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How does the minimum wage affect child maltreatment and parenting behaviors? An analysis of the mechanisms

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Abstract

Children in low socioeconomic status (SES) families are five times more likely to experience child maltreatment relative to children in high SES families. To determine whether increasing the wages of working poor families can prevent maltreatment, we examine whether changes in the local minimum wage (MW) affect child well-being and parenting behaviors. Using data from a representative, longitudinal survey, we use a lagged dependent variable model to compare parenting behaviors in localities where the MW changed to localities where the MW did not change relative to before the MW change took place. We also explore heterogeneity by child's age and a variety of potential mechanisms. We find that increasing the minimum wage reduces spanking by both mothers and fathers, as well as physical and psychological aggression by mothers. These results appear to be driven by changes in maternal employment; whereby mothers reduce their employment and change their weekend shifts. We find no significant effects for positive parenting behaviors, household income, or maternal mental health. Finally, older children exhibit fewer externalizing behaviors as a result of increases in the minimum wage. The results of this study help inform the conversation about income supports and employment policies with regard to their effects and pathways to child well-being.

Keywords Child well-being · Child abuse and neglect · Minimum wage · Income supports

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1 Introduction

Child maltreatment during early childhood has pervasive effects on child health and development. These negative effects span a multitude of dimensions including impeding cognitive development, impairing social functioning, and lowering academic achievement (Kendall-Tackett & Eckenrode, 1996). The effects are also long-lasting. Child maltreatment, which includes physical abuse, sexual abuse, emotional abuse, and neglect, is linked to several long-term health and economic consequences. As adults, children who were the victims of abuse and neglect are more likely to be depressed, unemployed, and involved in the criminal justice system (Currie & Spatz Widom, 2010; Currie & Tekin, 2012; Zielinski, 2009). Furthermore, Kim et al. (2017) estimate that approximately 37% of children are the subject of an investigation for child maltreatment by their 18th birthday. The extensive consequences combined with the high prevalence of child maltreatment generates substantial costs to society, totaling $428 billion in the U.S. annually (Peterson et al., 2018).

Not all children are equally likely to be the victim of child maltreatment, however. Children living in poverty are at greater risk of maltreatment than children in middle- and high-income families. Though unpacking the causal effects of poverty on maltreatment is challenging, recent evidence shows that increasing income or wages can reduce child maltreatment (Berger et al., 2017; Cancian et al., 2013; Raissian & Bullinger, 2017), especially neglect. Particularly relevant for the current paper, previous work has found that increasing state minimum wages reduces reports of neglect to child protective services (CPS) (Raissian & Bullinger, 2017). Despite evidence that minimum wages and similar employment-related policies (e.g., the Earned Income Tax Credit (EITC), unemployment insurance, etc.) can affect income, employment, and other aspects of worker health and well-being, the mechanisms through which changes in these types of policies reduce child maltreatment, however, are less clear.

This paper contributes to the literature in three distinct ways. First, we build on previous research studying state-level minimum wages (Raissian & Bullinger, 2017) by investigating whether changes to a city's binding minimum wage affects the risk for child maltreatment. Next, we use individual-level data from a representative longitudinal survey (the Fragile Families and Child Well-Being Study) to understand the effect of the minimum wage on child maltreatment. Finally, we work to unpack possible mechanisms and uncover the effect's "black box." That is, we examine if the effects are due to changes in negative parenting behaviors, such as aggression and neglect, or through the presence of positive parenting practices. This approach allows us to incorporate parenting behaviors that often precede reports to child welfare agencies. We also explore whether material resources for childrearing, employment changes, and parental well-being are affected by the minimum wage. In sum, we are poised to provide evidence on the role of income and its associated pathways (e.g., parental time use, material hardship, mental health) in child maltreatment, which remains largely unanswered in the literature on the economic determinants of child maltreatment (Bullinger et al., 2021).

Largely consistent with earlier research, results show that when a city's minimum wage increases, spanking by both mothers and fathers declines. We also attribute less physical and psychological aggression toward children overall to greater minimum

wages, though this effect varies across child age. Finally, and contrary to what one might expect, we observe more physical neglect, which involves the deprivation of material necessities, among older children. There are no significant effects on positive parenting behaviors such as emotional warmth or engagement with children in various activities that enhance child development.

We probe a variety of mechanisms to better understand these results. The effects of minimum wage on the risk for child maltreatment likely operate through changes in maternal employment. In particular, we find evidence of a substitution effect; we see reductions in maternal employment. Additionally, mothers with young children (aged 3) are more likely to work weekend shifts, while mothers with slightly older children (aged 5) are less likely to work weekend shifts. We also find suggestive evidence for fewer externalizing child behavior problems among older children as a result of higher minimum wages. Finally, annual household income and maternal mental health do not appear to be affected by changes in the minimum wage.

These results have implications for both the scope of employment and income policies and the design and implementation of policies to prevent and treat child maltreatment. A deeper understanding of the ways in which the minimum wage and similar employment-based policies influences the risk for child maltreatment, through attendant changes in family well-being, provides important direction for the development of policy and practice.

2 Background

2.1 Disparities in child maltreatment

The Fourth National Incidence Study of Child Abuse and Neglect (NIS-4)–the nation's needs assessment on child abuse and neglect–found that children in low socioeconomic status families were more than five times as likely to be the victim of child maltreatment than children in high socioeconomic status families (Sedlak et al., 2010). Risk was particularly high for neglect, which is defined by inadequate access to basic needs such as food, clothing, shelter, medical care, and supervision. The NIS-4 also found pervasive inequalities in the incidence of maltreatment across race and ethnicities; the abuse rate of black children is 1.6 times greater than white and Hispanic children.

Previous research has found that household-level income (Berger, 2004), county-level income inequality (Eckenrode et al., 2014), and county-level income mobility (Bullinger et al., 2021) are all predictors of child maltreatment risk. This line of research implies that providing income support to lower-income families may reduce exposure to maltreatment for children in these families, potentially lessening the child maltreatment-income gradient.

2.2 Minimum wage and at-risk families

The population that benefits most from an increase in the minimum wage overlaps substantially with those at risk of perpetrating child maltreatment. Specifically, women largely benefit from increases in the minimum wage (National Economic

Council et al., 2014), and children living in single, female headed households are at the highest risk of child maltreatment (Sedlak et al., 2010). There is over-whelming evidence that increasing the minimum wage reduces poverty (Dube, 2018), especially for families with children (DeFina, 2008; Morgan & Kickham, 2001; Neumark & Wascher, 2001, 2011). Furthermore, recent evidence from the Seattle minimum wage ordinance suggests that income gains have been con-centrated among workers who work relatively more hours and have been in the labor force longer (Jardim et al., 2018). In other words, the gains from the Seattle minimum wage increase are largely among adult workers (instead of adolescents) and workers heading families.

2.3 The direct role of income in child maltreatment

There are multiple ways in which improving financial well-being can affect child maltreatment. The first is a direct pathway: through a caregiver's ability to provide a child with basic needs—such as food, shelter, and healthcare—and safe and con-sistent care (Berger, 2007; Berger & Waldfogel, 2011; Feely et al., 2020). This direct connection is perhaps most relevant for the incidence of childhood neglect, which is closely related to a caregiver's ability to provide materially for a child.

Research attempting to separate the effects of income from the effects of other confounding factors such as human capital, health, neighborhoods, and social sup-ports depends largely on income shocks through policy interventions. For example, Raissian & Bullinger (2017) examine whether variation in state-level minimum wages over time affect CPS involvement using panel data on administrative reports. They find that increasing the state-level minimum wage by one dollar reduces reports of neglect by about 10%. The effects are strongest for children age 12 and younger. Increases in family income through exogenous variation in the EITC and child support have also been shown to significantly reduce CPS involvement, primarily through reductions in neglect (Berger et al., 2017; Cancian et al., 2013; Kovski et al., 2021). Notably, these studies are fairly consistent in effect sizes. Expansions in the EITC also reduced foster care entries (Biehl & Hill, 2018).

Changes in economic circumstances can also lead to food insecurity. Resource scarcity within households often forces families to reallocate resources across their obligations such as rent, medical care, or bills (Heflin et al., 2009). To the extent that low-income families shift their resources away from providing food, children are at a greater risk of maltreatment, particularly neglect. Indeed, there is evidence that parents who reduce their meals or use a food pantry are more likely to be involved with CPS (Slack et al., 2011; Yang, 2015). Studies on the effects of state and federal minimum wages on food security, however, are mixed (Rodgers, 2015; Sabia & Nielsen, 2015).

Finally, poor financial well-being can lead to, or may be the result of, housing insecurity. Housing insecurity as measured by foreclosures (Berger et al., 2015; Frioux et al., 2014; Wood et al., 2012), evictions (Bullinger & Fong, 2020), and doubling up or homelessness (Font & Warren, 2013) have been linked to CPS involvement. Financial strain due to housing insecurity can directly affect child maltreatment, primarily through its effects on neglect (Warren & Font, 2015).

2.4 Indirect pathways

The minimum wage is very likely to change the hourly wages of low-income families. This may indirectly affect the risk for child maltreatment through various pathways, including employment patterns and time use, financial stress, relationship strain, and parenting quality, to name a few.

Changes in employment patterns may affect the material resources available for childrearing (a direct link to maltreatment) and can also change parental time use. Shifts in parental time use toward children may also have different effects than shifts away from children. For example, if children spend more time with parents, child well-being may improve. If children spend more time with relatives or caregivers that are more likely to maltreat them, then child well-being may deteriorate (Bullinger et al., 2021; Raissian, 2015). Indeed, recent research shows that mass layoffs leading to large scale job loss increased child maltreatment (Lindo et al., 2018; Schenck-Fontaine et al., 2017). Lindo et al. (2018) also find that male employment reduces maltreatment while female employment increases maltreatment, consistent with a parental time use mechanism. Schenck-Fontaine & Gassman-Pines (2020) further find that mass layoffs have larger effects on child abuse and neglect in states with low-income inequality.

When applying this theory to higher minimum wages, if parents respond by changing their employment patterns in the form of shifts or hours worked, we may expect child well-being to be affected. The direction, however, may depend on whether parents work more or less, which parent's employment patterns change, and possibly when parents work (e.g., days, nights, weekends, etc.). For example, Bastian & Lochner (2020) examine the role of the EITC on maternal time use. They find that expansions in the EITC reduce time spent with children, but this does not appear to change the quality of time mothers spend engaging with their children (as measured through time spent on child "investment" activities), suggesting the employment pathway to child outcomes may be particularly important. There may also be a relationship between the employment shifts a parent can work and the childcare arrangements available to them. For example, if parents work during non-standard hours, care options may be more limited, but if parents work during standard hours, more (and possibly higher quality) care options may be available. The availability of safe and sustainable care reduces children's risk of neglect and other forms of abuse.

Income levels can also affect mental health, substance use, crime, and relationship strain. Stress, anxiety, and depression among caregivers are important risk factors for physical abuse and neglect (Stith et al., 2009). If these psychological issues result in caregivers developing unhealthy coping strategies, such as substance use and abuse, children can be at a greater risk of maltreatment (Bullinger & Ward, 2021). A recent line of research provides evidence that increasing the minimum wage improves mental and overall health (Reeves et al., 2017)—including reducing non-drug suicides among low-educated adults (Dow et al., 2020)—particularly among women (Horn et al., 2017), decreases the prevalence of smoking (Lenhart, 2017), increases leisure time (Lenhart, 2019), and lowers absences from work due to illness (Du & Leigh, 2018), all of which may improve parent–child relationships. Additionally, recent research shows that increasing the minimum wage reduces prison recidivism,

particularly among income-generating crimes such as property and drug crimes (Agan & Makowsky, 2018).

Intra-family relations may also be affected by changes in household incomes. For example, higher family incomes can have a protective effect on family conflict, balance of power, sensitivity, warmth, and consistency in parenting behaviors (Conger et al., 1990; Yeung et al., 2002). Although research on this topic is sparse—and is one of the contributions of this paper—Dwyer et al. (2020) find that when only fathers' incomes are sensitive to the minimum wage, fathers are more likely to live with their children. Alternatively, the authors also found that when only mothers' incomes are sensitive to minimum wage increases, fathers are less likely to live with their children. These changes in fathers' residence based on minimum wage increases reflect family processes in response to economic policies, and may be an important conduit to child maltreatment and well-being.

Finally, to the extent that child health predicts child maltreatment, minimum wages may affect child maltreatment by affecting child-specific risk factors. For example, higher minimum wages have been shown to affect risk factors for child maltreatment such as reducing teen parenthood (Bullinger, 2017; Lenhart, 2021) and improving birth outcomes and child health (Komro et al., 2016; Wehby et al., 2020a, b). Extant research also indicates that some aspects of child maltreatment may be bi-directional, with parent and child behaviors interacting to increase or decrease the likelihood of maltreatment (Belsky, 1980). Child behavior problems and low levels of parent–child attachment may increase the likelihood of child maltreatment (Crittenden & Ainsworth, 1989; Herrenkohl et al., 1983). Similarly, mothers experiencing depression may be more likely to interpret child behavior as defiant, resulting in increased risk for maltreatment (Easterbrooks et al., 2013).

Our paper builds on the existing literature in a number of important ways. We are the first to examine the effect of changes to a city's minimum wage on outcomes related to child discipline, maltreatment, and well-being. We then fully leverage the measures in our data (explained below) to interrogate which mechanisms may affect child maltreatment and well-being. Results from this work extend the evidence demonstrating the need for financial assistance among low-wage earning families.

3 Data

3.1 Sources

Parenting behaviors come from the Fragile Families and Child Well-Being Study (FFCW), which is a nationally representative, individual-level survey. The FFCW study follows the parents of nearly 5000 children born in 20 large U.S. cities in 15 states between 1998 and 2000. Follow-up interviews were conducted when the child was roughly 1, 3, 5, 9, and 15 years old. We do not include the year 15 follow-up since many of the questions we examine are not asked during this wave. The study includes questionnaires of both mothers and fathers and in-home observations. When weighted, the survey produces a nationally representative dataset of children born in urban areas between 1998 and 2000. City of birth and notification of a move
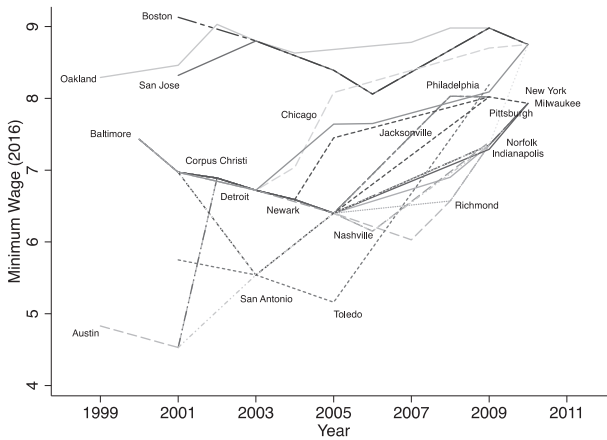
Fig. 1 Trends in real minimum wage ($2016) by FFCWS city

are provided, which we use to match individuals to the minimum wage in the current city of residence.

Local minimum wage levels come from the Inventory of U.S. City and County Minimum Wage Ordinances, compiled by the University of California, Berkeley Center for Labor Research and Education. We assign a city's minimum wage as the binding (or higher) minimum wage from either the federal government, state government, or the city itself. We construct real wage levels (2016 dollars) using the Consumer Price Index (CPI), which introduces a fourth type of policy variation.

Following previous literature on the effects of minimum wage on children, we limit the sample to mothers with a high school education or less at baseline to better approximate the effects on the population likely affected by changes in the minimum wage (Wehby et al., 2020a, b). Figure 1 shows changes in the minimum wage for each city. During the study period (1998–2010) there were five cities among the Fragile Families sample cities where the local minimum wage differed from the state or federal minimum wage (in 2004, 2005, and 2007).

Overall, changes in the minimum wage largely occurred at the state or federal level. We include time fixed effects in our model, however, which removes the absolute variation from federal-level changes. This level of change implies that our estimates are less likely to suffer from endogeneity (i.e., that certain cities are more likely to change their own MW), and we are still able to examine the effect at the local level, just not via local policy. In addition, we are able to draw on variation in the value of the minimum wage since it is transformed into real dollars and families in different cities were sampled in different years. Therefore, ultimately, identifying variation comes from city and state policy changes and changes in the cost of living and inflation[1].

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[1] In Supplementary analyses we estimate a pooled model where minimum wage is a function of city and year fixed effects. In this model, $1 - R^2 = 0.13$.

3.2 Measures

3.2.1 Adverse parenting behaviors

We use five different measures to capture a child's risk of maltreatment: spanking, physical aggression, psychological aggression, physical neglect, and supervisory/ exposure neglect. Beginning at the age 1 survey and measured continuously throughout the study, both mothers and fathers were asked whether they had spanked the focal child in the past month. Although corporal punishment is not itself child abuse, research indicates that it may be an indicator of the risk for child abuse (Gershoff, 2002). We use this question to create a dichotomous variable for maternal and paternal spanking.

Next, we measure physical and psychological aggression. Beginning at the age 3 survey, mothers reported on their own physically and psychologically aggressive parenting behaviors. Questions were drawn from the Conflict Tactics Scale for Parent and Child (CTSPC) (Straus et al., 1998). For physical aggression mothers reported how often they had (in reference to the focal child): (1) hit child on the bottom with something like a belt, hair brush, stick or other hard object (2) shook child; (3) slapped child on the hand, arm, or leg; or (5) pinched child. We use these responses to create a continuous measure, ranging from 0 to 24.

For psychological aggression mothers reported how often they had: (1) shouted, yelled, or screamed at the child; (2) swore or cursed at child; (3) said you would send child away/kick out of the house; (4) threatened to spank or hit child but did not do it; (5) called child dumb, lazy, or similar name. Again, we create a continuous measure of the number of times the parent engaged in psychological regression (range is 0–24).

We then largely follow Font & Berger (2015) in constructing our measures of (1) physical neglect and (2) supervisory/exposure neglect.[2] For physical neglect, beginning at the age 3 survey, mothers were asked whether: the child did not receive sufficient food, the child did not receive needed medical care, the family was homeless or doubled up, if the household was physically unsafe according to an in-home observer, or the child appeared to have poor physical hygiene according to an in-home observer. We create an indicator if any of these items (seven possible) were reported as yes (Berger et al., 2017). We also draw on a series of questions beginning at the age 3 survey to assess supervisory/exposure neglect (Font & Berger, 2015). Mothers were asked if: the child was left alone without an adult, the child was exposed to parental substance abuse, or the child was exposed to criminal activity. We employ a dichotomous indicator variable for supervisory/exposure neglect if any of these experiences (maximum of five) occurred.

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[2] We make two exceptions in following Font & Berger (2015). First, for physical neglect, we do not include whether the household had its utilities shut off, as this could be its own mechanism. Second, for similar reasons, we do not include whether the child was exposed to domestic violence in the supervisory/ exposure neglect measure.

3.2.2 Positive parenting behaviors

We measure positive parenting behaviors as maternal warmth and play activities. First, maternal warmth was assessed through a series of observations from the HOME scale (Caldwell & Bradley, 2001). Trained in-home observers recorded whether the mother: (1) spoke to the child; (2) used terms of endearment; (3) or cuddled the child, among other items. We sum these items to create a scale ranging from 0 to 7. Second, at waves 1, 3, and 5 mothers reported how often they and the child's biological father engaged in a number of play activities with the child. Activities included: read stories, told stories, played with blocks or toys, played games, and played outside, among others. Mothers only reported on fathers' play activities if the father had seen the child in the past 30 days. Fathers who had not seen the child were recoded as having not recently or never engaged in play activities. The range for both maternal and paternal parenting activities is 0–7.

3.2.3 Mechanisms

The minimum wage affects the hourly wages of low-wage earners. Ideally, we would study the effects of the minimum wage on wages. Instead, we use income and employment measures, as hourly wage measures are unavailable. Specifically, mothers reported their pre-tax household income in the last year in nominal dollars. This measure is flawed if mothers adjust their work hours due to a higher wage. Nonetheless, it is our best measure of the direct income effect. Mothers and fathers reported whether they were employed, working for pay in the last 2 weeks, which we use as two separate dichotomous measures. Finally, mothers reported whether they sometimes worked the evening and/or weekend shifts (separately). We use these responses to determine if minimum wage changes affect the wage premium on working less desirable shifts, as measured by two separate binary variables. In Supplementary analyses we draw on measures of maternal and paternal employment, hours of work, and earned income from the American Community Survey (ACS), restricted to the Fragile Families sample cities, child ages, and years in an effort to increase sample size.

The FFCWS included 15 question form the Major Depressive Episodes (MDE) scale derived from the Composite International Diagnostic Interview – Short Form (CIDI-SF) (Kessler et al., 1998). Mothers reported feelings of dysphoria or anhedonia in the past year that lasted 2 weeks or more. We draw on a dichotomous depression variable, identifying mothers having depressive symptoms that lasted for at least half of the day, almost every day. Additionally, mothers were asked how strongly they agreed with four questions about feelings of being overwhelmed or discouraged by their parenting responsibilities (strongly disagree to strongly agree). We draw on these questions to create a measure of parenting stress (range: 0–12).

Child behavior as a result of changes in household economic well-being may also change a child's risk for maltreatment, although changes in economic well-being could also elicit changes in child behavior (Weinberg, 2001). We use measures of both externalizing and internalizing behavior problems. Specifically, at the

age 3-, 5-, and 9-year follow-up surveys, mothers were asked a series of questions designed to illicit information on their children's externalizing behaviors. These questions were drawn from 35 items from the aggression and rule-breaking sub-scales of the Achenbach Child Behavior Check List (CBCL) (Achenbach & Edelbrock, 1991). We sum these items to create a scale of externalizing behavior problems ranging from 0 to 39. Mothers were also asked questions about their children's internalizing behavior problems. These questions were drawn from the anxious/depressed or withdrawn/depressed, and somatic complaints subscales of the CBCL. We sum these items to create a scale of internalizing behavior problems, which ranges from 0 to 34.

Although FFCWS asked mothers to report who provided childcare for them, we were unable to draw on these questions due to small sample sizes. Instead, we use mothers' responses regarding how many childcare arrangements they have (range: 0–12) and the number of hours per week that their child was in care. Analyses using this outcome suffer from small sample sizes, and, therefore, we present them in the Appendix.

Finally, to assess whether changes in minimum wages affect family or household dynamics, we test whether formal and informal child support payments are responsive. Specifically, mothers reported whether non-resident fathers had provided child support via a legal agreement or child support order, and how much fathers had actually paid. Mothers also reported whether non-resident fathers provided informal cash payments. These analyses are also presented in the Appendix due to small sample sizes.

3.2.4 Covariates

We include a robust set of socio-demographic controls measured at baseline, including maternal marital status (married, cohabitating, single) maternal race/ethnicity (white, black, Hispanic, other), mother's age, child age, child sex, and number of children in the household. We also include whether the mother was married to, or cohabiting with, a new partner at the age 1 follow-up survey. In addition, we include a number of geographic-based controls including, a measure of the city-level unemployment rate during the year of the interview drawn from the Bureau of Labor Statistics, and the following Census tract-level character-istics: the percentage race/ethnicity, female headed households with children, mean number of persons per household, median gross rent, and median housing value in nominal dollars. These variables come from the Census Bureau. We also include state-level controls for the state-level EITC rate and the maximum TANF benefit amount for a family of three in nominal dollars, which we obtain from the University of Kentucky Center for Poverty Research (UKCPR, 2020). Finally, we restrict our main sample to only include mothers with a high school or less than high school education or equivalent.

3.3 Descriptive statistics

Table 1 and Appendix Table 9 report the baseline binding minimum wage and maternal characteristics for our largest analytic sample ($n = 1417$), along with

Table 1 Baseline covariates and characteristics of mothers

	Mean (SD)
Baseline minimum wage (2016 dollars)	6.85 (1.07)
Baseline marital status	
Married (0/1)	0.12
Cohabiting (0/1)	0.4
Single (0/1)	0.48
Baseline education	
Less than HS (0/1)	0.51
High school (0/1)	0.49
Race/ethnicity	
White (0/1)	0.13
Black (0/1)	0.57
Hispanic (0/1)	0.28
Other (0/1)	0.02
Mother age (range: 14–45)	23.54 (5.43)
Child age (months) (range: 0–112)	1.28 (3.79)
Child male (0/1)	0.54
Number of children (range: 0–7)	1.42 (1.33)
City and state contextual factors	
City unemployment rate (range: 2.4–5.9)	3.85 (1.00)
State EITC benefit rate (range: 0–0.23)	0.03 (0.06)
State TANF maximum (nominal) (range: 185–746)	351.26 (194.55)
Census tract contextual factors	
Percent white (range: 0–0.99)	0.25 (0.28)
Percent black (range: 0–0.99)	0.48 (0.37)
Percent Hispanic (range: 0–0.97)	0.21 (0.27)
Percent of households with children under 18 (range: 0–0.82)	0.25 (0.14)
Mean persons per household (range: 1.24–6.35)	2.84 (0.55)
Median monthly gross rent (nominal) (range: 131–2001)	554.15 (193.61)
Median housing value (nominal) (range: 0–1,000,001)	93,540.81 (88,604.02)
Sample size	1417

descriptive statistics for each of the outcome and mechanism variables. At baseline, the sample largely consists of single mothers (48%) with a high school degree or less (49 and 51%, respectively). The majority of mothers were black (57%). Cities in which respondents reside have relatively low unemployment rates (3.85%) throughout the study period. At baseline, the average state EITC rate was 3% and the average TANF benefit for a family of three was about $351 per month, and approximately one-quarter of households had children under the age of 18.

Measures of parenting behaviors range across child ages. For example, 31 and 22% of 1-year olds experience spanking by mothers and fathers, respectively, whereas those numbers are 51 and 20% at age 9. Younger children are more likely to be the victim of physical aggression and physical neglect. For example, 3-year olds experience approximately seven events of physical aggression compared to four events among 9-year olds. Seventy one percent of 3-year olds are the victims of physical neglect, compared to 42% of 9-year olds. In contrast, older children are more likely to experience supervisory/exposure neglect. Children of all ages experience about eight to nine indicators of psychological aggression, on average

3.4 Analytical approach

Generally, we compare child maltreatment and parenting behaviors in localities with changes in their binding (i.e., highest of the federal, state, or local minimum wage pertaining to a given locality) minimum wages to localities that did not experience a change in their binding minimum wage, before and after those changes occurred. Specifically, we estimate the following equation:

$$Y_{ict} = \beta_0 + \beta_1 MW_{ct} + \beta_2 Y_{it-1} + X_i + Z_{ct} + \alpha_c + \tau_t + \varepsilon_{it} \tag{1}$$

where Y is the outcome of interest (a parenting behavior), for individual i residing in city c in year of interview t. MW is the real and binding minimum wage for city c in year t, and is the variable of interest. We are interested in whether the effects of changes in minimum wages on maltreatment and parenting behaviors varies by child age. Therefore, in our preferred model we do not pool the FFCW into one large cross-section, since we would not be able to observe differences across age. We also do not use the full longitudinal dataset, as we would then be studying only 9-year-olds. Instead, we adjust for the outcome variable in all previous waves in a dependent variable lagged model. For example, a parent's responses for physical aggression at child's age 3 would adjust for the parent's responses at child age 1; a parent's responses at child's age 9 would adjust for the parent's responses at child age 1, 3, and 5 (if all are available). This approach is akin to including household fixed effects, allowing us to both adjust for unobserved characteristics that are correlated with previous wave's parenting behaviors, and examine differences in effects across child age.

This feature is important since there may be time-variant factors related to child maltreatment and parental labor supply that, if excluded, could bias our results. For example, children of different ages are more susceptible to spanking and parents with young children are less likely to be in the labor force than those with older children. Similarly, the minimum wage may affect investments in parenting skills and behaviors; in earlier periods these investments may compound over time. The vector X includes baseline characteristics noted above. Z captures the city's unemployment rate, socio-demographic information at the Census tract level, and state-level social welfare generosity, α consists of city-level fixed effects, which adjust for time-invariant factors correlated with both the city's minimum wage and parenting behaviors, and τ includes a year fixed effect,

which captures differences in parenting behaviors over time affecting all cities. The idiosyncratic error term is captured in ε.

In a second model (Eq. 2), we pool the data across waves, which continues to include a lagged dependent variable and a city fixed effect. The primary difference between Eqs. 1 and 2 is that in order to estimate the effect of the minimum wage on child outcomes at various ages, in Eq. 2, we interact the minimum wage with a binary variable for child's age (ages 5 and 9). Since we include a lagged dependent variable in this model, we lose age 1 observations for most outcomes. Age 3 is then the omitted group. Thus, β_3 and β_4 then produce the differential effect of the minimum wage at ages 5 and 9 compared to the effect at age 3. The exceptions are household income where age 1 is the omitted group, since household income is measured at birth, and measures from questions that begin at age 3, which is the omitted group.

Equations 1 and 2 are estimated using ordinary least squares (OLS), or a linear probability model (LPM) when the outcome is a binary variable. We estimate Poisson models for physical aggression, psychological aggression, maternal warmth, parenting activities, and parenting stress to reflect the count nature of these measures. Bootstrapped standard errors (1000 iterations) are clustered at the city level, the level at which the minimum wage variation exists, and to account for the relatively small number of clusters; this also corrects for any over dispersion in the Poisson model.

3.5 Robustness checks

In Supplementary models presented in Appendix Table 11 we test the sensitivity of the main analytic strategy to a number of alternative specifications. We draw on two primary outcomes related to the risk for child maltreatment, maternal spanking and physical neglect. First, we re-estimate the primary models without including lagged dependent variables. Second, we pool the data across waves and estimate individual fixed effects models. Third, we estimate the effects of the minimum wage on a sample that is less likely to be affected by increases in the minimum wage, by restricting the sample to households with an education level of some college or more. This serves as a form of placebo test.

Next, we draw on local, city-level cost of living data from the Council for Community and Economic Research (C2ER) to adjust the minimum wage in each city for its cost of living. The C2ER creates a cost-of-living index for participating locations, where the average is 100. For example, a composite index greater than 100 signals a more expensive location than average whereas a composite index less than 100 means a location with a lower-than-average cost of living. In this analysis, we divide each city's real minimum wage by the composite index and estimate Eq. 1 using these cost of living adjusted minimum wage values as the primary independent variable of interest. We test the robustness of the linear OLS model by using a probit model for the binary outcomes.

We also estimate the pooled city fixed effects model with an individual fixed effects. This is a hybrid individual-level fixed effect plus lagged dependent variable model, and has been used widely in previous scholarship (e.g., see Clotfelter et al., 2007; Bollen, 2010; Halaby, 2004; Liu, 2019; Woolridge, 2010).

By including a one time period lag of the dependent variable and an individual-level fixed effect, this model accounts for both time-invariant individual-level factors and time-varying factors. In doing so, we also include interactions between child age and minimum wage to discern age-specific effects. This model takes the following form:

$$
\begin{aligned}
Y_{ict} = \beta_0 + \beta_1 MW_{ct} + \beta_2 Y_{it-1} + \beta_3 MW_{ct} * Age5_{it} + \beta_4 MW_{ct} * Age9_{it} \\
+ \beta_5 Age5_{it} + \beta_6 Age9_{it} + Z_{ct} + \gamma_i + \alpha_c + \tau_t + \varepsilon_{it}
\end{aligned}
\tag{2, 3}
$$

Equation 3 adds an individual-level fixed effect (γ_i), which is a vector of time-invariant child characteristics that may be correlated with both a city's minimum wage and child outcomes to Eq. 2. Other coefficients are the same as those in Eq. 2. The hybrid model is perhaps very powerful in its ability to better account for time-invariant factors, but it may suffer from Nickell bias (Nickell, 1981). Therefore, we present it as a robustness check rather than our preferred specification.

4 Results

4.1 Main results

We begin by presenting evidence on how the city's minimum wage effects parenting behaviors, and we disaggregate our results by parenting behaviors, across both parents (when available), and child age. Our first set of results focuses on maternal and paternal spanking, reported in Table 2. For each parent, we show results from our preferred specification (the lagged dependent variable models), followed by the hybrid fixed effects model.

Column 1 shows that increasing the real minimum wage by $1 is associated with a reduction in maternal spanking of a 3-year old by about 8 percentage points, after adjusting for whether the mother spanked the child at age one. Relative to the mean of 55%, this change reflects a reduction of 14.5%. Columns 2 and 3 show no significant effects of the minimum wage on maternal spanking of 5- and 9-year olds. Notably, whether a mother spanked a child in the previous waves is a strong predictor of spanking the child in the current wave, consistent across all ages. Columns 5 through 7 suggest a similar story among paternal spanking. Specifically, a $1 increase in the minimum wage is associated with a reduction of 9.3 percentage points (21.6%) in the probability of spanking a 3-year old. We find no significant effects for father's spanking of 5- or 9-year olds.

Table 2 also presents results from the pooled city fixed effects and lagged dependent variable model. For both mothers and fathers, there is no significant effect of increasing minimum wage on maternal or paternal spanking (columns 4 and 8); there is also no differential effect of the minimum wage on 5- or 9-year olds compared to 3-year olds. However, the relative difference among 5- and 9-year olds in the hybrid model is larger but qualitatively comparable to the age-specific effects compared to 3-year olds.

Table 3 presents models with outcome measures that better reflect most legal definitions of child maltreatment and are more likely to constitute a report to CPS. Specifically, Table 3 displays the effects of local minimum wages on physical

Table 2 Effects of minimum wage on spanking

	Maternal spanking[a]				Paternal spanking[a]			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Year 3	Year 5	Year 9	City FE[a,b]	Year 3	Year 5	Year 9	City FE[a,b]
Minimum wage ($2016)	−0.079*** (0.021)	−0.003 (0.021)	−0.029 (0.025)	−0.012 (0.04)	−0.093** (0.032)	−0.027 (0.027)	−0.015 (0.034)	0.043 (0.046)
Lagged outcome in year 1	0.299*** (0.029)	0.072* (0.030)	0.010 (0.030)		0.0333*** (0.048)	0.141** (0.052)	0.055 (0.051)	
Lagged outcome in year 3		0.364*** (0.027)	0.126*** (0.031)			0.310*** (0.042)	0.075+ (0.041)	
Lagged outcome in year 5			0.194*** (0.030)				0.110** (0.042)	
Lagged outcome (pooled)				0.302*** (0.017)				0.269*** (0.023)
Age 5				−0.274 (0.216)				−0.034 (0.028)
Age 9				0.132 (0.426)				0.179 (0.575)
Age 5 × min wage				0.048 (0.035)				0.010 (0.043)
Age 9 × min wage				0.043 (0.033)				0.070+ (0.043)
R^2	0.1217	0.1960	0.1010	0.1261	0.1769	0.1886	0.0874	0.1667
Mean Y	0.55	0.5	0.51	0.47	0.43	0.34	0.2	0.02
N		1347		4041		569		1707

Source: Fragile Families and Child Well-Being Study

Sample limited to respondents with high school education or less. Models adjust for outcome variable in all previous waves, baseline marital status, education, race/ethnicity, mother's age, child age, child gender, number of children in household, year 1 marital status, city unemployment rate, the following Census tract-level characteristics: percentage race/ethnicity, female headed households with children, mean number of persons per household, median gross rent, and median housing value, the respondent's state EITC rate and the maximum TANF benefit amount, and city and year fixed effects. Bootstrapped standard errors clustered at the city level are in parentheses

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$, + $p < 0.10$

[a]Linear probability model

[b]City fixed effects with lagged dependent variables

Table 3 Effects of minimum wage on the risk for child maltreatment

	Physical aggression[a]			Psychological aggression[a]			Physical neglect[b]			Supervisory/exposure neglect[b]		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Year 5	Year 9	City FE[a,c]	Year 5	Year 9	City FE[a,c]	Year 5	Year 9	City FE[b,c]	Year 5	Year 9	City FE[b,c]
Minimum wage ($2016)	−0.38 (0.057)	−0.222** (0.083)	0.148* (0.060)	0.059 (0.039)	−0.157** (0.054)	0.187*** (0.043)	−0.027 (0.027)	0.072* (0.036)	−0.036 (0.049)	0.020 (0.014)	−0.007 (0.021)	0.036 (0.033)
Lagged outcome in year 3	0.075*** (0.004)	0.033*** (0.009)		0.058*** (0.004)	0.030*** (0.006)		0.064* (0.028)	0.029 (0.036)		0.232*** (0.038)	0.190*** (0.03)	
Lagged outcome in year 5	0.072*** (0.008)			0.051*** (0.006)			0.107** (0.039)			0.149*** (0.035)		
Lagged outcome (pooled)			−0.049*** (0.002)	0.080***		−0.042*** (0.002)			−0.404*** (0.024)			−0.530*** (0.021)
Age 5												
Age 9			1.146** (0.422)			0.326 (0.306)			−1.495*** (0.321)			0.134 (0.185)
Age 5 × min wage												
Age 9 × min wage			−0.271*** (0.053)			−0.206*** (0.036)			0.185*** (0.040)			−0.028 (0.024)
R^2	0.170	0.1831	0.1987	0.1270	0.1706	0.1499	0.0223	0.0354	0.2412	0.0663	0.0692	0.0560
Mean Y	1.29	1.67	1.57	8.44	9.21	8.35	0.81	0.42	0.65	0.11	0.16	0.13
N	805		1610	886		1772	993		1961	1417		2798

Source: Fragile Families and Child Well-Being Study

Sample limited to respondents with high school education or less. Models adjust for outcome variable in all previous waves, baseline marital status, education, race/ethnicity, mother's age, child age, child gender, number of children in household, year 1 marital status, city unemployment rate, the following Census tract-level characteristics: percentage race/ethnicity, female headed households with children, mean number of persons per household, median gross rent, and median housing value, the respondent's state EITC rate and the maximum TANF benefit amount, and city and year fixed effects. Bootstrapped standard errors clustered at the city level are in parentheses

***$p<0.001$, **$p<0.01$, *$p<0.05$

[a]Poisson regression

[b]Linear probability model

[c]City fixed effects with lagged dependent variables

aggression, psychological aggression, physical neglect, and supervisory/exposure neglect. Within each outcome, the first two columns provide the results from the lagged dependent variable model for 5 and 9-year olds, and the third column provides results from the pooled city fixed effect model. According to the lagged dependent variable model, changes in the minimum wage appear to significantly reduce the frequency of both physical (by 13%) and psychological (by 1.7%) aggression toward 9-year olds, respectively. Once again, the parent exhibiting aggression in previous waves (ages 3 or 5) remains a very strong predictor for both types of aggression in the current wave.

The city fixed effects lagged dependent variable model in columns 3 and 6 demonstrates similar results. Here, a higher minimum wage is associated with more physical and psychological aggression overall, but the results vary by child age. For 9-year old children, increasing the minimum wage decreases physical aggression by 27.1% and psychological aggression by 20.6%, compared to 5-year old children.

In contrast—and curiously—physical neglect among 9-year olds may increase alongside the minimum wage. Column 8 shows an increase of 7.2 percentage points, and this is consistent with the results in column 9. Finally, columns 10 and 11 show no effects on supervisory/exposure neglect among 5- or 9-year olds. The city fixed effects models suggest similar results. We never detect a significant effect of the minimum wage on supervisory/exposure neglect for either age group.

As noted earlier, changes in income and/or employment may affect parenting behaviors in a variety of ways—which may include behaviors that promote child well-being. Table 4 shows that changes in a city's minimum wage do not appear to affect positive parenting behaviors. This null result is present for all ages, and for all of the outcomes we examined (maternal warmth, maternal activities, and paternal activities). Results are similar across the two models, with one potential exception. The city fixed effects and lagged dependent variable model suggests that increases in the city's minimum wage may increase maternal warmth for 9-year olds relative to 3-year olds, but this coefficient is significant at the 10% level.

4.2 Mechanisms

Minimum wage increases could affect child maltreatment directly through changes in income, or indirectly through changes in parental time use, mental health, or family dynamics. We first examine the direct effects on household income. Table 5 shows no significant effect of minimum wage changes on total pre-tax household income at child ages 1, 3, 5, or 9. However, results from the pooled city fixed effect model indicate lower household incomes at ages 5 and 9, compared to age 1, as a result of a higher minimum wage. This is qualitatively similar to the lagged dependent variable model.

Given we find no evidence for a direct income effect, we next investigate if indirect mechanisms could play a role. Table 6 captures how changes in the city's minimum wage affect parental time use, in particular if parents' employment status and engagement. We also explore outcomes related to mothers' shift and weekend work. Our results show reductions in the probability of a mother working for pay within the past 2 weeks at child age 5, and a reduction in father's employment at

Table 4 Effects of minimum wage on positive parenting behaviors

	Maternal warmth[a]			Maternal activities[a]			Paternal activities[a]		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Year 5	Year 9	City FE[a,b]	Year 3	Year 5	City FE[a,b]	Year 3	Year 5	City FE[a,b]
Minimum wage ($2016)	0.016 (0.032)	−0.019 (0.036)	−0.144 (0.232)	−0.013 (0.014)	−0.009 (0.011)	0.017 (0.101)	0.032 (0.030)	−0.023 (0.028)	0.216 (0.216)
Lagged outcome in year 1	0.034+ (0.020)			0.123*** (0.007)	0.060*** (0.005)		0.117*** (0.012)	0.050*** (0.010)	
Lagged outcome in year 3		−0.022 (0.017)			0.069*** (0.006)			0.099*** (0.009)	
Lagged outcome in year 5		0.037*** (0.010)							
Lagged outcome (pooled)			0.109** (0.039)			−0.504*** (0.026)			0.425*** (0.024)
Age 5			5.442+ (2.996)			0.181 (0.557)			1.104 (1.075)
Age 9									
Age 5 × min wage			−0.206 (0.238)			0.132 (0.100)			−0.191 (0.148)
Age 9 × min wage									
R^2	0.0111	0.0154	0.1642	0.0389	0.0382	0.0223	0.0475	0.0573	0.2756
Mean Y	5.31	4.58	4.78	4.86	4.82	4.89	3.91	3.81	4.05
N	521		1029	1436		2493		658	1303

Source: Fragile Families and Child Well-Being Study

Sample limited to respondents with high school education or less. Models adjust for outcome variable in all previous waves, baseline marital status, education, race/ethnicity, mother's age, child gender, child age, number of children in household, year 1 marital status, city unemployment rate, the following Census tract-level characteristics: percentage race/ethnicity, female headed households with children, mean number of persons per household, median gross rent, and median housing value, the respondent's state EITC rate and the maximum TANF benefit amount, and city fixed and year effects. Bootstrapped standard errors clustered at the city level are in parentheses

***$p<0.001$, **$p<0.01$, +$p<0.10$

[a]Coefficients from OLS regression

[b]City fixed effects with lagged dependent variables

Table 5 Effects of minimum wage on HH income

	Annual household income[a]				
	(1)	(2)	(3)	(4)	(5)
	Year 1	Year 3	Year 5	Year 9	City FE[b]
Minimum wage ($2016)	−81.473 (778.638)	−368.654 (811.560)	−655.470 (921.251)	−874.238 (1139.882)	−361.622 (985.911)
Lagged outcome in baseline	0.405*** (0.043)	0.253*** (0.037)	0.061* (0.030)	0.139*** (0.033)	
Lagged outcome in year 1		0.415*** (0.056)	0.185*** (0.038)	0.155*** (0.055)	
Lagged outcome in year 3			0.390*** (0.050)	0.153** (0.054)	
Lagged outcome in year 5				0.306*** (0.057)	
Lagged outcome (pooled)					0.495*** (0.013)
Age 3					468.79 (6128.446)
Age 5					15082.530+ (8771.304)
Age 9					41447.530* (17132.490)
Age 3 × min wage					1369.925 (187.208)
Age 5 × min wage					−280.267 (1218.479)
Age 9 × min wage					78.28 (1123.585)
R^2	0.2654	0.3672	0.3350	0.3093	0.2867
Mean Y	20,749	22,242	24,186	29,949	23,786
N		1441		5086	

Source: Fragile Families and Child Well-Being Study

Sample limited to respondents with high school education or less. Models adjust for outcome variable in all previous waves, baseline marital status, education, race/ethnicity, mother's age, child age, child gender, number of children in household, year 1 marital status, city unemployment rate, the following Census tract-level characteristics: percentage race/ethnicity, female headed households with children, mean number of persons per household, median gross rent, and median housing value, the respondent's state EITC rate and the maximum TANF benefit amount, and city and year fixed effects. Bootstrapped standard errors clustered at the city level are in parentheses.

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$, + $p < 0.10$

[a]Coefficients from OLS regression

[b]City fixed effects with lagged dependent variables

Table 6 Effects of minimum wage on employment, evening shift, and weekend shift

	Maternal employment[a]				Paternal employment[a]				Sometimes work evening shift[a]				Sometimes work weekend shift[a]			
	(1) Year 3	(2) Year 5	(3) Year 9	(4) City FE[b]	(5) Year 3	(6) Year 5	(7) Year 9	(8) City FE[b]	(9) Year 3	(10) Year 5	(11) Year 9	(12) City FE[b]	(13) Year 3	(14) Year 5	(15) Year 9	(16) City FE[b]
Minimum wage ($2016)	−0.02 (0.022)	−0.036* (0.019)	−0.018 (0.027)	−0.252 (0.032)	−0.039+ (0.022)	0.006 (0.027)	−0.016 (0.032)	0.090* (0.040)	−0.003 (0.023)	−0.017 (0.025)	−0.016 (0.029)	−0.025 (0.039)	0.038* (0.019)	−0.036* (0.016)	0.015 (0.019)	0.026 (0.026)
Lagged outcome in year 1	0.321*** (0.024)	0.205*** (0.025)	0.127*** (0.030)		0.410*** (0.045)	0.297*** (0.059)	0.119* (0.049)		0.098** (0.035)	0.101* (0.049)	0.017 (0.042)		0.074* (0.034)	0.152*** (0.043)	0.019 (0.036)	
Lagged outcome in year 3		0.274*** (0.024)	0.163*** (0.030)			0.212*** (0.056)	0.101* (0.049)			0.003 (0.036)	0.044 (0.047)			0.032 (0.034)	0.024 (0.034)	
Lagged outcome in year 5			0.227*** (0.025)				0.159*** (0.044)				0.033 (0.040)				0.021 (0.029)	
Lagged outcome (pooled)				0.324*** (0.015)				0.323*** (0.023)				0.083*** (0.021)				0.087*** (0.018)
Age 5				0.409* (0.200)				−0.432+ (0.246)				0.269 (0.235)				0.583*** (0.157)
Age 9				0.053 (0.391)				−0.698 (0.491)				0.507 (0.486)				0.279 (0.309)
Age 5 × min wage				−0.075* (0.031)				0.077* (0.038)				−0.053 (0.037)				−0.100*** (0.025)
Age 9 × min wage				−0.028 (0.029)				−0.01 (0.036)				−0.048 (0.034)				−0.027 (0.024)
R^2	0.1218	0.1752	0.1733	0.1289	0.2595	0.2581	0.2265	0.1883	0.0642	0.0603	0.0522	0.0358	0.0307	0.0531	0.0346	0.031
Mean Y	0.52	0.55	0.51	0.54	0.82	0.78	0.86	0.82	0.1	0.09	0.09	0.11	0.11	0.1	0.08	0.12
N		1436				534				657				922		

Source: Fragile Families and Child Well-Being Study

Sample limited to respondents with high school education or less. Models adjust for outcome variable in all previous waves, baseline marital status, education, race/ethnicity, mother's age, child age, child gender, number of children in household, year 1 marital status, city unemployment rate, the following Census tract-level characteristics: percentage race/ethnicity, female headed households with children, mean number of persons per household, median gross rent, and median housing value, the respondent's state EITC rate and the maximum TANF benefit amount, and city and year fixed effects. Bootstrapped standard errors clustered at the city level are in parentheses

***$p < 0.001$, **$p < 0.01$, *$p < 0.05$, +$p < 0.10$

[a]Linear probability model

[b]City fixed effects with lagged dependent variables

child age 3. Table 6 further shows that mothers of 5-year olds are less likely to work the weekend shift (though more likely at child age 3), which may affect who is assuming caregiver responsibilities. Here again, the pooled city fixed effects and lagged dependent variable models largely demonstrate similar findings. In particular, both estimations imply that mothers of 5-year old children are significantly less likely to work weekend shifts, compared to mothers of 3-year old children, given an increase in the city's minimum wage. The interaction variable, of age 5 and the minimum wage indicates rising minimum wage increases the likelihood of paternal employment at age 5.

Maternal well-being is also an important pathway to consider. In particular, if, all else equal, increasing the minimum wage reduces maternal stress, we may expect to observe fewer adverse parenting behaviors. However, when we examine the outcomes maternal depression and maternal stress in Table 7 (columns 1 through 8), we find no relationship between the minimum wage and maternal well-being—at any child age.

A final mechanism to consider is how the child's own behaviors might change in response to an increase in the city's minimum wage. We present these results in Table 7, and while this is an important potential mechanism, we only find weak evidence of it manifesting. Among 9-year olds, externalizing behaviors, which includes behaviors such as physical aggression and antisocial behaviors, are reduced —though this estimate is significant at the 10% level. However, results from the pooled city fixed effects and lagged dependent variable model are not statistically significant. The relationship between child internalizing behaviors and the minimum wage is not distinguishable from zero.

4.3 Effects by marital status

These results offer evidence supporting the employment and parental time use mechanism. Nonetheless, the average effects we have estimated thus far may mask important variation across subpopulations that may aid in uncovering which of these mechanisms, if any, is most likely, and for which populations. Therefore, we further disaggregate the effects by marital status. Table 8 reports the results for all outcomes and mechanisms. We use our preferred lagged dependent variable model. We continue to disaggregate the results by child age, but we add the additional dimension of maternal marital status.

On average, the results are similar to the main results, which pool across maternal marital status, but there are a few differences that warrant discussion. In particular, we find evidence that the minimum wage is protective of physical aggression (Panel C) at age 9 among single mother households and physical neglect (Panel E) at age 5 among single mother households. For psychological aggression (Panel D), the effect is uniform for children age 9 regardless of household type. For children age 5, increases in the minimum wage are protective in cohabiting households, but may be a risk factor in single mother households. We also see effects differing by household status among the paternal employment outcome (Panel L), where among 9-year old children paternal employment may increase for cohabiting households but decrease for single mother households. This analysis suggests that household structure and marital status may play an important role in how economic/employment

Table 7 Effects of minimum wage on maternal mental health and child behaviors

	Maternal depression[a]				Maternal stress[b]				Child externalizing[b]			Child internalizing[b]		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
	Year 3	Year 5	Year 9	City FE[c]	Year 3	Year 5	Year 9	City FE[c]	Year 5	Year 9	City FE[c]	Year 5	Year 9	City FE[c]
Minimum wage ($2016)	−0.020 (0.016)	−0.005 (0.012)	−0.024 (0.019)	0.025 (0.025)	0.013 (0.027)	0.052 (0.048)	−0.009 (0.046)	−0.092 (0.245)	0.471 (0.680)	−0.705[+] (0.431)	−0.266 (0.518)	0.092 (0.495)	−0.169 (0.352)	0.528 (0.567)
Lagged outcome in year 1	0.338*** (0.036)	0.215*** (0.031)	0.238*** (0.035)		0.095*** (0.007)	0.105*** (0.006)	0.078*** (0.008)							
Lagged outcome in year 3		0.211*** (0.035)	0.208*** (0.028)			0.046*** (0.006)	0.038** (0.010)		0.567*** (0.034)	0.330*** (0.046)		0.360*** (0.025)	0.439*** (0.067)	
Lagged outcome in year 5			0.085** (0.032)				0.035*** (0.008)			0.154*** (0.042)			0.057 (0.044)	
Lagged outcome (pooled)				0.302*** (0.015)				0.521*** (0.016)			0.488*** (0.021)			0.402*** (0.021)
Age 5				−0.111 (0.155)				−3.069[+] (1.685)						
Age 9				0.128 (0.309)				−2.785 (2.349)			1.284 (5.983)			12.214* (5.049)
Age 5 × min wage				0.137 (0.025)				0.280 (0.235)						
Age 9 × min wage				−0.004 (0.023)				−0.022 (0.251)			−0.318 (0.688)			−0.711 (0.527)
R^2	0.1015	0.1405	0.1726	0.1075	0.0722	0.1207	0.1063	0.2897	0.3128	0.2353	0.4086	0.2568	0.1861	0.2325
Mean Y	0.22	0.17	0.19	0.18	4.99	4.65	4.20	4.61	14.44	7.05	12.98	6.05	5.06	6.84
N	1435			3991	1350			3004	808		1640	811		1652

Source: Fragile Families and Child Well-Being Study

Sample limited to respondents with high school education or less. Models adjust for outcome variable in all previous waves, baseline marital status, education, race/ethnicity, mother's age, child age, child gender, number of children in household, year 1 marital status, city unemployment rate, the following Census tract-level characteristics: percentage race/ethnicity, female headed households with children, mean number of persons per household, median gross rent, and median housing value, the respondent's state EITC rate and the maximum TANF benefit amount, and city and year fixed effects. Bootstrapped standard errors clustered at the city level are in parentheses

***$p < 0.001$, **$p < 0.01$, *$p < 0.05$, [+]$p < 0.10$

[a] Linear probability models

[b] Coefficients from OLS regressions

[c] City fixed effects with lagged dependent variables

Table 8 Effects of minimum wage on child maltreatment, by maternal marital status

	(1) Year 1 Cohabitating	(2) Single	(3) Year 3 Cohabitating	(4) Single	(5) Year 5 Cohabitating	(6) Single	(7) Year 9 Cohabitating	(8) Single
Panel A. Maternal spanking			−0.081** (0.030)	−0.075* (0.032)	0.006 (0.032)	−0.002 (0.026)	0.018 (0.044)	−0.046 (0.036)
Panel B. Paternal spanking			−0.087* (0.038)	−0.106+ (0.066)	−0.004 (0.023)	0.005 (0.000)	−0.045 (0.048)	0.013 (0.063)
Panel C. Physical aggression					−0.023 (0.107)	−0.036 (0.073)	−0.016 (0.193)	−0.304** (0.111)
Panel D. Psychological aggression					−0.155** (0.057)	0.141* (0.069)	−0.108+ (0.067)	−0.164+ (0.094)
Panel E. Physical neglect					0.016 (0.036)	−0.071+ (0.039)	0.075 (0.060)	0.047 (0.043)
Panel F. Supervisory/exposure neglect					0.009 (0.019)	0.032 (0.021)	−0.029 (0.030)	−0.004 (0.024)
Panel G. Maternal warmth					0.056 (0.036)	−0.069 (0.067)	0.012 (0.048)	−0.075 (0.073)
Panel H. Maternal activities			−0.015 (0.019)	−0.010 (0.022)	0.014 (0.019)	−0.032* (0.016)		
Panel I. Paternal activities			0.012 (0.028)	0.100 (0.070)	−0.006 (0.030)	−0.079 (0.060)		
Panel J. Income	−1125.531 (985.228)	1770.235 (1383.428)	−285.346 (1421.565)	−531.670 (851.823)	−2091.842* (1031.706)	398.709 (1400.702)	−2301.208 (2025.830)	−602.528 (1717.917)
Panel K. Maternal employment			−0.012 (0.032)	−0.028 (0.035)	−0.039 (0.033)	−0.038 (0.027)	−0.001 (0.037)	−0.025 (0.033)
Panel L. Paternal employment			−0.035 (0.024)	−0.034 (0.064)	−0.016 (0.036)	0.054 (0.053)	0.047* (0.026)	−0.117* (0.055)
Panel M. Evening shift			0.013 (0.035)	−0.004 (0.037)	−0.060+ (0.037)	−0.009 (0.038)	0.017 (0.069)	−0.026 (0.034)
Panel N. Weekend shift			0.032 (0.025)	0.059* (0.028)	−0.076*** (0.022)	−0.029 (0.033)	0.016 (0.040)	0.012 (0.022)

Table 8 continued

	(1) Year 1	(2)	(3) Year 3	(4)	(5) Year 5	(6)	(7) Year 9	(8)
	Cohabitating	Single	Cohabitating	Single	Cohabitating	Single	Cohabitating	Single
Panel O. Maternal depression			−0.042+ (0.023)	0.004 (0.029)	−0.014 (0.023)	0.016 (0.024)	−0.026 (0.030)	−0.025 (0.029)
Panel P. Maternal stress			0.021 (0.049)	0.007 (0.044)	0.064 (0.059)	0.059 (0.061)	0.073 (0.077)	−0.050 (0.057)
Panel Q. Externalizing behaviors					−0.686 (0.972)	1.353 (1.161)	0.112 (0.846)	−0.870+ (0.497)
Panel R. Internalizing behaviors					−1.295 (0.555)	1.117* (0.514)	−0.318 (0.769)	0.016 (0.344)

Source: Fragile Families and Child Well-Being Study

Sample limited to respondents with high school education or less. Models adjust for outcome variable in all previous waves, baseline marital status, education, race/ethnicity, mother's age, child age, child gender, number of children in household, year 1 marital status, city unemployment rate, the following Census tract-level characteristics: percentage race/ethnicity, female headed households with children, mean number of persons per household, median gross rent, and median housing value, the respondent's state EITC rate and the maximum TANF benefit amount, and city and year fixed effects. Bootstrapped standard errors clustered at the city level are in parentheses

***$p < 0.001$, **$p < 0.01$, *$p < 0.05$, +$p < 0.10$

policies affect risk of child maltreatment. The nuance in how and under what circumstances this relationship manifests is an important area for future work to explore.

4.4 Robustness checks' results

Although the sample sizes were small, we examined four additional outcomes related to parental time use and resources. Appendix Table 10 reports results for childcare arrangements and child support (among single mothers). Changes in the minimum wage may instigate changes in the childcare arrangements that parents use. We examine the direct effects of minimum wage increases on the number of childcare arrangements that parents use, as well as the total number of hours that children spend in care per week. Columns 1–4 of Appendix Table 10 show no significant effect of minimum wage on either of these measures, though we note that the sample is substantially smaller for this set of outcomes. Last, increases in the minimum wage may also increase non-resident fathers' ability to pay formal or informal child support. However, columns 5 and 6 do not show a significant effect of minimum wage changes on fathers' informal or formal child support payments.

In Appendix Table 11 we test the robustness of the main results from a number of alternative specifications. The analyses focus on maternal spanking and physical neglect as these are two of the primary sources of child maltreatment. The first column estimates Eq. 1 without the lagged dependent variable, measuring outcomes at age 9. The direction and significance of the coefficients from the lagged and non-lagged models are similar for maternal spanking, and the direction and magnitude of the coefficients from the lagged and non-lagged models are similar for physical neglect.

Next, we pool the data across waves and estimate individual fixed effects models, controlling for time-varying covariates and city and year fixed effects (these models do not include a lagged dependent variable). Here again, the coefficients are similar to our preferred model. However, we rely on the lagged dependent variable models for two primary reasons. First, many of our outcomes, including those for child maltreatment, have a developmental component; omitting time variant factors could bias the results. Second, the separate, age-specific models allow for easy interpretation of differential effects of the minimum wage across child age.

Following the larger minimum wage literature, we limit the sample in our main analysis to parents with a high school degree or less. In columns 3 and 8 of Appendix Table 11 we perform a pseudo placebo test. Here, we restrict the sample to households with some college education or more. For both maternal spanking and physical neglect the results are indistinguishable from zero.

Columns 4 and 9 adjust the minimum wage for each city's cost of living. Although the direction of the coefficient using this approach is positive for maternal spanking (compared to negative in our preferred model), it is not statistically significant. The findings for physical neglect using the cost of living adjusted minimum wage is similar to the results from our preferred model. Potential differences may be driven by reductions in sample because of missing city-level cost of living information. As a

result, and because results were largely similar, we rely on the minimum wage measure not adjusted for city-level cost of living.

Last we test the robustness of the linear model (linear probability model). For binary outcomes, we estimate a non-linear model using a probit specification. Results from the probit specification are in columns 5 and 10, and they are not substantively different than those from a linear model.

In Appendix Table 12, we show results from an analysis that examines the generalizability of the Fragile Families data. We estimate the effects of changes in the minimum wage on maternal and paternal employment (worked in the last week), usual number of hours worked in a week (if employed in the past year), and total personal pre-tax income drawing on the American Community Survey. We restrict the data to the 20 FFCWS cities and limited to respondents with a high school education or less. Results from the ACS data suggests different findings than those presented in Tables 5 and 6. However, it is notable that average income was substantially lower in the FFCWS ($24,186 at age 5) compared to the ACS sample ($58,082).

Finally, in Appendix Tables 13 and 14 we show the full set of results from the hybrid individual fixed effects with lagged dependent variables model described above. The overall findings from the hybrid fixed effects models are quite similar to the pooled city fixed effects with lagged dependent variable models.

5 Discussion and conclusion

We examine the effect of changes in minimum wages on the risk for child maltreatment, parenting behaviors, and child behaviors. Our results show that a $1 increase in the minimum wage is associated with a reduction in both maternal and paternal spanking among 3-year olds by between roughly 8-9 percentage points (approximately 15–22%). We find no effects on spanking of 5- and 9-year olds. We also find reductions in physical and psychological aggression toward 9-year olds. Finally, we find an increase in physical neglect at age 9. These findings suggest that children of various ages may be affected differently by changes in the minimum wage, and there also appears to be some nuance based on the mother's marital status.

Our results contribute to a growing literature indicating that household economic circumstances and employment-based policies play a role in child maltreatment. Preventing primary maltreatment may then require more innovative strategies than have historically been employed. Policies and interventions that focus on narrow changes or outcomes may have limited long-lasting success, especially when compared to policies that address the underlying social and economic problems contributing to poverty and child maltreatment. Indeed, a recent review by the U.S. Preventive Services Task Force concludes that the existing evidence on interventions aimed at preventing primary child maltreatment—many of which include targeted home visiting—is disappointing (Runyan, 2018). Thus far research has not been successful in making universal policy recommendations, particularly for the primary, as opposed to secondary, or repeat, prevention of maltreatment. Given the enormous costs that child maltreatment generates to society, research should work to understand how to efficiently and effectively prevent child abuse and neglect and reduce

the inequalities in child victimization. The potential to simultaneously disrupt poverty and maltreatment through universal public policy is an important consideration for policymakers seeking to protect the nearly 4.4 million children who are referred to child protective service agencies annually (DHHS, 2021).

Although the FFCWS offers a number of benefits, including the ability to test a broad and theoretically important set of potential mechanisms, there remain limitations in this study. The estimation strategy adjusts for a wide range of parent, child, family, neighborhood, and time characteristics, but there are likely unobserved characteristics related to participation in the survey that remain omitted. Two features of the analysis help to attenuate this issue, however. First, we use a balanced sample of people who do not attrit. Second, we include lagged dependent variables and individual-level fixed effects in various specifications to account for these unobservable factors. We believe the results are then approximately representative of families with low-education in urban areas in the U.S. during this time period, and provide novel and robust evidence on the role of the minimum wage in the risk for child maltreatment and its potential mechanisms.

The decline of the value of the real minimum wage has been a significant factor in the increase in inequality for the lower half of the income distribution. Some research estimates that nearly half of the increase in low-end inequality from 1979 to 2009 was due to the decline in the value of the minimum wage (Autor et al., 2016). The minimum wage is just one policy tool designed to increase the incomes of low-income families and reduce economic inequality; the results from this study help to inform the conversation about other cash transfer programs, tax incentives, or employment policies aimed at reducing inequality. Taken together, the results from this analysis have the potential to expand the conversation surrounding social inequality, the minimum wage, and income assistance programs to incorporate measures of child well-being, which may in turn offer a more complete cost-benefit analysis of these policies.

Compliance with ethical standards

6 Appendix

Tables 9–14

Table 9 Mean outcomes by child age

	Mean (SD)				N
	Year 1	Year 3	Year 5	Year 9	
Outcomes					
Maternal spanking (0/1)	0.31	0.55	0.5	0.51	1347
Paternal spanking (0/1)	0.22	0.43	0.34	0.2	569
Physical aggression (range: 0–24)		6.72 (5.19)	6.09 (5.06)	4.00 (4.52)	993
Psychological aggression (range: 0–28)		8.44 (5.03)	9.21 (5.30)	8.45 (5.03)	1417
Physical neglect (0/1)		0.71	0.81	0.42	521
Supervisory/exposure neglect (0/1)		0.11	0.11	0.16	
Maternal warmth (range: 0–7)		4.46 (0.99)	5.31 (1.78)	4.58 (1.82)	1436
Maternal parenting activities (range: 0–7)	4.99 (1.43)	4.86 (1.65)	4.82 (1.44)		
Paternal parenting activities (range: 0–7)	4.43 (1.74)	3.91 (1.77)	3.81 (1.56)		658
Mechanisms					
Number of childcare arrangements (range: 0–12)	1.17 (0.45)	0.79 (0.57)	0.68 (0.69)		
Number of hours in childcare per week (range: 0–80)	11.39 (16.38)	13.01 (17.59)	11.13 (17.40)		
HH income (range: 0–127,243)	20,749.32 (19,996.99)	22,242 (21,856.42)	24,186 (22,046.44)	29,948.51 (24,841.51)	1441
Maternal employment (0/1)	0.48	0.52	0.55	0.51	596
Paternal employment (0/1)	0.8	0.82	0.78	0.86	534
Sometimes work evening shift (0/1)	0.14	0.1	0.09	0.09	657
Sometimes work weekend shift (0/1)	0.15	0.11	0.1	0.08	922
Maternal depression (0/1)	0.15	0.22	0.17	0.19	1435
Maternal parenting stress (range: 0–12)	4.57 (2.57)	4.99 (2.65)	4.65 (2.71)	4.20 (2.79)	1092
Child externalizing behaviors (range: 0–39)		14.43 (8.01)	14.44 (8.25)	7.05 (7.62)	808
Child internalizing behaviors (range: 0–34)		9.27 (6.11)	6.05 (4.56)	5.06 (5.71)	811
Formal child support (nominal) (range: 0–102,00)	110.31 (548.07)	198.36 (503.03)			
Informal child support (nominal) (range: 0–120,00)	502.61 (1289.82)	456.55 (1342.77)			

Table 10 Effects of minimum wage on childcare arrangements and hours and child support

	Number of childcare arrangements[a]		Number of hours in care[a]		Informal support[a]	Formal child support[a]
	(1)	(2)	(3)	(4)	(5)	(6)
	Year 3	Year 5	Year 3	Year 5	Year 3	Year 3
Minimum wage (2016)	0.105 (0.064)	−0.009 (0.100)	−0.498 (0.812)	−1.176 (1.384)	−116.603 (105.427)	−87.35 (50.092)
Lagged outcome at year 1	−0.024 (0.150)	0.18 (0.191)	0.373*** (0.057)	0.204** (0.066)	0.086 (0.065)	−0.105* (0.047)
Lagged outcome at year 3		0.207 (0.130)		0.271*** (0.070)		
Mean Y	0.79	0.68	13.01	11.13	502.614	269.829
N	129		355		417	486

Source: Fragile Families and Child Well-Being Study

Sample limited to respondents with high school education or less. Models adjust for outcome variable in all previous waves, baseline marital status, education, race/ethnicity, mother's age, child age, child gender, number of children in household, year 1 marital status, city unemployment rate, the following Census tract-level characteristics: percentage race/ethnicity, female headed households with children, mean number of persons per household, median gross rent, and median housing value, the respondent's state EITC rate and the maximum TANF benefit amount, and city and year fixed effects. Bootstrapped standard errors clustered at the city level are in parentheses

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$

[a] OLS regression

Table 11 Sensitivity analyses

	Maternal spanking					Physical neglect				
	(1) No lag[a]	(2) Fixed effects[b]	(3) Higher Ed[a]	(4) COLI[d]	(5) Probit[a]	(6) No lag[a]	(7) Fixed effects[c]	(8) Higher Ed[a]	(9) COLI[d]	(10) Probit[a]
Minimum wage ($2016)	−0.051* (0.024)	−0.030 (0.022)	−0.032 (0.032)	0.032 (0.106) 	−0.081 (0.071) 	0.056 (0.036)	0.012 (0.031)	0.017 (0.36) 	0.105*** (0.019)	0.188 (0.119)
Lagged outcome in year 1			0.033 (0.045)	0.020 (0.023)	0.027 (0.082)					
Lagged outcome in year 3			0.077* (0.037)	0.152*** (0.034)	0.335*** (0.081)			0.094** (0.033)	0.069* (0.034)	0.074 (0.091)
Lagged outcome in year 5			0.025*** (0.053)	0.158*** (0.031)	0.509*** (0.065)			0.008 (0.045)	0.116*** (0.033)	
	0.290*** 0.090)									
N	1347	5277	743	1252	1347	993	2926	557	990	993

Source: Fragile Families and Child Well-Being Study

Sample limited to respondents with high school education or less (except those shown in columns 3 and 8). Models adjust for outcome variable in all previous waves, baseline marital status, education, race/ethnicity, mother's age, child age, child gender, number of children in household, year 1 marital status, city unemployment rate, the following Census tract-level characteristics: percentage race/ethnicity, female headed households with children, mean number of persons per household, median gross rent, and median housing value, the respondent's state EITC rate and the maximum TANF benefit amount, and city and year fixed effects. Bootstrapped standard errors clustered at the city level are in parentheses

***$p < 0.001$, **$p < 0.01$, *$p < 0.05$

[a] Outcomes at age 9

[b] Pooled outcome (ages 1–9)

[c] Pooled outcome (age 3–9)

[d] Minimum wage adjusted for city-level cost of living

Table 12 Effects of minimum wage on work, hours, and income from the American community survey

	Maternal employment		Paternal employment		Maternal hours worked		Paternal hours worked		Maternal income		Paternal income	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Age 4–6	Age 8–10	Age 4–6	Age 8–10	Age 4–6	Age 8–10	Age 4–6	Age 8–10	Age 4–6	Age 8–10	Age 4–6	Age 8–10
Minimum wage ($2016)	0.941[+] (0.504)	−0.013 (0.027)	0.876 (0.596)	0.053 (0.038)	27.065 (21.209)	0.256 (1.092)	60.723* (25.607)	3.365* (1.578)	17,621.78 (19,301.14)	822.148 (1085.57)	32,470.54 (29,732.37)	1487.22 (1235.717)
N	5649	7003	2953	3070	5728	7241	2984	3192	5728	7241	2984	3192

Source: American Community Survey

Sample limited to respondents with high school education or less. Models control for marital status, education, race/ethnicity, mother's age, child age, child gender, city unemployment rate, the respondent's state EITC rate and the maximum TANF benefit amount, and city and year fixed effects. Bootstrapped standard errors clustered at the city level are in parentheses. We restrict to the years 2005–2010 due to data availability and to the 20 cities of the Fragile Families and Child Well-being Study

*$p < 0.05$, [+]$p < 0.10$

Table 13 Effects of minimum wage on parenting outcomes, hybrid individual fixed effects models with lagged dependent variable

	Maternal spanking[a]	Paternal spanking[a]	Physical aggression[b]	Psychological aggression[b]	Physical neglect[a]	Supervisory/exposure neglect[a]	Maternal warmth[c]	Maternal activities[c]	Paternal activities[c]
Minimum wage ($2016)	−0.004 (0.030)	0.030 (0.034)	0.204* (0.086)	0.139** (0.051)	−0.054 (0.046)	−0.003 (0.030)	−0.144 (0.250)	0.017 (0.101)	0.126 (0.179)
Lagged outcome (pooled)	−0.266*** (0.016)	−0.330*** (0.028)	−0.049*** (0.008)	−0.042*** (0.006)	−0.404*** (0.030)	−0.530*** (0.031)	−0.640*** (0.039)	−0.504*** (0.026)	−0.430*** (1.100)
Age 3									
Age 5	−0.083 (0.177)	0.075 (0.213)						0.181 (0.557)	
Age 9	−0.428 (0.536)	−0.864 (0.805)	0.004 (1.185)	−1.180+ (0.728)	−2.929*** (0.595)	−0.206 (0.358)	−5.409+ (3.075)		0.346 (1.050)
Age 3 × min wage									
Age 5 × min wage	0.032 (0.023)	−0.003 (0.032)						0.132 (0.100)	
Age 9 × min wage	0.045 (0.031)	0.070 (0.047)	−0.152+ (0.082)	−0.109** (0.041)	0.157*** (0.040)	−0.002 (0.020)	0.091 (0.153)		−0.042 (0.106)
R^2	0.0413	0.0085			0.0566	0.0255	0.0019	0.0223	0.1200
Mean Y	0.47	0.2	1.57	8.35	0.65	0.13	4.78	4.89	4.05
N	4041	1707	1610	1772	1961	2798	1029	2493	1303

Source: Fragile Families and Child Well-Being Study

Sample limited to respondents with high school education or less. Models adjust for outcome variable in all previous waves, baseline marital status, education, race/ethnicity, mother's age, child age, child gender, number of children in household, year 1 marital status, city unemployment rate, the following Census tract-level characteristics: percentage race/ethnicity, female headed households with children, mean number of persons per household, median gross rent, and median housing value, the respondent's state EITC rate and the maximum TANF benefit amount, and city and year fixed effects. Bootstrapped standard errors clustered at the city level are in parentheses

***$p<0.001$, **$p<0.01$, *$p<0.05$, +$p<0.10$

[a] Linear probability model

[b] Poisson regression

[c] Coefficients from OLS regressions

Table 14 Effects of minimum wage on parenting outcomes, hybrid individual fixed effects models with lagged dependent variable

	Annual HH income[b]	Maternal employment[a]	Paternal employment[a]	Sometimes work evening shift[a]	Sometimes work weekend shift[a]	Maternal depression[a]	Maternal stress[b]	Child externalizing[b]	Child internalizing[b]
Minimum wage ($2016)	918.598 (900.953)	−0.002 (0.031)	0.035 (0.038)	−0.034 (0.043)	0.025 (0.033)	0.005 (0.025)	(0.291)	(0.764)	(0.430)
Lagged outcome (pooled)	−0.170*** (0.026)	−0.315*** (0.017)	−0.309*** (0.034)	−0.315*** (0.028)	−0.213*** (0.023)	−0.354*** (0.023)	−0.253*** (0.026)	−0.426*** (0.036)	−0.170*** (0.037)
Age 3	6701.157 (6856.887)	0.388* (0.179)							
Age 5	25,303.800* (10,119.820)	0.333 (0.463)	−0.148 (0.246)	0.223 (0.277)	0.341+ (0.177)	−0.068 (0.139)	−1.574 (1.424)		
Age 9	75,766.160*** (19,942.160)		−0.809 (0.526)	0.898 (0.612)	0.097 (0.370)	0.064 (0.311)	−3.747+ (2.207)	9.439 (11.650)	10.876 (9.184)
Age 3 × min wage	−247.298 (1263.869)								
Age 5 × min wage	−2390.868* (1120.983)	−0.053* (0.027)	0.042 (0.034)	−0.036 (0.040)	−0.067* (0.031)	0.015 (0.021)	0.233 (0.199)		
Age 9 × min wage	−2517.097* (883.383)	−0.039 (0.026)	−0.017 (0.034)	−0.040 (0.041)	−0.037 (0.035)	0.010 (0.021)	0.163 (0.244)	−1.038+ (0.540)	−0.435 (0.356)
R^2	0.0209	0.0728	0.0413	0.0023	0.0005	0.0504	0.1264	0.0006	0.0020
Mean Y	23,786	0.54	0.82	0.11	0.12	0.18	4.60	11.98	6.84
N	5086	3925	1590	1800	2546	3991	3004	1640	1652

Source: Fragile Families and Child Well-Being Study

Sample limited to respondents with high school education or less. Models adjust for outcome variable in all previous waves, baseline marital status, education, race/ethnicity, mother's age, child age, child gender, number of children in household, year 1 marital status, city unemployment rate, the following Census tract-level characteristics: percentage race/ethnicity, female headed households with children, mean number of persons per household, median gross rent, and median housing value, the respondent's state EITC rate and the maximum TANF benefit amount, and city and year fixed effects. Bootstrapped standard errors clustered at the city level are in parentheses

*** $p < 0.001$, * $p < 0.05$, + $p < 0.10$

[a] Linear probability model

[b] Coefficients from OLS regressions

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