Pathways between Minimum Wages and Health:

The Roles of Health Care Access, Health Care Utilization, and Time Use

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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 care access, health care utilization, and time use are explored among individuals with at most a High School degree. Using three different data sets for the period 1989 to 2017, a period with significant number of state-level minimum wages increases, the study estimates both DD and DDD models. The analysis finds that higher minimum wages increase health insurance coverage, in particular individually purchased insurance, improves health care affordability and utilization, while reducing the amount of time low-educated individuals allocate towards exercising and personal health. When examining heterogeneous effects across the population, I show that the results are larger for employed and younger individuals, who are most likely to be affected by minimum wage increases.

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. 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.

Despite the increased focus by economists on investigating the effects of minimum wages on health, no consensus has yet been established. Depending on the outcomes looked at by researchers, the evidence is fairly mixed – some studies find that minimum wages are associated with improved health outcomes, while others find the opposite. Recent findings by Horn et al.

(2017) furthermore shows that, while potentially having small negative effects on general health, minimum wages might lead to improvements in mental health. Given that it might take some time before health changes are observable following minimum wage increases, a better understanding of the mechanisms underlying the relationship between minimum wages and health could provide evidence on long-term health effects.

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 improvement, while others have found no effects. 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 four potential mechanisms underlying the link between minimum wages and health: 1) health insurance coverage, 2) health care access, 3) health care utilization, and 4) time use. For the first three outcomes, I analyze U.S. data from two sources for the years 1989 to 2009, a period during which there were 295 changes to state-level minimum wages. For the time allocation analysis, I use detailed time use data from the American Time Use Survey (ATUS) for the years 2003 to 2017, a period with 257 minimum wage changes. 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 6.90% increase in

individually purchased insurance coverage. Individuals with low education are 1.46% less likely to not be able to afford necessary doctor visits and 6.43% more likely to have a routine health checkup following a 10% increase in minimum wages. Finally, the study finds that a $1 increase in one-year lagged real minimum wages reduces time spent on one's own health by 20 minutes per week (Monday through Friday), while increasing leisure time by 30 minutes. The main DD results are confirmed by two triple difference (DDD) models.

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 provided 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. 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.

To my knowledge, this is the first study to provide empirical evidence for the effects of minimum wages on time use. Several researchers have previously examined how economic conditions impact time allocated towards health-enhancing activities. Colman and Dave (2013) find that overall physical activity declines during recessions due to declines in on-the job physical activity being larger than increases in leisure-time physical activity (e.g. recreational exercise). Other studies provide evidence that economic downturns are correlated with increased drug and alcohol use among teenagers (Arkes, 2007), increased smoking among young adults (Arkes, 2012) and men (Xu, 2013), as well as with increased leisure-time physical activity, lower smoking and less excess weight (Ruhm, 2005).

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 purchases 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.

Another potential channel underlying the relationship between minimum wages and health, as mentioned by Horn et al. (2017), are time costs. Again, it seems likely that minimum wages increases will affect time costs differently across people with different employment outcomes. Individuals who lose employment have reduced time costs, which could lead to improved health outcomes if they spend more time on health-enhancing activities, such as exercising. Workers who keep their jobs and receive a raise after the policy changes, experience an increase in the opportunity cost of time, which make investments in nonmarket goods more expensive (Horn et al., 2017). Estimates on how minimum wage increases affect various categories of time use among lesser-skilled individuals can provide a better understanding of how minimum wages affect health outcomes. Furthermore, evidence for changes in time spent on health-enhancing activities and leisure activities might provide some insights on why minimum wages might worsen physical health, but improve mental health, as shown by Horn et al. (2017). Reduced physical activity could lead to long-term negative effects on physical health outcomes, whereas additional leisure time might make people happier and translate into improved self-reported mental health outcomes.

DATA

Current Population Survey (CPS)

The study uses data from the CPS 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. 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.

American Time Use Survey

Since 2003, the Bureau of Labor Statistics (BLS) annually conducts the American Time Use Survey (ATUS) in order to develop a nationally-representative overview of how people in the U.S. spend their time. The survey is given to respondents of the Current Population Survey (CPS) who are above 14 years of age, live in the U.S. and have completed month 8 of the CPS survey. The final sample of respondents is constructed in three stages. In the first stage, the oversampling of less-populous states, which exists in the CPS, is reduced. The second stage employs stratified sampling based on race and the number of children in the household, during which Hispanics, non-Hispanic Blacks, and households with children are oversampled. The final stage involves random sampling.[2]

This study uses all available waves of the ATUS data from 2003-2017 to examine the effects of minimum wages on time use. Each wave of the survey consists of 24-hour diaries in which respondents report their activities from the previous day in detailed time intervals. Given that individuals are drawn from the exiting sample of the CPS, information regarding

[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.

[2] As pointed out by Maddala (1983), the estimation of weighted regression models is not required in the case of oversampling based on exogenous regressors such as race. The analysis in this study controls for both race and the number of children present in the household. Additionally, we run our models including sample weights and find that the results remain similar. These results are not shown in the paper, but are available upon request.

respondents' employment status and other demographic characteristics is available in the survey. While the initial ATUS wave contained 20,720 individuals, sample sizes for all of the following waves were between 10,000-14,000 people. Following the approach taken by previous studies (e.g. Wehby et al., Horn et al., 2017), I narrow the sample to low-educated individuals, a group that is most likely to earn minimum wages. More specifically, the main analysis examines working-age people between the ages 18 to 64 who have at most a completed High School degree. After dropping individuals with missing time use information, the sample size for the main analysis is 25,887 individuals.

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 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.

Time Use Categories

The ATUS records detailed information on more than 400 categories of time use.[3] Using information on the day of the interview, we convert times individuals spend on certain activities into total times allocated towards these activities per week (Monday to Friday) and per weekend by closely following the approach by Aguiar et al. (2013). I examine whether minimum wage increases affect six different categories of time use: (1) exercise; 2) total time spent on one's own health; 3) leisure time; 4) education time; 5) work time; and 6) childcare time. Table 2 provides an overview of activities that are included in these categories in the analysis. Given that time

[3] Please see Hamermesh, Frazis and Stewart (2005) for more information on the types of activities that are recorded in the ATUS.

spent exercising makes up half of the total time allocated towards one's own health, I examine the effects on it separately. Finding changes in physical activity could provide evidence on a potential pathway between minimum wages and health outcomes, whereas changes in leisure activities such as socializing, pet care, watching television, or eating could explain how minimum wages affect mental well-being of affected individuals.

Minimum Wages

Minimum wage data is obtained from the U.S. Department of Labor.[4] The effective minimum wage is defined as the higher of the state and the federal minimum wage in each state. Table 3 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 1989-2009 analysis and 257 minimum wage during the 2003-2017 analysis using time use data. 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 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

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

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.[5] 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.[6]

Summary Statistics

Table 4 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

[5] 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.
[6] The data for the timing of TANF and for statewide waivers is obtained from the U.S. Department of Health & Human Services.

covered by employer-sponsored insurance. Only 7.1% of individuals report that they purchased their own private health coverage.

Table 5 provides descriptive statistics for the ATUS sample analyzed in this study. It is noticeable that half of all respondents were interviewed on a weekday, while the other half of the sample reported time use on the weekend. The time use statistics show total minutes spent on each category per week (Monday to Friday) and weekend.[7] Table 5 shows that respondents on average spend around two hours on their own health during the week, while half of that time is allocated towards exercising. Average total leisure time is 1,858 minutes during the week and 916 minutes on weekends. During the period of the study, mean nominal and average effective minimum wages are $6.73 and $6.14, respectively.

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. I estimate linear probability models for all the outcome variables. 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

[7] I multiply daily time use for each category by five (weekday) or two (weekend) to obtain total time use statistics for the two parts of the week.

to adjust for some time. X_{ist} represents a set of individual characteristics, such as age, gender, and race.[8] The inclusion of P_{st} in some specifications takes into account other 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. 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.

Besides the main DD analysis, I also examine whether the effects differ across subgroups of the population. As shown in Table 1, the share of low-wage workers varies substantially across demographic subgroups, suggesting that different groups might be more or less likely to be affected by minimum wage increases. Specifically, I test whether minimum wages differently impact outcomes across employment status, gender, and age. The subgroup analysis 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). 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.

[8] 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.

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).[9] Individuals who are at least 70 years old should 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 6 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

[9] 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.

10% increase in minimum wages is associated with a 0.524 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 0.70% 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 in driven by a certain type of insurance, Table 6 provides evidence for increases in privately purchased health insurance. The baseline estimate in Panel A indicates that a 10% increase in minimum wages is associated with a 0.493 percentage point increase for this type of coverage ($p<0.01$), which corresponds to a 6.94% increase relative to the sample mean (0.071). All estimates are robust to the inclusion of time-varying controls.

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 those 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 6 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 2.91% in response to a typical minimum wage increase.

While Table 6 also shows negative effects of minimum wages on employer-sponsored insurance and increases in public insurance, these effects are small and imprecisely estimated.

The direction of the estimation, however, could 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 7 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 0.265 percentage points ($p<0.10$), which corresponds to a 1.46% change relative to the sample mean (0.181). While the effects remain when using lagged minimum wages, the results lose statistical significance when controlling for additional state-level confounding policy changes.

Table 7 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 0.512 percentage points ($p<0.10$). This effect increases to 6.28 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 6.43% (current minimum wages) and 7.89% (lagged minimum wages). The estimates are robust to the inclusion of time-varying state controls.

Time Use

Table 8 reports the DD estimates of minimum wage increases on time use. Panel A shows results on time use during the week, while Panel B presents the effects on time allocation on weekends. I find that a $1 increase in one-year lagged minimum wages is associated with a reduction of time spent exercising by 12.85 minutes ($p<0.01$) between Monday and Friday. Relative to the baseline mean, this decline corresponds to a 20.41% reduction in exercise time. When additionally including other activities related to taking care of one's own health, the analysis finds a decline of 19.88 minutes ($p<0.01$) following a $1 increase in minimum wages in the prior year. When examining how individuals spend the newly available time, I find increases in total weekly leisure time by 29.62 minutes ($p<0.05$). The magnitude of this effect suggests that individuals reallocate time previously spent on health-enhancing activities towards leisure. No significant changes are found for the effects of minimum wage on time spent on education, work, or childcare. For all categories of time use, the effects remain unchanged when additionally including state-specific time trends to the analysis. Figure A1 in the Appendix provides estimates similar to an event study. While the sample of treated states is restricted in this analysis due to the continuous treatment in many states, the graph provides evidence that the effects on time spent exercising are largest two and three years following policy change.[10]

The results in Panel B show that minimum wages do not affect time use on weekends. While the descriptive time use statistics show that individuals on average spend 37.88 % and

[10] For the event study analysis, I only include treated states with not more than one policy change over given time periods in order to avoid capturing overlapping effects of several minimum wage increases in the same state. These states are: Alaska, California, Maine, Michigan, New Mexico, and Rhode Island.

33.01 % of their total exercise and leisure times on the weekend, respectively, weekend activities do not appear to be associated with minimum wages changes. A potential explanation for this could be the fact that the policy changes affect time use of individuals who are working more than they do for unemployed people. To get a better understanding of the heterogeneous nature of the results, I next re-estimate the effects for different subgroups of the population.

Heterogeneous Results

Table 9 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 9 provides evidence that there are differences in the observed effects across these 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 between 45 and 64). While the overall effect on insurance is small for individuals between the ages 45 to 64, the results indicate a 0.568 percentage point reduction in employer-sponsored coverage ($p<0.01$) and a 0.627 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).

The overall effects on health insurance across gender are very similar between men and women. Two notable differences across gender are that minimum wages are associated with slightly larger increases in individually purchased insurance coverage for women and substantially larger increases in the frequency of regular health checkups are only observable larger for women than for men. 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.

Table 10 presents time use DD estimates for several subgroups of the population. Panel A provides estimates for employed individuals and for those who are not in the labor force at the time of the interview. In line with the prediction that minimum wages affect the lives of employed individuals to a larger extent, I find larger declines in health-enhancing activities for this group. Among workers, a $1 increase in the effective minimum wages is associated with a decline of total health time by 26.25 minutes ($p<0.01$), while time allocated towards leisure activities increases by 33.01 minutes ($p<0.01$). It is noticeable that weekly work time is not altered following minimum wage for employed individuals. Panel B provides evidence that male respondents mainly drive the effects of the study. The results show a $1 increase in real minimum wages reduces the amount of time men exercise and spend on their own health by 23.35 ($p<0.05$) and 33.56 ($p<0.01$) minutes per week, respectively. The corresponding effects for women are small and imprecisely estimated. Finally, Panel C shows that the effects also differ across age groups of the population. While time use of individuals under 30 years of age is not statistically significantly affected by minimum wage changes, I find that individuals between the ages 30 to 45 experience the largest decline in exercise time (21.48 minutes). Furthermore, this

age group is shown to increase childcare time by 35.96 minutes ($p<0.01$) following a $1 increase in the effective minimum wage. Respondents between the ages 46 to 64 decrease their total health time by 23.61 minutes ($p<0.01$), while experiencing the largest increase in leisure time (42.04 minutes).

ROBUSTNESS CHECKS

The triple difference for the CPS/BRFFSS analysis is shown in Table 11. 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 6 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 indicate that this group might not be an ideal placebo group. Potential spillover effects of minimum wages to higher (and more educated) earners might explain the small positive effects for this comparison group.

The BRFSS estimates obtained from using elderly retired individuals as the within-state comparison group confirm the main DD results and show statistically significant effects on health care affordability and utilization. However, minimum wages are associated with small increases in health care affordability among elderly individuals. The DDD effects for the other placebo group (college-educated adults) show increases in the ability to afford necessary health care and the frequency of routine health checkups (all $p<0.05$). Overall, while confirming the main DD estimates of this study, the DDD results in Table 11 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.

The DDD time use results are reported in Table 12. The top of the table shows the DD results for the main treatment group (Table 8), while the remainder of Table 12 shows the effects for the two placebo groups as well as the DDD estimates for each of the two additional within-state comparison groups. For the sample of retired elderly adults, I find that minimum wages have positive effects on total weekly health time, while reducing time allocated towards childcare(both $p<0.10$). The DDD effects for this placebo group indicate reductions in total exercise and health time by 25.46 and 38.55 minutes (both $p<0.01$), while showing a positive treatment effect on time spent on leisure activities by 71.02 minutes during weekdays ($p<0.10$).

In line with the statistics shown in Table 1, changes in minimum wages do not affect time use of individuals with at least a college degree. The estimates for all categories of time use are small and statistically insignificant for this placebo group. Thus, the DDD effects are similar in magnitude to the main DD estimates. A $1 increase in lagged minimum wages is associated with 18.42 less minutes spent on one's own health during the week ($p<0.05$), while allocating 31.13 additional minutes ($p<0.10$) on leisure activities. While the effects on education and work are negligible, the DDD estimation for this subgroup find an increase in childcare time of 13.92 minutes during the week following higher minimum wages ($p<0.10$).

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. 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, the study finds increases in the ability to afford necessary health care, and the frequency of routine health checkups in response to increases in minimum wages. When examining the role of time allocation, I find that reductions in health-related time use following minimum wage increases might be another mechanism through which such policy changes can affect people's health. The analysis shows that individuals spend 20 minutes less on their own health between during the week (Monday to Friday) after a $1 increase in minimum wages, while allocating 30 additional minutes toward leisure activities. To put these results into perspective, former President Obama advocated for an increase in the federal minimum wage from $7.25 to $10.10. While 29 states and DC currently have minimum wages in place that are above the federal minimum level, such a reform would increase the wage floor by $2.85 in the remaining 21 states. Based on findings of this study, this corresponds to a decline in time spent on health-enhancing activities by 57 minutes during the week, while increasing leisure time by 85.5 minutes

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 on 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. Combining the findings of increased insurance coverage and more frequent health checkups but less time allocated towards healthy activities might suggest the presence of ex-ante moral hazard. This should be explored in more detail in future work.

It seems likely that several mechanisms are at play underlying the link between minimum wages and health. A better understanding of this relationship can provider a guide for policymakers trying to improve society's well-being. I believe that an overall analysis of the effects of minimum wages should look at the policy's impacts on all aspects of well-being, which includes potentially unintended effects such as reductions in time allocated towards health-enhancing activities. While being outside the scope if this study, it might be of interest for researchers to conduct a welfare analysis of minimum wage increases that includes the effects of these policy changes on a wide range of outcomes.

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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: Description of Time Use Activities

(1) Physical activity time
Exercising
(2) Total time spent on own health
Exercising
Self-care
Health care outside the house
In-home health care services
Waiting and travel time to obtain medical care
(3) Total leisure time
Eating
Watching television
Reading
Pet care
Non-health related personal care
Socializing
(4) Total education time
Time spent on education activities
(5) Total work time
Time spent on core work
(6) Total childcare time
Time spent on childcare activities

Table 3: State and Federal Minimum Wage Changes, 1989-2016

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
2010	AK, CO, FL, GA, IL, KS, MO, MT,
2011	AZ, CO, IL, MT, NV, OH, OR, VT, WA,
2012	AZ, CO, FL, MT, OH, OR, VT, WA,
2013	AZ, CO, FL, MO, MT, OH, OR, RI, VT, WA,
2014	AZ, CO, CT, DC, DE, FL, MO, MT, NJ, NY, OH, OR, RI, VT, WA,
2015	AK, AR, AZ, CA, CO, CT, DC, DE, FL, HI, MA, MD, MI, MN, MO, MT, NE, NJ, NY, OH, OR, RI, SD, VT, WA, WV
2016	AK, AR, CA, CO, CT, DC, HI, MD, MA, MI, MN, NE, NY, OR, RI, SD, VT, WV

Table 4: 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 5: Summary Statistics, ATUS (2003-2017)

Age	42.170 (13.202)
White	0.789 (0.408)
Black	0.166 (0.372)
Male	0.467 (0.499)
Married	0.483 (0.500)
Never Married	0.273 (0.446)
Number of Children in HH	1.008 (1.216)
High school graduate	0.717 (0.450)
Less than high school	0.283 (0.450)
Employed	0.633 (0.482)
Weekday interview	0.494 (0.500)
Weekend interview	0.506 (0.500)
Total exercise	
Weekdays	62.97 (247.66)
Weekend	38.40 (147.70)
Total time on own health	
Weekdays	122.65 (405.98)
Weekend	51.00 (181.28)
Total leisure time	
Weekdays	1,858.23 (998.04)
Weekend	915.57 (430.73)
Total education time	
Weekdays	63.47 (359.58)
Weekend	8.62 (72.07)
Total work time	
Weekdays	1,417.56 (1,418.21)
Weekend	185.97 (411.74)
Total childcare time	
Weekdays	200.21 (434.67)
Weekend	57.56 (153.44)
Minimum wage (nominal)	6.726 (1.206)
Minimum wage (real)	6.144 (1.559)
Observations	25,887

Table 6: DD Effects of Minimum Wage on Health Insurance (CPS, 1989-2009)

	Any health insurance		**Employer-sponsored insurance**		**Privately purchased insurance**		**Public insurance**	
Panel A: Current MW								
Log (Min. Wage)	0.0524**	0.0540**	-0.0227	-0.0181	0.0493***	0.0437***	0.0414	0.0519**
	(0.0253)	(0.0210)	(0.0230)	(0.0204)	(0.0183)	(0.0115)	(0.0313)	(0.0257)
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)	0.0584**	0.0551**	-0.0162	-0.0143	0.0503**	0.0438***	0.0452	0.0562*
	(0.0252)	(0.0216)	(0.0275)	(0.0257)	(0.0204)	(0.0142)	(0.0331)	(0.0294)
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
Time-varying 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, and race. Time-varying 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 7: The Effects of Minimum Wage on Health Care Access/Utilization (BRFSS, 1989-2009)

	Needed doctor visit but could not afford it		**Routine checkup last 2 years**	
Panel A: Current MW				
Log (Min. Wage)	-0.0265*	-0.0198	0.0512*	0.0585**
	(0.0159)	(0.0138)	(0.0301)	(0.0257)
Sample Mean	0.1805		0.7958	
Observations	1,281,680	1,281,680	1,281,680	1,281,680
Panel B: Lag MW				
Log (Min. Wage)	-0.0270*	-0.0199	0.0628**	0.0730***
	(0.0163)	(0.0146)	(0.0310)	(0.0262)
Sample Mean	0.1805		0.7958	
Observations	1,145,416	1,145,416	1,145,416	1,145,416
State-specific time trends	Yes	Yes	Yes	Yes
Time-varying state controls	No	Yes	No	Yes

Robust standard errors, clustered at the state-level, are shown in parentheses. The control variables include age, gender, and race. Time-varying 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 8: DD Effects of Minimum Wage on Time Use (ATUS, 2003-2017)

	Total Exercise		**Total own health**		**Total leisure**		**Total education**		**Total work**		**Total Childcare**	
Panel A: Weekdays												
Min. Wage	-12.85***	-11.32**	-19.88***	-18.88***	29.62**	29.71*	4.25	3.59	-8.10	-8.05	6.44	5.02
	(4.29)	(4.73)	(7.06)	(6.92)	(14.71)	(16.14)	(6.24)	(6.38)	(24.83)	(23.24)	(6.28)	(6.71)
Sample Mean	62.97		122.65		1,858.23		63.47		1,417.56		200.21	
Observations	25,887		25,887		25,887		25,887		25,887		25,887	
Panel B: Weekends												
Min. Wage	0.26	-0.15	1.14	-0.12	9.46	9.93	-0.66	-0.40	-0.56	-0.50	-0.80	-1.39
	(2.98)	(2.83)	(3.15)	(3.22)	(9.52)	(9.21)	(1.39)	(1.47)	(9.87)	(9.49)	(4.36)	(4.30)
Sample Mean	38.40		51.00		915.57		8.62		185.97		57.56	
Observations	26,497		26,497		26,497		26,497		26,497		26,497	
State-specific time trends	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes

Robust standard errors, clustered at the state-level, are shown in parentheses. All models control for age, gender, race, marital status, employment status, the number of children living in the household, year and state fixed effects as well as time-varying state policy controls. * p<0.10, ** p<0.05, and *** p<0.01.

Table 9: 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	0.0799**	0.0178	0.0199	0.0578*	-0.0987***	0.0919**
	(0.0308)	(0.0336)	(0.0143)	(0.0333)	(0.0264)	(0.0440)
Sample mean	0.6592	0.4478	0.0638	0.1836	0.1989	0.7843
30-44	0.0632**	-0.0141	0.0486**	0.0589	-0.0361	0.0962**
	(0.0299)	(0.0411)	(0.0232)	(0.0485)	(0.0280)	(0.0377)
Sample mean	0.7298	0.5881	0.0556	0.1367	0.1980	0.7551
45-64	0.0337	-0.0568***	0.0627***	0.0377	-0.0070	0.0343
	(0.0225)	(0.0182)	(0.0235)	(0.0240)	(0.0208)	(0.0272)
Sample mean	0.8104	0.6142	0.0914	0.1798	0.1616	0.8281
Gender						
Male	0.0557**	-0.0179	0.0422*	0.0521**	-0.0295	0.0328
	(0.0264)	(0.0250)	(0.0213)	(0.0256)	(0.0190)	(0.0346)
Sample mean	0.7241	0.5690	0.0688	0.1344	0.1449	0.7266
Female	0.0628**	-0.0146	0.0585***	0.0399	-0.0335	0.0789**
	(0.0264)	(0.0321)	(0.0201)	(0.0417)	(0.0234)	(0.0304)
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, and race. All regressions include state-specific time trends and non-weighted data. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 10. Heterogeneous DD Effects of Minimum Wage on Time Use (2003-2017)

	Total Exercise	**Total own health**	**Total leisure**	**Total education**	**Total work**	**Total Childcare**	**N**
Panel A: Employment							
Employed	-17.52***	-26.25***	33.01*	3.39	-2.09	-8.47	16,421
	(4.49)	(7.04)	(19.39)	(6.92)	(38.13)	(6.65)	
Not in Labor Force	-7.81	-12.97	44.21	-8.26	5.96	37.42**	7,059
	(11.75)	(16.97)	(42.11)	(11.61)	(10.78)	(16.21)	
Panel B: Gender							
Male	-23.35**	-33.56***	48.44*	13.30	2.28	-7.33	12,118
	(8.89)	(12.06)	(29.10)	(10.20)	(31.22)	(11.35)	
Female	-4.70	-7.40	11.71	-1.46	-13.09	16.07	13,769
	(4.88)	(8.68)	(22.42)	(10.67)	(31.56)	(12.31)	
Panel C: Age							
18 to 29	-5.66	-15.25	16.04	19.17	-66.06	-22.22	5,291
	(8.95)	(12.49)	(36.53)	(25.20)	(57.27)	(19.73)	
30 to 45	-21.48**	-19.34	19.65	3.41	-43.97	35.96***	9,126
	(8.18)	(12.83)	(25.80)	(6.63)	(35.19)	(11.20)	
46 to 64	-8.23	-23.61*	42.04*	5.36*	42.77	-4.78	11,470
	(6.89)	(13.19)	(24.30)	(3.12)	(35.63)	(4.63)	

Robust standard errors, clustered at the state-level, are shown in parentheses. All models control for age, gender, race, marital status, employment status, the number of children living in the household, year and state fixed effects as well as time-varying state policy controls. * p<0.10, ** p<0.05, and *** p<0.01.

Table 11: 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)	0.0524**	0.0584**	-0.0265*	-0.0198	0.0512*	0.0628**
	(0.0253)	(0.0252)	(0.0159)	(0.0138)	(0.0301)	(0.0310)
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	0.0139*	0.0162*	0.0096	0.0082
	(0.0077)	(0.0086)	(0.0080)	(0.0086)	(0.0153)	(0.0173)
Sample mean	0.9907		0.0433		0.9221	
Observations	176,667	167,957	297,092	297,092	256,299	256,299
DDD estimate	0.0439**	0.0495**	-0.0404***	-0.0360**	0.0415*	-0.0546***
	(0.0206)	(0.0215)	(0.0152)	(0.0154)	(0.0220)	(0.0187)
Sample: 18-64, at least college degree						
Log(minimum wage)	0.0305	0.0304	-0.0095	-0.0030	-0.0171	-0.0128
	(0.0186)	(0.0192)	(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	0.0219	0.0281**	-0.0231**	-0.0301**	0.0683**	-0.0808**
	(0.0144)	(0.0138)	(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, and race. All regressions include state-specific time trends * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 12: DDD Effects of Minimum Wage on Time Use

	Total exercise	**Total own health**	**Total leisure**	**Total education**	**Total work**	**Total childcare**
Sample: 18-64, at most HS degree						
Min. Wage	-12.85***	-19.88***	29.62**	4.25	-8.10	6.44
	(4.29)	(7.06)	(14.71)	(6.24)	(24.83)	(6.28)
Sample mean	79.01	127.36	1,695.12	76.58	1,666.85	135.26
Observations	25,887	25,887	25,887	25,887	25,887	25,887
Sample: 70+, retired, at most HS degree						
Min. Wage	12.61	18.66	-41.39	1.82	1.78	-5.28*
	(8.02)	(10.40)	(39.80)	(1.50)	(11.82)	(3.09)
Sample mean	80.90	190.56	2,787.77	5.15	14.99	6.68
Observations	9,930	9,930	9,930	9,930	9,930	9,930
DDD estimate	-25.46***	-38.55***	71.02*	2.42	-9.88	11.72*
	(8.44)	(13.23)	(42.59)	(6.55)	(25.54)	(6.99)
Sample: 18-64, at least college degree						
Min. Wage	-3.37	-1.47	-1.51	0.73	7.04	-7.48
	(4.28)	(4.89)	(12.94)	(6.36)	(16.26)	(7.59)
Sample mean	98.33	132.89	1,531.94	55.54	1,957.60	281.33
Observations	25,552	25,552	25,552	25,552	25,552	25,552
DDD estimate	-9.48	-18.42**	31.13*	3.52	-15.14	13.92
	(6.26)	(8.77)	(16.22)	(10.09)	(30.58)	(8.06)

Robust standard errors, clustered at the state-level, are shown in parentheses. All models control for age, gender, race, marital status, employment status, the number of children living in the household, year and state fixed effects as well as time-varying state policy controls. * p<0.10, ** p<0.05, and *** p<0.01.