

The Impact of Macroeconomic Conditions in Childhood on Adult Labor Market Outcomes

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Abstract

This paper analyzes the influence of business cycles in childhood on economic performance later in life. First, I relate unemployment rates between the year before one's birth and the year of one's fifteenth birthday to schooling, employment, and income as an adult. Next, I study how the background characteristics of parents raising children vary with the state of the macroeconomy. Finally, I document the impact of economic fluctuations on home environments and parenting behaviors. The average unemployment rate in childhood normally has a negative effect on parental investments in offspring and the stock of human capital in adulthood.

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1 Introduction

The process of skill formation in childhood is an important area of research. An understanding of the effects of business cycles on child development can be useful to policymakers when designing and targeting economic stimulus plans or health care programs. This paper investigates how macroeconomic conditions during one's formative years affect one's labor market performance in adulthood. An economic downturn might lower the amount of resources that parents spend on educating their children or the quality of the neighborhood in which children are raised. Alternatively, the opportunity cost of making time consuming investments in child care might decrease in a recession. By altering the environment in which children grow up, business cycles may impact the productivity of future generations of workers.

This paper builds on existing research that studies how macroeconomic fluctuations affect health outcomes.¹ Ruhm (2000) uncovers a procyclical relationship between mortality and unemployment, although suicides rise during recessions. Using data on babies born in the late twentieth century, Dehejia and Lleras-Muney (2004) find that infant health tends to improve when state unemployment rates increase. Based on a sample of individuals born in the Netherlands between 1812 and 1912, van den Berg et al. (2006) observe that children born during recessions display higher mortality later in life. The current paper addresses an important unanswered question related to this literature. Do business cycles in childhood have persistent effects not only on health but also on economic variables such as schooling, income, and employment? Depending on the nature of such effects, the adult outcomes of children might be improved by policies that provide funds to jobless parents for child rearing or that give parents time off from work for child care.

¹Other relevant studies include: Beaudry and DiNardo (1991), who analyze the impact of the lowest unemployment rate since beginning a job on the wage; Malmendier and Nagel (2011), who examine the influence of stock market returns during one's adult lifetime on risk preferences; and Oreopoulos et al. (2012), who investigate the lasting effects of an economic downturn at college graduation on earnings.

The analysis proceeds in three stages, each of which exploits a different source of data. First, a large extract from the American Community Survey (ACS) is used to document the relationship of unemployment rates during childhood to labor market outcomes as an adult. The state of the economy during one's childhood is measured as the average unemployment rate between the year before one's birth and the year of one's fifteenth birthday.² Specifications including the national unemployment rate as a regressor control for basic demographic variables, state of birth, and current economic conditions. Regressions involving the state unemployment rate also account for national cohort effects as well as linear trends in unobserved variables specific to each state of birth.

Next, a matched sample of parents and children from the Panel Study of Income Dynamics (PSID) is constructed to assess whether differences over the business cycle in the underlying quality of parents raising children are likely to explain the observed impacts of childhood conditions on adult outcomes.³ A number of strategies are employed. I examine how the estimated coefficient on the unemployment rate changes after controlling for parental background variables. I also describe the relationship of the unemployment rate during one's childhood to parental characteristics. In addition, family fixed-effects models are estimated using sibling data so as to account for the influence of parental background on the results.

Finally, detailed information on home environments and caregiving practices from the Child Supplement of the National Longitudinal Survey of Youth 1979 (NLSY79-CH) is used to illustrate a possible mechanism through which childhood economic conditions can affect the stock of human capital

²Some authors have argued that early childhood is an especially crucial period for human capital formation (Cunha and Heckman, 2007; Almond and Currie, 2011). Therefore, estimates for the impacts of unemployment rates at different stages of development are also presented.

³See Dehejia and Lleras-Muney (2004) for a theoretical and empirical discussion of how the unemployment rate affects the characteristics of women selecting to give birth.

in adulthood.⁴ I estimate the impact of the current unemployment rate on the quality of a child’s home environment, which is measured using parental assessment tools from the child development literature. These assessments cover a variety of topics such as visiting a museum or the theater, providing books or toys at home, and spending time or eating meals as a family. To disentangle the causal effect of economic conditions from changes in parental background, family and person fixed-effects estimates are computed.

A notable feature of this study is the compilation of national and state unemployment series covering a long time horizon. The Bureau of Labor Statistics (BLS) provides data on national unemployment rates only from 1941 onwards and state unemployment rates only from 1976 onwards. Nonetheless, national unemployment rates are available for the whole twentieth century using the estimates in Coen (1973) and Romer (1986), and state unemployment rates can be computed for the entire second half of the twentieth century based on ET Financial Data Handbook 349.

Overall, there is evidence of a negative impact of the unemployment rate early in life on one’s home environment as a child and one’s economic performance as an adult. This effect is unlikely to be explained by changes over the business cycle in the underlying quality of parents raising children. The remainder of this paper is organized as follows. Section 2 summarizes the information on unemployment rates as well as the data from the ACS, PSID, and NLSY79-CH. Section 3 outlines the empirical strategy. Section 4 presents the estimation results. Section 5 contains some concluding remarks.

2 Data

This section outlines the datasets used in the paper. Section 2.1 describes the sources of the national and state unemployment rates. Sections 2.2, 2.3, and 2.4 document the main estimation samples from the ACS, PSID, and

⁴Other possible factors include changes over the business cycle in the quality of medical care, schooling systems, and neighborhoods.

NLSY79-CH.⁵

2.1 Unemployment Rate Series

A national unemployment rate series from 1890 to 2010 is compiled as follows. For each year from 1941 to 2010, the annual average unemployment rate is obtained from the BLS.⁶ Between 1931 and 1940, the estimates of the unemployment rate from Coen (1973) are used. Between 1890 and 1930, the unemployment rate series from Romer (1986) is used.

A state unemployment rate series from 1947 to 2009 is generated as follows.⁷ For each year from 1976 to 2009, the annual average unemployment rate for each state is obtained from the BLS. Because the BLS does not provide state unemployment rates prior to 1976, yearly information on the rate of insured unemployment is obtained for each state from ET Financial Data Handbook 349. The rate of insured unemployment is available for every state from 1947 to 2009.⁸ In order to estimate the unemployment rate for each state between 1947 and 1975, the annual average unemployment rate for a given state is regressed on the rate of insured unemployment, the national unemployment rate, and a linear trend in year using the observations on that state between 1976 and 2009. The estimated regression equation for that state is then applied to the rates of insured unemployment and the national unemployment rates to predict the annual average unemployment rates between 1947 and 1975.

Some robustness checks substitute the employment-to-population ratio for the unemployment rate as a measure of macroeconomic conditions. The national and state employment-to-population ratios are available from the

⁵Further information about each sample is located in the notes to the tables.

⁶The national unemployment rate covers individuals 16 years old and above from 1948 to 2010 and individuals 14 years old and above from 1941 to 1947.

⁷The District of Columbia is included as a state.

⁸Only three states—Georgia, Hawaii, and Oregon—have data on the rate of insured unemployment before 1947.

BLS beginning respectively in 1948 and 1976. The values of these variables in earlier years are estimated as follows. The national employment-to-population ratio is regressed on the national unemployment rate and a linear trend in year using observations from 1948 to 2010, and the estimated regression equation is applied to historical data on the national unemployment rate to predict the national employment-to-population ratios between 1890 and 1947. The employment-to-population ratio for a given state is regressed on the rate of insured unemployment and the national unemployment rate as well as a linear trend in year using the observations on that state from 1976 to 2009, and the estimated regression equation is applied to the rates of insured unemployment and the national unemployment rates to predict the employment-to-population ratios for that state between 1947 and 1975.

2.2 ACS Sample

In order to document the relationship between unemployment rates in childhood and economic outcomes as an adult, I construct a large sample using the Integrated Public Use Microdata Series (IPUMS) for the 2000 to 2011 waves of the ACS.⁹ The dataset is restricted to individuals aged between 30 and 65 at the time of the survey who have data on educational attainment, working last year, employment status, labor force status, and wage income.¹⁰ Only persons born in one of the fifty states or the District of Columbia are included. Consequently, the sample used to study national unemployment rates in childhood includes respondents with birth years ranging from 1935 to 1981. Because state unemployment rates are available for all states only from 1947 onwards, the sample used for the analysis of state unemployment rates

⁹The ACS is a monthly survey conducted by the U.S. Census Bureau and is intended to replace the long form of the decennial census.

¹⁰Because the exact year of birth is not provided in the ACS, the year of birth is approximated by subtracting age from the survey year. The empirical results are similar if one imputes the birth year by subtracting one plus age from the survey year or if one uses data from earlier Censuses in which the exact birth year is known.

between the year before one's birth and the year of one's fifteenth birthday includes respondents born between 1948 and 1981.

Table 1 displays summary statistics for the dataset from the ACS. The samples used with national and state unemployment rates contain 9,794,615 and 8,491,751 observations, respectively. The mean years of birth for the respective samples are 1959 and 1962. Correspondingly, the mean ages are 47 and 45. For the former sample, the average national unemployment rate between the year before one's birth and the year of one's fifteenth birthday has mean 5.46 and standard deviation 0.88. For the latter sample, the average state unemployment rate in childhood has mean 6.59 and standard deviation 1.57. The outcomes examined are: indicators for high school completion, college graduation, and receipt of some graduate education; indicators for having worked in the past calendar year, currently being in the labor force, and being employed at present; and indicators for having both worked in the past calendar year and received a wage income of at least \$10,000, \$20,000, and \$30,000 during that period.¹¹ The analysis of income levels utilizes joint work-wage outcomes instead of log wages so as to account for selection into employment.¹²

2.3 PSID Sample

In order to assess whether the observed impact of unemployment rates in childhood can be attributed to changes in the characteristics of parents raising children, I construct a matched sample of parents and children from the 1968 to 2009 waves of the PSID.¹³ The dataset contains sample family members from both the Survey Research Center (SRC) and Survey of Economic

¹¹The income figures are expressed in 1982-1984 terms.

¹²Other methods of accommodating the employment decision include the use of a median regression or a selection correction. However, such procedures are difficult to justify here because they usually rely on an assumption about the wage offers of nonparticipants relative to participants or the existence of a variable affecting participation but not wage offers.

¹³The data from the PSID are annual from 1968 to 1997 and biennial thereafter.

Opportunity (SEO) components of the PSID. The analysis is restricted to individuals with valid data on year of birth who grew up in one of the 50 states or the District of Columbia. The dataset includes only respondents whose mother or father has information on first occupation and birth year as well as years of schooling, total hours worked, total labor income, and employment status for some survey year when aged between 30 and 65.

One observation is generated on an individual for each survey year in which he or she is a head or wife between the ages of 30 and 65 as of the end of the year and has data on years of schooling, total hours worked in the past calendar year, total labor income in the past calendar year, and current employment status. The sample used to study national unemployment rates in childhood includes observations on individuals with birth years ranging from 1925 to 1979.¹⁴ When using state unemployment rates between the year before one's birth and the year of one's fifteenth birthday, the sample is limited to individuals born between 1948 and 1979, because state unemployment rates are available for all states only from 1947 onwards.

Descriptive statistics for the main samples from the PSID are presented in Table 2. The samples used with national and state unemployment rates comprise 64,798 observations on 6,742 individuals and 58,642 observations on 6,439 individuals, respectively. The mean years of birth for the respective samples are 1956 and 1957. Correspondingly, the mean ages are 39 and 38. For the former sample, the average national unemployment rate between the year before one's birth and the year of one's fifteenth birthday has mean 5.16 and standard deviation 0.71. For the latter sample, the average state unemployment rate in childhood has mean 6.32 and standard deviation 1.78. The outcomes examined are: indicators for high school completion, college graduation, and receipt of some graduate training; indicators for having worked in the past calendar year, currently being in the labor force, and being employed at present; and indicators for having both worked in the past calendar year

¹⁴No respondents meeting the sample selection criteria were born before 1925.

and received at least \$10,000, \$20,000, and \$30,000 in labor income during that period.¹⁵

2.4 NLSY79-CH Sample

In order to understand how parental caregiving and home environments change with the unemployment rate, I construct a sample of individuals from the 1986 to 2008 waves of the NLSY79-CH, which surveys children born to female participants in the NLSY79.¹⁶ The restricted-access geocode files for the NLSY79 and NLSY79-CH are obtained so as to match respondents to state-level data on the unemployment rate.

The quality of each child's household surroundings is measured using information from the Home Observation for Measurement of the Environment-Short Form (HOME-SF) inventory.¹⁷ The scores on the HOME-SF inventory are based on both parental reports and interviewer observations. The topics covered by the HOME-SF vary with each child's developmental level: infant/toddler (part A, ages 0-2), early childhood (part B, ages 3-5), middle childhood (part C, ages 6-9), and early adolescence (part D, ages 10-14). Examples of items on the HOME-SF include: number of children's books and toys at home; frequency of visits to the grocery, theater, and museum; whether the child eats meals with his/her mother and father; whether the child's mother spoke to, caressed, or spanked the child during the interview; how often the child spends time with his/her father; whether the child's mother helps teach the child numbers, letters, colors, and shapes; whether the child is expected to make his/her bed, clean up after him/herself, and perform regular housekeeping tasks; whether the child's home appears to be well lighted, clean, and free of trash. The HOME inventory has been widely

¹⁵The income figures are expressed in 1982-1984 terms.

¹⁶Individuals in the NLSY79-CH are interviewed biennially.

¹⁷The HOME-SF is a condensed version of the Home Observation for Measurement of the Environment (HOME) inventory. The HOME-SF inventory was developed for use in the NLSY79-CH and is also administered in the PSID. See Caldwell and Bradley (2003) for more details on the HOME inventory.

employed in the child psychology literature to study how the family setting affects cognitive and behavioral development.¹⁸

The sample from the NLSY79-CH contains individuals whose mother belongs to the cross-sectional or supplemental sample of the NLSY79. The analysis is restricted to observations on children who live in one of the fifty states or the District of Columbia and are aged between 0 and 15 as of the end of the survey year. The dataset includes only children whose mother has information on first occupation, years of schooling, and AFQT score. Each observation is classified into one of four categories, depending on which age-appropriate part of the HOME-SF inventory was administered to the child in that survey year. Each category includes only observations in which the child has valid data on the total, cognitive stimulation, and emotional support raw scores for the applicable part of the HOME-SF inventory. In addition, many of the items used to compute the scores are individually analyzed in order to further investigate the mechanisms driving the results. I also examine several behaviors related to the prenatal and neonatal period such as drug use in pregnancy and the duration of breastfeeding.

Table 3 summarizes the main sample of children from the NLSY79-CH. The datasets for parts A, B, C, and D of the HOME-SF inventory respectively contain 6,723 observations on 5,410 individuals, 8,593 observations on 6,600 individuals, 12,323 observations on 7,659 individuals, and 11,999 observations on 6,734 individuals. The mean survey years for the respective samples are 1991, 1993, 1995, and 1998. Correspondingly, the mean ages are 1.6, 4.5, 8.0, and 12.2. For the respective parts, the current national unemployment rate has means 6.03, 5.91, 5.76, and 5.52 and standard deviations 0.95, 0.96, 0.98, and 0.95, and the current state unemployment rate has means 6.13, 5.98, 5.83, and 5.57 and standard deviations 1.64, 1.61, 1.57, and 1.41. The main outcome variables are the total, cognitive stimulation, and emotional

¹⁸For example, see Elardo et al. (1977), Bradley and Caldwell (1980), and Bradley et al. (1988).

support scores on each part of the HOME-SF inventory.¹⁹

3 Methods

This section presents the methodology for identifying the effect of childhood economic conditions on adult outcomes. Sections 3.1, 3.2, and 3.3 describe the analysis of the data from the ACS, PSID, and NLSY79-CH, respectively.

3.1 Childhood Conditions and Adult Outcomes

The data from the ACS are used to document the relationship between state and national unemployment rates in childhood and labor market outcomes as an adult. A negative relationship might arise if a recession lowers spending on education and health care, elevates stress among parents and children, or lessens the amenities offered by neighborhoods. A positive relationship is possible if parents are more likely to make time consuming investments in caring for and bringing up children when the economy slackens.

Let h_{it} be an indicator variable representing the schooling, employment, or income of person i in year t . Let $b(i)$ be person i 's birth year and $s(i)$ be person i 's childhood state. Let x_i be a vector of basic demographic variables like race and gender for person i . Denoting by $u_{b(i)}$ the average national unemployment rate between years $b(i)-1$ and $b(i)+15$, the following equation is estimated for business cycles at the national level:

$$h_{it} = \alpha u_{b(i)} + \gamma_{s(i)}^1 + \gamma_t^2 + \gamma_{t-b(i)}^3 + \Gamma' x_i + \epsilon_{it}, \quad (1)$$

where $\gamma_{s(i)}^1$, γ_t^2 , and $\gamma_{t-b(i)}^3$ are fixed effects for childhood state, survey year, and age, respectively. The coefficient α reflects the impact of national business cycles in childhood on adult outcomes. Note that α is identified by

¹⁹Although Table 3 reports summary statistics for the raw scores on the HOME-SF inventory, the regression analysis uses standardized scores so as to facilitate interpretation of the results.

combining data from multiple survey years and assuming that age has the same effect in each year. The error term ϵ_{it} is clustered by birth year because the national unemployment rate in childhood does not differ across individuals born in the same year.

Denoting by $u_{b(i),s(i)}$ the average unemployment rate between years $b(i)-1$ and $b(i)+15$ in state $s(i)$, the following equation is estimated for business cycles at the state level:

$$h_{it} = \beta u_{b(i),s(i)} + \delta_{b(i)}^1 + \delta_{s(i)}^2 + \delta_t^3 + \delta_{t-b(i)}^4 + \delta_{s(i)}^5 b + \Delta' x_i + \nu_{it}, \quad (2)$$

where $\delta_{b(i)}^1$, $\delta_{s(i)}^2$, δ_t^3 , and $\delta_{t-b(i)}^4$ are fixed effects for birth year, childhood state, survey year, and age, respectively. Note that $\delta_{b(i)}^1$ controls for the quality of a national birth cohort and δ_t^3 accounts for the current state of the national economy. The parameter $\delta_{s(i)}^5$ allows for a linear trend in unobservable variables specific to each childhood state. For example, $\delta_{s(i)}^5$ might capture a gradual improvement in the schooling system or business climate within a state. The coefficient β represents the influence of the state unemployment rate in childhood. Note that β is identified based on deviations early in life between the state unemployment rate and national economic conditions. The error term ν_{it} is clustered by state of birth so as to account for serial correlation across birth years among individuals born in the same state.²⁰

I also present estimates for extended versions of specifications (1) and (2). First, some authors including Oreopoulos et al. (2012) have observed that economic conditions at labor market entry have a persistent impact on earnings. To accommodate such an effect, I add the unemployment rate at age eighteen as an explanatory variable in the regressions. Second, some authors including Cunha and Heckman (2007) and Almond and Currie (2011) have indicated that early childhood is a critical period for skill development. To permit such a distinction, I include separate regressors for the average

²⁰See Bertrand et al. (2004) for a discussion of how serial correlation affects the standard errors for differences-in-differences estimates.

unemployment rates in the year before one’s birth, the year of one’s birth, the first to fifth years after one’s birth, the sixth to tenth years after one’s birth, and the eleventh to fifteenth years after one’s birth. These intervals correspond to the prenatal stage, infancy, early childhood, middle childhood, and early adolescence.

3.2 Environmental Changes versus Selection Effects

The data from the PSID are used to evaluate whether changes over the business cycle in parental background can explain the impact of childhood economic conditions on adult outcomes.²¹ If children are a normal good, then a recession might decrease fertility by reducing family income. If parenting is time intensive, then fertility might increase in a recession due to a lower opportunity cost of time. Depending on how such income and substitution effects differ across demographic groups, the background characteristics of parents raising children might be related to macroeconomic conditions.

I employ multiple strategies to analyze how selection into child rearing affects the empirical results. First, specifications (1) and (2) are estimated both excluding and including control variables for parental background. The controls are indicators for mother’s and father’s first occupation, educational attainment, and birth year. I study how the addition of these regressors changes the coefficient on the unemployment rate in childhood.

Second, the relationship between the unemployment rate in one’s childhood and the characteristics of one’s parents is examined. Let k_{it} be an indicator variable encoding the schooling, employment, or income in year t for the parent of person i . Recall that $b(i)$ is person i ’s birth year and that $s(i)$ is person i ’s childhood state. Let z_{it} be a vector containing dummies for the race and age of person i ’s parent. Recall that $u_{b(i)}$ is the average national unemployment rate between years $b(i) - 1$ and $b(i) + 15$ and that $u_{b(i),s(i)}$ is

²¹Dehejia and Lleras-Muney (2004) discuss in detail how the unemployment rate can affect the decision to give birth.

the average unemployment rate between years $b(i) - 1$ and $b(i) + 15$ in state $s(i)$. The following equations are estimated separately for the mothers and fathers of the youths in the sample:

$$k_{it} = \theta u_{b(i)} + \pi_{s(i)}^1 + \pi_t^2 + \pi^3 b + \Pi' z_{it} + \eta_{it} \quad (3)$$

and

$$k_{it} = \zeta u_{b(i),s(i)} + \phi_{b(i)}^1 + \phi_{s(i)}^2 + \phi_t^3 + \phi_{s(i)}^4 b + \Phi' z_{it} + v_{it}. \quad (4)$$

In the first equation, the terms $\pi_{s(i)}^1$ and π_t^2 are fixed effects for the youth's childhood state and the parent's survey year, respectively. In the second equation, the terms $\phi_{b(i)}^1$, $\phi_{s(i)}^2$, and ϕ_t^3 are fixed effects for the youth's birth year, the youth's childhood state, and the parent's survey year, respectively. The parameters π^3 and $\phi_{s(i)}^4$ control for linear trends in the youth's national and state birth cohort. The coefficients θ and ζ reflect the association of nationwide and statewide economic conditions in childhood with parental characteristics. The error terms η_{it} and v_{it} are clustered by the youth's birth year and childhood state, respectively.

Third, family fixed-effects estimates for the impact of childhood economic conditions are computed using sibling data. By studying differences between siblings, parental traits are largely held constant. Recall that h_{it} is an indicator variable for the schooling, employment, or income of person i in year t . Let $g(i)$ be person i 's gender. Denoting by $f(i)$ the family of person i , the following specification is estimated:

$$h_{it} = \xi u_{b(i)} + \chi_{f(i)}^1 + \chi_t^2 + \chi_{g(i)}^3 + \chi_{t-b(i)}^4 + \omega_{it}, \quad (5)$$

where $\chi_{f(i)}^1$, χ_t^2 , $\chi_{g(i)}^3$, and $\chi_{t-b(i)}^4$ are fixed effects for family, survey year, gender, and age, respectively. The coefficient ξ captures the effect of the unemployment rate in childhood after controlling for family background. The error term ω_{it} is clustered by family.

3.3 Unemployment Rates and Home Environments

The data from the NLSY79-CH are used to illustrate how macroeconomic fluctuations affect home environments and caregiving practices. An economic contraction might have both positive and negative influences on parental investments in children. On the one hand, parents may have less money to spend on toys, books, lessons, or magazines. On the other hand, parents may have more time to spend eating meals as a family or taking children on outings. Furthermore, parental stress might vary over the business cycle, altering how parents interact with children.

I begin by computing the impact of the state unemployment rate on the quality of the home environment.²² Let r_{it} denote the standardized value of the emotional, cognitive, or total score from the HOME-SF inventory for child i in year t .²³ Let $s(i)$ be child i 's state of residence and $b(i)$ be child i 's year of birth. Recall that x_i is a vector of basic demographic variables for person i . Denoting by $u_{s(i),t}$ the unemployment rate in state $s(i)$ during year t , the following equation is estimated for the scores on each part of the HOME-SF inventory:

$$r_{it} = \lambda u_{s(i),t} + \kappa_{s(i)}^1 + \kappa_t^2 + \kappa_{t-b(i)}^3 + \kappa_{s(i)}^4 t + K'x_i + o_{it}, \quad (6)$$

where $\kappa_{s(i)}^1$, κ_t^2 , and $\kappa_{t-b(i)}^3$ are fixed effects for state, year, and age, respectively. Note that κ_t^2 captures the influence of economic conditions at the national level. The parameter $\kappa_{s(i)}^4$ accounts for a linear trend in year specific to each state. The coefficient λ reflects the effect of the state unemployment rate. The error term o_{it} is clustered at the state level. In order to assess whether changes in parental background are driving the results, estimates are presented that control for the first occupation, test score, schooling level,

²²The analysis in this section focuses on state instead of national unemployment rates due to the small number of years covered by the NLSY79-CH. Nonetheless, the results are similar if national unemployment rates are used.

²³In addition to these aggregate scores, many specific parenting behaviors are analyzed.

and birth year of a child's mother.

As a further test for changes in parental background, I estimate the relationship of the state unemployment rate to measures of parental quality. Let q_i be an indicator variable for the schooling level or test score of child i 's mother. Let c_i be a vector containing dummies for the race and birth year of child i 's mother. The following equation is estimated using the sample for each part of the HOME-SF inventory:

$$q_i = \vartheta u_{s(i),t} + \tau_{s(i)}^1 + \tau_t^2 + \tau_{s(i)}^3 t + T' c_i + e_{it}, \quad (7)$$

where $\tau_{s(i)}^1$ and τ_t^2 are fixed effects for state and year, respectively. The parameter $\tau_{s(i)}^3$ allows for a linear time trend specific to each state. The coefficient ϑ reflects the association of the state unemployment rate with maternal characteristics. The error term e_{it} is clustered by state.

Finally, I compute family and person fixed-effects estimates so as to control for the influence of parental background. This strategy helps to isolate the effect of behavioral changes from variation over the business cycle in the background attributes of parents raising children. Recall that $g(i)$ signifies person i 's gender and that $f(i)$ signifies person i 's family. Denoting by u_t the national unemployment rate during year t , the following equations are estimated for the scores on each part of the HOME-SF inventory:

$$r_{it} = \psi u_t + \varsigma_{f(i)}^1 + \varsigma_{g(i)}^2 + \varsigma_{t-b(i)}^3 + \varsigma^4 t + u_{it} \quad (8)$$

and

$$r_{it} = \varphi u_t + \varrho_i^1 + \varrho_{t-b(i)}^2 + \varrho^3 t + v_{it}. \quad (9)$$

In the first equation, the terms $\varsigma_{f(i)}^1$, $\varsigma_{g(i)}^2$, and $\varsigma_{t-b(i)}^3$ are fixed effects for family, gender, and age, respectively. In the second equation, the terms ϱ_i^1 and $\varrho_{t-b(i)}^2$ are fixed effects for person and age, respectively. The terms ς^4 and ϱ^3 control for linear time trends. The coefficients ψ and φ represent the impact of economic conditions on the home environment. Note that ψ

is identified based on differences among siblings in the unemployment rates experienced during childhood and that φ is identified based on differences across time in the unemployment rates experienced by a child. The error terms u_{it} and v_{it} are clustered by family and person, respectively.

4 Results

This section discusses the empirical results on the impact of unemployment rates in childhood. Sections 4.1, 4.2, and 4.3 present the findings from the ACS, PSID, and NLSY79-CH, respectively.

4.1 Childhood Conditions and Adult Outcomes

Section 4.1.1 describes the main estimates for the ACS sample. Section 4.1.2 reports some robustness checks for the ACS results.

4.1.1 Main Estimates

Table 4 provides estimates for equations (1) and (2), which relate national and state unemployment rates early in life to labor market performance in the future. In specification (1), the average national unemployment rate in childhood has significantly negative impacts on graduating from high school, working last year, being in the labor force, being currently employed, and earning at least \$10,000 in wage income. In specification (2), the average state unemployment rate in childhood has significantly negative impacts on finishing college, attending graduate school, working last year, being in the labor force, being currently employed, and earning at least \$10,000 in wage income. These negative effects are substantial in size. A one percentage point increase in the unemployment rate decreases the probability of each of these outcomes by over half a percentage point. Only at the upper end of the wage distribution is there possible evidence of a positive impact of the unemployment rate in childhood.

Table 4 also presents estimates that control for the unemployment rate at age eighteen. The main findings are unlikely to be explained by economic conditions at labor market entry. The significant impacts of the unemployment rate in childhood strengthen after controlling for the unemployment rate at age eighteen. The unemployment rate at age eighteen has a negative impact on labor market performance, except perhaps at the upper end of the wage distribution.

Table 5 contains results using the average unemployment rates at different stages of childhood as individual regressors. The pattern of estimates is complex. Both significantly positive and negative impacts are found depending on the stage of childhood, the control variables, and the outcome analyzed. Unemployment rates earlier in childhood do not seem to have a larger influence on adult economic outcomes than unemployment rates later in childhood. Nonetheless, these results should not necessarily be interpreted as evidence against the importance of critical periods in child development. An economic downturn can have both positive and negative effects on skill formation among children. During an economic downturn, parents might have less money but more time to invest in child rearing, and parents might have more or less stress depending on the stability and intensity of their jobs. These competing effects may offset each other to varying degrees for different groups of the population or at different times in childhood.

4.1.2 Robustness Checks

Several robustness checks were conducted to assess the sensitivity of the results to changes in the construction of the estimation sample and the measurement of economic conditions.²⁴ First, I replicated the analysis using the raw data on the rate of insured unemployment for each state instead of the estimates for the state unemployment rate.²⁵ Second, I performed the regres-

²⁴These results are available from the author on request.

²⁵As described in section 2.1, the rate of insured unemployment from ET Financial Data Handbook 349 is used to estimate the annual state unemployment rates between 1947 and

sions using the employment-to-population ratio instead of the unemployment rate as an indicator of economic conditions.²⁶ Third, I estimated the specifications after weighting each observation by its person weight for the survey.²⁷ Overall, the findings above are largely unaffected by these changes. That is, I continue to find significant evidence of a negative impact of the unemployment rate in childhood on most human capital measures.

4.2 Environmental Changes versus Selection Effects

The main estimates for the PSID sample are presented in section 4.2.1. The robustness checks for the PSID results are outlined in section 4.2.2.

4.2.1 Main Estimates

Table 6 reports estimates for equations (1) and (2) based on the PSID sample. The impact of economic conditions in childhood on adult labor market outcomes is computed both excluding and including control variables for parental background. In each case, the national unemployment rate in childhood has a significantly negative impact on graduating from high school. The negative impacts of the state unemployment rate in childhood on finishing college, attending graduate school, working last year, and joining the labor force become statistically significant after controlling for parental background variables. Because the addition of these controls strengthens the negative coefficient on the main explanatory variable, changes in parental background over the business cycle do not seem to explain the negative impact of the unemployment rate in childhood on economic performance as an adult.

1975, because the BLS does not provide annual state unemployment rates prior to 1976.

²⁶As noted by Dehejia and Lleras-Muney (2004), the use of the employment-to-population ratio instead of the unemployment rate avoids measurement error in determining the size of the labor force and the number of unemployed workers.

²⁷In some cases, the use of sample weights can make the results more representative of the general population. See Solon et al. (2013) for a discussion of the advantages and disadvantages of using sample weights.

Table 7 displays estimates for equations (3) and (4), which relate the national and state unemployment rates in one’s childhood to the characteristics of one’s parents. The national unemployment rate in one’s childhood has a significantly positive association with most measures of the schooling and earnings of one’s mother, and the state unemployment rate in one’s childhood has a significantly positive association with most measures of the employment of one’s mother. There is a significantly positive relationship between the national or state unemployment rate in one’s childhood and some measures of the schooling or earnings of one’s father. Because high unemployment is usually associated with an improvement in parental characteristics, it is unlikely that the deterioration in the labor market prospects of children raised during a period of high unemployment is attributable to selection by parents over the business cycle into raising children.

Table 8 describes the results from estimating specification (5) using sibling data. The inclusion of fixed effects for family helps control for much of the influence of parental background when identifying the relationship of childhood economic conditions to adult outcomes. The point estimates for the coefficient on the unemployment rate are negative in all but one case. The unemployment rate in childhood has a significantly negative impact on graduating from high school. Although the estimates are somewhat imprecise, the findings are consistent with a negative causal effect of the unemployment rate in childhood on the stock of human capital as an adult.

4.2.2 Robustness Checks

This section describes a few robustness checks analogous to those in section 4.1.2.²⁸ First, the results were replicated using the raw data on the rate of insured unemployment for each state instead of the actual and estimated values of the state unemployment rate. Second, the regressions were conducted using the employment-to-population ratio instead of the unemployment rate

²⁸The estimates summarized here are available from the author on request.

as a measure of macroeconomic conditions. Third, the specifications were estimated only for members of the nationally representative SRC sample of the PSID.²⁹ Overall, these modifications do not substantially affect the conclusions above. That is, I continue to find that the negative impact of the unemployment rate in childhood cannot be adequately explained by changes in parental background over the business cycle.

4.3 Unemployment Rates and Home Environments

Section 4.3.1 contains the main estimates for the NLSY79-CH sample. Section 4.3.2 discusses some further items from the NLSY79-CH data. Section 4.3.3 documents some robustness checks on the NLSY79-CH results.

4.3.1 Main Estimates

Table 9 provides estimates for specification (6), which describes how the quality of a child's home environment varies with the unemployment rate. Results are presented both before and after adding controls for the background characteristics of a child's mother. In most cases, the point estimate for the coefficient on the unemployment rate is negative, indicating that a higher unemployment rate is associated with a worse home environment. Regardless of whether control variables for maternal characteristics are excluded or included, the unemployment rate has a significantly negative impact on the total and emotional scores in middle childhood and early adolescence.

Table 10 contains results for equation (7), which relates the unemployment rate to the schooling level and test score of a child's mother. The coefficient on the unemployment rate is statistically insignificant for most outcomes and samples. However, the unemployment rate does have a significantly negative relationship with high school graduation among mothers with offspring in early or middle childhood. Hence, the negative impacts of

²⁹The original dataset combines individuals in the SRC and SEO samples. Low-income households are overrepresented in the SEO sample.

the unemployment rate on the home environment might be attributed in part to variation over the business cycle in the characteristics of mothers raising children.

In order to control for the influence of parental background, I estimate the family and person fixed-effects models from equations (8) and (9). The former and latter sets of results are exhibited in Tables 11 and 12. The point estimate for the coefficient on the unemployment rate is negative in each case, suggesting that a higher unemployment rate adversely affects the quality of the home environment. In the family fixed-effects regressions, the unemployment rate has a significantly negative impact on the total, cognitive, and emotional scores for infants/toddlers and early adolescents. In the person fixed-effects regressions, the unemployment rate has a significantly negative impact on the total and cognitive scores in middle childhood as well as the total, cognitive, and emotional scores in early adolescence. The findings are consistent with a negative causal effect of the unemployment rate on the home environment.

4.3.2 Further Items

To investigate the mechanisms through which the unemployment rate can affect the home environment, several items from each part of the HOME-SF inventory are separately analyzed.³⁰ The outcomes examined from each part are as follows with the applicable parts listed in parentheses: the child having at least one children's book (A, B, C, D); the mother reading to the child at least once a week (A, B, C); the mother taking the child to the grocery at least once a week (A); the number of cuddly or role-playing toys that the child has (A); the number of push or pull toys that the child has (A); the child seeing his/her father daily (A, B); the child eating with both his/her mother and father at least once a day (A, B, C, D); the mother having spanked the child in the past week (A, B, C, D); the child's family receiving at least one

³⁰The estimates summarized here are available from the author on request.

magazine regularly (B); the child having a tape recorder or similar device (B); the child having been taken to a museum in the past year (B, C, D); the number of hours that the television is on at home (B); the child having a musical instrument to use at home (C, D); the child's family receiving a daily newspaper (C, D); the child being taken to the theater in the past year (C, D); the child participating in special lessons or extracurricular activities (C, D); the child spending time daily with his/her father (C, D); the parents discussing television programs with the child (C, D).

To account for changes over the business cycle in the backgrounds of parents raising children, the family and person fixed-effects models in equations (8) and (9) are estimated.³¹ The specific items from the HOME-SF inventory are used as dependent variables instead of the aggregate scores. In the family fixed-effects regressions, the unemployment rate has a significantly negative impact on receiving at least one magazine regularly at home during early childhood, having access to a musical instrument at home and visiting a museum or the theater in the past year during middle childhood, and visiting a museum in the past year and receiving special lessons during early adolescence. A higher unemployment rate also increases the probability among early adolescents of being spanked by one's mother in the past week. In the person fixed-effects regressions, the unemployment rate has a significantly negative impact on visiting a museum in the past year during early adolescence and on receiving special lessons and visiting a museum or the theater in the past year during middle childhood. A higher unemployment rate also increases the probability among infants/toddlers of seeing one's father daily.

In addition to the information from the HOME-SF inventory, the NLSY79-CH contains a number of questions about prenatal and postnatal care. These data are used to examine the impact of economic conditions on parental behavior around the time of birth.³² The following actions and outcomes are

³¹The estimates for alternative specifications are available from the author on request.

³²The estimates summarized here are available on request from the author.

examined: the mother visiting a medical professional for prenatal care; the mother smoking and drinking during pregnancy; the mother taking vitamins, reducing calories, lowering salt; the child's gestation length; the mother having a Caesarean section; the child's birth weight; the child's length at birth; the duration of breastfeeding. Depending on whether the dependent variable covers the period up to or after the child's birth, the measure of economic conditions is the average unemployment rate in the year before and the year of the child's birth or the average unemployment rate in year of and the year after the child's birth.

In order to control for changes in parental background, fixed-effects estimates are computed using sibling data.³³ Specifically, each outcome is regressed on the average national unemployment rate around birth along with fixed effects for family, a gender dummy, and a linear trend in year of birth. The standard errors are clustered by family. A higher unemployment rate significantly increases the probabilities of the mother reducing caloric intake and salt consumption during pregnancy and of the child ever being breastfed and being breastfed for at least six months.

On the whole, the unemployment rate has a negative impact on the home environment during much of childhood, although a higher unemployment rate may enhance some aspects of prenatal and neonatal care. The latter result is consistent with the findings of Dehejia and Lleras-Muney (2004), who document an improvement in infant health during periods of high unemployment. The former result accords with the findings in sections 4.1 and 4.2, which identify a negative relationship between the unemployment rate in childhood and human capital measures as an adult.

³³The estimates for alternative specifications are available from the author on request.

4.3.3 Robustness Checks

A series of robustness checks parallel to those in sections 4.1.2 and 4.2.2 were conducted.³⁴ First, the specifications were reestimated using the rate of insured unemployment for each state instead of the state unemployment rate as a regressor. Second, the estimates were replicated after substituting the employment-to-population ratio for the unemployment rate as a gauge of labor market tightness. Third, the regressions were performed based only on children with a mother in the cross-sectional sample of the NLSY79.³⁵ Overall, the basic pattern of results is insensitive to these adjustments. That is, I continue to detect a negative impact of the unemployment rate on home environments and caregiving practices during much of childhood. This finding is unlikely to be attributable to changes in the background characteristics of parents raising children.

5 Conclusion

This paper examines the impact of macroeconomic conditions in childhood on labor market outcomes as an adult. Using a large sample from the ACS, I find significant evidence of a negative relationship between the average unemployment rate in childhood and several measures of schooling, employment, and income. Economic conditions both early and later in childhood may be important determinants of adult outcomes.

Using a matched sample of parents and children from the PSID, I show that the findings cannot be easily attributed to selection by couples over the business cycle into child rearing. The impact of childhood economic conditions does not weaken after controlling for parental background variables, and the underlying quality of parents raising children is not lower during

³⁴These results are available from the author on request.

³⁵The original dataset contains individuals with a mother in the cross-sectional or supplemental sample of the NLSY79. Blacks, hispanics, and disadvantaged whites are over-represented in the supplemental sample.

an economic downturn. Moreover, family fixed-effects regressions reveal a negative estimated impact of the unemployment rate in childhood on adult economic performance.

Using detailed information on parental caregiving from the NLSY79-CH, I investigate how the quality of a child's home environment varies over the business cycle. The data indicate that an economic downturn reduces the quality of the home environment during much of childhood, although prenatal and postnatal care might improve during a recession. Family and person fixed-effects estimates confirm that the findings are not attributable to a relationship between macroeconomic conditions and the background characteristics of parents raising children.

In sum, the evidence is consistent with a causal effect of childhood economic conditions on parental investments in children as well as the stock of human capital in adulthood. The impacts are often large in magnitude. In terms of policy implications, the empirical results provide a rationale for targeting economic stimulus programs towards children. Policies designed to enhance a child's home environment may help mitigate some of the adverse impacts of a recession on adult economic outcomes. Improvements in neighborhoods and schools might also be beneficial for this purpose. Both older and younger children may be in need of assistance.

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Table 1: Descriptive Statistics for ACS Sample

	Born from <u>1935 to 1981</u>	Born from <u>1948 to 1981</u>
<u>Basic Demographics</u>		
Pct. White	85.95	85.49
Pct. Female	50.95	50.71
Pct. South	30.10	29.80
Mean (S.D.) Year Born	1959.38 (9.95)	1961.72 (8.48)
Mean (S.D.) Age	47.48 (9.70)	45.34 (8.53)
<u>Unemployment Rate</u>		
Mean (S.D.) National U.E. Rate btw. Ages -1 and 15	5.46 (0.88)	—
Mean (S.D.) State U.E. Rate btw. Ages -1 and 15	—	6.59 (1.57)
<u>Schooling</u>		
Pct. High School and Above	93.03	93.65
Pct. College and Above	30.98	31.51
Pct. Some Graduate School	11.77	11.59
<u>Employment</u>		
Pct. Worked Last Year	86.03	88.68
Pct. in Labor Force	81.42	84.59
Pct. Currently Employed	78.15	81.12
<u>Wage Income</u>		
Pct. Worked and Income \geq \$10K	60.29	63.16
Pct. Worked and Income \geq \$20K	36.01	37.79
Pct. Worked and Income \geq \$30K	18.81	19.66
<u>Sample Size</u>		
Observations	9,794,615	8,491,751

Note: The summary statistics above are based on the main estimation sample for the ACS. Wage income is deflated using the CPI with 1982-1984 as the base period. National and state unemployment rates are constructed as described in the text.

Table 2: Descriptive Statistics for PSID Sample

	Born from 1925 to 1979 and Matched <u>with Parent</u>	Born from 1948 to 1979 and Matched <u>with Parent</u>
<u>Basic Demographics</u>		
Pct. White	58.42	58.29
Pct. Female	52.76	53.99
Pct. South	42.91	42.45
Mean (S.D.) Year Born	1956.26 (7.63)	1957.47 (6.89)
Mean (S.D.) Age	38.79 (7.21)	38.23 (6.78)
<u>Unemployment Rate</u>		
Mean (S.D.) National U.E. Rate btw. Ages -1 and 15	5.16 (0.71)	—
Mean (S.D.) State U.E. Rate btw. Ages -1 and 15	—	6.32 (1.78)
<u>Schooling</u>		
Pct. High School and Above	89.72	90.39
Pct. College and Above	24.49	24.13
Pct. Some Graduate School	10.10	9.84
<u>Employment</u>		
Pct. Worked Last Year	87.68	87.68
Pct. in Labor Force	85.80	85.83
Pct. Currently Employed	79.60	79.39
<u>Wage Income</u>		
Pct. Worked and Income \geq \$10K	61.99	61.61
Pct. Worked and Income \geq \$20K	33.34	32.59
Pct. Worked and Income \geq \$30K	15.29	14.71
<u>Sample Size</u>		
Individuals	6,742	6,439
Observations	64,798	58,642

Note: The summary statistics above are based on the main estimation sample for the PSID. Wage income is deflated using the CPI with 1982-1984 as the base period. National and state unemployment rates are constructed as described in the text.

Table 3: Descriptive Statistics for NLSY79-CH Sample

	Part A: Infant/ Toddler	Part B: Early Childhood	Part C: Middle Childhood	Part D: Early Adolescence
<u>Basic Demographics</u>				
Pct. White	55.29	54.46	51.41	48.34
Pct. Female	49.19	49.56	49.44	49.80
Pct. South	35.06	36.66	38.16	38.84
Mean (S.D.) Year	1991.29 (4.73)	1992.59 (5.23)	1994.53 (5.89)	1997.59 (5.51)
Mean (S.D.) Age	1.59 (0.93)	4.51 (0.94)	8.02 (1.30)	12.16 (1.36)
<u>Unemployment Rate</u>				
Mean (S.D.) National U.E. Rate	6.03 (0.95)	5.91 (0.96)	5.76 (0.98)	5.52 (0.95)
Mean (S.D.) State U.E. Rate	6.13 (1.64)	5.98 (1.61)	5.83 (1.57)	5.57 (1.41)
<u>HOME-SF Inventory</u>				
Mean (S.D.) Total Raw Score	140.86 (24.33)	204.81 (36.28)	198.84 (38.02)	202.09 (35.85)
Mean (S.D.) Cognitive Stimulation Raw Score	67.85 (15.67)	117.14 (22.57)	98.40 (24.52)	92.98 (23.19)
Mean (S.D.) Emotional Support Raw Score	73.03 (14.77)	87.60 (20.24)	100.45 (20.86)	109.11 (20.38)
<u>Sample Size</u>				
Individuals	5,410	6,600	7,659	6,734
Observations	6,723	8,593	12,323	11,999

Note: The summary statistics above are based on the main estimation sample for the NLSY79-CH. Parts A, B, C, and D of the HOME-SF inventory are generally administered to children aged 0-2, 3-5, 6-9, and 10-14 years, respectively. National and state unemployment rates are constructed as described in the text.

Table 4: Relationship of Unemployment Rate in Childhood to Adult Outcomes for ACS Sample

	H.S. Diploma	College Degree	Grad. School	Worked Last Yr.	In Labor Force	Currently Employed	Worked & Y ≥ \$10K	Worked & Y ≥ \$20K	Worked & Y ≥ \$30K
<u>Born Between 1935 and 1981</u>									
Average National Unemployment Rate in Childhood									
U.E. Rate btw. Ages -1 and 15	-0.0075 (0.0023)	0.0063 (0.0053)	0.0033 (0.0032)	-0.0084 (0.0017)	-0.0094 (0.0019)	-0.0089 (0.0020)	-0.0095 (0.0033)	-0.0035 (0.0027)	0.0001 (0.0015)
National Unemployment Rate at Age 18 Also									
U.E. Rate btw. Ages -1 and 15	-0.0110 (0.0020)	-0.0026 (0.0040)	-0.0020 (0.0024)	-0.0109 (0.0017)	-0.0124 (0.0017)	-0.0120 (0.0018)	-0.0131 (0.0031)	-0.0071 (0.0025)	-0.0016 (0.0013)
U.E. Rate at Age 18	-0.0032 (0.0007)	-0.0080 (0.0015)	-0.0048 (0.0008)	-0.0023 (0.0005)	-0.0027 (0.0006)	-0.0028 (0.0006)	-0.0033 (0.0010)	-0.0033 (0.0008)	-0.0016 (0.0004)
Sample Size	47 Birth Years / 9,794,615 Observations								
<u>Born Between 1948 and 1981</u>									
Average State Unemployment Rate in Childhood									
U.E. Rate btw. Ages -1 and 15	-0.0019 (0.0010)	-0.0065 (0.0022)	-0.0040 (0.0016)	-0.0068 (0.0013)	-0.0075 (0.0014)	-0.0079 (0.0014)	-0.0077 (0.0019)	-0.0002 (0.0016)	0.0036 (0.0009)
State Unemployment Rate at Age 18 Also									
U.E. Rate btw. Ages -1 and 15	-0.0015 (0.0010)	-0.0074 (0.0022)	-0.0060 (0.0019)	-0.0083 (0.0013)	-0.0086 (0.0015)	-0.0088 (0.0016)	-0.0082 (0.0022)	0.0009 (0.0016)	0.0049 (0.0007)
U.E. Rate at Age 18	0.0002 (0.0002)	-0.0005 (0.0004)	-0.0011 (0.0003)	-0.0008 (0.0003)	-0.0006 (0.0003)	-0.0005 (0.0003)	-0.0003 (0.0004)	0.0006 (0.0002)	0.0007 (0.0002)
Sample Size	51 Birth States / 8,491,751 Observations								

Note: The main estimation sample for the ACS is used. The specifications in the upper panel contain indicator variables for race, gender, birth state, survey year, and age. The specifications in the lower panel control for race, gender, birth state, age dummies, fixed effects for survey year, indicator variables for year born, and a linear trend in year born specific to each birth state. Huber-White standard errors, clustered by birth year in the upper panel and by birth state in the lower panel, are reported in parentheses.

Table 5: Relationship of Unemployment Rates at Different Stages of Childhood to Adult Outcomes for ACS Sample

	H.S. Diploma	College Degree	Grad. School	Worked Last Yr.	In Labor Force	Currently Employed	Worked & Y ≥ \$10K	Worked & Y ≥ \$20K	Worked & Y ≥ \$30K
<u>Born Between 1935 and 1981</u>									
Average National Unemployment Rate at Different Stages of Childhood									
U.E. Rate at Age -1	-0.0024 (0.0006)	-0.0022 (0.0008)	-0.0011 (0.0005)	-0.0017 (0.0004)	-0.0020 (0.0005)	-0.0022 (0.0005)	-0.0032 (0.0007)	-0.0022 (0.0005)	-0.0009 (0.0002)
U.E. Rate at Age 0	0.0002 (0.0008)	-0.0002 (0.0011)	-0.0005 (0.0006)	-0.0005 (0.0005)	-0.0002 (0.0006)	-0.0000 (0.0007)	0.0003 (0.0009)	0.0003 (0.0008)	0.0001 (0.0003)
U.E. Rate btw. Ages 1 and 5	-0.0014 (0.0007)	0.0036 (0.0013)	0.0027 (0.0010)	-0.0009 (0.0006)	-0.0015 (0.0006)	-0.0014 (0.0007)	-0.0015 (0.0010)	-0.0001 (0.0008)	0.0004 (0.0004)
U.E. Rate btw. Ages 6 and 10	0.0031 (0.0011)	0.0155 (0.0017)	0.0087 (0.0011)	0.0007 (0.0008)	0.0006 (0.0010)	0.0013 (0.0010)	0.0043 (0.0015)	0.0058 (0.0012)	0.0036 (0.0005)
U.E. Rate btw. Ages 11 and 15	-0.0006 (0.0008)	0.0081 (0.0017)	0.0031 (0.0013)	-0.0015 (0.0006)	-0.0025 (0.0007)	-0.0024 (0.0008)	-0.0003 (0.0011)	0.0009 (0.0009)	0.0019 (0.0005)
Sample Size	47 Birth Years / 9,794,615 Observations								
<u>Born Between 1948 and 1981</u>									
Average State Unemployment Rate at Different Stages of Childhood									
U.E. Rate at Age -1	0.0001 (0.0001)	0.0008 (0.0003)	0.0005 (0.0002)	0.0000 (0.0002)	-0.0000 (0.0002)	-0.0002 (0.0002)	-0.0002 (0.0002)	-0.0003 (0.0002)	-0.0001 (0.0001)
U.E. Rate at Age 0	0.0003 (0.0002)	-0.0000 (0.0003)	0.0003 (0.0002)	-0.0002 (0.0002)	-0.0002 (0.0002)	-0.0002 (0.0002)	-0.0001 (0.0003)	0.0001 (0.0002)	-0.0003 (0.0002)
U.E. Rate btw. Ages 1 and 5	-0.0009 (0.0004)	-0.0005 (0.0011)	-0.0005 (0.0006)	-0.0011 (0.0004)	-0.0013 (0.0005)	-0.0015 (0.0005)	-0.0014 (0.0008)	0.0007 (0.0006)	0.0015 (0.0005)
U.E. Rate btw. Ages 6 and 10	-0.0006 (0.0004)	-0.0022 (0.0008)	-0.0007 (0.0005)	-0.0024 (0.0004)	-0.0027 (0.0005)	-0.0028 (0.0005)	-0.0028 (0.0006)	-0.0006 (0.0006)	0.0009 (0.0005)
U.E. Rate btw. Ages 11 and 15	-0.0001 (0.0003)	-0.0020 (0.0006)	-0.0021 (0.0004)	-0.0019 (0.0004)	-0.0019 (0.0004)	-0.0021 (0.0005)	-0.0020 (0.0006)	0.0001 (0.0005)	0.0008 (0.0003)
Sample Size	51 Birth States / 8,491,751 Observations								

Note: The main estimation sample for the ACS is used. The specifications in the upper panel contain indicator variables for race, gender, birth state, survey year, and age. The specifications in the lower panel control for race, gender, birth state, age dummies, fixed effects for survey year, indicator variables for year born, and a linear trend in year born specific to each birth state. Huber-White standard errors, clustered by birth year in the upper panel and by birth state in the lower panel, are reported in parentheses.

Table 6: Relationship of Unemployment Rate in Childhood to Adult Outcomes for PSID Sample

	H.S. Diploma	College Degree	Grad. School	Worked Last Yr.	In Labor Force	Currently Employed	Worked & Y ≥ \$10K	Worked & Y ≥ \$20K	Worked & Y ≥ \$30K
<u>Born Between 1925 and 1979 and Matched with Parent</u>									
Average National Unemployment Rate in Childhood									
Without Parental Background Variables									
U.E. Rate btw. Ages -1 and 15	-0.0265 (0.0101)	-0.0026 (0.0117)	0.0082 (0.0088)	-0.0027 (0.0091)	0.0008 (0.0090)	-0.0014 (0.0109)	-0.0050 (0.0112)	0.0044 (0.0100)	0.0069 (0.0065)
With Parental Background Variables									
U.E. Rate btw. Ages -1 and 15	-0.0298 (0.0122)	-0.0052 (0.0146)	0.0052 (0.0101)	-0.0050 (0.0103)	0.0009 (0.0103)	-0.0028 (0.0116)	-0.0057 (0.0137)	0.0057 (0.0147)	0.0098 (0.0086)
Sample Size	51 Birth Years / 6,742 Individuals / 64,798 Observations								
<u>Born Between 1948 and 1979 and Matched with Parent</u>									
Average State Unemployment Rate in Childhood									
Without Parental Background Variables									
U.E. Rate btw. Ages -1 and 15	-0.0002 (0.0170)	-0.0128 (0.0139)	-0.0092 (0.0113)	-0.0077 (0.0067)	-0.0100 (0.0073)	0.0009 (0.0085)	-0.0045 (0.0148)	0.0018 (0.0152)	0.0074 (0.0089)
With Parental Background Variables									
U.E. Rate btw. Ages -1 and 15	-0.0102 (0.0154)	-0.0380 (0.0121)	-0.0202 (0.0094)	-0.0115 (0.0055)	-0.0145 (0.0067)	-0.0034 (0.0073)	-0.0143 (0.0115)	-0.0142 (0.0121)	-0.0065 (0.0095)
Sample Size	49 Childhood States / 6,439 Individuals / 58,642 Observations								

Note: The main estimation sample for the PSID is used. Parental background variables are indicators for mother's and father's first occupation, educational attainment, and birth year. The categories for occupation at first regular job are: professional and technical workers; managers, officials, and proprietors; self-employed businessmen; clerical and sales workers; craftsmen and foremen; operatives; laborers and service workers; and armed services and protective workers. The categories for educational attainment are: less than high school graduate, high school diploma, some college, college degree, and some post-graduate training. The specifications in the upper panel contain indicator variables for race, gender, childhood state, survey year, and age at the end of the survey year. The specifications in the lower panel control for race, gender, childhood state, age dummies, fixed effects for survey year, indicator variables for year born, and a linear trend in year born specific to each childhood state. Huber-White standard errors, clustered by birth year in the upper panel and by childhood state in the lower panel, are reported in parentheses.

Table 7: Relationship of Unemployment Rate in Childhood to Parental Characteristics for PSID Sample

	H.S. Diploma	College Degree	Grad. School	Worked Last Yr.	In Labor Force	Currently Employed	Worked & Y ≥ \$10K	Worked & Y ≥ \$20K	Worked & Y ≥ \$30K
<u>Mothers of Individuals Born Between 1925 and 1979</u>									
Average National Unemployment Rate in Youth's Childhood									
U.E. Rate btw. Ages -1 and 15	0.0288 (0.0140)	0.0261 (0.0097)	0.0151 (0.0044)	0.0123 (0.0130)	0.0131 (0.0121)	0.0063 (0.0117)	0.0215 (0.0105)	0.0199 (0.0056)	0.0101 (0.0028)
Sample Size	49 Birth Years for Youth / 106,941 Observations on Mother								
<u>Fathers of Individuals Born Between 1925 and 1979</u>									
Average National Unemployment Rate in Youth's Childhood									
U.E. Rate btw. Ages -1 and 15	0.0624 (0.0172)	0.0226 (0.0202)	-0.0163 (0.0133)	0.0068 (0.0081)	0.0102 (0.0099)	0.0077 (0.0098)	0.0128 (0.0113)	0.0213 (0.0148)	0.0192 (0.0139)
Sample Size	46 Birth Years for Youth / 91,502 Observations on Father								
<u>Mothers of Individuals Born Between 1948 and 1979</u>									
Average State Unemployment Rate in Youth's Childhood									
U.E. Rate btw. Ages -1 and 15	-0.0159 (0.0166)	-0.0135 (0.0092)	-0.0041 (0.0036)	0.0174 (0.0080)	0.0209 (0.0087)	0.0182 (0.0079)	0.0058 (0.0077)	-0.0076 (0.0053)	-0.0017 (0.0025)
Sample Size	48 Childhood States for Youth / 104,100 Observations on Mother								
<u>Fathers of Individuals Born Between 1948 and 1979</u>									
Average State Unemployment Rate in Youth's Childhood									
U.E. Rate btw. Ages -1 and 15	0.0640 (0.0239)	0.0179 (0.0217)	0.0178 (0.0196)	0.0073 (0.0106)	0.0055 (0.0099)	0.0050 (0.0126)	0.0435 (0.0159)	0.0128 (0.0242)	0.0078 (0.0266)
Sample Size	46 Childhood States for Youth / 89,394 Observations on Father								

Note: The dataset contains an observation for every survey year in which the parent of an individual in the main estimation sample for the PSID has valid data on years of schooling, total hours worked, total labor income, and employment status. The specifications in the upper half of the table control for parent's race, youth's childhood state, parent's survey year, and parent's age at the end of the survey year as well as a linear trend in the youth's birth year. The specifications in the lower half of the table control for parent's race, youth's childhood state, parental age dummies, fixed effects for parent's survey year, indicator variables for youth's birth year, and a linear trend in the youth's birth year specific to the youth's childhood state. Huber-White standard errors, clustered by youth's birth year in the upper half and by youth's childhood state in the lower half, are reported in parentheses.

Table 8: Family Fixed-Effects Estimates for Relationship of National Unemployment Rate in Childhood to Adult Outcomes for PSID Sample

	H.S. Diploma	College Degree	Grad. School	Worked Last Yr.	In Labor Force	Currently Employed	Worked & Y ≥ \$10K	Worked & Y ≥ \$20K	Worked & Y ≥ \$30K
U.E. Rate btw. Ages -1 and 15	-0.0330 (0.0151)	-0.0055 (0.0074)	0.0003 (0.0075)	-0.0121 (0.0121)	-0.0089 (0.0118)	-0.0119 (0.0124)	-0.0209 (0.0172)	-0.0092 (0.0092)	-0.0020 (0.0084)
Sample Size	1,897 Families / 5,703 Individuals / 58,849 Observations								

Note: The dataset is constructed by expanding the main estimation sample for the PSID to include respondents who do not have a parent with data in the survey and by restricting the resulting sample to respondents who have a sibling in the sample for some year. The specifications include fixed effects for survey year and dummy variables for age at the end of the survey year. A gender dummy is also added. Huber-White standard errors, clustered by family, are reported in parentheses.

Table 9: Relationship of Current State Unemployment Rate to HOME-SF Inventory Scores for NLSY79-CH Sample

	Standardized Total Score	Standardized Cognitive Score	Standardized Emotional Score
<u>Part A: Infant/Toddler</u>			
U.E. Rate	-.0048 (.0164)	-.0035 (.0154)	-.0057 (.0180)
Maternal Background	No	No	No
Sample Size	Yes	Yes	Yes
	50 States / 5,410 Individuals / 6,723 Observations		
<u>Part B: Early Childhood</u>			
U.E. Rate	-.0106 (.0119)	-.0178 (.0150)	.0011 (.0117)
Maternal Background	No	No	No
Sample Size	Yes	Yes	Yes
	50 States / 6,600 Individuals / 8,593 Observations		
<u>Part C: Middle Childhood</u>			
U.E. Rate	-.0300 (.0104)	-.0117 (.0126)	-.0412 (.0143)
Maternal Background	No	No	No
Sample Size	Yes	Yes	Yes
	50 States / 7,659 Individuals / 12,323 Observations		
<u>Part D: Early Adolescence</u>			
U.E. Rate	-.0479 (.0205)	-.0185 (.0164)	-.0630 (.0286)
Maternal Background	No	No	No
Sample Size	Yes	Yes	Yes
	50 States / 6,734 Individuals / 11,999 Observations		

Note: The main estimation sample for the NLSY79-CH is used. The scores for each part of the HOME-SF inventory are standardized among individuals at the same age level. Maternal background variables are indicators for mother's first occupation, educational attainment, AFQT quartile, and birth year. The quartiles for the AFQT score are computed by comparing each mother's AFQT score to the AFQT scores of all female respondents in the NLSY79 with the same year of birth. The categories for occupation after first leaving school are the 23 major occupational groups in the 2000 SOC. The categories for educational attainment are: less than high school graduate, high school diploma, some college, college degree, and some post-graduate training. The estimates control for race, gender, state of residence, indicator variables for survey year, fixed effects for age at the end of the survey year, and a linear trend in survey year specific to each state of residence. Huber-White standard errors, clustered by state of residence, are reported in parentheses.

Table 10: Relationship of Current State Unemployment Rate to Maternal Characteristics for NLSY79-CH Sample

	<u>AFQT \geq Q1</u>	<u>AFQT \geq Q2</u>	<u>AFQT \geq Q3</u>	<u>H.S. Diploma</u>	<u>College Degree</u>	<u>Grad. School</u>
	<u>Mothers of Individuals in Home Inventory Part A: Infant/Toddler</u>					
U.E. Rate	-0.0035 (.0065)	-0.0125 (.0084)	-0.0095 (.0071)	-0.0117 (.0079)	-0.0103 (.0081)	.0002 (.0032)
Sample Size	50 States / 6,723 Observations					
	<u>Mothers of Individuals in Home Inventory Part B: Early Childhood</u>					
U.E. Rate	-0.0092 (.0099)	-0.0085 (.0105)	-0.0103 (.0092)	-0.0171 (.0058)	-0.0063 (.0060)	.0000 (.0027)
Sample Size	50 States / 8,593 Observations					
	<u>Mothers of Individuals in Home Inventory Part C: Middle Childhood</u>					
U.E. Rate	-0.0052 (.0059)	-0.0052 (.0057)	-0.0047 (.0059)	-0.0159 (.0050)	-0.0049 (.0037)	-.0001 (.0022)
Sample Size	50 States / 12,323 Observations					
	<u>Mothers of Individuals in Home Inventory Part D: Early Adolescence</u>					
U.E. Rate	.0058 (.0071)	-.0025 (.0084)	.0007 (.0057)	.0073 (.0054)	-.0004 (.0051)	-.0029 (.0015)
Sample Size	50 States / 11,999 Observations					

Note: The dataset is constructed by matching each observation on an individual in the main estimation sample for the NLSY79-CH to the available information on the individual's mother. The quartiles for the AFQT score are computed by comparing the mother's AFQT score to the AFQT scores of all female respondents in the NLSY79 with the same year of birth. The estimates control for mother's race, state of residence, fixed effects for mother's year of birth, indicator variables for survey year, and a linear trend in survey year specific to each state of residence. Huber-White standard errors, clustered by state of residence, are reported in parentheses.

Table 11: Family Fixed-Effects Estimates for Relationship of Current National Unemployment Rate to HOME-SF Inventory Scores for NLSY79-CH Sample

	<u>Standardized Total Score</u>	<u>Standardized Cognitive Score</u>	<u>Standardized Emotional Score</u>
	<u>Part A: Infant/Toddler</u>		
U.E. Rate	-0.0584 (0.0188)	-0.0392 (0.0195)	-0.0564 (0.0211)
Sample Size	1,702 Families	4,132 Individuals	5,216 Observations
	<u>Part B: Early Childhood</u>		
U.E. Rate	-0.0092 (0.0127)	-0.0135 (0.0142)	-0.0037 (0.0148)
Sample Size	2,174 Families	5,425 Individuals	7,166 Observations
	<u>Part C: Middle Childhood</u>		
U.E. Rate	-0.0148 (0.0100)	-0.0191 (0.0104)	-0.0044 (0.0119)
Sample Size	2,628 Families	6,900 Individuals	11,208 Observations
	<u>Part D: Early Adolescence</u>		
U.E. Rate	-0.0566 (0.0113)	-0.0357 (0.0110)	-0.0591 (0.0133)
Sample Size	2,312 Families	6,014 Individuals	10,850 Observations

Note: The dataset is constructed as follows. The main estimation sample for each part of the HOME-SF inventory from the NLSY79-CH is expanded to include children who may be missing information on maternal characteristics. The resulting sample is then restricted to observations on individuals who have a sibling in the sample for that part of the HOME-SF inventory in some year. The scores for each part of the HOME-SF inventory are standardized among individuals at the same age level. The specifications include a linear trend in survey year and fixed effects for age at the end of the survey year. A gender dummy is also added. Huber-White standard errors, clustered by family, are reported in parentheses.

Table 12: Person Fixed-Effects Estimates for Relationship of Current National Unemployment Rate to HOME-SF Inventory Scores for NLSY79-CH Sample

	<u>Standardized Total Score</u>	<u>Standardized Cognitive Score</u>	<u>Standardized Emotional Score</u>
		<u>Part A: Infant/Toddler</u>	
U.E. Rate	-0.0538 (0.0330)	-0.0595 (0.0339)	-0.0203 (0.0361)
Sample Size		1,365 Individuals / 2,730 Observations	
		<u>Part B: Early Childhood</u>	
U.E. Rate	-0.0246 (0.0203)	-0.0348 (0.0231)	-0.0079 (0.0243)
Sample Size		2,066 Individuals / 4,132 Observations	
		<u>Part C: Middle Childhood</u>	
U.E. Rate	-0.0282 (0.0137)	-0.0404 (0.0143)	-0.0040 (0.0169)
Sample Size		4,672 Individuals / 9,516 Observations	
		<u>Part D: Early Adolescence</u>	
U.E. Rate	-0.0535 (0.0139)	-0.0400 (0.0140)	-0.0488 (0.0163)
Sample Size		4,543 Individuals / 10,023 Observations	

Note: The dataset is constructed as follows. The main estimation sample for each part of the HOME-SF inventory from the NLSY79-CH is expanded to include children who may be missing information on maternal characteristics. The resulting sample is then restricted to observations on individuals who are in the sample for that part of the HOME-SF inventory in at least two years. The scores for each part of the HOME-SF inventory are standardized among individuals at the same age level. The specifications include a linear trend in survey year and fixed effects for age at the end of the survey year. Huber-White standard errors, clustered by person, are reported in parentheses.