



The impact of minimum wage on parental time allocation to children: evidence from the American Time Use Survey

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Abstract

In this study, using data from the 2003–2019 American Time Use Survey (ATUS), we investigate whether changes in the minimum wage have impacted time allocation to children among low-educated mothers and fathers. Relying on geographic and temporal variation in minimum wage changes across US states, we investigate the impacts of minimum wage increases on total time spent at home with children, time spent on primary childcare, and time spent on enriching childcare activities. Our results indicate that an increase in the minimum wage has a large positive effect on the time low-educated mothers spend on primary childcare and enriching time, with no effect among low-educated fathers. We find that Black mothers with less than a high school education see the biggest gains, with an increase in time spent on childcare and time spent on enriching childcare activities by 13.8 and 15.8 min per day, respectively, for each \$1 increase in the minimum wage. We also see that single mothers' time investment is largely unaffected by minimum wage changes, suggesting that there are still considerable income constraints facing these families. Lastly, we see that less educated families with children under the age of 7 significantly increase time spent on primary childcare and enriching time from minimum wage increases, given that they may not have the ability to afford private childcare.

Keywords Time with children · Minimum wage · Primary childcare

JEL classification J22 · J13

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1 Introduction

In recent years, many US states have increased their minimum wages. While attempts to include a \$15 federal minimum wage as a part of a COVID-19 relief bill did not materialize, in April 2020, President Joe Biden signed an executive order requiring federal contractors to raise the minimum wage to \$15 per hour by 2022 (The Whitehouse, 2021). These legislative changes spurred a revived interest in examining the potential effects of minimum wage increases on various aspects of economic activity. While low-income parents with small children have been seen politically as the largest beneficiaries of increases in minimum wages, minimum wage legislation does not specifically target this demographic group as effectively as child tax credits or other state and federal policies do. We suspect, however, that increases in the minimum wage may alter time spent with children, via a number of potential mechanisms. These include changes in the opportunity costs of time, the potential for disemployment effects from minimum wages, or intrafamily time substitution. While many previous studies examined the impact of changes in minimum wage on labor supply decisions (including parental labor supply) little is known about how changes in the minimum wage regulation impact parental behaviors. Thanks to the detailed 2003–2019 American Time Use Survey (ATUS), our study is among the first to quantify the effect of minimum wage on parental time allocation, including time investment into children's human capital among low educated mothers and fathers.

Early life environments, including children's early skills, have been linked to later-life outcomes (Almond et al., 2018; Francesconi & Heckman, 2016). Economic literature has recently begun modeling family time investment into child skills formation production function (Bernal, 2008; Bernal & Keane, 2010; Del Boca et al., 2014; Del Bono et al., 2016; Cardoso et al., 2010; Gayle et al., 2015). Both Del Boca et al., (2014) and Del Bono et al., (2016) find that parental time with children is crucial for cognitive and emotional development, specifically when children are young. Some of the most productive time is that which parents spend with their children in structured or educational environments (Fiorini & Keane, 2014; Hsin & Felfe, 2014).

Given that there are considerable benefits from spending more time with children, we investigate the impact that minimum wage changes could have on parents' ability to do so. Hill and Romich (2018) point out three main pathways of the effect of minimum wages on children: (i) changes in parental income; (ii) parental stress and parents' practices; and (iii) parental time and routines. Given that there exists a positive link between parental income and children's outcomes, it may seem that increasing minimum wages would lead to improvements in childhood outcomes (Dahl & Lochner, 2012; Duncan et al., 2011). Theoretically, however, the overall effects are ambiguous.

The impact of minimum wage increases on how parents choose to spend their time, specifically including time spent with children, is complex. Increases in minimum wages change the opportunity cost of parental time, where parents may substitute their time away from children and toward more work. Alternately, a higher wage may induce parents to spend less time at work, and devote more time to non-work activities, including childcare. Additionally, minimum wage increases could lead to higher rates of unemployment. Although this could increase time spent at

home with children, the reduction in household income and increase in parental stress could offset these increased stay-at-home benefits. Non-work time can be spent in leisure, household production (cooking and cleaning), or can be spent actively/passively with children. Importantly, there are secondary tradeoffs that must be made during time allocation (e.g., Increased home production via home cooking may improve the overall health of the family, but it may come at the expense of reading to children). Therefore, parents must balance how they spend time on overall household production, how they spend time on themselves, and how they spend time on their children. Caucutt et al. (2020), Kooreman and Kapteyn (1987), and Kimmel and Connelly (2007) found that higher wages earned led parents to increase both time spent at work to earn more household income, as well as to increase time investments in children, in part by reducing leisure and home production time. To further complicate the analysis, there could be intra-family household substitution, where the primary income earner works more from a minimum wage increase, while a secondary income earner works less. Therefore, the a priori impacts of a minimum wage on time spent at home with children (and therefore childhood outcomes) is unclear.

The aim of our study is to examine whether changes to minimum wages impact time that parents allocate to their children in various activities, including activities critical for a child's development. We use three measures of time spent at home: (i) total time spent with children; (ii) time spent as primary childcare; and (iii) time spent at home that is considered "enriching," given that not all time spent at home would be considered equal. Appendix Table 6 lists all activities in these categories. Broadly, total time spent with children is the overall measure of time that parents spend with children regardless of an activity, as long as a child was present during the activity. This includes both passive and active time with children. Time spent as primary childcare, which is a subset of total time spent with children, incorporates three broad groups: (i) caring for and helping household children; (ii) activities related to household children's education; and/or (iii) activities related to household children's health. Our last set, time spent at home that is considered enriching, is a subset of the previous two categories. As shown in Appendix Table 6, enriching time is considered physical or educational activities where the child and parent are both directly engaged in the activity; as noted in Pabilonia and Song (2013), this time would be considered analogous to "investment". As defined by Stewart (2010), these activities are directly related to child development.

We find a number of results that extend the literature. First, we observe that nearly all of the changes in time spent with children, resulting from minimum wage changes, are concentrated among the lowest educated American mothers: For mothers with less than a high school education, a one dollar increase in the minimum wage leads to an increase in primary childcare time of nearly 12 min per day, and an increase in enriching activities time of about 10 min per day. This suggests that over four fifths of the time spent on primary childcare is in enriching activities, which may provide sizable cognitive and emotional benefits for children.

Second, we find that there is no impact for fathers, regardless of their education level, marital status, or age of the youngest child. This suggests that traditional gender stereotypes still play a role, and males are likely to be the primary income earners in a family. Third, we find that Black mothers see the largest increases in time spent with children via minimum wage changes; Black mothers experience an increase in total time

spent with children of around 15 min per day, an increase in time spent in primary childcare of 7.3 min per day, and an increase in time spent in enriching activities of 9.8 min per day. The changes in time distribution are even stronger among Black mothers with less than a high school education, where time spent in primary childcare and enriching activities increases by about a quarter of an hour.

Fourth, we see that married mothers experience an increase in total time spent with children of about 7 min per day, while there is no difference in time distribution for single mothers. The lack of a spouse and intrafamily time allocation between work and childcare impacts single mothers significantly. Additionally, among the least educated married mothers, we see an increase in primary childcare and enriching time spent with children, which does suggest intrafamily substitution. Lastly, when it comes to primary childcare and enriching time, we find that results are also concentrated in households with younger children whose mothers are less educated.

2 Literature review

We focus on recent literature that establishes a relationship between changes in minimum wages and the impacts on parents and their labor supply, as well briefly discuss studies that link minimum wage changes with child well-being. This literature has been influenced by Becker (1965), who introduced the cost of time into decisions on non-work activities, providing an ability to talk about non-market activities in opportunity cost terms. Therefore, households can now be analyzed as changing their market and non-market behavior in response to changes in earnings, which is important when addressing potential income and substitution effects from minimum wage changes.

Sabia (2008) studies the effect of minimum wage changes on the well-being of single mothers, relying on Current Population Survey (CPS) data. His results indicate that, while most working single mothers were not affected by changes in minimum wage, those with lower levels of education did not experience increases in income, and they may have been adversely impacted. Specifically, a 10 percent increase in the minimum wage is associated with decreases in employment of 8.8 percent, as well as an 11.8 percent reduction in annual hours worked. Godoy et al. (2019), however, utilizing an event study framework, document an increase in employment and income after an increase in state minimum wages. They find that an increase in state minimum wages leads to an increase in the labor supply of single mothers and married fathers. Godoy et al. (2019) also point out that minimum wage increases led to increased labor force participation, which helped to reduce child poverty.

An important consideration is how households reallocate their time in response to shifts in employment or from higher incomes due to increases in minimum wages. Over time, female labor force participation has grown, which could have a negative impact on the quantity and/or quality of time spent at home with children. Bianchi (2000) find that working mothers are reducing non-childcare related time activities, while working more to have the same amount of time spent with children. Fox et al. (2013), focusing exclusively on mothers, find similar results. Aguiar and Hurst (2007) show that the time spent in primary childcare by mothers had increased. Heiland et al. (2017), however, find that an increase in 10 additional hours of maternal work reduces the quantity of mother-child time by 7.5 percent.

While the distribution of time activities is important, and can positively impact children cognitively and emotionally, there could be broader health impacts of minimum wage increases for children (Del Boca et al., 2014; Del Bono et al., 2016). Komro et al. (2016) find that a one dollar increase in the minimum wage is associated with a one to two percent decrease in the incidence of low birth weight, as well as a four percent decrease in post neonatal mortality. Similarly, Wehby et al. (2020a) find that an increase in the minimum wage is associated with increases in birth weight, mainly driven by longer gestation and fetal growth rate. Wehby et al. (2020b) show that higher minimum wages in childhood are associated with better child health outcomes, with the largest cumulative effects in the first five years of a child's life. Given that in the first five years of a child's life, children are often too young for public schooling, parents must choose to pay for private childcare, find family or friends willing to take care of their children, or forego work income. Time constraints are further strained, given the higher need for preventive check-ups and vaccinations during these time periods, which often occur during traditional work hours. Wolf et al. (2021) find that minimum wage preemption laws, which restrict the autonomy of local government to increase minimum wages, are positively associated with infant mortality.

Raissian and Bullinger (2017) find that an increase in the minimum wage decreases the number of child maltreatment reports to child protective services, in part due to an increase in the financial resources of the family. Schneider et al. (2021) report that increasing minimum wages resulted in reduced spanking by both parents, as well as decreased physical and psychological aggression of the mother. Exploring the mechanisms behind this result, the authors find that higher minimum wages reduced maternal employment, as well as changed the likelihood of working a weekend shift, potentially leading to changes in time use and the likelihood of which parent assumes primary childcare responsibilities. Dwyer Emory et al. (2020) document that in households where the father's income was responsive to changes in minimum wage, fathers were more likely to live with their children; however, in families where only the mother's wages were sensitive to minimum wage changes, higher minimum wages were negatively associated with the father residing at home. Contrary to the literature documenting the positive effects of minimum wage on a child's well-being, Regmi (2020) finds that for children with mothers having less than a high school education, higher minimum wages reduce children's math scores, reading scores and reading comprehension scores, potentially due to a deterioration in home environment, especially if parents choose to work more and not reduce leisure or home production time to increase time spent on child investment. In the context of time allocation studies, Lenhart (2019) is one of the first papers that uses time diary data to explore the link between minimum wage and health. He finds that a one dollar increase in the minimum wage is associated with 13 and 20 minute declines in exercise time and personal health time during the week.

3 Data

We rely on data from the 2003 to 2019 American Time Use Survey (ATUS); the ATUS is a nationally representative survey intended to measure how Americans

spend their time. ATUS respondents are at least 15 years of age, and are picked from the outgoing rotation of the Current Population Survey (CPS). ATUS respondents are asked to report their time use within a 24-hour period on a day prior to an interview, which is then classified by ATUS into various activities. The ATUS data also provide information as to who was present with a respondent during a given activity, along with where the activity took place. Since ATUS respondents are sampled from the CPS survey, the data also include information on basic demographic characteristics and employment information, as well as state of residence. Since we are focusing on time allocation to children, we limit our sample to respondents who had their own household children under the age of 18. Additionally, since the effect of minimum wage is most likely to be felt by low-educated parents, a main subsample of interest is low-educated mothers and fathers; these groups are defined as those with less than a high school education. We focus on three different time use categories commonly utilized in previous studies as our outcome measures of interest: total time spent with children, time devoted to primary childcare, and time spent on enriching activities. Separating our outcome measures into these three areas is important, given that not all time with parents is equally productive and conducive to the development of better skill formation.

Table 1 provides summary statistics for our data. Since there are substantial differences in time allocation across parents, we present these statistics separately for mothers and fathers. Table 1 indicates that mothers with a lower level of education spend more *total* time with children than their more educated counterparts. For instance, mothers with less than a high school education spend, on average, 427 min per day with children, as opposed to mothers with a college education, who spend, on average, 370 min per day. However, we see that primary childcare time increases as education increases, and time spent on enriching activities is highest for mothers with a college education. Mothers who are less educated, especially those with less than a high school education, are in general younger, more likely to be Hispanic, less likely to be married, have more children in their household, and are more likely to be out of the labor force. Summary statistics for fathers in Panel B indicate that fathers spend less time with children in comparison to mothers across all education levels. However, we observe patterns similar to maternal time allocation for primary childcare time and enriching time categories: Fathers with more education spend more time with children, compared to those with less education. These trends suggest that even though parents may be at home with their children, a considerable amount of the time must be considered “passive,” and not “active.” For instance, mothers with less than a high school education only spend 17.6 percent of their time with children in enriching activities; college educated mothers spend 24.4 percent of their time with their children in enriching activities.

Data on current values of the minimum wage, along with the timing of minimum wage changes, come from the Bureau of Labor Statistics (BLS). We focus on the effective real minimum wage, which is the maximum of the given state or federal minimum wage, using 2019 dollars.

Table 2 provides information on years and states that had changes to the minimum wage during our study period. During 2002–2018, there were 317 total state-year minimum wage changes, along with 3 federal minimum wage changes (2007, 2008, and 2009). This accounts for 34.5 percent of our state-year observations having

Table 1 Average time with children for mothers and fathers (in minutes per day)

Variables	Less than high school	High school	Some college	College
Panel A: Mothers				
Total time	427.46	379.73	359.28	369.87
Primary childcare time	96.04	96.74	96.28	116.28
Enriching time	75.04	75.60	74.61	90.41
Parental age	34.47	35.46	36.41	39.61
Fraction White	0.81	0.78	0.78	0.81
Fraction Black	0.13	0.17	0.16	0.08
Fraction Hispanic	0.62	0.25	0.15	0.08
Fraction other (race)	0.06	0.06	0.06	0.11
Age of youngest child	5.78	6.86	6.98	6.77
Number of children	2.33	1.96	1.91	1.84
Fraction married	0.59	0.64	0.66	0.87
Fraction employed	0.40	0.60	0.69	0.76
Fraction not in LF	0.52	0.34	0.26	0.22
Observations	4015	9991	13,067	17,043
Panel B: Fathers				
Total time	279.32	252.29	259.11	260.99
Primary childcare time	41.91	46.06	56.59	64.65
Enriching time	30.12	35.04	43.75	51.58
Parental age	37.71	38.74	39.31	41.88
Fraction White	0.88	0.84	0.83	0.82
Fraction Black	0.07	0.11	0.12	0.06
Fraction Hispanic	0.66	0.23	0.14	0.07
Fraction other (race)	0.04	0.05	0.06	0.11
Age of youngest child	6.17	7.10	6.84	6.75
Number of children	2.22	1.91	1.91	1.92
Fraction married	0.80	0.82	0.87	0.95
Fraction employed	0.85	0.89	0.90	0.96
Fraction not in LF	0.09	0.07	0.06	0.03
Observations	2701	7257	7833	12,839
Panel C: State level covariates (aggregate)				
Lagged real min. wage	8.09			
Median household income	61457.68			
Unemployment rate	6.15			

Data come from ATUS 2003–2019. Final weights are used

Table 2 Minimum wage changes, 2002–2018

Year	State
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 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
2017	AK, AZ, AR, CA, CO, CT, FL, HI, MA, ME, MD, MI, MO, MT, NJ, NY, OH, OR, SD, VT, WA
2018	AK, AZ, CA, CO, FL, HI, ME, MI, MN, MO, MT, NJ, NY, OH, RI, SD, VT, WA

Source: U.S. Department of Labor

minimum wage changes. Over these changes, the average minimum wage change was 3.19 dollars.

4 Methodology

Since Becker's (1965) and Mincer's (1962) attempts to model time use in the home along with work time, there have been considerable developments in the theory of household production. Gronau (1977), Becker (1981), and Graham and Greene (1984) all reflected on multiple uses of household time, expanding the definition of household time to include home production (childcare, cooking, cleaning, etc.) and leisure time, indicating that nonmarket time is not perfectly substitutable. Kimmel and

Connelly (2007) noted that even these expanded models were not adequate; they pointed out that home-produced childcare is an imperfect substitute for market-produced childcare, as parents gain utility from spending time with their children. In their paper, they provide a model with five uses of time for parents: (i) (paid) market work, (ii) (unpaid) home work, (iii) childcare, (iv) leisure, and (v) other. According to Kimmel and Connelly (2007), parents maximize utility from spending time with children subject to their time and budget constraints.

However, Kimmel and Connelly (2007) note that their time categorization is ad hoc, given the difficulty in aggregating different uses of time, considering the substantial heterogeneity evident in human populations. Using a similar behavioral model to that presented in Kimmel and Connelly (2007), we model time use as a function of the market wage, the price of nonparental childcare (including daycare and preschool), the amount of nonlabor income available, preferences, and institutional structure, all conditional on characteristics of the mother, the household in which the mother lives, and the day of the week.

Our estimation strategy relies on changes in state-level minimum wages. Minimum wage regulation has the potential to induce several changes in the daily parental time allocation: some complementary and some as substitutes. For instance, a one dollar increase in the minimum wage increases the opportunity cost of some parents' time namely those working at or just above the prevailing minimum wage, so that they may choose to work more; this could reduce time spent with children by the parents, but increase nonparental childcare time, as the parents have more money available to pay for these services. On the other hand, a one dollar increase in the minimum wage could allow parents to work less and earn the same income, likely by substituting market work for home childcare production. At the extreme end, the disemployment effects of minimum wages would reduce market labor time to zero, but increase home production and home childcare time. The potential for considerably heterogeneous effects, which depend on a number of individual-specific, household-specific, and job-specific factors, suggest that the disaggregated time breakdown provided in Kimmel and Connelly (2007) is an appropriate way to measure potential changes.

To estimate the effects of state-level changes in minimum wage on parental time allocation, we implement the following fixed effects Ordinary Least Squares (OLS) model:

$$Y_{ist} = \beta_1 MW_{st-1} + \beta_2 X_{ist} + \beta_3 Z_{st} + S_s + T_t + D_t + M_t + \varepsilon_{ist},$$

where Y denotes the minutes per day of time spent with children (all time, primary childcare, enriching time) for parent i residing in state s in year t . MW is the one year lagged effective real minimum wage (in 2019 dollars) deflated using CPI for all urban consumers¹. X is a vector of individual-level demographic characteristics, that includes parental age, race, ethnicity, gender, educational level (less than high school, high school education, some college, and college education), number of children in the household, age of the youngest child, marital status. S_s corresponds to state fixed effects, T_t are year fixed effects, D_t are day of the week fixed effects, M_t are monthly fixed effects, and ε_{ist} is an error term that is assumed to be normally

¹ The CPI data were retrieved from the Bureau of Labor Statistics <https://data.bls.gov/cgi-bin/surveymost?cu>.

distributed. Additionally, we account for state level unemployment rates and median household income, as well as the indicator of whether a state had an Earned Income Tax Credit (EITC) program, whether the program was refundable and the percentage of the state's EITC relative to the federal EITC captured by Z .

Our major variable of interest is the lagged value of the real state-level minimum wage for state s in year $(t-1)$, which is identified through variation in state-level minimum wages across states and over time. During our study period, the nominal minimum wage ranged between \$5.15 to \$13.25 per hour. Given that states are able to require minimum wages that are higher than the federal minimum wage, in 2018, 29 states and the District of Columbia had a state-level minimum wage higher than the federally mandated minimum wage of \$7.25. We deflate minimum wage to 2019 dollars, and use the effective minimum wages, which is the maximum of either the state or federal minimum wage. Similar to recent studies, including Lenhart (2019), Dwyer Emory et al. (2020), Karney et al. (2022), Horn et al. (2017), we choose to lag the minimum wage by a year to account for the possibility that the effects of minimum wage changes may not be immediate due to delays in family and market responses.² We use a lagged minimum wage as a reflection of household decisions for those households with children, for several reasons. First, established parental routines likely change slowly. Second, childcare responsibilities are a binding constraint, so it will take time for these decisions to manifest. Third, alternatives to home childcare (which includes nonparental childcare) often involve time dimensions (enrollment, building up a deposit). Finally, the last three federal minimum wage increases following the Fair Minimum Wage Act of 2007 all took place around mid-year. Inclusion of state-specific fixed effects allows us to account for fixed differences in time allocation across states, while time (year, month, day of the week) fixed effects account for trends in time use that could change over time.³ We estimate our results separately for mothers and fathers by parental education level, as well as examine the heterogeneity of the effects by marital status, race, and age of the youngest child.

One potential concern is that unobserved factors related to minimum wage setting could simultaneously be impacting time allocation and labor supply decisions. While in our case we use lagged minimum wage, similar issues can still arise. Unobserved factors related to minimum wages and time allocation/labor supply decisions can persist over time. More precisely, if minimum wages last year “reflect” these unobserved factors which persist over time, then they may be correlated with the unobserved factors in the current year, thus leading to potential serial correlation. For that reason, we control for state-level unemployment rates, which should capture current economic conditions. In our alternative specifications, we additionally control for other factors reflecting macroeconomic conditions, such as lagged labor force participation rates, and/or lagged unemployment rates. Our estimates do not change

² We also provide estimates in the Appendix, where instead of using the lagged value of the minimum wage, we use the contemporaneous value of the minimum wage.

³ This would capture individuals naturally spending more time with their children on the weekends, as well as during months when seasonal holidays (e.g., Christmas) may limit the amount of schooling and private childcare options.

much with the inclusion of these controls, suggesting that current unemployment rate appears to pick up most of the previously uncontrolled-for factors.

Previous studies utilizing time use data have relied on Tobit models or two part-models, due to the fact that time diaries data contain a large amount of zeros for specific time use activities (Kalenkoski et al., 2005; Kimmel & Connelly, 2007). For instance, given a short interview reference window (e.g., one day), some parents may not be spending any enriching time with children on a given interview day. Hence, time spent in this activity will be recorded at zero. However, according to Stewart (2013), the marginal effects obtained from Tobit models are biased, while OLS estimates are unbiased and robust to various assumptions about the data generating process. For this reason, we estimate our models using OLS.

5 Results

Table 3 provides our results on the effect of minimum wage increases on the allocation of time to children for mothers (Panel A) and for fathers (Panel B),

Table 3 The effect of minimum wages on time allocation of parents to children

Outcome Variables	(1) Less than high school	(2) High school	(3) Some college	(4) College
Panel A: Mothers				
Total time	12.307 (9.668)	10.550 (6.453)	1.210 (4.367)	7.175* (4.141)
<i>Mean Dep. Var.</i>	427.46	379.73	359.28	369.87
Primary childcare	11.824*** (3.320)	1.986 (2.480)	2.122 (2.467)	0.696 (2.347)
<i>Mean Dep. Var.</i>	96.04	96.74	96.28	116.28
Enriching time	9.944*** (3.583)	2.543 (2.568)	1.880 (1.928)	-0.497 (1.675)
<i>Mean Dep. Var.</i>	75.04	75.60	74.61	90.41
Observations	4015	9991	13,067	17,043
Panel B: Fathers				
Total time	2.066 (8.935)	-1.795 (5.016)	3.314 (6.757)	-3.413 (3.061)
<i>Mean Dep. Var.</i>	279.32	252.29	259.11	260.99
Primary childcare	-5.862* (2.933)	-2.007 (3.052)	1.804 (2.170)	2.877 (1.900)
<i>Mean Dep. Var.</i>	41.91	46.06	56.59	64.65
Enriching time	-4.131 (2.953)	-2.655 (2.467)	2.765 (2.123)	2.484 (1.504)
<i>Mean Dep. Var.</i>	30.12	35.04	43.75	51.58
Observations	2701	7257	7833	12,839

Robust standard errors in parentheses are clustered on state. Time is measured in minutes per day. All regressions include race (white, black, race other), ethnicity, education, marital status, age of the youngest child, number of children in the household, state unemployment rate, median household income, whether a state had an EITC program, whether EITC was refundable, percent of state's EITC relative to federal EITC, day of the week fixed effects, month fixed effects, year fixed effects, and state fixed effects. ATUS final weights are applied

*** $p < 0.01$; * $p < 0.1$

segmented by parental education when we use the lagged value of the minimum wage as our variable of interest.⁴ Our results for Panel A indicate that mothers with less than a high school education do not see increases in total time spent with children from minimum wage increases. However, we see that mothers with less than a high school education increase time spent on primary childcare by 11.8 min, and enriching time with children by 9.9 min from increases in the minimum wage. When evaluated at the means, these estimates translate into a 12.3 percent increase in time spent on primary childcare, as well as a 13.3 percent increase for enriching time with children. Given the considerable lifetime benefits of enriching time for children, minimum wage increases (as an unintended consequence) may increase the chances of children escaping poverty. Beyond Wehby et al. (2020a, 2020b), who find that minimum wage increases are associated with improved child health outcomes, it is likely that there are also child education outcome improvements from minimum wage increases (Del Boca et al., 2014; Del Bono et al., 2016; Fiorini & Keane, 2014; Hsin & Felfe, 2014). Our results support the fact that mothers with a low education recognize the benefits of enriching activities at an early age, and adjust schedules in response to minimum wage changes to provide more enriching opportunities for their children.

Looking across other education levels, we do not see any effect of changes in minimum wage on time allocation, except for total time with children among mothers with a college education. However, the point estimate is small in magnitude, and only marginally statistically significant. When we look at fathers in Panel B, we do not see any impact of changes in minimum wage on time that fathers spent with their children, except for fathers with less than a high school education, though it is statistically significant at the 10-percent level only. The results suggest that traditional gender stereotypes, where females are seen as primary child providers, are more prevalent in low education households.

In Appendix Table 8, we further examine whether the enriching time increases in our main results is spending more time on school-related educational activities or other enriching activities that are not directly school related (such as reading with children, playing with children, doing arts and crafts with children, and playing sports with children). The first four rows of the table look at the subsamples for mothers by education. We find that for mothers with less than a high school education, there is a 4.1 minute (per day) increase in physical care for children, with no change in time spent on educational activities. Coupled with the results from Table 3, this suggests that most of the increase in time spent with children in enriching activities for mothers with less than a high school education are physical activities, arts and crafts, and other “home” activities, rather than activities directly related to school. Conversely, mothers with a high school education increase time spent on educational activities by 2.1 min per day. These results suggest that time spent on children differs considerably based on the education level of the parents, and that physical activities and other home-related activities may be more attractive for the lowest educated.

⁴ Appendix Table 7 provides the same estimates, but uses the contemporaneous version of minimum wage changes. The results are qualitatively similar across most of the subsamples.

Next, we explore whether these increases in time spent with children could be driven by changes in employment time. In Appendix Table 9, we examine the effect of minimum wage changes on work time for all the subsamples of mothers used in our main results. The first four rows of the table focus on mothers by educational status. We see that mothers with less than a high school education do decrease work time by 10.6 min per day, similar to the findings in Schneider et al. (2021). This suggests that there is a nearly one-for-one substitution for low education mothers between work and childcare responsibilities.⁵ These results again suggest that while minimum wage increases do provide opportunities for low income families to potentially improve lifelong opportunities for their children via childcare and enriching activities, it does tend to reinforce traditional gender stereotypes.⁶ Interestingly, mothers with a high school education in Table 3 do not change time spent on children in the three time categories under investigation. Our results in Appendix Table 9 suggest that these same mothers do reduce work time by nearly 19 min per day; the disparate results may potentially suggest a discontinuity in outside-the-home childcare availability. Mothers with a high school education may be more likely to send their children to daycare or preschool, which may not be possible for those with less than a high school education and liquidity constraints. Though not reported, fathers' work time is not impacted by minimum wage changes, regardless of education levels.

According to Hill and Romich (2018), the impact of higher minimum wages is usually felt by children in female-headed, racial minority, and immigrant families, as these families are overrepresented in jobs that are more likely to pay minimum wages. Kalenkoski et al. (2005) note that single parents are likely to spend more time in childcare and less time in market work than other parents, suggesting that minimum wage increases may impact single parents differently than married or cohabiting parents. Fallesen and Gähler (2020) note that single parents and reconstituted families have parents that spend significantly less time on enriching activities for children.⁷ Hence, in Table 4, we further examine the heterogeneity of our results by maternal race (Panel A) and marital status (Panel B), which we further segregate by education.

Looking at the overall sample of Black mothers in Panel A, we see that an increase in the minimum wage by one dollar increases total time spent with children by 15 min per day, increases time spent in primary childcare by 7.3 min, and increases enriching time by 9.8 min. What is particularly important is that this increases primary childcare time by 9.1 percent, while enriching time increases by 15.9 percent. Given that Black mothers are more likely to be in poverty, this can have tremendous lifelong benefits for children. Importantly, however, it appears that all of the primary childcare time increase is spent in enriching activities, which should provide the biggest emotional and cognitive benefits for children.

⁵ We cannot rule out the possibility that there is actually no income effect for low education mothers in our sample, but that our reduction in work hours for low education mothers is in fact a disemployment effect for minimum wage increases.

⁶ Appendix Tables 8, 9 also provides estimates across a variety of subsamples that we analyze in Tables 4, 5.

⁷ A reconstituted family is a married or cohabitating family where one (or both) parents have children from other relationships living with them.

Table 4 The effect of minimum wages on time allocation of mothers by race and marital status

	(1)	(2)	(3)	(4)
	Panel A: Results by race (mothers)			
Outcome Variables	Black mothers	White mothers	Black, less than HS	White, less than HS
Total time	15.027** (6.478)	4.786 (3.107)	18.630 (17.795)	9.571 (10.85)
<i>Mean Dep. Var.</i>	319.05	384.75	350.54	442.85
Primary childcare	7.326* (3.723)	1.241 (1.436)	13.796* (7.370)	13.471*** (4.074)
<i>Mean Dep. Var.</i>	80.88	106.21	85.85	97.82
Enriching time	9.840*** (2.845)	0.528 (1.029)	15.772** (7.437)	10.233** (4.353)
<i>Mean Dep. Var.</i>	62.00	82.32	67.31	75.92
Observations	5042	35,895	563	3232
	Panel B: Results by marital status (mothers)			
Outcome Variables	Married	Single	Married, less than HS	Single, less than HS
Total time	7.058** (3.150)	5.315 (5.626)	12.793 (10.468)	17.917 (18.168)
<i>Mean Dep. Var.</i>	386.90	350.02	437.41	413.10
Primary childcare	3.013 (1.822)	0.953 (2.355)	12.379** (4.756)	6.762 (7.411)
<i>Mean Dep. Var.</i>	108.11	91.10	92.01	101.86
Enriching time	2.093 (1.419)	1.690 (2.101)	7.933* (4.641)	8.638 (7.455)
<i>Mean Dep. Var.</i>	84.02	71.20	70.69	81.31
Observations	30,325	13,791	2185	1830

Robust standard errors in parentheses are clustered on state. Time is measured in minutes per day. All regressions include race (white, black, race other), ethnicity, education, marital status, age of the youngest child, number of children in the household, state unemployment rate, median household income, whether a state had an EITC program, whether EITC was refundable, percent of state's EITC relative to federal EITC, day of the week fixed effects, month fixed effects, year fixed effects, and state fixed effects. ATUS final weights are applied

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

Coupled with our results in Appendix Tables 8, 9, this suggests that Black mothers, in total, spend more time on physical activities and other home-related activities (playing sports, arts and crafts, and talking/listening). Though the point estimate for Black mothers is negative for time spent at work, it is statistically insignificant, which may suggest that Black mothers may allocate away from educational activities towards other enriching activities, such as sports and arts and crafts that can be done at home.

When it comes to the overall sample of White mothers, we do not find any effect for total time, time spent on primary childcare, and time spent on enriching activities. This is consistent with the fact that White women are less likely than Black women to work in jobs where hourly pay is at or below the federal minimum wage (BLS, 2021).⁸ Columns (3) and (4) focus on the sample of mothers with less than a high

⁸ An alternative explanation for the finding of no results is that, for White women, the income and substitution effects offset each other in time spent with children due to minimum wage increases.

Table 5 The effect of minimum wages on time allocation of mothers by child's age

Outcome Variables	(1) Child's age < 7	(2) Child's age ≥ 7	(3) Child's age < 7, less than HS	(4) Child's age ≥ 7, less than HS
Total time	5.466 (4.155)	8.280*** (2.988)	14.250 (15.346)	14.808 (12.625)
<i>Mean Dep. Var.</i>	461.58	278.06	501.03	307.64
Primary childcare	1.800 (2.709)	3.067*** (0.990)	11.595** (5.491)	7.875* (4.183)
<i>Mean Dep. Var.</i>	146.81	52.99	124.53	49.65
Enriching time	2.766 (2.023)	1.352 (0.862)	10.885** (5.084)	6.163* (3.115)
<i>Mean Dep. Var.</i>	121.71	32.64	100.67	33.30
Observations	23,246	20,870	2419	1596

Robust standard errors in parentheses are clustered on state. Time is measured in minutes per day. All regressions include race (white, black, race other), ethnicity, education, marital status, age of the youngest child, number of children in the household, state unemployment rate, median household income, whether a state had an EITC program, whether EITC was refundable, percent of state's EITC relative to federal EITC, day of the week fixed effects, month fixed effects, year fixed effects, and state fixed effects. ATUS final weights are applied

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

school education, separated by race. Those mothers are likely to be the most impacted by changes in minimum wage regulations. We find that Black mothers with less than a high school education increase their time spent on primary childcare activities by 13.8 min per day. Evaluated at pre-minimum wage change means, this is an increase of 16.1 percent. Importantly, these mothers increase the time spent on enriching time by over a quarter of an hour. This means that total time spent on enriching activities increases by 23.4 percent, relative to the pre-minimum wage change mean. These results suggest that less educated Black mothers respond to either the income effect or disemployment effect of minimum wage changes by increasing the time spent on improving the emotional and cognitive development of their children. In fact, this is likely to be an incredibly underreported benefit of minimum wage increases. Also, it appears that less educated Black mothers may reduce other primary childcare activities for enriching activities, which suggests that they recognize the fundamental benefits of these enriching opportunities, given their own labor market experiences.

We also see an increase in time spent on primary childcare and enriching time among White mothers with less than a high school education. The point estimates are similar to those for Black mothers with less than a high school education in level terms; however, estimates are smaller in magnitude. More specifically, among White mothers with less than a high school education, a one dollar increase in the minimum wage increases time spent in primary childcare by 13.8 percent at pre-minimum wage change means, and increases enriching time by 13.5 percent at pre-minimum wage change means. In fact, unlike low educated Black mothers, where there appears to be time substitution away from certain primary childcare activities towards enriching activities, White mothers with less than a high school education spent about 75 percent of their increase in time spent on primary childcare by increasing the amount of enriching activities. This does suggest that there may exist inequities in access to

outside-of-the-home enriching activities for women of color with children, and that this must be made up at home.⁹

Panel B segments our sample by marital status, as well as marital status by education level. We find that higher minimum wages increase total time spent with children among married mothers only; this is likely an indication that higher minimum wages allow married mothers to work less (or even exit the labor force), though it appears that a majority of the time is passive time spent with children. Further stratifying the sample by education indicates that most of the increases in time allocation are driven by low educated married mothers, rather than by low educated single mothers. For married mothers with less than a high school education, a one dollar increase in the minimum wage increases time spent in primary childcare by 12.4 min per day, and increases enriching time by 7.9 min per day. We find that total time spent with children, time spent on primary childcare, and time spent on enriching activities does not change after minimum wage changes for single mothers with less than a high school education. This suggests that single mothers face considerable income constraints that reduce their ability to cut back significantly on work, even in the face of higher hourly wages.¹⁰ This is supported by the results in Appendix Table 9, where single mothers and single mothers with less than a high school education are not responsive, in terms of time spent at work, to changes in the minimum wage.

Table 5 focuses on the estimated effects of minimum wage increases, based on the child's age. We see that for children under the age of 7, there is no impact of minimum wage increases on time allocation. In part, this may reflect how strict time constraints are with younger children, where mothers may not feel that they have additional time to spend on additional childcare. In fact, with the estimates in Appendix Table 9 showing that mothers with children younger than 7 reduce work time by nearly 10 min per day in response to minimum wage changes, this suggests that mothers may use this additional time for other household activities, such as cooking or cleaning, or using it for their own purposes (sleep). In column (2) where we focus on mothers with children who are 7 or older, we see that minimum wage increases lead to increases in total time spent on children by 8.3 min per day, as well as increases in time spent on primary childcare by 3.1 min per day. This makes sense, as older children start to have non-school related activities, including sports and other group activities, where parents are the main source of transportation.

Columns (3) and (4) focus on the same child age subsamples, but focus on mothers with less than a high school education. We see that in both, minimum wage increases lead to increases in time spent on primary childcare and time spent on enriching activities. For mothers with children who are under 7 (7 or older), a one dollar increase in the minimum wage increases time spent on primary

⁹ We repeat our results for fathers as well, segmented by race (and race-by-education). We do not find any effects of changes in the minimum wage on a father's time allocation by race. Hence, we do not report these results, though they are available upon request.

¹⁰ We repeat our results for fathers as well, segmented by marital status (and marriage-by-education). We do not find any effects of changes in the minimum wage on a father's time allocation by marital status. Hence, we do not report these results, though they are available upon request.

childcare by 11.6 (7.9) minutes per day. The same increase in the minimum wage increases time spent on enriching activities by 10.9 (6.2) minutes per day. This again provides evidence of the external benefits of minimum wage increases; mothers who are most likely to be directly impacted by minimum wage increases, those with less than a high school education, increase time spent on activities with children, regardless of age. Based on the results from Appendix Table 8, it appears that regardless of the child's age, the least educated mothers increase time on physical activities, sport and non-sport activities, and arts and crafts at home, rather than on formal educational activities.

6 Discussion and Conclusions

The goal of our study is to examine whether changes in minimum wage regulation impact the amount of time that parents devote to their children. We do this using 2003 to 2019 time diary data from ATUS. We utilize three measures as outcomes: (i) total time spent with children; (ii) total time spent in primary childcare; and (iii) total time spent on enriching activities with children. Prior literature has linked considerable childhood developments to parental time. Both Almond et al. (2018) and Francesconi and Heckman (2016) have found that early life environments have long-term impacts. Del Boca et al. (2014) and Del Bono et al. (2016) find that parental time with children is crucial for both cognitive and emotional development; time actively spent with children, or time spent in educational activities, are the most productive time spent with children (Fiorini & Keane, 2014; Hsin & Felfe, 2014). Therefore, if minimum wage increases allow parents to spend more time with their children with no corresponding income loss, this could be an unintended benefit of minimum wage legislation, perhaps reprioritizing the debate about the level and frequency of changes in the minimum wage. Importantly, it appears that the indirect benefits of minimum wage legislation are neglected in the language of the bills themselves, as well as in populist fact sheets. For instance, the Education and Labor Committee's "Raise the Wage" Fact Sheet and blog posts note a myriad of direct benefits, for workers and businesses, to raising the federal minimum wage: (i) increased worker productivity; (ii) reduced worker turnover; (iii) reduced worker absenteeism; (iv) increases in worker income and earnings; (v) reductions in worker poverty; and (vi) reductions in wage gaps.¹¹ Notably, legislative bills fail to recognize the non-pecuniary benefits of minimum wage increases found in this paper and other related studies (Raissian & Bullinger, 2017; Schneider et al., 2021; Wehby et al., 2020a; 2020b). Ignoring these leads to smaller estimates of the benefits of minimum wage legislation than what actually occur.¹²

¹¹ This can be found at <https://edlabor.house.gov/raise-the-wage-act-information> and https://edlabor.house.gov/media/blog/raising-the-minimum-wage_good-for-workers-businesses-and-the-economy.

¹² Summaries of minimum wage legislation can be found at <https://www.ncsl.org/research/labor-and-employment/state-minimum-wage-chart.aspx>. Searchable legislation can be found at the minimum wage legislation database, <https://www.ncsl.org/research/labor-and-employment/minimum-wage-legislation-data-base.aspx>.

We find large increases in the time spent in primary childcare and time spent in enriching activities among mothers with less than a high school education, in response to increases in the minimum wage. However, our findings indicate that time allocation of fathers does not respond to changes in minimum wages. More specifically, among mothers with less than a high school education, a one dollar increase in the minimum wage increases time spent on primary childcare by nearly 12 min, as well as increases enriching time by approximately 10 min per day. This corresponds to nearly an hour increase in active time spent with children per week. From the findings in Del Boca et al. (2014) and Del Bono et al. (2016), we know that there exist benefits from increased parental time on childcare for children, through both cognitive and emotional development; however, a limitation of our dataset is that we are unable to observe children's outcomes. We do not examine the impact of changes in time allocation on cognitive and non-cognitive outcomes of children; therefore, our results are simply an extrapolation from existing research, rather than a causal mechanism. Similarly, we are not able to disentangle the mechanisms through which parents reallocate time. Though our results are suggestive, we cannot determine whether changes in time allocation are due to income or substitution effects, disemployment effects, or changes in inter-family household time allocation.

Our results uncover some important differences in response to changes in minimum wages by maternal race and marital status. We find that both White and Black mothers with less than a high school education devote more time to primary childcare and enriching time as minimum wages increases, but we find that these increases are particularly large among low educated Black mothers. For instance, among Black mothers, an increase in the minimum wage by one dollar is associated with increases of about 14 min in time spent on primary childcare and enriching time, which is equivalent to a 16.1 percent increase in primary childcare (13.8 percent for White mothers), and a 23.4 percent increase in enriching time (13.5 percent for White mothers). Given the racial disparities in children's achievement, the additional time that Black mothers spend in enriching activities could contribute to closing the achievement gap between White and Black children. These results should be interpreted with some caution, however. Given the nature of the ATUS data, some subsamples are relatively small. For instance, there are 563 observations of Black mothers with less than a high school education (3232 for White mothers with the same educational attainment).

Our results also suggest that married mothers with less than a high school education experience an increase in primary childcare and enriching time with children, yet, their single counterparts are not affected. This could be suggestive of various constraints on the time of single parents or differences in preferences for time with children (Fallesen & Gähler, 2020). Another potential explanation could be that income constraints are lower for married women, whose husbands could substitute time with children for other activities. This also highlights the tremendous income constraints faced by single mothers; even small increases in minimum wages may not be enough to allow these single mothers to devote more time to their children.

Time investments also appear to be sensitive to a child's age, with children younger than 7 in families where the mother has less than a high school education

being the main beneficiaries of higher minimum wages. Given the likely benefits of early life investment, this suggests that minimum wage increases have the potential to provide positive unintended benefits (Almond et al., 2018; Fallesen & Gähler, 2020; Francesconi & Heckman, 2016).

Overall, our results show consistent, positive effects of higher minimum wages on the time that low educated mothers spend with their children. Given the calls to increase the federal minimum wage to \$15 an hour, from its current \$7.25 level, these legislative changes may have sizable effects on the time allocation to children when compounded over longer periods of time. Further research is needed to investigate if the changes in time allocation spent on children is a result of firms reducing work hours (or decreasing employment) from higher minimum wages. If this were the case, then the benefits of increased time spent with children may be tempered by reductions in the income of a given family, which would have adverse impacts on the well-being of children. Though it is beyond the scope of our study to disentangle the exact mechanisms driving the changes in time allocation, our study points out that minimum wage legislation would confer important benefits on children in the form of additional time that children spent with their mothers in primary childcare or enriching activities. Future research should further investigate whether the additional time driven by minimum wage changes impacts the academic and emotional well-being of children, while accounting for the effects manifesting via income changes. Overall, one important policy implication is that policy makers should consider all external benefits (or costs) with regard to changes in minimum regulation, which goes beyond immediate effects on employment and income.

Lastly, while studies have found that the minimum wage is ineffective in combatting current poverty, there may be intergenerational impacts that have not been accounted for in studies to date (Burkhauser & Sabia, 2007; Churchill & Sabia, 2019). Specifically, if there are academic and emotional benefits from heightened amounts of enriching time and primary childcare with children by low education parents, this could increase the probability that these children escape the intergenerational poverty cycle.

Author contributions All of the authors contributed equally.

Compliance with ethical standards

Conflict of interest The authors declare no competing interests.

7 Appendix

Tables 6–9

Table 6 Time use categories codes

Primary Childcare	
30101	Physical care for hh children
30102	Reading to/with hh children
30103	Playing with hh children, not sports
30104	Arts and crafts with hh children
30105	Playing sports with hh children
30108	Organization & planning for hh children
30109	Looking after hh children (as primary activity)
30110	Attending hh children's event
30111	Waiting for/with hh children
30112	Picking up/dropping off hh children
30186	Talking with/listening to hh children
30199	Caring for and helping hh children, n.e.c.*
30201	Homework (hh children)
30202	Meetings and school conference (hh children)
30203	Home schooling for hh children
30204	Waiting associated with hh children's education
30299	Activities related to hh child's education, n.e.c.*
30301	Providing medical care for hh children
30302	Obtaining medical care for hh children
30303	Waiting associated with hh children's health
30399	Activities related to hh child's health, n.e.c.*
Enriching Time	
30101	Physical care for hh children
30102	Reading to/with hh children
30103	Playing with hh children, not sports
30104	Arts and crafts with hh children
30105	Playing sports with hh children
30186	Talking with/listening to hh children
30201	Homework (hh children)
30203	Home schooling for hh children
Total Time	
trtohhchild	Total time for children

Source: ATUS data dictionaries

*n.e.c. not elsewhere classified

Table 7 Impact of minimum wages (contemporaneous) on maternal time with children

Samples	Total time	Primary childcare time	Enriching time	Observations
Less than high school	8.230 (8.559)	8.884*** (3.079)	8.006** (3.391)	4015
High school	3.834 (5.811)	0.694 (2.448)	0.604 (2.318)	9991
Some college	2.694 (3.601)	3.745* (2.122)	3.909** (1.527)	13,067
College	2.701 (3.546)	-0.706 (2.160)	-0.817 (1.579)	17,043
Black mothers	7.975 (6.883)	6.527* (3.370)	7.311*** (2.324)	5042
White mothers	1.708 (2.344)	0.118 (1.151)	0.263 (0.959)	35,895
Black, less than HS	-5.573 (20.163)	5.103 (7.060)	6.503 (6.469)	563
White, less than HS	7.523 (9.288)	9.105*** (2.849)	7.458** (3.618)	3232
Mothers married	5.062** (2.084)	2.081 (1.527)	1.973 (1.235)	30,325
Mothers single	-0.878 (3.669)	0.754 (2.125)	0.987 (1.741)	13,791
Married, less than HS	22.42*** (8.244)	9.306** (3.844)	6.172 (4.386)	2185
Single, less than HS	-5.192 (16.14)	6.904 (7.235)	8.720 (6.552)	1830
Child's age < 7	0.646 (3.238)	1.380 (2.176)	2.406 (1.702)	23,246
Child's age ≥ 7	6.707** (2.553)	2.076** (0.875)	1.256 (0.785)	20,870
Child's age < 7, less than HS	9.284 (14.054)	9.907* (5.628)	10.157* (5.932)	2419
Child's age ≥ 7, less than HS	8.433 (10.201)	5.893 (3.858)	4.587 (2.904)	1596

Robust standard errors in parentheses are clustered on state. Time is measured in minutes per day. All regressions include race (white, black, race other), ethnicity, education, marital status, age of the youngest child, number of children in the household, state unemployment rate, median household income, whether a state had an EITC program, whether EITC was refundable, percent of state's EITC relative to federal EITC, day of the week fixed effects, month fixed effects, year fixed effects, and state fixed effects. ATUS final weights are applied *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

Table 8 Impact of minimum wages on maternal time with children (alternative time categories)

Samples	Physical care for children	Looking after children	Educational activities	Observations
Less than high school	4.082* (2.132)	-0.320 (1.275)	-0.015 (1.045)	4015
High school	-0.783 (1.917)	-0.978 (0.810)	2.107** (0.889)	9991
Some college	2.342* (1.383)	0.472 (0.883)	0.474 (0.609)	13,067
College	-2.311* (1.161)	0.729** (0.362)	0.554 (0.419)	17,043
Black mothers	3.661** (1.568)	-0.593 (1.046)	1.275 (1.268)	5042
White mothers	-0.518 (0.664)	0.003 (0.478)	0.682* (0.375)	35,895
Black, less than HS	7.163 (5.958)	1.900 (2.555)	3.768 (2.372)	563
White, less than HS	3.347 (2.640)	-0.280 (1.329)	-0.137 (1.024)	3232
Mothers married	-0.211 (0.925)	0.407 (0.602)	0.587 (0.496)	30,325
Mothers single	0.550 (1.600)	-0.778 (0.669)	1.462*** (0.516)	13,791
Married, less than HS	3.865 (2.909)	-0.394 (1.486)	-0.226 (1.422)	2185
Single, less than HS	2.991 (4.005)	0.197 (2.028)	0.408 (1.588)	1830
Child's age < 7	-0.033 (1.104)	-0.183 (0.606)	0.885* (0.496)	23,246
Child's age ≥ 7	0.189 (0.465)	0.282 (0.575)	0.731 (0.530)	20,870
Child's age < 7, less than HS	4.228 (3.710)	-0.475 (1.696)	0.415 (1.661)	2419
Child's age ≥ 7, less than HS	1.339 (1.504)	-1.217 (1.760)	0.774 (1.374)	1596

Robust standard errors in parentheses are clustered on state. Time is measured in minutes per day. All regressions include race (white, black, race other), ethnicity, education, marital status, age of the youngest child, number of children in the household, state unemployment rate, median household income, whether a state had an EITC program, whether EITC was refundable, percent of state's EITC relative to federal EITC, day of the week fixed effects, month fixed effects, year fixed effects, and state fixed effects. ATUS final weights are applied *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

Table 9 Impact of minimum wages on work time of mothers

Samples	Work time	Observations
Less than high school	−10.625* (6.085)	4015
High school	−18.668*** (4.809)	9991
Some college	4.210 (4.913)	13,067
College	−5.394 (4.320)	17,043
Black mothers	−10.602 (7.424)	5042
White mothers	−5.691* (2.959)	35,895
Black, less than HS	1.959 (16.45)	563
White, less than HS	−11.913 (7.871)	3232
Mothers married	−7.662** (3.650)	30,325
Mothers single	−6.514 (4.120)	13,791
Married, less than HS	−14.040 (9.033)	2185
Single, less than HS	−15.619 (11.007)	1830
Child's age < 7	−9.797** (4.395)	23,246
Child's age ≥ 7	−4.124 (4.042)	20,870
Child's age < 7, less than HS	−1.259 (11.10)	2419
Child's age ≥ 7, less than HS	−29.669** (11.336)	1596

Robust standard errors in parentheses are clustered on state. Time is measured in minutes per day. All regressions include race (white, black, race other), ethnicity, education, marital status, age of the youngest child, number of children in the household, state unemployment rate, median household income, whether a state had an EITC program, whether EITC was refundable, percent of state's EITC relative to federal EITC, day of the week fixed effects, month fixed effects, year fixed effects, and state fixed effects. ATUS final weights are applied

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

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