Minimum Wage Increases Lower the Probability that Low-Skilled Workers Will Receive Fringe Benefits? Joint Center for Poverty Research Working Paper 222.

Ruhm, C.J. (2000). Are Recessions Good for Your Health? Quarterly Journal of Economics, 115(2), 617-650.

Sabia, J.J., Pitts, M., Argys, L.M. (2018). Are Minimum Wages a Silent Killer? New Evidence on Drunk Driving Fatalities. Review of Economics and Statistics, forthcoming. https://doi.org/10.1162/rest_a_00761.

Simon, K.I., Kaestner, R. (2004). Do Minimum Wages Affect Non-Wage Job Attributes? Evidence on Fringe Benefits. Industrial and Labor Relations Review, 58(1), 52-70.

Summers, L.H. (1989). Some Simple Economics of Mandated Benefits. The American Economic Review, 79, 177-183.

The State of Obesity (2017). The State of Obesity: Better Policies for a Healthier America, Issue Report. Robert Wood Johnson Foundation. https://stateofobesity.org/files/stateofobesity2017.pdf.

Ullmann, D.F. (2017). The Effect of Medical Marijuana on Sickness Absence. Health Economics, 26(10): 1322-1327.

Vistnes, J., Zawacki, A., Simon, K., Taylor, A. (2012). Declines in Employer-Sponsored Insurance between 2000 and 2008: Examining the Components of Coverage by Form Size. Health Services Research 47 (3 Pt 1): 919-938.

Wehby, G., Dave, D., Kaestner, R. (2016). Effects of the Minimum Wage on Infant Health. NBER Working Paper No. 22373, 2016, http://www.nber.org/papers/w22373.

Zipperer, B. (2018). The Erosion of the Federal Minimum Wage has Increased Poverty, Especially for Black and Hispanic Families. Economic Policy Institute.

https://www.epi.org/publication/the-erosion-of-the-federal-minimum-wage-has-increased-poverty-especially-for-black-and-hispanic-families/.

TABLE 1
Hourly Wage Earners, CPS (1989-2009)

Sample	Wage < 1.10*minimum wage	Wage < 1.20*minimum wage	Wage < 1.25*minimum wage
High school or less	18.99	23.38	25.61
High school	29.54	35.77	38.79
< High school	15.64	19.44	21.43
At least some college	9.36	11.43	12.51
Some college	13.62	16.67	18.25
College graduate	5.70	6.94	7.64
Advanced degree	3.34	3.94	4.25
Male - high school or less	23.82	29.30	32.06

Female - high school or less	14.96	18.43	20.22
White - high school or less	16.17	19.89	21.76
Non-White - high school or less	23.58	29.07	31.88
Ages 18-29 - high school or less	31.04	37.20	40.23
Ages 30-45 - high school or less	15.02	18.84	20.85
Ages 46-64 - high school or less	13.19	16.70	18.50
Married - high school or less	13.71	17.31	19.20
Non-married - high school or less	25.96	31.40	34.07

TABLE 2
State and Federal Minimum Wage Changes, 1989-2009

Year	**States**
1989	
1990	AK, ME, MN, Federal
1991	AK, CT, RI, Federal
1992	HI, IA, MA, NC, NJ, OR, VA, WI,
1993	HI, NC, NM,
1994	DC, WA,
1995	VT,
1996	AR, CA, CO, CT, DE, FL, IA, IL, KY, LA, MA, MD, MI, MO, MS, MT, ND, NH, NV, RI, UT, VA, VT, WI, Federal
1997	AK, AL, AR, AZ, CA, CO, CT, DC, DE, FL, IA, ID, IL, KY, LA, MA, MD, ME, MI, MN, MO, MS, MT, NC, ND, NE, NH, NV, OK, OR, PA, RI, SC, SD, TN, UT, VA, VT, WI, WV, Federal

1998	AK, AL, AZ, CA, DC, IN, ME, OR, PA, SC, TN, Federal
1999	CT, DE, ID, IN, NJ, OR, RI, VT, WA,
2000	CA, CT, DE, ID, KY, MA, NY, WA,
2001	CT, GA, KY, MA, RI, TX, VT, WA, WY
2002	AK, CA, CT, HI, ID, ME, WA,
2003	CT, HI, ME, NM, OR, WA,
2004	CT, IL, ME, OR, RI, VT, WA,
2005	DC, IL, ME, MN, NJ, NY, OR, VT, WA, WI
2006	CT, FL, HI, ME, MI, NJ, NV, NY, OH, OR, RI, VT, WV
2007	AL, AR, AZ, CA, CO, CT, DE, FL, HI, IA, ID, IL, IN, KY, LA, MA, MD, ME, MI, MO, MS, MT, ND, NE, NH, NY, OH, OK, OR, PA, RI, SC, SD, TN, TX, UT, VA, VT, WA, WI, WV, Federal
2008	AL, AZ, CA, CO, DC, DE, FL, IA, ID, IL, IN, KY, LA, MA, MD, ME, MI, MO, MS, MT, NC, ND, NE, NH, NM, NV, OH, OK, OR, PA, SC, SD, TN, TX, UT, VA, VT, WA, WV, Federal
2009	AK, AL, AZ, CO, CT, DC, DE, FL, GA, ID, IL, IN, KY, LA, MD, ME, MO, MS, MT, NC, ND, NE, NH, NJ, NM, NV, NY, OH, OK, OR, PA, SC, SD, TN, TX, UT, VA, VT, WA, WI, Federal

Several states were missing in the BRFSS in the early years of the analysis: Alaska (1989-1990), Arkansas (1989, 1990, and 1992), Colorado (1989), Delaware (1989), the District of Columbia (1995), Kansas (1989-1991), Louisiana (1989), Mississippi (1989), Nevada (1989-1991), New Jersey (1989-1990), Rhode Island (1994), Vermont (1989), and Wyoming (1989-1993). (1989), Mississippi (1989), Nevada (1989-1991), New Jersey (1989-1990), Rhode Island (1994), Vermont (1989), and Wyoming (1989-1993).

Table 3: Summary Statistics, BRFSS and CPS (1989-2009)

	BRFSS	**CPS**
Age	42.726 (13.098)	39.223 (13.180)
White	0.796 (0.403)	0.624 (0.484)
Male	0.412 (0.492)	0.488 (0.500)
Married	0.550 (0.497)	0.576 (0.494)
High school graduate	0.702 (0.457)	0.707 (0.455)
Less than high school	0.298 (0.457)	0.293 (0.455)
Could not afford doctor visit last year	0.181 (0.385)	-
Routine checkup in last 2 years	0.796 (0.403)	-
Any health insurance	-	0.747 (0.435)

Employer-sponsored insurance	-	0.559 (0.497)
Privately purchased insurance	-	0.071 (0.257)
Public insurance	-	0.165 (0.372)
Spouses' insurance plan	-	0.174 (0.379)
Minimum wage (nominal)	5.440 (1.037)	5.152 (1.064)
Observations	1,281,680	1,018,401

Table 4: DD Effects of Minimum Wage on Health Insurance (1989-2009)

	Any health insurance		**Employer-sponsored insurance**		**Privately purchased insurance**		**Public insurance**	
Panel A: Current MW								
Log (Min. Wage)	0.0474**	0.0520**	-0.0322*	-0.0395**	0.0315***	0.0325***	0.0691**	0.0772***
	(0.0230)	(0.0225)	(0.0164)	(0.0167)	(0.0078)	(0.0084)	(0.0260)	(0.0217)
Sample Mean	0.7466		0.5586		0.0710		0.1654	
Observations	1,018,401		1,018,401		1,018,401		1,018,401	
Panel B: Lag MW								
Log (Min. Wage)	0.0546**	0.0559**	-0.0214	-0.0284	0.0330***	0.0337***	0.0673**	0.0732***
	(0.0222)	(0.0218)	(0.0182)	(0.0184)	(0.0090)	(0.0099)	(0.0269)	(0.0251)
Sample Mean	0.7466		0.5586		0.0710		0.1654	
Observations	969,962		969,962		969,962		969,962	
State-specific time trends	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Add'l state controls	No	Yes	No	Yes	No	Yes	No	Yes

Robust standard errors, clustered at the state-level, are shown in parentheses. The control variables include age, gender, race, state unemployment rates and state GDP. Additional state controls include indicators for state EITC regulations as well as statewide variations during welfare reforms, such as the timing of TANF implementations, state waivers, sanctions, and work requirements. All regressions use unweighted data from the CPS. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 5: The Effects of Minimum Wage on Health Care Access/Utilization

	Needed doctor visit but could not afford it		**Routine checkup last 2 years**	
Panel A: Current MW				
Log (Min. Wage)	-0.0396**	-0.0266	0.0514*	0.0640**
	(0.0201)	(0.0175)	(0.0300)	(0.0313)
Sample Mean	0.1805		0.7958	
Observations	1,458,178	1,458,178	1,458,178	1,458,178
Panel B: Lag MW				
Log (Min. Wage)	-0.0394**	-0.0274	0.0640**	0.0741***
	(0.0200)	(0.0184)	(0.0313)	(0.0263)
Sample Mean	0.1805		0.7958	
Observations	1,281,680	1,281,680	1,256,654	1,256,654
State-specific time trends	Yes	Yes	Yes	Yes
Additional state controls	No	Yes	No	Yes

Robust standard errors, clustered at the state-level, are shown in parentheses. The control variables include age, gender, race, state unemployment rates and state GDP. Additional state controls include indicators for state EITC regulations as well as statewide variations during welfare reforms, such as the timing of TANF implementations, state waivers, sanctions, and work requirements. All regressions use non-weighted data from the BRFSS.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 6: Heterogeneous DD Effects (Lag Min. Wage)

	CPS				BRFSS	
	Any insurance	Employer-sponsored insurance	Privately purchased insurance	Public insurance	Needed doctor visit but could not afford it	Routine checkup last two years
Age						
18-29	0.0676**	-0.0015	0.0135	0.0729*	-0.0908***	0.0796*
	(0.0285)	(0.0266)	(0.0120)	(0.0378)	(0.0255)	(0.0413)
Sample mean	0.6592	0.4478	0.0638	0.1836	0.1989	0.7843
30-44	0.0617**	-0.0311	0.0243**	0.0995***	-0.0367	0.0820**
	(0.0303)	(0.0274)	(0.0113)	(0.0318)	(0.0273)	(0.0343)
Sample mean	0.7298	0.5881	0.0556	0.1367	0.1980	0.7551
45-64	0.0137	-0.0672***	0.0447***	0.0470**	-0.0163	0.0187
	(0.0191)	(0.0185)	(0.0116)	(0.0206)	(0.0196)	(0.0276)
Sample mean	0.8104	0.6142	0.0914	0.1798	0.1616	0.8281
Gender						
Male	0.0411*	-0.0256	0.0203**	0.0644**	-0.0296	0.0233
	(0.0232)	(0.0173)	(0.0091)	(0.0247)	(0.0184)	(0.0348)
Sample mean	0.7241	0.5690	0.0688	0.1344	0.1449	0.7266
Female	0.0540**	-0.0386**	0.0428***	0.0738**	-0.0417*	0.0666**
	(0.0253)	(0.0185)	(0.0083)	(0.0288)	(0.0235)	(0.0294)
Sample mean	0.7680	0.5487	0.0732	0.1950	0.2055	0.8440

Robust standard errors, clustered at the state-level, are shown in parentheses. The control variables include age, gender, race, state unemployment rates, and state GDP. All regressions include state-specific time trends and non-weighted data. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 7: DDD Effects of Minimum Wage on Health Care Insurance, Health Care Access and Utilization

	CPS		*BRFSS*			
	Any insurance		**Needed doctor visit but could not afford it**		**Routine checkup in last 2 years**	
	Current MW	1-Year Lagged MW	Current MW	1-Year Lagged MW	Current MW	1-Year Lagged MW
Sample: 18-64, at most HS degree						
Log(minimum wage)	0.0474**	0.0546**	-0.0396**	-0.0394**	0.0514*	0.0640**
	(0.0230)	(0.0222)	(0.0201)	(0.0200)	(0.0300)	(0.0313)
Sample mean	0.7466		0.1805		0.7958	
Observations	1,018,401	969,962	1,281,680	1,145,416	1,281,680	1,145,416
Sample: 70+, retired, at most HS degree						
Log(minimum wage)	0.0085	0.0089	0.0156*	0.0199**	0.0134	-0.0035
	(0.0089)	(0.0093)	(0.0085)	(0.0092)	(0.0236)	(0.0250)
Sample mean	0.9907		0.0433		0.9221	
Observations	176,667	167,957	297,092	297,092	256,299	256,299
DDD estimate	0.0389**	0.0457**	-0.0551***	-0.0595***	0.0380*	-0.0675***
	(0.0193)	(0.0198)	(0.0176)	(0.0180)	(0.0224)	(0.0200)
Sample: 18-64, at least college degree						
Log(minimum wage)	0.0233	0.0266	-0.0095	-0.0030	-0.0171	-0.0128
	(0.0149)	(0.0163)	(0.0077)	(0.0070)	(0.0227)	(0.0118)
Sample mean	0.8857		0.0799		0.8264	
Observations	1,116,849	1,077,823	1,365,745	1,365,745	1,194,160	1,194,160
DDD estimate	0.0240	0.0280*	-0.0231**	-0.0301**	0.0683**	-0.0808**
	(0.0163)	(0.0151)	(0.0116)	(0.0123)	(0.0319)	(0.0389)

Robust standard errors, clustered at the state-level, are shown in parentheses. DDD estimates are calculated by taking the difference between the DD estimate for the main treatment group and the placebo group. The control variables include age, gender, race, state unemployment rates and state GDP. All regressions include state-specific time trends

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.