The Effect of the Minimum Wage on Children's Cognitive Achievement

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Abstract

At the center of the minimum wage debate is its role in improving the welfare of low-income families. However, there is little empirical evidence of whether minimum wage changes actually affect those families' children. This paper examines the effect of the minimum wage on the math and reading achievement levels of children with low socioeconomic status whose parents are most likely to be affected by the minimum wage, comparing with children in households with high socioeconomic status. Estimates show that a $1 minimum wage increase reduces children's math and reading scores by approximately 0.10-0.19 standard deviations. Further, there is evidence that increases in the minimum wage lead to deterioration in the home environment, which may be one potential mechanism underlying my main findings.

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I. Introduction

The minimum wage continues to be the subject of critical, contentious policy debate in the United States. Many states and localities, including New York, California, Seattle, and San Francisco, have passed legislation to raise the minimum wage up to $15 an hour, more than double the existing federal minimum wage of $7.25. Amid new legislation, the minimum wage has drawn increased attention with regards to its effects on employment, income, and the overall well-being of a family. Although there is an expansive literature documenting the effect of the minimum wage on labor market outcomes,[1] the literature does not provide evidence on an important margin, namely children's cognitive achievement.

The effects of minimum wage changes can extend to influence children's academic achievement through at least three channels. First, for those workers who have fewer employable skills, increases in the minimum wage increase the likelihood of joblessness or reduced work hours (Neumark, Schweitzer, and Wascher 2004). These effects on labor market outcomes reduce the number of resources available for children, and potentially negatively affect their cognitive achievement. Second, those individuals who are able to keep their jobs following a minimum wage hike can experience a reduction in the quality of their jobs, including a decline in fringe benefits and the loss of schedule flexibility (Wessels 1980 and McKenzie 1980). A decline in the quality of minimum-wage jobs can reduce parental investment in their children, adversely affecting their children's achievement. Third, those individuals who can keep their jobs and have higher wages may be able to support their children's cognitive achievement positively. This mix of potentially relevant mechanisms makes the effects of minimum wage changes on children's cognitive achievement an important empirical question.

This paper investigates the way in which the minimum wage affects children's cog-

[1] In recent evidence of the effect the minimum wage has on employment, Neumark, Salas, and Wascher (2014), Meer and West (2016), Liu, Hyclak, and Regmi (2016), Clemens and Wither (2019), Harasztosi and Lindner (2019), Kreiner, Reck, and Skov (2019), and Monras (2019) provide evidence of its negative effects, while Allegretto et al. (2017) and Cengiz et al. (2019) find no statistically significant effects on employment overall.

nitive achievement by exploiting the variation in the minimum wage across states and over time. My analysis is based on individual-level panel data from the National Longitudinal Survey of Youth 1979 (NLSY79) and the NLSY79 Child and Young Adult, which follows biological children of mothers in the NLSY79. I use children's math, reading recognition, and reading comprehension scores from 1986 to 2008.[2]

Employing a child-fixed effect model, I start my analysis by examining the effect of the minimum wage on children from low-socioeconomic households which I define as those in which the mother has less than a high school degree.[3] In my analysis, I define households in which the mother has a high school degree or beyond as high-socioeconomic households. In my baseline empirical specification, I compare children's outcomes to changes in exposure to the minimum wage over time, netting out time-invariant child-specific unobserved heterogeneity and other unobserved family backgrounds. My results show a statistically significant effect for the low-socioeconomic status children. I find that a $1 minimum wage increase leads to around a 0.16 standard deviation decline in math scores, around a 0.13 standard deviation decline in reading recognition scores, and around a 0.18 standard deviation decline in reading comprehension scores. However, the minimum wage's effect on children from high-socioeconomic households is not statistically different from zero.

Interpreting the results from a child-fixed effects model as causal requires an identifying assumption that unobserved heterogeneities that determine the minimum wage and children's educational outcomes jointly are time-invariant. It is certainly possible that states raise the minimum wage when the unemployment rate is low and this identifying assumption may not hold. To address this concern, I augment my empirical specification, comparing

[2]I base my analysis on the data up to the interview year 2008 for two reasons. First, I want to avoid the possibility that my estimates are biased by expansionary fiscal and monetary policies introduced after the Great Recession, which affected states disproportionately and could be correlated with both the minimum wage and children's education. Second, by 2008 almost all children have already passed their test-taking age, as a result of which the number of test-taking children in the NLSY79 Child and Young Adult is very small after 2008. Nonetheless, I extend my analysis up to 2014, the latest year until which the data are available, in a robustness check.

[3]This is similar to Sabia and Nielsen (2015) and Smith (2018). Typically, low-skilled workers are affected by the minimum wage.

children from low-socioeconomic households with those from high-socioeconomic households. The underlying assumption of this model is that omitted factors that jointly determine the minimum wage and other variables influencing children's educational outcomes affect the children from low- and high-socioeconomic households in a similar way. Estimates show that a $1 minimum wage increase reduces children's math and reading scores by approximately 0.10-0.19 standard deviations. They provide further evidence that a minimum wage increase has a negative and statistically significant effect on children's math and reading achievement. I find qualitatively similar results when I employ a specification that uses variation in the minimum wage within cross-border commuting zones (CZs).

Finally, I use an alternative definition of the treatment group. I calculate parents' hourly wages in the previous calendar year, separately, dividing their total annual incomes by annual hours worked. In the spirit of Aaronson, Agarwal, and French (2012) and Dettling and Hsu (2017), I define the treatment group as those children, one or both of whose parents are minimum wage workers, such that either parent has earnings in the range of 60 percent to 120 percent of the effective minimum wage.[4] I use the data in a cross-sectional format. The results show a statistically significant and negative effect of the minimum wage on children's test scores.

To understand the potential mechanism through which the minimum wage operates to affect children's test scores adversely, I examine the link between the minimum wage and the home environment. I use three measures of the home environment, which are available in the NLSY79 Child and Young Adult data. The scores are calculated based on numerous questions pertaining to support and resources for a child at home, which could serve as inputs in children's cognitive development and academic achievement. I find negative and significant effects on the home environment for children with low socioeconomic status, demonstrating that a higher minimum wage leads to a deteriorating home environment for a child. However, the effects on the home environment of children with high socioeconomic status are not

[4]This is higher of the state minimum wage and the federal minimum wage.

statistically different from zero. To shed further light on why the minimum wage leads to an adverse home environment for low-socioeconomic status children, I show that an increase in the minimum wage lowers the probability that both parents eat with their child at least once a day and that parents encourage a child to pursue hobbies. These findings suggest that parental time investment in children declines with a rise in the minimum wage. For those individuals who have minimum-wage jobs, a higher minimum wage may have decreased the quality of their jobs, such as a decline in fringe benefits and a rise in irregular scheduling (Wessels 1980 and McKenzie 1980) and a decline in employer provided health coverage (Clemens, Kahn, and Meer 2018). For those who lose their jobs following a minimum wage hike, the perilous of joblessness is expected to affect the home environment adversely.

By showing that the effects of minimum wage changes come to affect children's cognitive achievement, this paper makes a novel contribution to the minimum wage literature. Despite the minimum wage literature being expansive, the literature does not provide evidence on an important margin of family well-being which is children's achievement. The literature that examines the link between the minimum wage and other unintended outcomes is closest to this paper, such as the uptake of other social welfare programs, teens' educational outcomes, and birth weight.[5]

This paper complements the literature studying the short-term effects of social welfare programs on child development. Dahl and Lochner (2012) examine the effect of the Earned Income Tax Credit (EITC) on children's math and reading ability in the United

[5]For example, Page, Spetz, and Millar (2005) find suggestive evidence of the minimum wage on individuals' dependency on means-tested social welfare programs. Aaronson, Agarwal, and French (2012) show that a minimum wage increase leads to a rise in both spending and debt. Dettling and Hsu (2017) provide evidence of the minimum wage on household finances, such as payment delinquency and credit scores. Smith (2018) re-examines the link between the minimum wage and the children's high-school dropout status and shows that a higher minimum wage reduces the likelihood for the low-socioeconomic children of dropping out of high school. A possible explanation behind this finding is that a minimum wage increase reduces these children's employment chances in the labor market, thus decreasing their opportunity cost of staying in school. Neumark and Wascher (1995) and Turner and Demiralp (2001) provide initial evidence on this topic. Wehby, Dave, and Kaestner (2016) provide evidence of the positive association between the minimum wage and birth weight. In an attempt to investigate the role of the minimum wage as an antipoverty initiative, a few papers look at its effect on the family poverty status and findings are mixed (Dube 2018, Sabia and Nielsen 2015, and Addison and Blackburn 1999).

States, using similar data as in this analysis. They find a positive effect. Milligan and Stabile (2011), who investigate the effects for income transfer programs in Canada, show positive impacts of such programs on children's test scores and mental health. Likewise, Regmi (2019) provides evidence of a positive link between the generosity of unemployment insurance benefits and children's education in the United States. The central message of my analysis is that unlike government transfer programs, the minimum wage lowers children's human capital accumulation. The disparate effects of the minimum wage and other social welfare programs may be attributable to the fact that they have different consequences for the workers affected. Government transfer programs that provide financial support, while the government receives no service in return, are generally intended to shield individuals temporarily against negative shocks in the labor market. On the other hand, the minimum wage has been shown to generate negative effects for low-skilled workers with respect to employment opportunities (e.g, Neumark, Salas, and Wascher 2014, Meer and West 2016, and Clemens and Wither 2019).

The remainder of the paper unfolds as follows: Section II presents a conceptual framework to show potential channels between the minimum wage and children's cognitive achievement. Section III describes the data and Section IV the empirical specification. I present the results in Section V and provide the robustness of the main findings in Section VI. I explain potential mechanisms in Section VII. Section VIII concludes.

II. Conceptual Framework

In this section, I present a conceptual framework to illustrate the ways in which the minimum wage influences multiple inputs of the cognitive achievement production function.

A child's achievement at a particular age is a complex product of several factors interacting over time. To characterize the achievement production function in a simple framework, I follow Todd and Wolpin (2007) and present it in the following form:

$$A_{ija} = A_a(T_i, G_i, P_i, \omega_{ij0}), \tag{1}$$

where cognitive achievement (A) for child i in household j at test-taking age a is determined by a vector of inputs. T_i represents a vector of parental time investment, including helping the child in homework, playing with the child, going on outings, taking the child to a gym, engaging with the child in physical and mental exercises. G_i is a vector of market-based goods such as health expenditures, housing, and extra educational resources. P_i includes inputs related to public programs such as the food stamp program, child-support programs, and education policies. ω_{ij0} is a measure of a child's initial endowments.

In the production function above, a minimum wage increase is expected to affect a child's achievement by influencing T_i and G_i. It is also possible that, to the extent that the minimum wage interacts with other social safety net programs, it can generate mechanical effects on a child's achievement through P_i.

As the preponderance of evidence shows that the minimum wage reduces employment, particulary for workers with fewer skills, it is conceivable that the minimum wage changes parents' time investment and alters the parent-child emotional relationship. Children of vulnerable parents who face a job loss because of the minimum wage could be subject to family stress and less parental supervision and care. Horn, Maclean, and Strain (2017) find that minimum wage increases lead to deteriorating mental health among men. Further, the literature has shown that joblessness breaks down emotional bonding between a father and a child (Elder, Nguyen, and Caspi 1985). This could be detrimental to the child's development and motivate him/her to engage in risky behaviors. On the other hand, given the traditional role of women, when a mother is unemployed, she may be able to engage more in the home production, shaping a child's cognitive achievement positively. Besides emotional impacts, children of those parents hit hard by the minimum wage may get fewer resources and less support from their parents in their education.

In light of a few research papers that show no effect or a positive effect of the minimum wage,[6] it is reasonable to assume that some workers who are competitive might be affected positively. And, the minimum wage may have different implications for their children. Having a higher family income implies an improvement in parents' ability to provide more resources for their children's education, such as extracurricular activities, books, and better health care. On the other hand, in response to an increase in the minimum wage, firms may reduce their expenditures on jobs' non-monetary attributes, such as fringe benefits to minimize their production costs, thus reducing the quality of minimum-wage jobs (Wessels 1980 and McKenzie 1980). Consequently, even if monetary-wages increase following a minimum wage increase, the possibility of a decline in non-monetary wages may culminate in unchanged–or even a decrease–in workers' compensation overall. That means that parents' financial condition overall may not improve and subsequently, their investment in their children may not change. In the similar line, Clemens, Kahn, and Meer (2018) show that an increase in the minimum wage leads to a decline in employer sponsored health coverage, which can have direct, negative consequences on children's achievement. Further, firms may respond to a rise in the minimum wage by introducing more inflexible schedules and by exacting more efforts from workers (Strain and Clemens 2019), in order to improve the marginal product of labor to offset the rise in the marginal cost of production. Such responses by firms to a minimum wage hike make the minimum-wage jobs both "physically and psychologically" challenging, leading workers to burn out more and reducing their work-life balance. As a result, when minimum-wage earning parents return home after these jobs, they may be less responsive to children's needs, adversely affecting their cognitive achievement.

Similarly, in cases in which a minimum wage increase leads to an increase in monetary-wages, families can change the dynamics of their spending. Aaronson, Agarwal, and French (2012) find that minimum wage workers' spending increases by nearly three times their

[6] See Card and Krueger (1994) and Dube, Lester, and Reich (2010).

income. This may be facilitated by an improvement in borrowing ability. If a minimum wage increase leads to a steep increase in expenditures on durable goods and indebtedness, parents may need to cut their spending on their children's education, which affects them adversely. Likewise, the findings of MaCurdy (2015)–a rise in the federal minimum wage raises consumer price, becoming a regressive tax for low-skilled workers–suggest negative consequences for children's education.

Another potential avenue through which the minimum wage affects a child's cognitive achievement is its interactions with other social safety net programs. In theory, a minimum wage hike could lead to increased (through a reduction in employment) or decreased (through an increase in wages) participation in means-tested programs. Amid evidence of that public safety net programs have positive effects on children (e.g., Aizer et al. 2016 and Hoynes, Schanzenbach, and Almond 2016), a minimum wage increase may affect a child's cognitive achievement by altering the dynamics of parents' participation in such programs. However, the literature analyzing the relationship between the minimum wage and public safety net programs largely is inconclusive. Reich and West (2015) show that a minimum wage increase reduces the enrollment in the Supplementary Nutritious Assistance Program (SNAP), previously known as the food stamp program. Page, Spetz, and Millar (2005) find some suggestive evidence that the minimum wage motivates individuals to depend on means-tested social welfare programs. However, in re-examining the issue, Sabia and Nguyen (2017) concludes that there is no relationship between the minimum wage and participation in major social welfare programs.

Overall, the production function shows that net effect of the minimum wage is theoretically ambiguous. I next go to frame an empirical specification, linking the cognitive achievement production function to data, to understand the effect of the minimum wage on children's cognitive development.

III. Data

A. National Longitudinal Surveys

I use individual-level data from two complementary samples from the National Longitudinal Surveys to examine the impact of the minimum wage on children's achievement. First, I use the National Longitudinal Survey of Youth 1979 (NLSY79), which is a nationally representative longitudinal survey. It began in 1979, interviewing respondents every year through 1994 and biannually thereafter. The survey is ongoing. In the first interview, individuals were 14 to 21 years of age. The total number of respondents was 12,686. One advantage of this data set is that it contains a rich set of information on different topics such as labor market outcomes, educational attainment, and family background.

As part of the NLSY79, a new survey, the NLSY79 Child and Young Adults, commenced in 1986, and follow all children born to mothers in the NLSY79. The survey collects extensive child-specific information, including test scores. The children are interviewed every two years. The survey provides measures of cognitive ability, including the Peabody Individual Tests (PIAT) math and reading scores. The sample size of the data in each survey depended on the number of biological children born to mothers in the NLSY79. Although, as of 2014, 11,521 children were born to NLSY79 mothers, all of them did not appear in a single survey. As a result, sample size in each survey is relatively smaller. For example, in the first survey in 1986, there were about 790 children. The NLSY79 contains a nationally representative cross-sectional sample and over-sampled Hispanic, black, economically disadvantaged whites, and members of the military. I use the cross-sectional sample, which best represents the U.S. population. Because the data publicly available do not contain geocode information which is critical for the purpose of this study, I use the restricted version.

I link the children to their mothers. As a result, I am able to observe parents', particularly mothers', educational and labor market outcomes as well as children's test scores.

This feature makes the surveys especially suitable for this study.

As presented in a histogram of birth cohorts in Figure A1, most births occurred in the 1980s and 1990s. According to the Center for Human Resource Research (2002), most of the women had passed their primary childbearing age by 2000. It is worth noting that in 2000 the youngest woman was 36 years old. I base my analysis on the data from from 1986 to 2008. I exclude the period after 2008 because of two reasons. First, I want to avoid the possibility of my estimates being biased by expansionary fiscal and monetary policies introduced in the wake of the Great Recession, which affected states disproportionately. Second, by 2008 almost all children have already passed their test-taking age and the number of test-taking children is very small after 2008. And, the sample after 2008 is likely to contain children born after 2000, who might not be similar to the average sample. It could be argued that births after 2000 were mainly the result of childbearing postponement by females (see Carneiro, Meghir, and Parey 2013). Nonetheless, in a robustness check, I extend my analysis up to 2014, the most recent year of data availability at the time of writing.

Outcome Variables: Math and Reading Scores

I use the Peabody Individual Achievement Test (PIAT) which measures cognitive achievement of children. The test has been widely used to assess child achievement in the literature. It is assessed every other year to children aged 5 to 14 years.[7] The difficulty level of the test increases from preschool to high school, making it an age-appropriate test. The battery of PIATs contains three tests, namely the Mathematics, Reading Recognition, and Reading Comprehension assessments. I use all these three tests in my analysis. The PIAT Mathematics assesses a child's understanding of mathematics that is typically taught in regular classrooms in schools. The test has 84 multiple-choice items that measure skills from recognizing numerals to advanced geometric and trigonometric concepts. The PIAT Reading Recognition assesses a child's skills to recognize and pronounce word. It has 84 assessment

[7]However, until 1992, there were some children aged 15 to 18 who took these tests. For consistency, I use children up to age 14. Even if I include these older children, I find almost identical estimates.

items, including matching names and letters and reading single words aloud. Likewise, the PIAT Reading Comprehension measures a child's ability to comprehend sentences' meanings. As part of the test, the child is first asked to read a sentence and then is presented with four pictures, requiring him/her to select the one that best reflects the meaning of the sentence. Like math and reading recognition tests, its difficulty level increases from preschool to high school. In my analysis, I normalize a total score with a mean zero and a standard deviation of one.

Outcome Variable: Home Environment

The NLSY79 Child and Young Adult survey uses the Home Observation Measurement of the Environment-Short Form (HOME-SF) to measure the quality of a child's home environment. The HOME-SF asks a number of questions on various issues supposedly related to a child's need to have a conducive environment in which to grow. For example, the questionnaire items include an assessment for "How many books does the child have?," "How often mother reads to the child?," "How often does the child eat with both mom and dad?," "How often did the mother spank the child in past week?," "Is there a musical instrument that child can use at home?," "Does the family get a daily newspaper?," and "Does the child get special lessons or do extracurricular activities?". Responses to such questions are used to calculate the total raw score for the home environment. Furthermore, cognitive stimulation and emotional support scores are calculated using responses to questionnaire items relevant for cognition and emotional support, respectively. In my analysis, I use all three measures: the total raw score, the stimulation support score, and the emotional support score. I normalize these scores to have a mean of zero and a standard deviation of one.

B. Minimum Wage and Other Data

I draw the minimum wage data from Meer and West (2016).[8] The authors note that they compile the minimum wage data from state-level sources, making their compilation more comprehensive than the data published by the U.S. Department of Labor (DOL). That is the reason I use their data. As my variable of interest varies at the annual level, I use the minimum wage available in the first quarter of each year, and thus have the annual frequency of my data. Appendix Figures A2 and A3 present cross-sectional variations and growths of the minimum wage across states, respectively.

Other Variables: I use the unemployment rate data from the University of Kentucky Center for Poverty Research.[9] Likewise, I draw data on the student-teacher ratio from the Digest of Education Statistics, the National Center for Education Statistics.[10] The ratio is measured at the state level. In order to calculate the ratio of the minimum wage to the state average wage, I use data retrieved from the Quarterly Census of Employment and Wages (QCEW).[11] The average wage is calculated by dividing a state's total wages by the state's total employment in a given year.[12] Further, I gather information on commuting zones (CZs) from the Department of Agriculture.[13]

[8] Available from the author's website http://people.tamu.edu/~jmeer/research.html. Accessed August 20, 2018

[9] The link is http://ukcpr.org/resources/national-welfare-data.

[10] The data are extracted from https://nces.ed.gov/programs/digest/current_tables.asp.

[11] The link for the data is https://www.bls.gov/cew/datatoc.htm.

[12] Specifically, I use the variable "avg_annual_pay" from the QCEW data.

[13] The link is https://www.ers.usda.gov/data-products/commuting-zones-and-labor-market-areas/.

IV. Modeling the Cognitive Achievement Production Function

I model the cognitive achievement production function to illustrate the role the minimum wage plays in its inputs. To do so, I consider that a child's observed test score represents his/her achievement (A) at age a. Let X_{ija} represent parental inputs at age a and υ_{ija} be unobserved factors that determine a child's test score. Assuming that the achievement function is approximately linear and separable (Todd and Wolpin 2007), I can use the following empirical specification:

$$A_{ija} = \alpha_1 X_{ija} + \alpha_2 X_{ija-1} + ... + \alpha_a X_{ij1} + \gamma\omega_{ij0} + \tau_1 \upsilon_{ija} + \tau_2 \upsilon_{ija-1} + ... + \tau_a \upsilon_{ij1} + \epsilon_{ija}. \quad (2)$$

I focus on a variant of the contemporaneous specification of this function consistent with this study's objective to examine the contemporaneous effect of the minimum wage. I assume that contemporaneous inputs (X_{ija}) are orthogonal to unobserved factors (υ_{ija} and its lagged values). Now, I can modify Equation (2) in the following form:

$$A_{ija} = \alpha_1 X_{ija} + \gamma\omega_{ij0} + \epsilon_{ija}. \quad (3)$$

Assuming that the initial endowment and other unobserved factors affect each test a child takes at different ages, in a similar fashion, we can eliminate the term ω_{ij0}. Therefore, it is now possible to estimate the achievement production function consistently to derive the effect of family inputs (a vector of parameters α_1), using a child-fixed effects model.[14] However, the objective of this study is to estimate the effect of the minimum wage, which affects these inputs as explained above. As described in Todd and Wolpin (2003, 2007) and Cunha and Heckman (2007), when we have multiple inputs, an instrumental variable method

[14] I also provide estimates from an augmented value-added model that controls for a child's lagged test score, in the Appendix.

is not a viable approach. Hence, I replace X with the minimum wage and estimate its direct effects, which may be viewed as reduced form estimates. My approach is also in line with the literature that examines the association between the minimum wage and other outcomes than employment.

A. Baseline Child-Fixed Effects Model

My empirical analysis leverages the variation in the minimum wage over space and individual panel data to measure its effect on children's test scores. I choose to focus on analyzing children from low-socioeconomic households, where parents are likely low-skilled. It is a standard practice in the literature to use low-skilled workers to evaluate the effect of minimum wage on employment (e.g, Lordan and Neumark 2018). I define low-socioeconomic households as those in which a mother has less than a high school degree. Ideally, it would have been more precise if I were able to observe both parents' education level. The data do not include the father's education.[15] However, as argued in the literature on assortative matching (for instance, Greenwood et al. 2014), children of less-educated mothers are very likely to have less-educated fathers as well.

I use a standard child-fixed effects model, using variation in the minimum wage within a child and eliminating any constant individual- and family-level unobserved factors. Specifically, I use the regression of the following form:

$$A_{ist} = \alpha_i + \beta_1 MW_{st} + \lambda X_{ist} + \rho Z_{st} + \gamma_t + \epsilon_{ist}, \tag{4}$$

where i indexes child, s indexes state, and t indexes calendar year and A_{ist} is an outcome of interest, which could be a normalized PIAT math score, a normalized PIAT reading recognition score, and a normalized PIAT comprehension score. Likewise, $MW \in \max\{MW_{state},$

[15]The NLSY79 includes a spouse's education only until 1982, when mothers were 17 to 25 years of age. That is also years prior to the beginning of the survey of the NLSY1979 Child and Young Adult.

$MW_{fed}\}$ is the minimum wage representing higher of the state or the federal minimum wage. X_{ist} includes time-variant individual characteristics, which are the child's age and age squared and the mother's age and marital status in the calendar year. In this specification, time-invariant variables such as race are eliminated. Z_{st} is a vector of state-level variables that change over time, particularly the unemployment rate and the pupil-teacher ratio in a state. They are intended to capture the effects of the business cycle and educational resources, respectively, on child development. γ_t is a vector of year fixed effects that captures unobserved factors that vary over time and affect all children. The example includes the federal education policy or federal health insurance policy. The unit of analysis is a child-year, meaning children are repeated over years in my sample. I cluster standard errors at the mother level to account for the fact that errors within the household are correlated. The primary identifying assumption of this model is that after controlling for individual- and state-level variables and year fixed effects, changes in other time-varying omitted variables that are correlated with changes in the minimum wage do not affect a child's test scores.

B. Specification Using a Control Group

It is possible that other time-varying unobserved factors may determine the minimum wage and children's test scores jointly, thus violating the assumption of the model specified above. For example, it is conceivable that states are more likely to raise the minimum wage during times of lower unemployment and higher economic growth. During such times, states may increase their educational expenditures and carry out other expansionary fiscal policies. If this is the case, then β_1 is biased towards zero. Hence, in my preferred, alternative specification, I augment Equation (4), comparing children with low socioeconomic status (whose parents are likely to be exposed to the minimum wage's effects) to those with high socioeconomic status (whose parents are not typically exposed to the minimum wage's effects), living in two different minimum wage regimes. The underlying assumption of this model[16] is that unobserved factors that jointly determine the minimum wage and children's educational outcomes do not affect these two kinds of children differently.

$$A_{ist} = \alpha_i + \beta_1 D_i * MW_{st} + \beta_2 MW_{st} + \lambda X_{ist} + \rho Z_{st} + \gamma_t + \epsilon_{ist}, \tag{5}$$

where β_1 is a parameter of the interest. D_i is an indicator variable for low-socioeconomic status children whose parents are considered to be affected by the minimum wage; more specifically, children whose mothers are high school dropouts. Other variables are defined as above. Using a child-fixed effects model in the panel data renders a separate dummy for D_i unnecessary, which is canceled out like other time-invariant variables.

In summary, as these two models require different identifying assumptions, they provide a check to reinforce the validity of each model's assumption. A concern in a baseline child-fixed effects model is the possibility that omitted variables that are correlated with both changes in the minimum wage and children's achievement may have driven my results. A model using a control group accounts for this concern. On the other hand, a concern in a model using a control group is whether or not unobserved heterogeneity affects children from low-socioeconomic and high-socioeconomic households in a similar way. Findings from a child fixed-effects model mitigate this concern substantially.

V. Results

In this section, I first present the results estimated from Equation (4). Then, I estimate the effects of the minimum wage relative to the state average wage. Further, I provide the results, using the minimum wage in logs, and carry out an analysis to examine pre-trends in

[16]The model is, in spirit, similar to Hsu, Matsa, and Melzer (2018), who compare the unemployed to the employed to examine the effect of unemployment insurance generosity on mortgage delinquency.

outcome variables. In the next step, I report the results from Equation (5). Finally, I report heterogeneous effects by gender and race.

Baseline Child-Fixed Effects Model. I estimate Equation (4) to examine the effect of the minimum wage on children's educational outcomes. I begin my analysis, deriving the results without using any individual- and state-level controls. I estimate the effect for the children of low-educated mothers (minimum wage-earning households). Panel A of Table 2 reports the results. The outcome variables are normalized. I cluster standard errors at the mother level to account for the fact that unobserved components in test scores for children within the household are probably correlated. My estimates show a statistically significant effect of the minimum wage on test scores for children from low-socioeconomic households. I find a $1 increase in the minimum wage leads to a 0.16 standard deviation decline in math scores, a 0.13 standard deviation decline in reading recognition scores, and a 0.18 standard deviation decline in reading comprehension scores. As a falsification exercise, I investigate the way in which the minimum wage impacts the test scores of children from high-socioeconomic households, which are defined as households where a mother has a high school degree or beyond. As these household members are not likely to be exposed to the minimum wage, their children should be unaffected. As reported in Panel B of Table 2, I do not find a statistically significant and negative effect for these children with high socioeconomic status.

Next, I add individual-level controls (Panel A of Table 3) in the empirical specification for children with low socioeconomic status, and further add state-level controls as specified above (Panel B of Table 3). For completeness, I re-estimate the model including control variables for children with high socioeconomic status (Panel C of Table 3). The results are qualitatively similar to those estimated without controls.

As shown in Figures A2, states that tend to have higher wages have higher level of the minimum wage. For instance, the minimum wage is higher in northeast and west-coast states such as Massachusetts, California, Washington and New York. These states also have a higher cost of living. Therefore, I further examine the robustness of my findings by dividing a state's minimum wage by its average wage. Panel A of Table 4 presents the results, which are qualitatively similar to those of baseline estimates. Additionally, I use the minimum wage in logs and examine its effects on these test scores, and the results are consistent (Panel B of Table 4).

To analyze the possibility that my model is picking up pre-existing trends in children's achievement, I examine whether increases in the future minimum wage are related to a child's current test scores. In particular, I regress a child's current test scores on year-to-year changes in the minimum wage in the year $t-k$, where $k \in$ { -2, -1, 0, 1, and 2 }, that is, two lags and two leads. I choose to use year-to-year changes in the minimum wage rather than the minimum wage in levels because the objective is to investigate whether any other unobserved confounders are associated with a state's decision to raise the minimum wage.[17] Also, using the minimum wage in levels creates the problem of multicollinearity. I do not find any future increases in the minimum wage (in years $t+1$ and $t+2$) affect the current test scores (Table A1). Current changes in the minimum wage have significant and negative effects on math scores and reading comprehension scores. An increase in the minimum wage of last year appears to have a negative and statistically significant effect on reading recognition scores. Overall, this exercise does not provide support that my baseline results are picking up pre-existing trends. Otherwise, I should have found significant effects of future minimum wage changes. In addition, I next re-estimate my model using a control group to eliminate possible unobserved confounders.

Specification Using a Control Group. I augment my baseline specification by interacting the minimum wage with a dummy variable for low-socioeconomic households, specified in Equation (5). The results are presented in Table 5. I find statistically stronger results. The finding is that a $1 increase in the minimum wage reduces a low-socioeconomic status child's math score by around 0.10 standard deviation, reading recognition score by around 0.19

[17]Given that the minimum wage is typically revised upward, any changes in it reflect increases.

standard deviation, and reading comprehension score by around 0.14 standard deviation, as compared to those of a high-socioeconomic status child. Clustering standard errors either at the state level or at the mother-state level yields similar standard errors (Table A2).

To control further for the possibility of that the estimates are driven by other linear, time-variant unobserved factors, I add state-specific linear trends and re-estimate Equation (5). As presented in Panel B of Table 5, the estimates are consistent. Moreover, I use the minimum wage in 1990 dollars using the Consumer Price Index (CPI) published by the Bureau of Labor Statistics. I find that estimates derived using the real minimum wage are qualitatively similar (Panel A of Table A3). I further add state-specific linear trends, which intend to account for state-specific linear changes in inflation (Panel B of Table A3).

In yet another sensitivity check, I extend my analysis to the sample year 2014, the latest year which has data on children's test scores. As reported in Panel C of Table A3, I find similar point estimates and standard errors.

The objective of this study is to analyze the second-order effects of the minimum wage. It is a possibility that older children may be affected directly by the minimum wage, which influences their employment chances. Therefore, I re-examine the effect limiting my analysis to children aged 12 or below. The Fair Labor Standards Act (FLSA) requires that children be at least 14 years old for employment. I drop those who are 13 years of age too because in my sample age is defined as the difference between the calendar year and birth year, and some of those aged 13 may actually be 14 years old because of rounding errors related to months. Additionally, for those children, who are above or close to the legal age to work, in higher minimum wage states may not feel the need to have more education as a higher minimum wage reduces return to schooling. Hence, their subsequent negligence in study could be reflected in test scores. I report the results in Panel D of Table A3.[18] They are almost identical to those of baseline estimates.

[18] Even if I include those who are aged 13, the results are similar.

Heterogeneity by Gender and Race. I further analyze the heterogeneous effects of the minimum wage by gender. Panel A of Table 6 presents the results for boys and Panel B presents the results for girls. I find statistically significant effects for boys on all of these three tests. For girls, the statistically significant effect is limited to the reading test. The more powerful effects for boys could be explained in the context of an emerging literature that explores underlying home environments to understand the gender gap in educational achievement. The literature shows that the home environment associated with family disadvantage affects boys' academic outcome more disproportionately than that of girls (Bertrand and Pan 2013, Autor et al. 2016).

It has been shown that human capital accumulation differs across ethnicity and race. Therefore, I separate children by their race: white, black and Hispanic. Table 7 reports the results. As shown in Panel A, the estimates are statistically significant for all these tests for white children. For black and Hispanic children (Panels B and C, respectively), I find a statistically significant effect only on reading scores. The lower statistical power for black and Hispanic children may have stemmed from a smaller sample size.

VI. Robustness of Main Results

In general, my results above are robust to different specifications that control for unobserved factors which could be correlated with both the minimum wage and children's achievement. In this section, I further investigate the possibility of my results being biased by systematic differences in states' trends in educational outcomes or other unobserved heterogeneity.

A. Cross-State Commuting Zones

First, I investigate the minimum wage's effect on children's test scores by comparing children who are affected by the minimum wage to those presumably not exposed to the minimum wage, all of whom live in the same local labor market. As in Tolbert and Sizer (1996) and Autor and Dorn (2013), I define commuting zones (CZs) as local labor markets. In the context of the minimum wage, Allegretto, Dube, and Reich (2009) use cross-border commuting zones to relate changes in the minimum wage to changes in teens' employment. Unlike state or county jurisdictions which resemble political boundaries more than labor markets, CZs are geographical units delineated to be more representative of local economic areas. Because the CZs could straddle states, people living in the same CZ may be exposed to different minimum wages two or more states set. In 2000, there were a total of 709 CZs. The boundaries of CZs change slightly over decades. However, in this study, I use the boundaries defined in 2000 for the purpose of consistency. I augment my preferred specification, Equation (5), by including commuting-zones-by-year fixed effects. Specifically, I use the following model:

$$A_{ist} = \alpha_i + \beta_1 D_i * MW_{st} + \beta_2 MW_{st} + \lambda X_{ist} + \rho Z_{st} + \gamma_t + \psi_{CZt} + \epsilon_{ist}, \tag{6}$$

where ψ_{CZt} represents commuting-zone-by-year fixed effects. Table 8 presents the results. The estimates are qualitatively similar to those of the baseline estimates. Overall, these estimates provide further validity of the main findings in this paper, that the minimum wage affects a child's test scores negatively.

B. Interaction with Social Safety Nets

I investigate whether the minimum wage is associated with the uptakes of major social safety net programs, namely Worker's Compensation, Aid to Families with Dependent Children (AFDC)/Temporary Assistance for Needy Families (TANF),[19] the Supplemental Nutrition Assistance Program (SNAP) that was previously known as the food stamp program, and

[19] The Personal Responsibility and Work Opportunity Reconciliation Act of 1996 (PRWORA) replaced AFDC with TNAF.

Supplemental Security Income (SSI) Disability.[20] Table A4 reports the results. First, I regress the minimum wage on the uptake of each program separately. I next regress the minimum wage on the uptakes of all these programs (Column 5 of Table A4). I define the uptake of each program as the total number of a program's recipients in a state divided by the state's population. I estimate the analysis for the period from 1986 to 2008, except for the uptake of SSI Disability, for which data are available only since 1990. After controlling for year and state fixed effects, I do not find any statistically significant correlation between the minimum wage and the uptakes of these programs, except for AFDC/TANF which is significant at the conventional level. Therefore, I re-estimate my model controlling for the uptake of the AFDC/TANF program. As presented in Table A5, estimates are similar to the baseline estimates.

The robustness of these findings is expected, given that studies examining the interactions between the minimum wage and the uptake of social welfare programs are inconclusive. Reich and West (2015) show that a minimum wage hikes reduces the enrollment in the Supplementary Nutritious Assistance Program (SNAP), previously known as the food stamp program. Page, Spetz, and Millar (2005) find some suggestive evidence of the minimum wage pushing individuals to depend on means-tested social welfare programs. In re-examining the issue, Sabia and Nguyen (2017) conclude that there is no statistically significant relationship between the minimum wage and participation in other social welfare programs. A caveat of these studies is that respondents in household surveys tend to underreport their participation in social safety nets, which may have biased these findings (Meyer, Mok, and Sullivan 2009).

[20] I use data from the University of Kentucky Center for Poverty Research.

C. Alternative Definition of Treatment

Thus far, I use children of mothers having less than a high-school degree as my treatment group. In this subsection, I compare differences in cognitive achievement between children from minimum wage-earning households and those from households earning outside the minimum wage. Following Aaronson, Agarwal, and French (2012) and Dettling and Hsu (2017), I define minimum wage earning households as those in which either parent had earnings, in the previous calendar year, in the range of 60 percent to 120 percent of the minimum wage. In the NLSY79, the mother reports her spouse's earnings and there are several missing values. Hence, it is worth noting that a caveat of this analysis is measurement errors with respect to wages.

First, I calculate an hourly wage for a mother and a father, separately. In my sample, mothers report both the number of hours worked and annual income in the previous calendar year. Thus, I am able to calculate a mother's hourly wage using these pieces of information (total annual income divided by the number of annual hours worked). For a father, a spouse reports annual income, the number of weeks worked, and usual hours worked per week in the previous calendar year. I multiply the number of weeks worked and usual hours worked to calculate the annual hours worked by fathers. I divide father's annual income by annual hours to estimate an hourly wage. I exclude children if both parents have missing information on wages. I fit the following model:

$$A_{ist} = \beta_1 D_i * MW_{st} + \beta_2 MW_{st} + \beta_3 D_i + \lambda X_{ist} + \rho Z_{st} + \zeta_s + \gamma_t + \epsilon_{ist}, \quad (7)$$

where "D" takes a value of one if one or both of whose parents have earnings in the range of 60 percent to 120 percent of the minimum wage and otherwise zero. ζ_s is a vector of state-fixed effects. It is likely that some children could be in the treatment group for some period and in the control group in other periods, as parents' income may exceed the minimum wage range in some periods. I use the data in the cross-sectional format. I cluster standard errors at the state level. As shown in Table 9, the results are similar to those of the baseline estimates.

VII. Mechanisms

Having established the adverse effects of the minimum wage on children's achievement, in this section I explore potential mechanisms, and provide additional explanations, for my findings. In particular, I examine the link between the minimum wage and the home environment.[21] I use the sample of those children who have at least one non-missing test score, either the math or reading scores that I use in my main analysis and are aged 5 to 14 years. Using information from the Home Observation Measurement of the Environment (HOME)-Short Form, the NLSY79 Child and Young Adult provides three measures of the home environment: (i) the total HOME score, (ii) the cognitive stimulation score, and (iii) the emotional support score. The scores are calculated based on several questions that are intended to reflect a child's quality of life. In my analysis, I use all of these three scores.

I estimate the effect for low-socioeconomic and high-socioeconomic status children, separately. The results are presented in Table 10. I find significant and negative effects of the minimum wage for low-socioeconomic children (Panel A). However, the effects for high-socioeconomic children are not statistically different from zero (Panel B).

To understand better why the minimum wage affects the home environment for low-socioeconomic status children adversely, I examine the effects on two important factors related to parental time investment in children. Specifically, I examine whether the minimum wage affects the likelihood that a child eats with both parents at least once a day and whether

[21] I also investigate how the minimum wage affected employment and incomes for parents of the low-socioeconomic status children in the previous calendar year. However, I do not find statistically significant effects for incomes and for the annual number of hours worked. One major concern with my analysis is that I have a very small sample size of mothers, less than 500, severely weakening the statistical power of my model. Table A7 reports the results.

the family encourages a child to engage in hobbies. I find that an increase in the minimum wage has statistically significant and negative effects on both of these outcomes (Table A8), suggesting that a minimum wage increase decreases parental time investment in children. And parental time (both the mother's and father's) is considered to be an essential input in children's cognitive development (Boca, Flinn, and Wiswall 2014).

There may be several potential explanations why the minimum wage can affect parental time investment in children or the home environment even if there are no effects on employment and income. To offset a rise in wages stemming from a minimum wage increase, firms may decide to cut non-wage job benefits on several dimensions. McKenzie (1980) illustrates that a minimum wage increase prompts employers to explore avenues to offset the increase in monetary-wages by reducing their non-monetary and fringe benefits. Firms try to prevent the marginal cost of production from rising above the marginal product of labor. Such measures on employers' parts result in a deterioration in the working environment. In his theoretical discussion, Wessels (1980) notes that a minimum wage increase leads employers to reduce "on-the-job training, fringe benefits, and job safety." Likewise, Clemens, Kahn, and Meer (2018), using American Community Survey data from 2011 to 2016, find that an increase in the minimum wage reduces employer-sponsored health coverage. The loss in health coverage can deteriorate the home environment by creating health problems for parents.

Another crucial dimension along which firms respond to a minimum wage increase is by taking steps in order to exact more efforts from workers to improve the marginal product of labor. This is to balance the increase in the marginal cost of production that are attributable to a minimum wage increase. Firms may alter the work schedules of their employees, making them more irregular and base workers' schedules on call-ups (see Strain and Clemens 2019 for further discussion). Such responses by firms to a minimum wage hike make the minimum-wage jobs both "physically and psychologically" challenging, leading workers to burn out more and reducing their work-life balance. As a result, when minimum-wage earning parents return home after these jobs, they may be less responsive to their children's needs, thus resulting in a decline in the home environment.

Drawing on psychology literature, we can elucidate further with regards to how the effects of minimum wage changes go on to affect those children whose parents' employment outcomes are affected negatively. This literature suggests that the major path through which voluntary unemployment affects a child is a breakdown in the emotional relationship with the parents, particulary the father (Elder, Nguyen, and Caspi 1985). Recent findings from economics literature provide some credence to this insight from psychology literature (Rege, Telle, and Votruba 2011). In addition, Horn, Maclean, and Strain (2017) find that a higher minimum wage affects men's mental health adversely. Consistent with these findings, the minimum wage affects the home environment adversely for those children whose parents' employment outcomes are affected negatively, thus adversely affecting their cognitive development. In summary, these lines of the existing literature explain why the minimum wage affects the home environment negatively for both types of children–those whose parents lose their jobs and those whose parents are able to keep the minimum-wage jobs following a minimum wage increase. It is worth noting that there could be several other potential mechanisms that function through the minimum wage to influence a child's cognitive achievement. Future research could provide insight into additional channels and explanations.

VIII. Conclusion

Since the New Deal instituted the minimum wage in 1938 in the US, it has remained one of widely researched topics. At the heart of the minimum wage debate, proponents argue for its possible important role in shielding workers from employers' exploitation and in boosting family welfare. Yet, despite its important relevance for policy, there is little evidence of the extent to which the minimum wage affects low-skilled workers' children's well-being. The literature focuses instead on the minimum wage's effects on employment. In this paper, I provide the first empirical evidence of the role of the minimum wage in children's cognitive achievement, measured by math and reading test scores.

I choose to focus on children with low-socioeconomic status, as they are likely to experience the effects of the minimum wage because of their parents' employment. I find consistent effects across different empirical specifications, in that a higher minimum wage reduces these children's math and reading test scores. My results show that, depending on an empirical specification, a \$1 increase in the minimum wage leads to a 0.09-0.16 standard deviations decline in math scores, a 0.08-0.15 standard deviations decline in reading recognition scores, and a 0.06-0.2 standard deviations decline in reading comprehension scores.

To explore mechanisms through which the minimum wage impedes child achievement, I study the minimum wage's effect on the home environment. My results show a negative and statistically significant effect for children with low-socioeconomic status. In contrast, I find statistically insignificant effects for children with high-socioeconomic status.

As the first paper to study the minimum wage's effect on test scores, I cannot compare its findings directly to those in the literature. However, to gauge the magnitude of my estimates, I relate the findings here to the literature that has examined other welfare programs' effects on test scores. Dahl and Lochner (2012) find that a \$1,000 increase in the annual family income, induced by the Earned Income Tax Credit (EITC), leads to approximately a 0.06 standard deviation increase in test scores. Likewise, Milligan and Stabile (2011)'s results show around 0.073 standard deviation rise for a \$1,000 increase in tax credits. If taken at face value, these papers' findings make the naive suggestion that my paper's estimates are equivalent to the effects attributable to an annual income loss of \$1,000-\$2,500. However, there are two caveats in comparing my results directly to theirs. First, as I show, the minimum wage effects in my paper are driven by the adverse home environment, a finding that is consistent with those of Rege, Telle, and Votruba (2011) and Horn, Maclean, and Strain (2017). Rege, Telle, and Votruba (2011) argue that the major channel through which job displacement affects children's education is mental distress. The authors show that a loss in income is not related to a child's declining performance in school. Horn, Maclean, and Strain (2017) find negative effects of a higher minimum wage on men's mental health. Second, as the principle of loss aversion–used widely in cognitive phycology and behavioral economics literature–asserts that losses have greater effects than do comparable gains, losing $1,000 because of the minimum wage's negative effects on employment is not similar to collecting $1,000 through welfare programs.

In examining the link between the minimum wage and child achievement, this paper carries important policy implications. The effects of the minimum wage go beyond negatively affecting chances of employment for low-skilled workers to be detrimental to child development. While formulating minimum wage legislatives, policymakers may want to consider its possible impact on children.

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Table 1: **Summary Statistics**

	N	Mean	Std. Dev.
Panel A			
PIAT Math	1470	-0.576	0.927
PIAT Reading Recognition	1461	-0.687	0.985
PIAT Reading Comprehension	1206	-0.659	0.997
Age	1482	9.832	2.715
Female	1482	0.445	0.497
White	1482	0.807	0.395
Black	1482	0.116	0.320
Hispanic	1482	0.077	0.266
Mother Married	1482	0.639	0.480
Mother's Income	1427	$4386	$6547
Minimum Wage	1466	$4.26	$0.85
Panel B			
PIAT Math	17,460	0.141	0.950
PIAT Reading Recognition	17,409	0.133	0.952
PIAT Reading Comprehension	14,870	0.140	0.952
Age	17,549	9.622	2.729
Female	17,549	0.492	0.500
White	17,549	0.931	0.253
Black	17,549	0.050	0.219
Hispanic	17,549	0.018	0.135
Mother Married	17,549	0.817	0.387
Mother's Income	17,034	$16,593	$24,850
Minimum Wage	17,447	$4.75	$0.94

Notes: Summary statistics are calculated using survey weights. Panel A reports the statistics for children with low socioeconomic status whose parents are considered to be exposed typically to minimum wage effects and Panel B presents the statistics for children with high socioeconomic status. The sample includes children ages 5 to 14 who have either non-missing PIAT math score or non-missing PIAT reading scores. I normalize PIAT math, PIAT reading recognition, and PIAT reading comprehension scores. Note that variables such as *female*, *white*, *black*, *Hispanic*, and *mother married* are indicators.

Table 2: **Effects of the Minimum Wage: Without Controls**

	Math (1)	Reading Rec. (2)	Reading Comp. (3)
Panel A			
Min. Wage	-0.164**	-0.126**	-0.181*
	(0.069)	(0.053)	(0.092)
Controls	No	No	No
Observations	1,454	1,445	1,192
Number of children	428	429	410
R^2	0.026	0.077	0.232
Panel B			
Min. Wage	-0.010	0.038	-0.014
	(0.026)	(0.024)	(0.026)
Controls	No	No	No
Observations	17,358	17,307	14,778
Number of children	4,565	4,566	4,445
R^2	0.015	0.005	0.123

Notes: Panel A presents the results for children with low socioeconomic status whose parents are considered to be exposed typically to minimum wage effects. Panel B presents the results for children with high socioeconomic status. Socioeconomic status is defined according to the mother's education: low (less than a high school degree) or high (high school or beyond). The dependent variables are normalized. The results are derived using a child-fixed effects model, without any controls except for year fixed effects. Standard errors are clustered at the mother level. *** denotes significance at the one percent level, ** denotes at the five percent level, and * denotes at the ten percent level.

Table 3: **Effects of the Minimum Wage: Using Controls**

	Math (1)	Reading Rec. (2)	Reading Comp. (3)
Panel A			
Min. Wage	-0.159**	-0.140***	-0.198**
	(0.071)	(0.055)	(0.087)
Indiv. Controls	Yes	Yes	Yes
State Controls	No	No	No
Observations	1,454	1,445	1,192
Number of children	428	429	410
R^2	0.039	0.085	0.259
Panel B			
Min. Wage	-0.152**	-0.137**	-0.204**
	(0.072)	(0.056)	(0.087)
Indiv. Controls	Yes	Yes	Yes
State Controls	Yes	Yes	Yes
Observations	1,454	1,445	1,192
Number of children	428	429	410
R^2	0.037	0.085	0.261
Panel C			
Min. Wage	-0.010	0.034	-0.015
	(0.026)	(0.024)	(0.026)
Indiv. Controls	Yes	Yes	Yes
State Controls	Yes	Yes	Yes
Observations	17,358	17,307	14,778
Number of children	4,565	4,566	4,445
R^2	0.028	0.009	0.123

Notes: Panels A and B present the results for children with low socioeconomic status whose parents are considered to be exposed typically to minimum wage effects. Panel A presents the results using individual controls and Panel B further adds state-level controls. Panel C presents the results for children with high socioeconomic status. Socioeconomic status is defined according to the mother's education: low (less than a high school degree) or high (high school or beyond). The dependent variables are normalized. The results are derived using a child-fixed effects model. Standard errors are clustered at the mother level. *** denotes significance at the one percent level, ** denotes at the five percent level, and * denotes at the ten percent level.

Table 4: **Alternative Measures of the Minimum Wage**

	Math (1)	Reading Rec. (2)	Reading Comp. (3)
PanelA			
(Min.Wage/Avg. State Wage)*1000	-6.671***	-3.965**	-5.525**
	(2.564)	(2.046)	(2.292)
Controls	Yes	Yes	Yes
Observations	1,454	1,445	1,192
Number of children	428	429	410
Panel B			
Log Min. Wage	-0.758**	-0.715***	-1.021***
	(0.334)	(0.263)	(0.385)
Controls	Yes	Yes	Yes
Observations	1,454	1,445	1,192
Number of children	428	429	410
R^2	0.038	0.085	0.262

Notes: I limit the sample to children with low socioeconomic status whose parents are considered to be exposed typically to minimum wage effects. Socioeconomic status is defined according to the mother's education: low (less than a high school degree) or high (high school or beyond). The dependent variables–PIAT math, PIAT reading recognition, and PIAT reading comprehension scores–are normalized. Panel A presents the effects of the ratio of the minimum wage to the average state wage on children's test scores. The average state wage is calculated by dividing a state's total wages by the state's total employment in a given year. Panel B uses the minimum wage in logs. The results are derived using a child-fixed effects model. Standard errors are clustered at the mother level. *** denotes significance at the one percent level, ** denotes at the five percent level, and * denotes at the ten percent level.

Table 5: **Effects of the Minimum Wage: Specification Using a Control Group**

	Math (1)	Reading Rec. (2)	Reading Comp. (3)
Panel A			
Min. Wage * D	-0.103***	-0.192***	-0.138***
	(0.040)	(0.042)	(0.049)
Min. Wage	-0.010	0.035	-0.016
	(0.025)	(0.023)	(0.026)
Controls	Yes	Yes	Yes
Observations	18,812	18,752	15,970
Number of Children	4,993	4,995	4,855
R^2	0.027	0.013	0.130
Panel B			
Min. Wage * D	-0.098**	-0.183***	-0.133***
	(0.040)	(0.042)	(0.049)
Min. Wage	-0.011	0.038	-0.014
	(0.027)	(0.024)	(0.028)
Controls	Yes	Yes	Yes
Observations	18,812	18,752	15,970
Number of Children	4,993	4,995	4,855
R^2	0.033	0.022	0.135

Notes: D is an indicator variable for the treatment group that includes those children whose mothers have less than a high school degree (children with low socioeconomic status). The control group includes those children whose mothers have a high school degree or beyond (children with high socioeconomic status). The dependent variables–PIAT math, PIAT reading recognition, and PIAT reading comprehension scores–are normalized. Panel A presents the results estimated from the model specified in Equation (5). Panel B presents the results derived from further adding state-specific linear trends in Equation (5). Standard errors are clustered at the mother level. *** denotes significance at the one percent level, ** denotes at the five percent level, and * denotes at the ten percent level.

Table 6: **Effects of the Minimum Wage: By Gender**

	Math (1)	Reading Rec. (2)	Reading Comp. (3)
Panel A: Boys			
Min. Wage * D	-0.177***	-0.302***	-0.133**
	(0.060)	(0.058)	(0.068)
Min. Wage	0.003	0.055*	-0.057
	(0.033)	(0.033)	(0.039)
Controls	Yes	Yes	Yes
Observations	9,573	9,542	8,012
Number of Children	2,573	2,574	2,497
R^2	0.054	0.019	0.094
Panel B: Girls			
Min. Wage * D	-0.040	-0.068	-0.156**
	(0.059)	(0.054)	(0.067)
Min. Wage	-0.015	0.020	0.029
	(0.033)	(0.031)	(0.035)
Controls	Yes	Yes	Yes
Observations	9,239	9,210	7,958
Number of Children	2,420	2,421	2,358
R^2	0.014	0.016	0.175

Notes: D is an indicator variable for the treatment group that includes those children whose mothers have less than a high school degree (children with low socioeconomic status). The control group includes those children whose mothers have a high school degree or beyond (children with high socioeconomic status). The dependent variables–PIAT math, PIAT reading recognition, and PIAT reading comprehension scores–are normalized. Panel A presents the results for boys and Panel B for girls. Standard errors are clustered at the mother level. *** denotes significance at the one percent level, ** denotes at the five percent level, and * denotes at the ten percent level.

Table 7: **Effects of the Minimum Wage: By Race**

	Math (1)	Reading Rec. (2)	Reading Comp. (3)
Panel A: White			
Min. Wage * D	-0.093*	-0.123**	-0.152**
	(0.052)	(0.061)	(0.074)
Min. Wage	-0.015	0.028	-0.000
	(0.029)	(0.026)	(0.028)
Controls	Yes	Yes	Yes
Observations	14,676	14,620	12,460
Number of Children	3,860	3,862	3,754
R^2	0.032	0.009	0.099
Panel B: Black			
Min. Wage * D	-0.139	-0.199***	0.046
	(0.102)	(0.071)	(0.101)
Min. Wage	0.013	0.088	-0.154**
	(0.069)	(0.061)	(0.064)
Controls	Yes	Yes	Yes
Observations	2,693	2,698	2,301
Number of Children	731	732	713
R^2	0.029	0.131	0.319
Panel C: Hispanic			
Min. Wage * D	0.016	-0.237**	-0.108
	(0.085)	(0.092)	(0.076)
Min. Wage	-0.057	0.019	-0.049
	(0.079)	(0.091)	(0.110)
Controls	Yes	Yes	Yes
Observations	1,443	1,434	1,209
Number of Children	402	401	388
R^2	0.040	0.037	0.189

Notes: D is an indicator variable for the treatment group that includes those children whose mothers have less than a high school degree (children with low socioeconomic status). The control group includes those children whose mothers have a high school degree or beyond (children with high socioeconomic status). The dependent variables–PIAT math, PIAT reading recognition, and PIAT reading comprehension scores–are normalized. Panel A presents the results for white children, Panel B for black children, and Panel C for Hispanic children. Standard errors are clustered at the mother level. *** denotes significance at the one percent level, ** denotes at the five percent level, and * denotes at the ten percent level.

Table 8: **Effects of the Minimum Wage: Cross-State Commuting Zones**

	Math	Reading Rec.	Reading Comp.
	(1)	(2)	(3)
Min. Wage * D	-0.128**	-0.218***	-0.170***
	(0.051)	(0.045)	(0.052)
Min. Wage	-0.012	-0.115	0.042
	(0.134)	(0.135)	(0.133)
Controls	Yes	Yes	Yes
Observations	18,717	18,658	15,888
Number of Children	4,975	4,978	4,840
R^2	0.234	0.231	0.322

Notes: D is an indicator variable for the treatment group that includes those children whose mothers have less than a high school degree (children with low socioeconomic status). The control group includes those children whose mothers have a high school degree or beyond (children with high socioeconomic status). The dependent variables are normalized. The results are derived using a child-fixed effects model, controlling for commuting-zone-by-year fixed effects, as specified in Equation (6). Standard errors are clustered at the mother level. *** denotes significance at the one percent level, ** denotes at the five percent level, and * denotes at the ten percent level.

Table 9: **Effects of the Minimum Wage: Alternative Definition of the Treatment Group**

	Math (1)	Reading Rec. (2)	Reading Comp. (3)
Min. Wage * D	-0.086**	-0.076**	-0.061**
	(0.035)	(0.027)	(0.025)
Min. Wage	-0.016	0.023	-0.056**
	(0.032)	(0.036)	(0.027)
D	0.272*	0.246*	0.171
	(0.155)	(0.126)	(0.122)
State and Year Fixed Effects	Yes	Yes	Yes
	(0.030)	(0.043)	(0.029)
Controls	Yes	Yes	Yes
Observations	16,533	16,486	14,106
R^2	0.117	0.098	0.131

Notes: D is an indicator variable for the treatment group that includes those children, one or both of whose parents are minimum wage workers, such that either parent has earnings in the range of 60 percent to 120 percent of the effective minimum wage. The dependent variables–PIAT math, PIAT reading recognition, and PIAT reading comprehension scores–are normalized. The results are derived using the ordinary least squares (OLS) regression, as specified in Equation (7). Standard errors are clustered at the state level. *** denotes significance at the one percent level, ** denotes at the five percent level, and * denotes at the ten percent level.

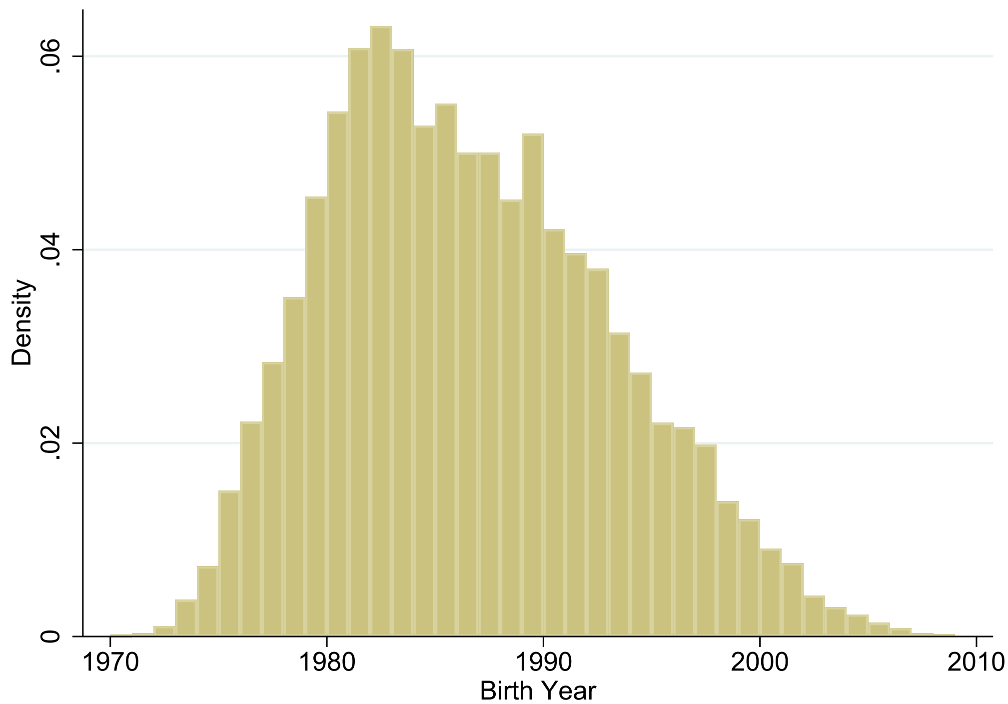
Table 10: **Effects on the Home Environment**

	Home Env. (1)	Cog. Env. (2)	Emot. Env. (3)
Panel A			
Min. Wage	-0.312**	-0.248	-0.373*
	(0.139)	(0.162)	(0.198)
Controls	Yes	Yes	Yes
Observations	1,427	1,323	1,253
Number of Children	426	419	414
R^2	0.030	0.030	0.047
Panel B			
Min. Wage	0.008	0.015	0.005
	(0.029)	(0.030)	(0.034)
Controls	Yes	Yes	Yes
Observations	17,129	16,589	15,931
Number of Children	4,551	4,520	4,521
R^2	0.018	0.009	0.022

Notes: Panel A presents the results for children with low socioeconomic status whose parents are considered to be exposed typically to minimum wage effects. Panel B presents the results for children with high socioeconomic status. Socioeconomic status is defined according to the mother's education: low (less than a high school degree) or high (high school or beyond). The dependent variables–total HOME score, cognitive simulation score, and emotional support score–are normalized. The results are derived using a child-fixed effects model. Standard errors are clustered at the mother level. *** denotes significance at the one percent level, ** denotes at the five percent level, and * denotes at the ten percent level.

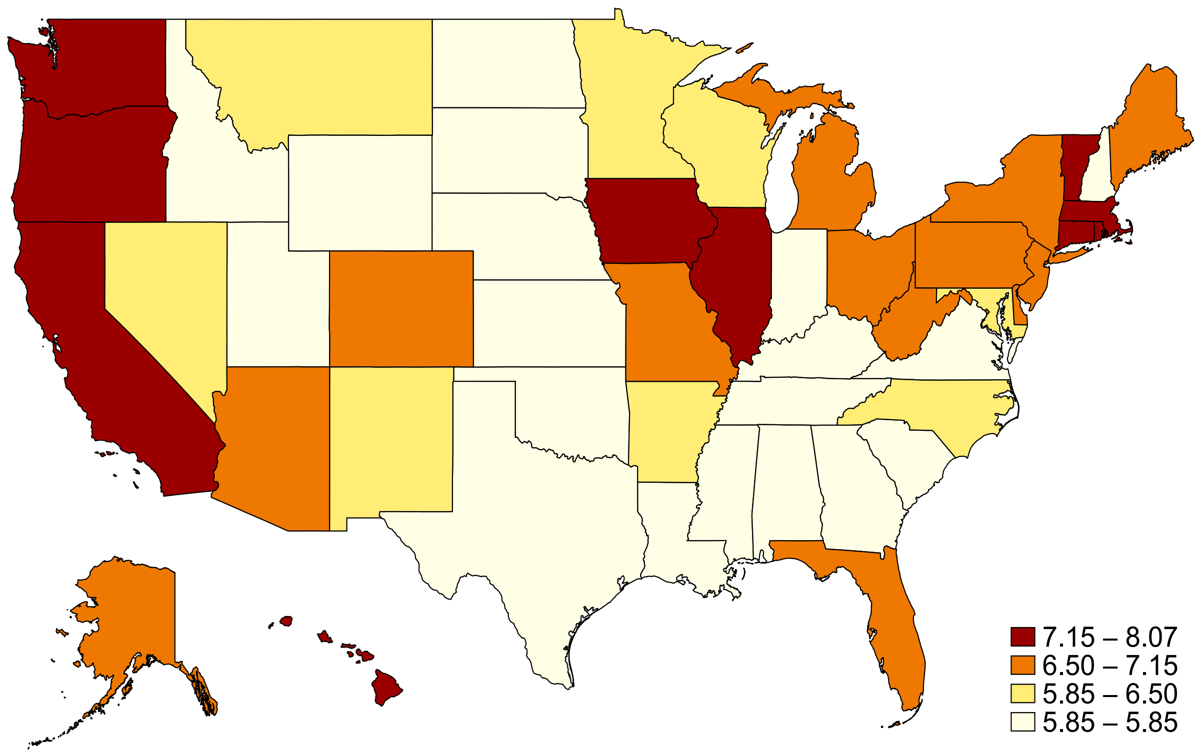
Appendix A

Figure A1: Distribution of Birth Cohorts in NLSY79 Child and Young Adult



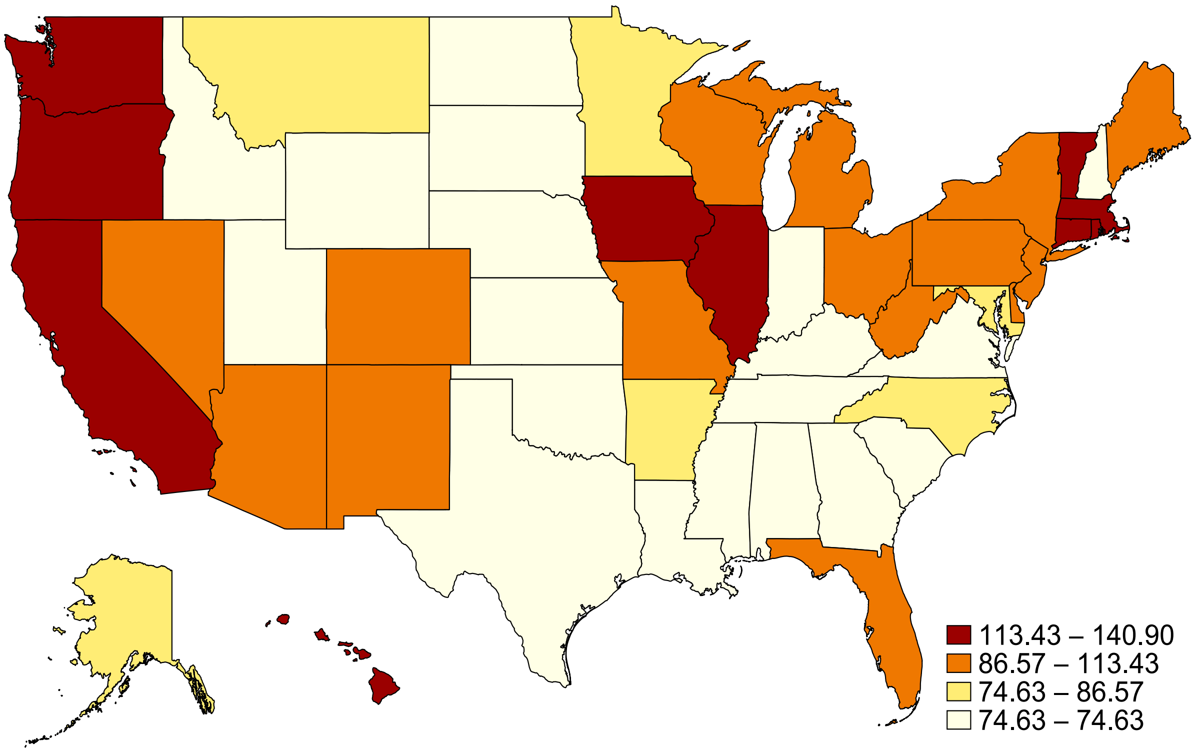
Note: The histogram shows birth years of children in the NLSY79 Child and Young Adult.

Figure A2: Cross-Sectional Variation in the Minimum Wage in 2008



Note: The figure illustrates the cross-sectional variation in the minimum wage in 2008. The numbers in the legend in the bottom-right represent dollar amounts.

Figure A3: Growth Rates of the Minimum Wage across States: 1988 to 2008



Note: The figure illustrates growth in the minimum wage from 1986 to 2008 across states. The numbers in the legend in the bottom-right represent percent changes.

Table A1: **Pre-Trend Analysis**

	Math (1)	Reading Rec. (2)	Reading Comp. (3)
ΔMin. Wage$_t$	-0.192*	-0.089	-0.273**
	(0.112)	(0.117)	(0.133)
ΔMin. Wage$_{t-1}$	0.058	-0.301***	0.166
	(0.115)	(0.104)	(0.119)
ΔMin. Wage$_{t-2}$	-0.288*	0.057	-0.100
	(0.170)	(0.132)	(0.122)
ΔMin. Wage$_{t+1}$	0.007	-0.016	0.187
	(0.099)	(0.124)	(0.116)
ΔMin. Wage$_{t+2}$	0.030	-0.016	0.140
	(0.149)	(0.085)	(0.091)
Controls	Yes	Yes	Yes
Observations	1,454	1,445	1,192
Number of children	428	429	410

Notes: I regress a child's test scores on past and future year-to-year changes in the minimum wage, that is, in the year $t - k$, where $k \in \{$ -2, -1, 0, 1, and 2 $\}$. Each column presents the results from a separate regression. The sample includes children with low socioeconomic status whose parents are considered to be exposed typically to minimum wage effects. The results are derived using a child-fixed effects model. Standard errors are clustered at the mother level. *** denotes significance at the one percent level, ** denotes at the five percent level, and * denotes at the ten percent level.

Table A2: **Effects of the Minimum Wage: Alternative Approaches to Cluster Standard Errors**

	Math (1)	Reading Rec. (2)	Reading Comp. (3)
Min. Wage * D	-0.103***	-0.192***	-0.138**
	(0.036)	(0.046)	(0.059)
	[0.030]	[0.040]	[0.051]
Controls	Yes	Yes	Yes
Observations	18,812	18,752	15,970
Number of Children	4,993	4,995	4,855

Notes: D is an indicator variable for the treatment group that includes those children whose mothers have less than a high school degree (children with low socioeconomic status). The control group includes those children whose mothers have a high school degree or beyond (children with high socioeconomic status). The dependent variables–PIAT math, PIAT reading recognition, and PIAT reading comprehension scores–are normalized. Standard errors presented in parentheses are clustered at the state level and presented in brackets are clustered at the mother-state level. *** denotes significance at the one percent level, ** denotes at the five percent level, and * denotes at the ten percent level.

Table A3: **Additional Sensitivity Checks**

	Math (1)	Reading Rec. (2)	Reading Comp. (3)
Panel A			
Min. Wage * D	-0.064***	-0.108***	-0.085***
	(0.023)	(0.024)	(0.027)
Panel B			
Min. Wage * D	-0.060***	-0.103***	-0.082***
	(0.023)	(0.024)	(0.027)
Panel C			
Min. Wage * D	-0.085**	-0.170***	-0.121***
	(0.036)	(0.042)	(0.041)
Panel D			
Min. Wage * D	-0.088*	-0.168***	-0.253***
	(0.051)	(0.050)	(0.063)
Observations	18,812	18,752	15,970
Number of Children	4,993	4,995	4,855

Notes: D is an indicator variable for the treatment group that includes those children whose mothers have less than a high school degree (children with low socioeconomic status). The control group includes those children whose mothers have a high school degree or beyond (children with high socioeconomic status). The dependent variables–PIAT math, PIAT reading recognition, and PIAT reading comprehension scores–are normalized. Panel A presents the results using the real minimum wage. Panel B uses the specification that adds state-specific trends as further controls together with the real minimum wage. Panel C presents the results derived using the extended sample from 1986 to 2014 and Panel D derived limiting the sample to the children aged 5 to 12 years. The standard errors are clustered at the mother level. *** denotes significance at the one percent level, ** denotes at the five percent level, and * denotes at the ten percent level.

Table A4: **Correlation Between the Minimum Wage and Uptakes of Social Safety Net Programs**

	Dep. Variable: Min. Wage				
	(1)	(2)	(3)	(4)	(5)
Workers' Compensation	0.939				0.569
	(0.828)				(0.606)
AFDC/TNAF		-6.826**			-9.779*
		(3.259)			(5.065)
SNAP			-0.730		0.993
			(1.835)		(2.955)
SSI Disability				29.504	18.252
				(18.066)	(18.419)
Observations	1,173	1,173	1,173	969	969

Notes: I regress the minimum wage on the uptakes of social safety net programs, such as Aid to Families with Dependent Children (AFDC)/Temporary Assistance for Needy Families (TANF), Supplemental Nutrition Assistance Program (SNAP) that was previously known as the food stamp program, and Supplemental Security Income (SSI) Disability, respectively. Each column presents the results from a separate regression. I control for year and state fixed effects. I use data from 1986 through 2008, the time period of my main analysis, except for the uptake of SSI Disability, for which the data are available only since 1990. Standard errors are clustered at the state level. *** denotes significance at the one percent level, ** denotes at the five percent level, and * denotes at the ten percent level.

Table A5: **Effects of the Minimum Wage: Controlling for AFDC/TNAF Uptake**

	Math (1)	Reading Rec. (2)	Reading Comp. (3)
Min. Wage * D	-0.104***	-0.192***	-0.137***
	(0.040)	(0.042)	(0.049)
Controls	Yes	Yes	Yes
Observations	18,812	18,752	15,970
Number of Children	4,993	4,995	4,855

Notes: D is an indicator variable for the treatment group that includes those children whose mothers have less than a high school degree (children with low socioeconomic status). The control group includes those children whose mothers have a high school degree or beyond (children with high socioeconomic status). The dependent variables–PIAT math, PIAT reading recognition, and PIAT reading comprehension scores–are normalized. The results are derived using the model specified in Equation (5), except that it further adds the uptake of AFDC/TNAF as a control variable. Standard errors are clustered at the mother level. *** denotes significance at the one percent level, ** denotes at the five percent level, and * denotes at the ten percent level.

Table A6: **Augmented Value-Added Model**

	Math (1)	Reading Rec. (2)	Reading Comp. (3)
Panel A			
Min. Wage	-0.174**	-0.237**	-0.273***
	(0.088)	(0.096)	(0.102)
Controls	Yes	Yes	Yes
Observations	1,021	1,010	774
Number of children	383	383	351
Panel B			
Min. Wage * D	-0.105**	-0.162***	-0.050
	(0.048)	(0.043)	(0.072)
Min. Wage	-0.013	0.013	-0.048
	(0.027)	(0.025)	(0.031)
Controls	Yes	Yes	Yes
Observations	13,795	13,726	11,040
Number of children	4,603	4,599	4,368

Notes: Panel A presents the results estimated using the augmented value-added model by adding the lagged test score in Equation (4). Panel B presents the results estimated using the augmented value-added model by adding the lagged test score in Equation (5). Standard errors are clustered at the mother level. *** denotes significance at the one percent level, ** denotes at the five percent level, and * denotes at the ten percent level.

Table A7: **Effects on Parents' Incomes and Employment**

	Moth. Income (1)	Moth. Annual Hours (2)	Fath. Income (3)	Fath. Annual Hours (4)
Min. Wage	0.100	-88.688	-0.022	218.450
	(0.282)	(179.277)	(0.133)	(163.061)
Controls	Yes	Yes	Yes	Yes
Observations	432	481	349	466
Number of Individuals	128	135	98	115

Notes: The table reports the effects of the minimum wage on both mothers' and fathers' annual incomes and annual hours of worked. I use annual incomes in logs. The minimum wage and parents' incomes and hours worked are from the previous calendar year. I limit the sample to the parents of children that I use in my main analysis. I use a mother-fixed effects model in the panel data. The control variables are a mother's age and year fixed effects. Each column presents estimates from a separate regression. Standard errors are clustered at the mother level. *** denotes significance at the one percent level, ** denotes at the five percent level, and * denotes at the ten percent level.

Table A8: **Effects on Parental Time Investment in Children**

	Eating with Child	Encourage Hobbies
	(1)	(2)
Min. Wage	-0.264***	-0.198**
	(0.098)	(0.088)
Controls	Yes	Yes
Observations	1,124	1,260
Number of children	397	415

Notes: The table reports the effects of the minimum wage on low-socioeconomic status children's likelihood to eat with parents at least once a day and on the likelihood that parents encourage children to engage in hobbies. Both outcome variables are indicators. The results are derived using a child-fixed effects model. Standard errors are clustered at the mother level. *** denotes significance at the one percent level, ** denotes at the five percent level, and * denotes at the ten percent level.

Appendix B: Not For Publication

Table B1: **Minimum Wages across States**

State	1986	1988	1990	1992	1994	1996	1998	2000	2002	2004	2006	2008
AL	3.35	3.35	3.35	4.25	4.25	4.25	5.15	5.15	5.15	5.15	5.15	5.85
AK	3.85	3.85	3.85	4.75	4.75	4.75	5.65	5.65	5.65	7.15	7.15	7.15
AZ	3.35	3.35	3.35	4.25	4.25	4.25	5.15	5.15	5.15	5.15	5.15	6.9
AR	3.35	3.35	3.35	4.25	4.25	4.25	5.15	5.15	5.15	5.15	5.15	6.25
CA	3.35	3.35	4.25	4.25	4.25	4.75	5.15	6.25	6.75	6.75	6.75	8
CO	3.35	3.35	3.35	4.25	4.25	4.25	5.15	5.15	5.15	5.15	5.15	7.02
CT	3.37	3.75	4.25	4.27	4.27	4.27	5.18	6.15	6.7	7.1	7.4	7.65
DE	3.35	3.35	3.35	4.25	4.25	4.25	5.15	5.65	6.15	6.15	6.15	7.15
DC	3.9	4.85	4.85	5.45	5.25	5.25	6.15	6.15	6.15	6.15	7	7
FL	3.35	3.35	3.35	4.25	4.25	4.25	5.15	5.15	5.15	5.15	6.4	6.79
GA	3.35	3.35	3.35	4.25	4.25	4.25	5.15	5.15	5.15	5.15	5.15	5.85
HI	3.35	3.85	3.85	4.25	5.25	5.25	5.25	5.25	5.75	6.25	6.75	7.25
ID	3.35	3.35	3.35	4.25	4.25	4.25	5.15	5.15	5.15	5.15	5.15	5.85
IL	3.35	3.35	3.35	4.25	4.25	4.25	5.15	5.15	5.15	5.5	6.5	7.5
IN	3.35	3.35	3.35	4.25	4.25	4.25	5.15	5.15	5.15	5.15	5.15	5.85
IA	3.35	3.35	3.85	4.65	4.65	4.65	5.15	5.15	5.15	5.15	5.15	7.25
KS	3.35	3.35	3.35	4.25	4.25	4.25	5.15	5.15	5.15	5.15	5.15	5.85
KY	3.35	3.35	3.35	4.25	4.25	4.25	5.15	5.15	5.15	5.15	5.15	5.85
LA	3.35	3.35	3.35	4.25	4.25	4.25	5.15	5.15	5.15	5.15	5.15	5.85
ME	3.55	3.65	3.85	4.25	4.25	4.25	5.15	5.15	5.75	6.25	6.5	7
MD	3.35	3.35	3.35	4.25	4.25	4.25	5.15	5.15	5.15	5.15	5.15	6.15
MA	3.35	3.65	3.75	4.25	4.25	4.75	5.25	6	6.75	6.75	6.75	8
MI	3.35	3.35	3.35	4.25	4.25	4.25	5.15	5.15	5.15	5.15	5.15	6.95
MN	3.35	3.55	3.95	4.25	4.25	4.25	5.15	5.15	5.15	5.15	6.15	6.15
MS	3.35	3.35	3.35	4.25	4.25	4.25	5.15	5.15	5.15	5.15	5.15	5.85
MO	3.35	3.35	3.8	4.25	4.25	4.25	5.15	5.15	5.15	5.15	5.15	6.65
MT	3.35	3.35	3.35	4.25	4.25	4.25	5.15	5.15	5.15	5.15	5.15	6.25
NE	3.35	3.35	3.35	4.25	4.25	4.25	5.15	5.15	5.15	5.15	5.15	5.85
NV	3.35	3.35	3.35	4.25	4.25	4.25	5.15	5.15	5.15	5.15	5.15	6.33
NH	3.35	3.55	3.75	4.25	4.25	4.25	5.15	5.15	5.15	5.15	5.15	5.85
NJ	3.35	3.35	3.35	4.25	5.05	5.05	5.15	5.15	5.15	5.15	6.15	7.15
NM	3.35	3.35	3.35	4.25	4.25	4.25	5.15	5.15	5.15	5.15	5.15	6.5
NY	3.35	3.35	3.35	4.25	4.25	4.25	5.15	5.15	5.15	5.15	6.75	7.15
NC	3.35	3.35	3.35	4.25	4.25	4.25	5.15	5.15	5.15	5.15	5.15	6.15
ND	3.35	3.35	3.4	4.25	4.25	4.25	5.15	5.15	5.15	5.15	5.15	5.85
OH	3.35	3.35	3.35	4.25	4.25	4.25	5.15	5.15	5.15	5.15	5.15	7
OK	3.35	3.35	3.35	4.25	4.25	4.25	5.15	5.15	5.15	5.15	5.15	5.85
OR	3.35	3.35	4.25	4.75	4.75	4.75	6	6.5	6.5	7.05	7.5	7.95

PA	3.35	3.35	3.7	4.25	4.25	4.25	5.15	5.15	5.15	5.15	5.15	7.15
RI	3.35	3.65	4.25	4.45	4.45	4.45	5.15	5.65	6.15	6.75	6.75	7.4
SC	3.35	3.35	3.35	4.25	4.25	4.25	5.15	5.15	5.15	5.15	5.15	5.85
SD	3.35	3.35	3.35	4.25	4.25	4.25	5.15	5.15	5.15	5.15	5.15	5.85
TN	3.35	3.35	3.35	4.25	4.25	4.25	5.15	5.15	5.15	5.15	5.15	5.85
TX	3.35	3.35	3.35	4.25	4.25	4.25	5.15	5.15	5.15	5.15	5.15	5.85
UT	3.35	3.35	3.35	4.25	4.25	4.25	5.15	5.15	5.15	5.15	5.15	5.85
VT	3.35	3.55	3.75	4.25	4.25	4.75	5.25	5.75	6.25	6.75	7.25	7.68
VA	3.35	3.35	3.35	4.25	4.25	4.25	5.15	5.15	5.15	5.15	5.15	5.85
WA	3.35	3.35	4.25	4.25	4.9	4.9	5.15	6.5	6.9	7.16	7.63	8.07
WV	3.35	3.35	3.35	4.25	4.25	4.25	5.15	5.15	5.15	5.15	5.15	6.55
WI	3.35	3.35	3.65	4.25	4.25	4.25	5.15	5.15	5.15	5.15	5.7	6.5
WY	3.35	3.35	3.35	4.25	4.25	4.25	5.15	5.15	5.15	5.15	5.15	5.85

Note: Each cell in the table reports the minimum wage for each state in each year.