Table 1: Effects of Mild Early Life Shocks on Future Outcomes

Study	Micro - Data, N	Identification strategy and specification	Effects of the shock	Heterogeneity in mechanisms/effects
Panel A: Nutrition Shocks				
Adhvaryu et al., (2016). Effects of introduction of iodine fortification in the U.S. on age 25-55 education and labor market outcomes.	1) Census 1950-1980 that provide data on educ, wages, N= 418,791 obs. 2) Data on the geographic distribution of iodine deficiency prior to salt iodization comes from spatial distribution of goiter in 1924.	DD: Compare cohorts exposed in-utero (1920-1927) to iodized salt with those slightly older (& unexposed) (1928-1931), across states with high vs. low iodine deficiency rates prior to the salt fortification. Models include rich controls, region*birth year dummies, & year of birth FE & region of birth FE using 9 Census Bureau divisions.	Labor force participation: +1.35pp (2.2%=0.03 of a SD) (women: 1.63pp). Positive wage earning: +0.8pp (2.0% = 0.016 of a SD). No significant effects on education. Income quintiles: the likelihood of being in the 2nd wage income quantile rose by 0.35 to 0.68pp more during and after the roll out of iodized salt in high goiter compared to in low goiter states.	Results are driven by impacts on women: salt iodization accounts for 5% of the rise in female participation btw 1950 & 1990. Effects on LFP were larger in the 1st & 2nd income quintiles: effect = 1pp.
Almond and Mazumder (2011). Effects of exposure to Ramadan fasting on birth outcomes and adult disability, education, and mortality in Michigan, Iraq, and Uganda.	1) Census data for: Iraq 1997; N=250,000 (Muslims: 11%), Ages 20-39 Uganda 2002; N= 80,000 (Muslims: 11%), Ages 20-80. 2) Michigan Natality data, universe of births, 1989-2006, N~2.5M birth records.	Exploit the timing (month) of Ramadan as a natural experiment in diurnal fasting and fetal health. DD model: compare Muslim outcomes (treatment) to non-Muslim outcomes (control). Identifying assumption: pregnancies are not timed relative to Ramadan along unobserved determinants of health. Models include controls for month of birth FE, geographic location FE, and rich individual controls (estimates are ITT).	Exposure to Ramadan: BW= -18gr for Arab-named pregnancies (-0.6%). Effects by trimester: -21, -26, 0 grams, effects by month: -40 grams in first 2 months of pregnancy & in months 5th/7th significant effects. Adult disability: +22% (eff. in 1st month only, driven by mental or learning disabilities.) Mortality: "due to aging" +0.37pp (~+70% wrt the mean). Wealth: -2.6pp, -2.1pp less likely to own a home (males only). Education: no effects.	Most of the estimated effect of early pregnancy exposure is in the middle of the distribution. No gradient in BW by maternal education, Medicaid use, or month prenatal care was initiated. Effect sizes are similar in Uganda and Iraq.
Almond, Mazumder, and Van Ewijk (2015). Effect of exposure to Ramadan fasting in utero on age 7 schooling attainment in England.	1) England's Register data "Key Stage 1 scores", students' academic performance for those who attend state schools, 1998-2007. 2) Pupil Level Annual School Census (PLASC), covers all enrolled pupils in each year, includes demog & socioeconomic characteristics including ethnicity. Authors link data on the Key Stage 1 scores to the PLASC for e/year using unique student identifier from 2002 onwards and a 2-step matching process prior to 2002. N=326,592 obs.	DD strategy: authors take the effect on Muslims and use and non-Muslims to control for possible seasonal effects. Design exploits the fact that Ramadan moves through the calendar. Control group: Caribbean students. Models include child's state of birth*child's YOB FE, cubic time trend of the N_days between the DOB & January 1, 1960. Authors also fully interact each regressor (except for the geographic FE) w/a dummy for Muslim.	Ramadan exposure in the 1st trimester: Test scores (math, reading, & writing "Key Stage 1"): -0.05 to -0.08 of a SD. By months of pregnancy: Math: -0.068, -0.059, -0.081 of a SD in 1st, 2nd, & 3rd months of pregnancy (no effects in other months). Reading: -0.054, -0.067, -0.073 SD. Writing: -0.052, -0.053, -0.055 SD. Effects rise monotonically over the course of the 1st trim; largest effects in 3rd trim. Estimates are downward biased to the extent that Ramadan is not universally observed.	NA

Table 1: Effects of Mild Early Life Shocks on Future Outcomes

Study	Micro - Data, N	Identification strategy and specification	Effects of the shock	Heterogeneity in mechanisms/effects
Panel A: Nutrition Shocks				
Feyrer, Politi, and Weil (2013). Effect of introducting iodine fortification in the U.S. in 1924 on military skill levels (young adult males) and thyroid related deaths.	1) Statistics from draft physicals for WWI, include info. on the incidence of goiter prior to treatment for 151 regions. 2) Dataset of men who enlisted in the Army during WWII; indicates who was drafted into the Air Force (highly skilled) vs Ground Forces (less skilled) based on an Army General Classif. Test (AGCT), source: National Archives & Records Administration N=2 million records in 1938 - 1946.	Compare cohorts born just before & after iodized salt introduced in 1924.Two sources of variation: i) pre-existing (<1924) iodine deficiency; ii) timing of the intervention. Also exploit the fact that the Air Force was assigned draftees w/higher test scores than Ground Forces. This non-random assignment is key for identification strategy. Linear Prob (& Logit) Models include interaction of goiter in 1924 in region of birth * YOB dummies, YOB dummies * enlistment year dummies, enlistment month dummies.	Individuals born in 1925 & 1926 (introduction of iod. salt was in 1924): Prob(being assigned to Air Forces- indicator of high skill): +0.3 to 0.6pp (full sample); +2.5-8.7pp (individuals in initially high goiter areas). Thyroid-related deaths: +10,000 in 1925-1942 (older groups more affected because they were iodine deficient for a longer period). Note: In 1926 death rates were >6 times as high for women as for men though sample is male.	NA
Fitzsimons and Vera-Hernandez (2013). Effect of breast-feeding in the U.K. on cognition and health at age 7.	UK Millenium Cohort Study; 9 months (2000/2001), 3 years (2004/05), 5 years (2006), 7 years (2008). Data includes hour of child's birth. N= 18,500 babies born (sample excludes C-section deliveries). Authors corroborate data w/Maternity Users Survey a postal survey conducted on 26,000 mothers, 3 months after birth.	Instrumental variables: Exploit timing in day of the week children are born (children born on weekend or just before, are less likely to receive breast feeding support services). IV: instrumental variable is being born on a weekend.	Breastfeeding has large effects on cognitive development, but NOT on noncognitive skills or physical health. Breastfeeding: Cognitive dev index: +0.6 of a SD.	NA
Greve, Schultz-Nielsen, and Tekin (2015). Examine the effect of Ramadan fasting on student outcomes in Denmark.	1) Danish administrative records on Danish, English, Math, & Science test scores in 9th grade. 2) Danish birth registry, which includes exact info on gestation length and birth date N=11,291 children.	DD: exploit the overlap between time in utero of children born in Denmark with the month of Ramadan. Treatment group: children born to immigrant parents from predominantly Muslim countries Control group: children born to immigrant parents from predominantly NON-Muslim countries.	Child is Muslim*Child was exposed to Ramadan: No overall effects on Danish, English, Math or Science test scores. Authors estimate models by gender & by gender-SES.	Estimates are larger for girls and for children of lower socioeconomics status mothers. Danish test scores: -1.08 SD (females and low SES children). English test scores: -1.84 SD; -1.6 SD (females and low SES children). Math test scores: -1.04 SD; -0.98 SD (males and low SES children).

Table 1: Effects of Mild Early Life Shocks on Future Outcomes

Study	Micro - Data, N	Identification strategy and specification	Effects of the shock	Heterogeneity in mechanisms/effects
Panel A: Nutrition Shocks				
Hoffman (2014). Effects of Ramadan Fasting in 7 Muslim countries on sex ratios of 0-60 month olds.	DHS data from 7 Muslim countries, 1987 - 2013; N=275,627 births.	Exploit variation in the timing of Ramadan throughout the year, across countries. Treatment group: individuals exposed to Ramadan (at least 1 month) during gestation, controls not exposed. Models include month of birth, year of birth, & country FE, & country-specific time trends, mother's FE.	Exposure to Ramadan during pregnancy: Prob(child is a girl): +2.4% (+ 0.024 SD). Exposure to Ramadan in the first 3 months of pregnancy: Prob(miscarriage): +1% (0.004 SD). No effects on neonatal death or infant death.	Effects somewhat larger in rural areas and in mothers without primary education. e.g., for less educated mothers: P(child is a girl): +3.4% (+0.035 SD) P(misscarriage): +1.7% (+0.017 SD) P(neonatal death): no effect P(infant death): 1.4% (0.014 SD) (driven by exposure to Ramadan in the month of birth).
Linnemayr and Alderman (2011). Effect of nutritional supplementation in Senegal on weight for age for children 0-3.	Baseline survey conducted in April 2004 in 212 villages, includes info on health status of children, SES of the children's household, nutrition, child care, etc.; follow-up in 2006; N=200,000 households.	1) DD comparing 111 treatment and 110 control villages. 2) IV: use planned treatment assignment as an instrument for actual treatment. 3) Propensity score matching across treatment and control villages. Models include initial village-level characteristics (e.g., distance to the next village), interactions of village characteristics and planned treatment, dummies for child age.	Weight-for-age: Using DD model: +0.1 SD Using IV: +0.31 SD (effect only observed on children <6 months). Using PSM: +0.27 SD	By child's age: authors find significant weight gain for younger children (these children were impacted in utero). "Most malnutrition occurs by 18 months w/limited catch-up after that."
Ludwig, Rouse, and Currie (2013). Maternal weight gain during pregnancy and child BMI in Arkansas.	1) Vital Statistics Natality data: universe of births in Arkansas 1989-2005, N=42,133 women (91,045 offspring). 2) State mandated data on childhood BMI from public schools (August 18, 2003 to June 2, 2011).	1) Exclude pre & post terms, multiple gestational N, maternal diabetes, & extremes in BW's. 2) incorporate measured confounders in models. 3) Sibling FE design. Models include rich maternal controls, month of child's age, & year of birth FE.	One additional Kg of pregnancy weight gain: Childhood BMI: +0.022 (0.06% = 0.004 of a SD). Childhood overweight/obesity: OR increased by 1.007. Variations in pregnancy weight gain accounted for a 0.43 kg/m2 difference in childhood BMI.	NA
von Hinke Kessler Scholder et al, (2014). Examines short and long-run effects of maternal alcohol consumption during pregnancy.	1) Avon Longitudinal Study of Parents and Children (ALSPAC); Panel follows cohort born in Avon, England in ~1991-1992. N=4,088 children. 2) Children's scores are obtained from the National Pupil Database, a census of all pupils and measured at 7, 11, 14, and 16.	Exploit genetic variation in the maternal alcohol-metabolism gene ADH1B to instrument for fetal alcohol exposure. Authors claim that at a population level, genetic variants are unrelated to socioeconomic characteristics. Instrument: dummy for whether an individual carries either one or two copies of the rare allele. Models control for child's genotype on the same variant, and for the ancestry-informative principal components.	Exposure to an additional unit of alcohol (instrumented by mother having the rare allele): 1st stage: Mothers who carry the rare allele are -11 to -15pp less likely to consume any alcohol during pregnancy (-53% w.r.t. the mean). Key Stage examination test scores (at ages 7, 11, 14, 16): -0.2 to –0.3 SD (no mean stats provided to compute % changes of the coefficient).	Estimates are slightly larger for children of lower education and lower income mothers. No difference by gender or partner's social class at birth.

Table 1: Effects of Mild Early Life Shocks on Future Outcomes

Study	Micro - Data, N	Identification strategy and specification	Effects of the shock	Heterogeneity in mechanisms/effects
Panel B: Stress				
Aizer (2011). Impact of domestic violence on birth outcomes in California.	Hospital admissions for assault during pregnancy in CA, 1991-2002 matched with universe of births in CA. N~500,000 pregnant women/yr.	2 challenges: i) possible omitted variables bias, ii) non-random under-reporting of domestic violence. Author uses: i) IV: A control function where IV is the enforcement of laws against domestic violence across jurisdictions, ii) Matching estimates on many covariates (n=1,542 women matched). Models include rich indiv controls, county*year dummies, a quadratic in year, county FE for the 5 largest counties in CA.	As criminal sanctions increase, domestic violence declines. Using control func. method: BW: -163gr due to hospitalization for an assault while pregnant (OLS models predict a BW decline of -161gr). Effects of violence on BW are larger in 1st half of pregnancy than in 3rd trim's (-166, -118, & -97gr in e/trim respect.) Using matching: BW = -159gr	NA
Aizer, Stroud, and Buka (2016). Examine relationship between measured cortisol levels during 3rd trimester and education at age 7.	National Collaborative Perinatal Project (NCPP); mothers cortisol levels were measured in 3rd trim and their children were followed up to age 7; years of birth: 1959 to 1965, sample used in study are 2 cities: Boston and Providence. N= 1,093 pregnancies (368 siblings).	Regression model w/indicator of cortisol exposure in pregnancy and rich individual controls and sibling FE.	Being exposed to highly elevated cortisol in-utero: Education: -0.39 to -1.1 yrs of schooling (0.58 of a SD) (sibling FE)	Children born to mothers without a HS degree & exposed to highly elevated cortisol in-utero: Education: -2 yrs of schooling (sibling FE). No effect among children of more educ moms.
Currie and Rossin-Slater (2013). Effect of stress due to potential hurricane exposure during pregnancy on infant health outcomes in Texas.	1) Vital statistics, 1996-2008, includes info on mothers' names, DOB, & residential addresses (helps identify mothers who were in the path of major tropical storms & hurricanes), child's exact DOB, county of birth N= 1,270,441 births 2) Data on hurricanes come from the Weather Underground Hurricane Archive; publicly available.	Exploit the temporal & geographic variation in the ocurrence of hurricanes in Texas. Mother FE (to account for mother's time invariant characteristics) with IV to account for a mother's endog. migration in response to a hurricane. Instrument is a mother's county of residence in 1st pregnancy.	Exposure to hurricanes: No effects on LBW or gestation. Prob. of abnormal cond.: +60% (including meconium aspiration syndrome or being on ventilator >30 min). Prob. of having complications during labor/delivery: +30%.	NA

Table 1: Effects of Mild Early Life Shocks on Future Outcomes

Study	Micro - Data, N	Identification strategy and specification	Effects of the shock	Heterogeneity in mechanisms/effects
Panel B: Stress				
Lee (2014). Intergenerational effect of stress mother suffered while in utero (due to Kwangju uprising in Korea) on her children's birth outcomes 20 to 22 years later.	1) Korean vital statistics, 2000 & 2002, N=1,124,848 births.	Natural experiment: Massacre of >500 civilians and wounding of 3000 in the Kwangju (KU), Korea in 1980. DD: Assume that individuals whose mother resided in Kwangju in May 1980 & who were born between June 1980 & February 1981 were exposed to stress caused by the violence in utero. Models include cubic time trends, and rich mother controls.	Exposure to the KU shock by trimester of pregnancy: BW: -37grams (-1.1%) (1st trim), -105 grams (-3.2%) (2nd), no effect (3rd trim) LBW: +1.7% (1st trim), +4.0% (2nd trim), +1.3% (3rd trim) Preterm: no effect (1st trim), +4.6% (2nd trim), +1.5% (3rd trim).	NA
Persson and Rossin-Slater (2016). Asks how death of a family member during pregnancy affects birthweight, mental and physical health, hospitalizations, and income up to age 30.	1) Universe of children in Sweden in 1973, 1977, 1983, 1988, 1995, 1999, 2001, & 2005. Link child to information on siblings, parents, grandparents, aunts and uncles and maternal great-grandparents. Review cause of death register for all family members, combine with information about child's exact DOB, birth outcomes and later health outcomes as well as income and taxation register with labor income up to age 30. N=63,756 obs.	Exploit the quasi-random variation in the exact timing of bereavement relative to the child's expected date of delivery at full-term. Models include year & month of conception FE, & municipality where a mother lived at conception of child FE.	In-utero exposure to the death of a relative: Mental health outcomes Uses prescription drug: +6% (No standard deviations of ouctomes provided) Uses anti-anxiety drugs: 11% Uses anti-depression drugs: 9% Daily dose of ADHD med.: 23% BW: -18gr (-0.5% = -0.03 of a SD) (eff driven by lower tail of distrib) LBW: +20%; VLBW: +30%; Preterm: +15% No significant effects on physical health or income.	NA
Quintana-Domeque and Rodenas-Serrano (2016). Effect of in utero stress due to terrorist attacks in Spain on birth outcomes.	1) Vital stats; live births conceived btw 1980-2003; N=6.5 million live births 2) The Victims of ETA Dataset: provides the N of casualties committed by ETA between January 1980 & February 2003 in each day & region Datasets merged at the trimester and province levels.	DD: exploit the variation in casualties accross provinces (50 geographical regions) & months-years (more than 275 conception month-years) Models include mother's province of residence FE, year & month of conception FE, a vector of control variables (birth order, mother's age, marital status, etc.), size of the municipality of residence categories, province-specific linear time trends.	1 additional bomb casualty in the 1st trimester of pregnancy: BW: -0.7grams (-0.02%) (no standard deviations provided in Table 1) Prematurity: +0.9 per 1,000 live births (-0.02%) Normality: 0.6 per 1,000 live births. Results are driven by exposure to terrorism in the 1st trimester.	By gender: no differential effect for both boys and girls (results not shown).

Table 1: Effects of Mild Early Life Shocks on Future Outcomes

Study	Micro - Data, N	Identification strategy and specification	Effects of the shock	Heterogeneity in mechanisms/effects
Panel C: Disease				
Almond, Currie, and Hermann (2011). Effect of disease environment as proxied by postneonatal mortality rates on the health of women observed in the U.S. vital statistics natality data.	U.S. vital statistics natality & mortality records: authors are able to link the post-neonatal mortality rates in the mother's state of birth & provide info on outcomes of mother & infant. 1) Vital Statistics natality microdata, 1989 –2006, N~3.5- 4 million births/yr 2) Mortality microdata, 1960 – 1991.	Exploit the geographic & temporal variation in post-neonatal mortality rates (across racial groups) from 1960 to 1990 in 5 large states . Aggregate data into cells by mother's state and YOB, age, and race, and child's state and YOB. Regression models (defined at the mother's race, state of birth, in YOB & yr, state, age that mother gave birth) include mother characteristics, mother's state of birth FE, child's YOB *child's state FE, maternal single year age FE, mother's state of birth linear time trends, linear time trends in maternal age FE.	An additional postneonatal death per 1,000 in the year after mother's YOB: Health: Diabetes: 1.8% (0.009 of a SD); 1.4% = 0.007 of a SD (whites), 3.5% = 0.012 of a SD (blacks). Hypertension: no effects SES: Educ attainment: -0.1% (-0.012 of a SD) Married: -0.6% (-0.009 of a SD) Maternal behav: smoking +2% (-0.02 of a SD); high weight gained 1.7% (0.01 of a SD).	Larger impacts for blacks than for whites. The mean PNMRt+1 for whites (4.0) and the mean PNMRt+1 for blacks (8.4) suggest that the early life disease environment increased the probability of diabetes during pregnancy by almost 30% for blacks compared to 5.6% for whites.
Baird, Hicks, Kremer, and Miguel (2016). Effects of deworming on test scores and anthropometrics of 8-15 year old children in Kenya.	1) Longitudinal data from 75 rural schools treated 1998-2001. 2) Kenya Life Panel Survey (KLPS) 2007-2009, tracked N=7,500 respondents who had been enrolled in grades 2-7 in the 75 treated schools at baseline in 1998.	Reduced form model: includes dummy for treatment, N of treatm pupils in 6Km, & N of treatm schools in 6Km & baseline indiv & school characteristics. Estimate exposure to spillovers using the N of pupils attending deworming treatment schools within 6Km, conditional on total N of primary school pupils within 6Km.	Health: Self-reported health is v. good: +4.1pp (+ 0.085 of a SD); Prob of miscarriage: -2.7pp (-0.69 of a SD) (females only). Education: yrs of schooling +0.3 (+0.10 of a SD), English vocab. tests +0.076 of a SD. Labor market outcomes: work hours: +1.76hrs = 12% (+0.12 of a SD); wages: +30.1 log points = 3.8% (0.36 of a SD). Shifts in employment towards full-time jobs with higher wages (i.e., manufacturing) (males) & away from casual labor & domestic services (females).	No differences in labor supply effects by gender or by age or by initial infection rate. Externality effects: an increase of 1SD in local density of treatment school pupils (917 pupils= treating 20% of local primary school pop), leads to: +3 hours worked/wk
Beach, Ferrie, Saavedra, and Troesken (2016). Typhoid rates in 3-yr MA around birth on adult education and earnings.	1) Census data of 1900 & of 1940. 2) City-year level typhoid fatality rates for 75 cities (source: Whipple (1908); 10th annual Census mortality statistics). N=189,515 obs.	Exploit variation in typhoid fatality rates during early life as a proxy for water quality. Instrument typhoid fever using lagged city-level typhoid rates that lie upstream). "Cities that dump their sewage into a river will increase future typhoid rates for cities downstream." Models include controls for being black, city & year of birth FE, birth order FE.	1st stage: Lagged typhoid rates in the feeder city are a strong predictor of typhoid rates in the receiving city (F-stat>517.81). Educational attainment: +1 month of schooling (OLS) (0.9%=0.026 of a SD) (no effect obtained from IV). Earnings: +1% (OLS) (0.012 of a SD); +9% (IV) (0.10 of a SD). No effect on home owning.	NA

Table 1: Effects of Mild Early Life Shocks on Future Outcomes

Study	Micro - Data, N	Identification strategy and specification	Effects of the shock	Heterogeneity in mechanisms/effects
Panel C: Disease				
Bhalotra and Venkataramani (2013). Effects of diarrheal disease on test scores of children in Mexico at age 9-15.	1) Mexican Family Life Survey (MxFLS), N=8,500 HHs in 150 communities in 16 states, waves: 2001-2002; includes month & year of birth, birth state, indicators of HH wealth, parental investment. 2) PISA Test score data: waves 2003, 2006 & 2009 for cohorts born in 1987/1988, 1990, & 1993; includes school quality, parental investments. 3) Census micro-data 1960-2000 from IPUMS (to study empl. & occup. trends by gender).	Reduction in the risk of waterborne disease from a major water reform in Mexico in 1991. Reform introduced suddenly in reaction to threat of cholera in neighboring countries. Exploit state*yr variation in program intensity. DD model: includes respiratory disease as a control disease un affected by the reform but a leading cause of child morbidity & mortality. ITT estimates identifying assumption: test scores are uncorrelated w/the timing of the water reform. Models include indiv controls in pre-1991*dummy Post, state & year of birth FE, state time trends.	A 1 SD reduction in childhood diarrhea mortality rates: Test scores (Raven): +0.1 of a SD (0.6%) (girls only) Reading: 0.04 of a SD (+0.7%) (girls only) Math: 0.05 of a SD (+0.8%) (girls only) A 1 SD decrease in diarrheal mortality rates in childhood reduces gender gap by 80% (MX gender gap smaller than the OECD avg gap: 11 in 500 points).	Effects are driven by low SES girls.
Bhalotra and Venkataramani (2015). Examine the impacts of pneumonia in infancy on adult (males) education, employment, disability, income and income mobility.	1) US Census micro data for 1980-2000; authors focus on men only who were born born between 1930-1943; N=2,018,898 men (of which less than 10% are Blacks).	Exploit state variation in 1937 in the introduction of sulfa antibiotics to prevent pneumonia. Treatment group: cohorts in their infancy in 1937 or later. Control group: cohorts in their infancy before 1937. Models include an interaction between: (the pre-sulfa pneumonia mortality rate in the birth state in 1930-1936) * (Dummy for cohorts who were in their infancy in 1937 or later) Models include indiv controls, birth state & birth year varying observables, state linear time trends.	A 1 SD decline in pneumonia exposure in the birth state due to the introduction of antibiotics: Years of schooling: +0.1 (no SD provided in paper) HS completion: +1.5% College completion: +1.2% Cognitive disability: -0.6% Work-related disability: -0.6% Employment: +0.4% Income: +1.5% Having income in the lowest quintile: -0.47% Having income in the highest quantile: +0.41%	By levels of institutional-racial segregation: "Black men born in the least segregated states reaped substantial gains from infant exposure to sulfa drugs, while blacks born in the more segregated states saw muted gains".

Table 1: Effects of Mild Early Life Shocks on Future Outcomes

Study	Micro - Data, N	Identification strategy and specification	Effects of the shock	Heterogeneity in mechanisms/effects
Panel C: Disease				
Currie and Schwandt (2013). Shows that there is seasonality in health at birth within mother and that this may reflect seasonal flu epidemics.	1) Vital Statistics Natality data in NJ (1997-2006), NYC (1994-2004), & PA (2004 -2010). N=647,050 pairs of siblings (1,435,213 children). 2) Info. on prevalence of Influenza is obtained from the Center for Disease Control (1997-onward).	Analyze the seasonality of health at birth by comparing siblings conceived by the same mother at different times using sibling FE. Compare impact of coming to term in early winter in high flu and low flu years.	Conception from Jan. to May is associated with significant reductions in gestation (-0.08 week) and prematurity within families: +1pp (13.2%). Birth weight falls by -4gr (increases by 8gr if conception occurs in June-August). More severe flu seasons show stronger effects. In children coming to term in high flu season the risk of negative birth outcomes is much higher, suggesting that exposure to flu late in pregnancy causes preterm delivery.	The seasonal pattern in health outcomes is observed across SES, child gender, & birth order groups.
Oizer (2014). Spillover effects of the Kenya deworming program measured at ages 8-15.	Data on children were collected in 2009 and in 2010 at all of the deworming project schools in Samia and Bunyala districts of Kenya's Western Province; includes N= 20,000 children with info on collected height, weight, and migration status; and 2,400 children, cognitive measures were collected.	"Conditional on child's age & data collection year, deworming exposure was randomized." Treatment group: children born in 1998 in communities w/ the deworming program. Control group: children born in 1998 in a community w/out the deworming program (the program only started to operate in 2001 in control communities, i.e., when these cohorts were age 3).	Community deworming before age 1: Raven's matrices: +0.22 of a SD PPVT: no effect Verbal fluency: +0.19 SD. No effects on height. "That Raven's Matrices are responsive to the intervention suggesting that even mild disease burdens early in childhood can alter cognitive development."	By gender: no differences. By differential exposure within the HH: Having older siblings in an affected school: Raven's matrices +0.42 SD. Having older female siblings in an affected school: Raven's matrices +0.84 SD (females more likely to care for younger siblings).
Schwandt (2016). Effect of maternal hospitalization for influenza during pregnancy on earnings, welfare dependance, etc. at 19-32 in Denmark.	1) Danish Birth Records, 1980-1993; N= 700,000 births. 2) Income Register & Population Register, 1980, 2012; ages 19-32. 3) National Patient register, 1980-2012, ages 18+; used to link births to maternal hospitalizations during pregnancy; this dataset helps identify influenza-like illness infections in pregnant women. Datasets are merged using personal identifiers.	Exploit the variation in seasonal influenza in the month of conception. Models include individual controls & mother-FE. Author also uses an IV strategy: instrument for 3rd trimester influenza exposure to correct for the potential bias that a shorter duration of pregnancy is correlated with a shorter period in which a mother can be infected by influenza.	Influenza admission during pregnancy (dummy): BW: -77grams (-2.2% = -0.14 SD). LBW: +2.9pp (+66%). Gestation (weeks): -0.3 (-0.8% = -0.17 SD). Preterm: +4pp (+88%). Sex ratio: no effect. LT outcomes: Earnings: -10% (0.09 SD). Labor force participation: -7%. Welfare dependance: +43%. Labor mkt outcomes are driven by exposure in 2nd & 3rd trimesters.	By mother's educ: Children of mothers w/ low educ are less likely to be in school (at ages 18-20) & have fewer yrs of educ compared to children of other moms. Effects are driven by influenza admissions in the 3rd trimester.

Table 1: Effects of Mild Early Life Shocks on Future Outcomes

Study	Micro - Data, N	Identification strategy and specification	Effects of the shock	Heterogeneity in mechanisms/effects
Panel C: Disease				
Venkataramani (2012). Effects of malaria exposure in Mexico on adult cognition.	1) 2002 Mexican Family Life Survey; N=1,649 men and 2,184 women. Data include test scores, employment, HH & individual income, expenditure, education, anthropmetrics, morbidity, health care utilization, migration. 2) State-level data on the avg death rate (per 100,000) from malaria 1949-1953 (erradication began in 1957).	Exploit the nationwide introduction of malaria eradication efforts in Mexico: DD Strategy: compare the change in outcomes btw cohorts born before & after the intervention in areas that benefited more from the policy against the same change for cohorts born in less malarious regions. Models include state and year of birth FE and birth state specific linear time trends, individual controls.	Birth year exposure to malaria eradication: Raven Progressive Matrices test scores: +0.11 to 0.22 SD (+25 to 51%). Household consumption expenditures: +6.5 to 13.6%. Total Schooling: no effect. Cohorts affected by the policy entered and exited school earlier: Age at school entry: falls by -0.15 to -0.37 years. Age @school exit: falls by -0.55 to -1.06 years.	By gender: effects are only observed for men.
Ward and Phipps (2014). Exposure to flu in utero on health and cognition of 4-5 year old children in Canada.	1) National Longitudinal Study of Children and Youth (NLSCY), 1992- (week 37) to 2011 (week 34), N=11,888. 2) Rate of laboratory confirmed influenza includes influenza laboratory surveillance rates, from the Canadian Respiratory Virus Detection/Isolation Surveillance System (RVDI). 3) Hospital counts from records of inpatient discharges, 1996-2006; & Google Flu Trends data.	Exploit the weekly variation in Influenza surveillance rates across provinces to estimate effects of exposure during gestation on child cognition & health. Models include the Influenza term & its square to capture nonlinear effects. Also year, month, & province FE, seasonal factors & individual characteristics. Conception date: N of gestational weeks before e/child's DOB where gestational length is based on the date of the mother's last menstrual period.	An increase of 1 SD from the mean Influenza surveillance rate (in the whole pregnancy) has no statistically significant effect. The effect of each week of Influenza during the 1st trimester (13 week-period): PPVT: -1.1pp (1.1% = 0.07 of a SD) Chronic condition: -2.8pp (-14.7% =-0.08 of a SD).	NA

Table 1: Effects of Mild Early Life Shocks on Future Outcomes

Study	Micro - Data, N	Identification strategy and specification	Effects of the shock	Heterogeneity in mechanisms/effects
Panel D: Pollution				
Aizer, Currie, Simon, and Vivier (2016). Examine the effects of Rhode Island's policies to reduce preschool blood lead levels on third grade test scores.	1) Blood lead levels (BLL) from Rhode Island (RI) Department of Health: includes age at test, test method (capillary or venous), census tract, and BLL. 2) Child's test scores from the RI Department of Education: include NECAP12 test scores in 3rd grade. 3) Confidential birth certificates of children born in RI: include child's home address + individual and maternal characteristics. N=71,000 children.	IV to control for confounding and for measurement error in blood lead levels (instrument: introduction of a lead remediation program). Models control for individual covariates, Census tract FE, average test scores in the child's school & grade, year and month of birth FE. Key assumption: Growth in the N of lead safe certificates in a neighborhood is uncorrelated with other factors increasing test scores. Authors also estimate models using the subset of children who have both venous + capillary measures using the former as instruments for the later.	A 1-unit increase in mean blood lead: Reading test score: -0.07 SD (-2%) Probability of substantially below proficient in reading: +25.7%. The BLL levels declined by 2.23 milligrams per deciliter from 1997 to 2005.	By score distribution: "The effects are larger at the lower end of the score distribution".
Arceo-Gomez, Hanna, and Oliva (2012). Asks how variations in air pollution (CO and PM10) due to inversions in Mexico City affect infant mortality.	1) Mortality data from the Ministry of Health; includes birth & death certificates, & contains info on date of birth & municipality of residen. N=not specified. 2) Pollution: Automatic Network of Atmospheric Monitoring (RAMA) longitudinal data; includes PM10, SO2, CO, O3; years of data 1997-2006 for 48 municipalities. 3) Thermal inversions data from Ministry of Environment.	1) Reduced form model that includes municipalities FE, week FE, & municipality-specific year trends. 2) IV approach: Exploit the meteorological phenomenon of thermal inversions; use the N of inversions in a given week to instrument for pollution levels that week. IV Models include rich controls, municipality & year FE, & week-municipality trends.	IV results: A 1% increase in CO: Infant mortality: a 0.23% increase. A 1% increase in PM10 over a year: Infant mortality: a 0.42% increase. 1st stage results: E/inversion leads to a 3.5% increase in PM10 & a 5.4% increase in CO. The overall decline in pollution from 1997 to 2006 predicts a decline of 277 infant deaths per 100,000 births.	Non-linearities in the effects of pollution: using estimates from Currie & Neidell (2005) authors find suggestive evidence of non-linearities only in the CO effect.

Table 1: Effects of Mild Early Life Shocks on Future Outcomes

Study	Micro - Data, N	Identification strategy and specification	Effects of the shock	Heterogeneity in mechanisms/effects
Panel D: Pollution				
Bharadwaj, Gibson, Graff-Zivin, and Nielsen (2016). Effect of fetal exposure to carbon monoxide on 4th grade test scores in Chile.	1) Vital statistics: Universe of births 1992 -2002; N=627,530 births. 2) Education data (SIMCE): test scores (math, language) for e/student, 2002-2010. 3) Data from pollution monitors (CO, PM10, O3), 1998-2001. Authors construct an Air Quality Index (AQI). 4) Data on air quality alerts to help address concerns related to avoidance behavior. Data are merged using individual ids.	Sibling FE regressions control for child's gender, & for seasonality, temperature, precipitation, fog, wind, & month and year FE. Models also include a measure of avoidance behavior based on air quality alerts. As a robustness check, authors use PM10 instead of CO & include ozone pollution level controls.	A 1 SD increase in CO exposure during the 3rd trimester of pregnancy: 4th grade math test scores: -0.036 SD. 4th grade language test scores: -0.042 SD. No significant effects were observed in 1st or 2nd trim. Sibling FE slightly larger than OLS estimates. Controlling for avoidance behavior, has a modest impact on estimates.	By mother's educ: effects of CO exposure are larger for children of mothers w/out a high school diploma. Language test scores: -0.096 SD in 1st trim & -0.082 SD in 3rd trim whereas for children more educ mothers effect is -0.029 sd in 3rd trimester.
Billings and Schnepel (2015). Effects of an Early Intervention for Children Exposed to Lead.	1) Admin data from the "Lead Poisoning Prevention Program" in Charlotte NC, includes preschool blood lead level tests. 2) Public school records: k-garten to 12th grade, 1998-1999 to 2010-2011. 3) Criminal arrest records 2006-2013. 4) Birth certificate records from NC: 1990-1997, provides parental info & child's BW. 5) County assessor's data for all parcels; match to lead test results based on home address. N=312 children (treatment 119; control 193). Authors match 54% to 86% of data.	Children with 2 consecutive tests of 10 micrograms of lead per deciliter of blood (µg/dL) receive an elevated Blood lead level (BLL) intervention. DD: Compare individuals in treatment group (2 tests with BLL>=10µg/dL) with control group (1st test with BLL>=10µg/dL & 2nd test of 5µg/dL<=BLL<=10µg/dL). "Basic intervention": education for caregivers, optional home investigation, referral to lead remediation services "Intensive intervention": services in basic + nutritional assessment + medical evaluation + WIC	Children with high BLL who were assigned to: Basic intervention: Antisocial behavior (Index based on absences & N of days suspended, school reported crimes, adolescent criminal arrests, positive effect is good): +0.179 SD. Education (Index based on math & reading test, grade retention): +0.128 SD. Intensive intervention: Antisocial behavior: +0.382 SD. Education: +0.368 SD.	NA

Table 1: Effects of Mild Early Life Shocks on Future Outcomes

Study	Micro - Data, N	Identification strategy and specification	Effects of the shock	Heterogeneity in mechanisms/effects
Panel D: Pollution				
Black, Bütikofer, Devereux, and Salvanes (2014). Ask how prenatal exposure to fallout from above ground nuclear testing in the 1950s and 1960s affected IQ, earnings, education at 18-35 years in Norway.	1) Norwegian registry data covers the population of Norwegians up to 2009 (education register, family register, tax and earnings register); N=37,000. 2) Norwegian military records, provides IQ scores for men only; N=94,649. 3) Norwegian Defense Research Establishment : Total beta radiation in the air expressed as Bq/m3, and (ii) total beta radiation on the ground) expressed in Bq/m2.	Regional fallout was determined by wind, rainfall, & topography. Significant fallout in 1957-1958 & in 1962 -1963. Authors compare individuals born within the same municipality but born in diff. month/year of birth (and thus exposed to different levels of radiation in utero). Models include individual/family charact,municipality of birth FE & YOB* month of birth FE's, municipality linear trends, interactions between municp*yr, & munip*month sibling FE.	A 1 SD increase in monthly exposure to ground(air) radiation: Male IQ scores: -0.04 (-0.06) of a SD (effect size: -2% (-1%) of a SD) (exposure in months 3 & 4). Yrs of schooling: -0.08 (-1%) (men), -0.1 (-1%) (women) (exposure in months 3 & 4). Earnings and adult height: negative although weak effects. Intergenerational transmission of HK: Exposure of parents in utero leads to Son's IQ: -0.025 of a SD (no effect for daughters).	Little evidence for non-linearities (the estimates are monotonically increasing in magnitude w/quintile); only for quintiles 3-5 of exposure that there are any significant negative impacts of radioactive fallout. Effects are greater for individuals born to more highly educated parents.
Currie (2011). Asks whether minority and less educated mothers are more likely to be exposed to toxic releases from plants and/or Superfund sites during pregnancy in 5 large U.S. states.	1) Individual-Level Natality Data, 5 large states (FL, MI, NJ, PA, & TX), 1989 (N= 3,948,042 singleton births) & 2006 (N=4,121,898); data include a mother's residential location. 2) Data on pollution: Superfund sites (see column J) & facilities listed in the EPA TRI.	DD model: Exploit timing in exposure to the pollution cleanups & the distance of mother's residence to pollution sites. The treatment is "Close × (After Cleanup)" which represents the extent to which the area surrounding a Superfund site became “Y” (e.g., "whiter") after a cleanup. Models include rich mother controls & controls for county & yr of child's birth FE. Also examine effects of information about toxic release inventory sites on migration.	Following cleanups, mothers in the immediate vicinity of a Superfund site are more likely to be: “white college educated” mothers: +10.1%. Also, white college educated mothers are more likely to leave an area when new information about toxic releases is revealed -8.7%.	Whites and educated mothers are more likely to respond to information or changes in pollution levels, which may partially explain lower exposure levels.

Table 1: Effects of Mild Early Life Shocks on Future Outcomes

Study	Micro - Data, N	Identification strategy and specification	Effects of the shock	Heterogeneity in mechanisms/effects
Panel D: Pollution				
Currie, Graff Zivin, Meckel, et al. (2013). Asks how potential exposure to contaminated drinking water affects birth outcomes in New Jersey.	1) NJ vital statistics natality data - all births, 1997-2007, include mother's residence, siblings matched using mother's full maiden name, race & birth date, father's information, & SSN; N=521,978. 2) Records of drinking water violations in NJ, 1997-2007. 3) Temperature & precipitation statistics. 4) Map of drinking water service areas in New Jersey.	Sibling FE with IV (instrument for actual contamination using the contamination that would have been experienced had gestation lasted exactly 39 weeks). Models control for temperature & other controls, & year*month of birth effects. Authors address the mechanical correlation btw gestation length, and exposures by using IV.	Living in a water district with contaminated water during pregnancy: using mother-FE + IV: LBW: +6% due to any chemical cont. +14% due to any contamination. Prob(preterm): no effects (full sample). Authors address the mechanical correlation btw gestation length & exposures by using IV.	LBW: + 14.6% (of a SD) for mothers with HS educ or less; Prob(preterm birth): +10.3% (of a SD) for mothers with HS educ or less.
Currie and Walker (2011). Estimate effects of E-ZPass (which reduced traffic congestion and vehicle emissions near highway toll plazas) on birth outcomes.	1) Vital Statistics Natality records from PA, 1997-2002. 2) Vital Statistics Natality records from NJ, 1994-2003. 3) Data on housing prices in NJ, 1989-2009 to test if housing prices. N= 412,884 observations. Authors know the exact addresses of mothers.	Exploit the introduction of electronic toll collection (E-ZPass). Diff-in-Diff: compare mothers within 2 km of a toll plaza to mothers who are 2 to 10 km from a toll plaza. Models include month and year of birth FE, toll plaza FE, distance to highway, and maternal characteristics.	E-ZPass adoption reduced NO2 by 10.8%, likely reduced CO by 40% near toll plazas. E-ZPass adoption (comparing children of mothers within 2 km of a toll plaza to those of mothers who are 2 to 10 km from a toll plaza): Prematurity: -9.0 %; LBW: -11.3%. A 1-4% decline in pollution from cars leads to a 1% decline in LBW.	African Americans only: Prematurity: -22.4% LBW: -29.5%
Ferrie, Rolf, and Troesken (2014). Asks how lead in the water supply in the early 20th century affected the intelligence of Army Air Corps members in WWII.	1) 5% sample of the 1930 U.S. Pop Census. 2) Data on assignment to the air corps among Army recruits during WWII. N=44,040 enlistees in 293 cities. 3) Data on pH level of water used by the public water company in the enlistee's city of residence & w/the enlistee's air corps status.	Authors use "enlistee's state of birth" to identify early-exposure to lead. Water with high ph creates scale in lead pipes which reduces lead in water. Models include year & state of birth FE, a dummy for SES and an interaction btw SES and both pH and pH-squared.	Intelligence (dummy for assignment to the Army Air Corps): The probability of assignment to air corps was significantly reduced when water pH decreased (below 7.5) or increased (above 7.5), and this U-shape relationship was particularly strong for enlistees from low SES backgrounds.	Living in a city with acidic water increases the probability that a recruit from a blue collar family was assigned to the air corps by 7%. No effect for recruits from white collar families. Similar contrasts observed comparing children from unemployed vs. employed fathers and in HH's with low rent vs. high rent.

Table 1: Effects of Mild Early Life Shocks on Future Outcomes

Study	Micro - Data, N	Identification strategy and specification	Effects of the shock	Heterogeneity in mechanisms/effects
Panel D: Pollution				
Isen, Rossin-Slater, and Walker (2016). Effects of reductions in air pollution in non-attainment counties due to the 1970 Clean Air Acts on employment and earnings at ages 29-31.	Longitudinal Employer Household Dynamics (LEHD); 1998-2007, includes location & DOB. N=5.7M indiv.; universe of employed workforce quarterly earnings records; authors collapse data to the county*year (888 units in total). Earnings records: UI-covered earnings by employer/ quarter. Algorithm to match county of birth in LEHD to GNIS (95% of indiv. matched). 2) Authors match data to the REIS for county characteristics. 3) Authors match data to NCHS to examine infant health & use maternal, paternal, child characteristics.	Exploit sharp changes in ambient air pollution due to the implementation of the 1970 Clean Air Act Amendments (CAAA) to investigate effects of cleaner air on adult earnings. Compare cohorts born just before & just after the CAAA. Three methods: 1) reduced form model of the LT effect of TSP on earnings; these models include county FE, birth-state*year FE, indiv. controls. 2) two-step estimator: to construct group-level adjusted earnings (p. 9). 3) IV for air quality in county at birth. IV: dummy for the 1970 CAAA introduction at the county-year level.	A 10 unit decrease in TSP in-utero: Quarters employed: +0.7% Annual earnings: +1% Gains in lifetime income: +$4,300 (using a 5% annual discount rate) (2008 dollars). Total wage bill attributable to improved early life air quality: $6.5Bill. /cohort (2008 dollars). 1st stage: CAAA reduced TSP concentrations by 8-12 g/m3 (10% reduction; mean 95.9 g/m3).	By percentiles of the earnings distribution: most of the mean earnings effect is being driven by the bottom tail of the distribution (CAAA is associated with a decrease in the fraction of indiv. at the bottom tail of the distrib. & an increase in the fractions in middle parts of the distribution). Authors find little heterogeneity in effects of TSP on labor market outcomes across age groups (age 28, 29, 30, & 31). Little heterogeneity across gender, race (results not shown).
Knittel, Miller, and Sanders (2011). Ask how zip code level variations in air pollution due to traffic patterns affect infant health outcomes in California.	1) Vital statistics, 2002-2007, birth & death records. 2) Freeway Performance Measurement System (PeMS); traffic measures from freeways in Sacramento Valley, the Bay Area, & Los Angeles Basin. 3) EPA data on ambient pollution levels. 4) National Climatic Data Center info on ambient weather conditions. Authors collapse the data into mother zip code by birth week by total weeks survived cells; N= 1,436,739 obs.	Exploit the relationship between traffic fluctuations, ambient weather conditions, & various pollutants (CO, PM10 micrometers, & ground-level ozone) at the week & zip-code levels in CA. Instrument for week-to-week pollution using zip-level traffic & zip-level traffic interacted w/linear & quadratic weather variables). Models include rich weather and individual-level controls, a flexible spline in age in weeks, zip_code FE, zip*month*year FE.	A one-unit decrease in PM10: Infant mortality: -18 lives per 100,000 live births (-6%). Neither CO nor ozone have a statistically significant impact on child mortality. 1st stage: local pollution instrumented by car traffic & the interaction btw car traffic & weather measures is strong; however, authors do not show results on 1st stage.	A one-unit decrease in PM10: Blacks: no effect (but perhaps few blacks in CA). Births covered by Medicaid: -23 lives per 100,000 live births (~-8%). Births to HS dropouts: -29 lives per 100,000 live births (~-10%).

Table 1: Effects of Mild Early Life Shocks on Future Outcomes

Study	Micro - Data, N	Identification strategy and specification	Effects of the shock	Heterogeneity in mechanisms/effects
Panel D: Pollution				
Sanders (2012). Asks how variation pollution in the county and year of birth affects 10th grade math test scores in Texas.	1) Texas Education Agency (TEA) includes data on the Texas Assessment of Academic Skills (TAAS) & on the Texas Learning Index (TLI), 1994-2002, 10th graders; N= 1,902,463 studentsin 416 schools across 30 countie . 2) EPA database of historical air quality; includes readings from all pollution monitors within 20 miles of a county population centroid. 3) Global Surface Summary of the day: weather data. 4) REIS data on county characteristics.	Counties with more manufacturing saw greater decreases in pollution in the recession of 1981-1983. Instrument pollution levels using county-level changes in relative manufacturing employment. Instrument=TSPs as a function of all workers in a county employed in the manufacturing industry (SIC code 400) /total county employment levels in all other sectors in a given year. Estimates are LATE. Models include rich controls, school FE, year of test FE, school*year pupil-to-teacher ratios from the CCD. Data is collapsed by demographic group, school of attendance, year of birth, and year of test; regressions are weighted.	A 1SD decrease in TSP in a student's year of birth: High school test scores: 0.06 of a SD . 1st-stage: a 1pp increase in the ratio of relative manufacturing employment increases ambient TSP levels by 0.61 µg/m3 (F-test~33). IV estimates are larger than OLS estimates (0.06 vesus 0.02 of a SD) which could be due to: measurement error & the fact that IV identify local effects.	Results are significant only in the periods of the most drastic pollution variation, suggesting a subtle relationship that may be difficult to separate from background trends.

Table 1: Effects of Mild Early Life Shocks on Future Outcomes

Study	Micro - Data, N	Identification strategy and specification	Effects of the shock	Heterogeneity in mechanisms/effects
Panel E: Weather				
Aguero (2014). Examines the effect of high temperatures at various ages in childhood on adult heights in Mexico.	ENSANUT: Mexico's health & nutrition survey; cross-section; includes e/person's age & location; nationally rep. waves: 2000, 2006, 2012. N=65,000. 2) Mexico's National Weather Service: includes meteorological stations across the country. 3) District-level poverty index from CONAPO. Match HH data w/weather info using the coordinates of each station & the district where each individual lives.	Exploit year-to-year variation in temperature across districts in Mexico. Author claims that the year-to-year variation in weather is orthogonal to other unobserved determinants affecting health status. Models include controls to approximate initial health endowment, FE's at the district, birth cohort, survey year, state time trends. Author reports effects of temp by stages: i) in utero (exposure in the year before birth), ii) infancy (ages 1-4), iii) childhood (5-9), iv) adolescence (10-15).	Hotter temperatures in infancy & adolescence (two periods when human growth is fastest) are negatively associated with adult height. Being exposed to hotter temperatures prior to birth & in childhood is NOT associated w/future height.	Author includes interaction terms with all the temperature variables: By gender: no differences. By district poverty level: negative effects of hot temp are stronger for individuals living in poorer districts. Hot temp help amplify health differences by SES.
Krutikova and Lilleor (2015). Variations in rainfall in rural Tanzania in 10 years around birth on outcomes at 17 to 28.	1) the Kagera Health and Development Survey (KHDS); Baseline 1991-1994 (915 households in 51 villages), 1st follow-up in 2004 (sample expanded to 2500 HHs); 2nd follow-up in 2010 (sample expanded to 3300 HHs). The last waves include the outcome of interest. Final sample N=897 individuals. 2) Rainfall data at the monthly - village level.	Exploit the geographic and temporal variation in rainfall across villages in rural Tanzania. Siblings FE models. The coefficient of interest is the effect of rainfall in utero, in 0-1, 1-2 years of life.	A 10% increase in rainfall from the LR avg: "Core self-evaluation" (relative to siblings): +0.08 SD. (Note: no descriptive table with outcomes to convert the coefficient). Effect is significant ONLY in utero and not in the first 2 years of life. By trimester: the effect is similar across all trimesters (beta= 0.08SD).	By gender: little difference in the effects of rainfall.

Table 1: Effects of Mild Early Life Shocks on Future Outcomes

Study	Micro - Data, N	Identification strategy and specification	Effects of the shock	Heterogeneity in mechanisms/effects
Panel E: Weather				
Rocha and Soares (2014). Rainfall fluctuations in semi-arid parts of Brazil during gestational period and effects on birth weight and infant mortality.	1) Birth and mortality registration records used to create a municipality-by-month panel, 1996 -2010; N=188,640 obs. 2) Precipitation & temperature municipality-by-month weather data. 3) Census of 2000 & 2010: provides municipality info on the % of households w/access to piped water, sanitation.	Exploit variation in rainfall at the municipality & monthly levels. Health outcomes (measured as the municipality avg for children born in municipality i, on year y, month t) are regressed on avgerage temperature in the municipality over last 12-months, municipality-by-month of birth FE, year of birth FE, & municipality-level trends.	A 1 SD increase in rainfall: Infant mortality: -5% w.r.t. the sample avg of 30 deaths/ 1000 births. BW: +1.6 grams (+0.05% = +0.03 SD). Fraction of full-term pregnancies: +0.3pp (+0.32% = +0.027 SD). Effects are stronger during the 2nd trimester of gestation, for children born during the dry season, & for mortality immediately after birth. Potential benefits from expanding the piped water & sanitation systems exceed the cost.	By child's gender: slightly higher effects for girls, particularly for intestinal infections, malnutrition, & perinatal conditions; BW effects are larger for girls than for boys, while the coefficients for length of gestation are almost identical across genders.
Rosales (2015). Effects of exposure to El Nino floods in utero and during 1st year on birth weight, height, and test scores.	1) Longitudinal HH survey on Ecuador's cash transfer program "Bono de Desarrollo Humano." 1st wave: 2003-2004; 2nd wave: 2005-2006; N~8,000 children. Sample over-represents poor families. 2) Reproductive and Health Survey (RHS): 1994, 1999. 3) Living Standards Measurement Survey (LSMS): 1995, 1998, 1999. Last two are nationally representative.	DD model: Compare regions that experienced El Nino vs. those that did not and during the years of El Nino 1998/1999 versus previous years. Model includes individual controls, village of residence FE, year of child's birth FE.	Exposure to El Nino floods (avg exp 3 mths): HAZ= -0.09 of 1SD (effects 3rd trim); PPVT= -0.13 of 1SD (effects 1st trim) LBW= +2.3pp (3rd trim) (14.6% = 0.06 of a SD).	1) By maternal educ: effects on PPVT are smaller for children w/more educated mothers (effects: - 0.02 SD). 2) By rural/urban: effects on PPVT are stronger for rural children (effects: -0.01 SD). 3) By SES index (1-2 quintiles vs. 4-5): effects on LBW significant for children in low quintiles (effects: +3.2pp).

Table 1: Effects of Mild Early Life Shocks on Future Outcomes

Study	Micro - Data, N	Identification strategy and specification	Effects of the shock	Heterogeneity in mechanisms/effects
Panel E: Weather				
Shah and Millett Steinberg (2016). Rainfall shocks in rural India in utero and current on outcomes for children and young adults.	1) Survey on educational achievement of primary school children in rural India conducted every year over 5 years from 2005-2009; N=2 million children. 2) Monthly district rainfall data. 3) NSS (National Sample Survey) collected by the Government of India's in 2004-2008; includes information on wages, labor, etc.	Rainfall varition: within district & across districts within a year. Authors explore different periods of exposure: i) current shocks; ii) exposure in utero up to age 4; iii) exposure in utero up to age 16. Sibling FE models also include district FE, age FE, year of survey FE.	Children exposed to drought this year or last year: Test scores: +0.09pp (+0.07 SD = +4.1%). Years education: +0.02. Children exposed to flood: Test scores: -0.05pp (-0.037 SD = -2.3%). Test scores (exposure@11-13 & outcome@16): 0.05pp. Drought in utero to age 4: Test scores: -0.014 SD = -0.9%. Never enrolled in school: +8% (+0.01SD). Child not on track: +3pp (0.08 SD = 3.7%). Test scores (exposure in utero & outcome @age 16): -+0.05pp. Years education: +0.02. Children exposed to a flood in utero to age 4: Test score: +0.03pp (0.02 SD=1.4%). Years education: -0.02.	By mother's education: effects are exclusively concentrated among children whose mother's had no schooling. By districts w/more educational expenditure: Investments in educ help mitigate the negative effect of rainfall on test scores.
Wernerfelt, Slusky, and Zeckhauser (2016). Effects of in utero exposure to sunlight (vitamin D) on childhood asthma up to age 10.	Two independent datasets: 1) NHIS: private individual-level data, aggregated by state, month, & year of birth, 1914-1987, N=260,000. NHIS data merged w/ historical weather data from the NOAA. 2) Asthma hospital discharge data from NJ & AZ, from the Health Care Utilization Project and birth records from Vital Statistics; data aggreggated at the county, birth month, & year of birth, 1999-2009; N=2.1 million births (3,000 birth month by county cohorts).	Exploit the exogenous within-location variation in sunlight levels across birth years in location of birth. Assumes sunlight variation correlates w/actual exposure, but not w/ other factors affecting asthma incidence. Regressions include state of birth * month of birth FE, year of birth FE.	Doubling the amount of sunshine in an individual's location during the 2nd trim: Dataset 1) Prob(report asthma diagnosed): -1.15pp (-10%) (no standard deviations provided). Dataset 2) Rate of asthma emergency department discharges: -2.21pp (-21.3%) (no standard deviations provided). No effects in 1st or 3rd trimester in either data set.	NA

Table 1: Effects of Mild Early Life Shocks on Future Outcomes

Study	Micro - Data, N	Identification strategy and specification	Effects of the shock	Heterogeneity in mechanisms/effects
Panel F: Alcohol and Tobacco Policy				
Barreca and Page (2015). Focus on effects of changes in minimum legal drinking age in state and year of birth, 1978-1988.	1) Birth outcomes from the National Center for Health Statistics (NCHS) natality files (1968–1989), N= 73,973. 2) Month-year MDLA data from Distilled Spirits Council of the U.S. Datasets matched by mother's estimated age at conception, month of conception, & mother's state of residence at delivery.	DDD approach: exploiting variation in MLDA laws that occurred across states in 1970s-1980s. Comparing birth outcomes btw: Treatment: infants of mother's 14–20 years old and Control group: infants born to mothers 21-24 years old. Models include state of birth, month, & yearof birth FE, & age-by-year FE & state-by-age FE.	Children of mothers 18-20 years old exposed to the MLDA of 18 years experience: LBW: -0.10pp (-1.2%) (Table 1 does not include SD!) Female child: +0.18pp (+0.4%) No effects on Apgar, preterm birth, congential defects.	By race - A MLDA of 18 years: Whites: LBW: small increase Sex ratio: no effects Blacks' fetuses are positively selected: Preterm: -0.3pp Sex ratio: +0.462pp.
Bharadwaj, Johnsen, and Løken (2014). Effects of a smoking ban in restaurants/stores in Norway on health at birth.	1) Birth records for all Norwegian births, 1967 to 2010, includes unique identifiers , & smoking behavior at the start and end of pregnancy. 2) Longitudinal administrative records: 1967-2010 (includes gender, DOB, city, marital status, years of education, LFP, earnings, occupation). N=4,030.	Exploit a smoking ban in Norway as a natural experiment. Authors are able to identify mothers who worked in restaurants & bars during the period of interest. DD: by compares outcomes before & after the law change for people working in restaurants & bars to the same difference among people who work in a similar occupations. Also estimate twin FE models.	Mothers who benefited while pregnant: VLBW: -1.8pp (-0.6pp controlling for gestational age = -26% = -0.04 SD). Pre-term: -2.5pp (-39% = -0.10 of a SD). Twin FE: children born after the reform have better health outcomes. BW: +175gr (most of the effects come from the lower tails of the BW distribution). VLBW: -5.8pp . A 100 g increase in BW increases adult income at 28 by 1.7%, & income conditional on full time employment by 0.7%.	Effects of the reform: stronger for mothers who reported smoking at start of pregnancy. BW: +160 gr (mothers who smoked at the start of preg; effect is concentrated at the lower tails of the BW distribution); no effect on non-smoking mothers.
Nilsson (2015). The effect of alcohol consumption during pregnancy on long-term outcomes of the first and second generation.	1) LOUISE database covering all individuals of ages 16 to 65, living or working in Sweden 1990- 2004; includes year & month of birth, gender & region of birth, education, labor market outcomes, welfare payments. Individuals linked to biological parents using the "multi-generational" register. N=4,104 obs. 2) Military enlistment data on cognitive & non-cognitive outcomes for 18 year old males.	Exploit an alcohol policy in Sweeden in the late 1960s that temporarily and sharply increased access to strong beer in certain regions and among young people. DDD: compare the cohort that was exposed to the policy change in-utero to cohorts exposed at other moments in their life exploiting variation in: i) year and month-of-birth, ii) region of birth, iii) age of the mother (below/ above age 21). Models include mother FE.	Children born to mothers under the age of 21 at delivery, in the treatment regions, and conceived between July and October 1967: Earnings: -24% Prob(no earnings): +56% (+7.2pp). Prob(welfare recipient): +56% (+3.5pp). Prob(low cognitive ability): +27%. Prob(low non-cognitive ability): +16%. Years of schooling: -0.3 (-2.6%) . Effects on the next generation: Health at birth outcomes: no effects on prematurely born, LBW, sex ratio.	Effects of the policy: Earnings: -24% (men only). Prob(no earnings): +74% (+8.3pp) (men only). Prob(welfare recipient): +79% (+4.5pp) (men); +40% (+2.7pp) (women). _Years of schooling: -0.5 (-4.3%) (men); -0.2 (-1.7%) (women). Males more likely to be premature or miscarried. Share of males: -7.3pp Gestation length: -1 week (-0.28 months) (boys only).
Simon (2016). Changes in maternal smoking due to tax changes and health of U.S. 3-17 year olds.	1) NHIS - restricted-use geocoded data, 1997-2010; N=118,271. 2) Vital statistics, 1989–2004, N~2million.	Exploit variation in cigarette taxes btw 1989-2007 at the state and municipal levels. DD: identified off by variation in the timing & size of changes in taxes across states & over cohorts. Models include state and year-month FE, demographic and state policy controls, and linear time trends.	A $1 dollar increase (in $2009) in state cigarette excise tax: Sick days from school: -10% (no SD available on outcomes). 2 or > doctor visits in past year: -4.5%. Hospitalizations: -19%. Asthma attacks: -16%.	Effects are twice as big on less educated mothers. Effects are significant for teen mothers but no effects for children of older moms.

Table 2: Parental Investments

Study	Micro - Data, N	Identification strategy and specification	Effects of the shock	Heterogeneity in mechanisms/effects
Adhvaryu and Nyshadham (2016). Impact of iodine supplementation in Tanzania on parental investments on children 0-5.	DHS 1999; representative of women of reproductive age. N =456 children 0-5 (and their mothers).	Exploit the variation in in-utero exposure to a large-scale iodine supplementation program across districts. Linear Prob. Models include rich controls & district & child's age FE. To test for resource allocation spillovers across sibling, authors regress health investments on own and sibs' accumulated treatment.	A 1 SD increase in treatment exposure: Vaccination: +0.2 of a SD (polio 0.16pp, measles 4.5pp). Breastfeeding >=6mths: +0.1 of a SD (3.5pp) (parents reinforce investments). Siblings of treated children were more likely to be immunized (no effects on breastfeeding.)	Vaccinations highly responsive to parental observed benefits from the program… even when treated child is younger/older, younger/older siblings are more likely to receive additional investments (i.e.vaccination.)
Baker and Milligan (2016). Ask how differences in parental time investments are related to gender gaps in reading and math scores in Canada, the U.S., and the U.K. at school entry.	1) Canada: National Longitudinal Survey of Children and Youth (NLSCY); children born btw 1999-2004; 2) US: Early Childhood Longitudinal Survey-Birth Cohort (ECLS-B); children born in 2001; 3) UK: Millennium Cohort Study (MCS); children born in 2000/2001; N=was not reported. 4) US data from: i) American Time Use Survey (ATUS); waves 2003-2011; ii) National Survey of Family Growth (NSFG); waves: 2002 & 2006-08; and Canadian data from the Maternity Experiences Survey (MES).	Authors assume sex of 1st born child is exogenous. Model regressions include demographic + SES controls and a dummy variable for first born male child. The authors investigate how parental investments change with child's age Twin FE: authors test the hypothesis that parents treat opposite sex twins with greater similarity than parents generally treat sons and daughters (time inputs were asked separately for each twin in the UK data).	Controlling for parental time inputs in early life (ages 0-3) in baseline regressions reduces: Gender gap (boy/girl) in reading scores: -23% in US, -16% in UK, -33% in Canada. Gender gap in Math scores: -25% in US, -23% in U.K., and -33% in Canada.	Boys have lower reading and math scores at school entry. Authors argue that this may be explained by parental time inputs.

Table 2: Parental Investments

Study	Micro - Data, N	Identification strategy and specification	Effects of the shock	Heterogeneity in mechanisms/effects
Bharadwaj and Lakdawala (2013). Investigate gender differences in prenatal care, neonatal and early childhood mortality among mothers who had an ultrasound in India, Bangladesh, and China.	1) India: National Fertility and Health Survey (NFHS), waves: 1998–1999, 2005 –2006. 2) Bangladesh: Demography & Health Survey (DHS), waves: 1996–1997, 1999– 2000, 2004, 2007. 3) China: Health and Nutrition Survey (CHNS), waves: 1991, 1993, 1997, 2000, 2004, 2006. Authors also use DHS data for other countries: Pakistan (2006 –2007), Ghana (1993, 1998, 2003, 2008), Sri Lanka (1987), & Thailand (1987). N=32,012.	Exploit the fact that some mothers had ultrasounds (so could discriminate prenatally) while others did not. If mother did not have ultrasound can only discriminate post-natally. Also expect larger effects in places where sex discimination is more severe (e.g. Northern India). Models (linear & logit) include a dummy for gender of fetus, mother/child controls (that includes birth order, fam size, etc.), state FE & year of birth FE	Mother pregnant with a boy: Attended prenatal care at least twice per week (India): +1.8pp (3%) (+4.6% in Northern India where sex discrimination is higher) Tenanus: +3% (only sign. for Northern India). Results are only significant in the sample of mothers who had an ultrasound. No evidence of sex-selective prenatal care in countries with weak or no son preference (i.e., Ghana, Sri Lanka). Tetanus shots can explain 2.6–7.2% of the excess female neonatal mortality.	Larger effects in northern India.
Breining, Daysal, Simonsen, and Trandafir (2015). Spillover effects of medical treatments received by VLBW children on their siblings.	1) Bith register data from Denmark since 1970. 2) Emergency room visits data (available between 1995 and 2011), provides inpatient hospital admissions & mortality. 3) Data on academic achievement including 9th grade test scores (available from 2002), high school enrollment by age 19. Final sample = 3,677 obs.	RD that exploits changes in medical treatment around the VLBW threshold (as in Almond et al., 2010). Treatment group: siblings of a child with BW just below 1,500 grams & with 32 or more weeks of gestation Control group: siblings of a child with BW just above 1,500 grams & with 32 or more weeks of gestation.	A child with a VLBW sibling (with 32 weeks or more gestational length) who received medical treatment due to this condition, experiences: Math test score (@age 15): +0.36 SD Language test score (@age 15): +0.31 SD High school enrollment (@age 15): +9.5pp (+30%) Mortality (28-day & 1-year mortality) (ages 0-15): no effect Diagnosis of intellectual disability <age 5: no effect.	Heterogeneity in the spillover effects on sibling academic achievement varies by sibship characteristics that are most closely tied to the quality of peer interactions (gender of sibling, gender composition of the sibling pair, and birth order).

Table 2: Parental Investments

Study	Micro - Data, N	Identification strategy and specification	Effects of the shock	Heterogeneity in mechanisms/effects
Del Bono, Ermisch, Francescon (2012). Ask how smoking and maternal work stoppage before birth affect outcomes in the U.S. and U.K., and whether parents respond to idiosyncratic changes in one child's endowments by altering investments in a later child.	Three large representative samples: 1) UK: British Household Panel Survey, longitudinal, 1991–2005, N=1,339 singletons 2) UK: Millennium Cohort Study, longitudinal, years of birth: 2000 & 2001, N=17,483 singletons 3) US: National Survey of Family Growth, authors use the 5th cycle (1995), data is retrospective on children who were born in 1970-1995, N=12,166 singletons.	To address endogeneity of choice of birth inputs, use method of moments estimator (similar to an IV-FE that uses prenatal inputs during earlier pregnancies as instruments for differences in inputs between pregnancies). Identification assumption is that prenatal inputs associated with a specific pregnancy are uncorrelated w/the idiosyncratic child endowments. Authors estimate the direct effect of inputs on birth outcomes (structural parameters) & the reduced form parental responses to realized child endowments when choosing the inputs in successive pregnancies.	1) Maternal smoking during preg: BW: -190 to -200 grams (-5.6% = -0.34 of a SD) (BHPS & MCS datasets); -139 grams (NSFG) (-4.2% = -0.24 of a SD). Fetal growth: -5.4% (-0.36 of a SD) (BHPS); -4.1% (-0.26 of a SD) (NSFG). 2) 3 month-work stoppage in late preg: BW: 5.2% (0.3 of a SD)(BHPS); 1.8% (0.10 of a SD) (NSFG). Fetal growth: 3.5% (0.23 of a SD) (BHPS); 1.3% (0.08 of a SD) (NSFG). "Parents respond to idiosyncratic endowment heterogeneity in a way that is easier to reconcile with inequity aversion."	More educated women are less likely to smoke and more likely to stop working three months before birth during their first three pregnancies.

Table 2: Parental Investments

Study	Micro - Data, N	Identification strategy and specification	Effects of the shock	Heterogeneity in mechanisms/effects
Dizon-Ross (2014). Investigate the effect of providing parents with information about their children's true achievement on parental investments.	1) Author conducted a sibling census during January - March of 2012, based on information on children participating in 39 schools in two districts in central Malawi (the Machinga and Balaka districts) 2) Test data were gathered for all periodic exams administered at school N=3,464 households with at least 2 children enrolled in grades 2-6	Randomly assigned half of the households to a treatment group that received information about their children's recent achievement test results in school, and half to a control group, which did not receive information	The information delivered to parents about their children's academic abilities: (1) Parents' perceptions of their children's achievement diverges from children's true achievement: the gap is 1 SD. (2) Parents reallocate educational investments: Willingness-to-pay for remedial math and English textbooks: +1.3pp in subjects in which children were doing worse than expected. Free subject-specific workbooks (remedial, average, advanced): parents shifted their choices towards workbooks that corresponded more closely to their children's true achievement level.	Poorer, less-educated parents have less accurate perceptions about their children's academic abilities than richer, more-educated parents, and update their beliefs more in response to improved information.
Cunha, Elo, and Culhane (2015). What would happen to investments & child development if a policy that moved expectations from the median to objective estimates from the CNLSY/79 data was implemented?	1) Children of the National Longitudinal Survey of Youth/1979 (CNLSY/79); authors employ the Motor-Social Development Scale; N=335 African American mothers.	Formulate a model of early childhood development in which mothers have subjective expectations about the tech. of skill formation. Empirically, the identification of the model poses a problem: preferences and beliefs are confounded. To solve this problem, authors create a survey instrument to elicit maternal expectations about the tech. of skill formation. Mothers are asked: "what is the youngest and oldest age at which your baby will learn how to do task X or Y?" (the tasks are taken from the Motor-Social Development Scale of the CNLSY/79 and NHANES). Authors exploit within-family variation to estimate the parameters of the technology of skill formation.	1) Mothers underestimate the elasticity of child development w.r.t. investments: Mothers' subjective expectation about the elasticity of their child developm't w.r.t. investments is btw 4-19%, but authors estimate ndicates elasticities btw 21-36%. 2) A policy that moved expectations from the median to objective estimates would increase investment by 4% to 24% and stocks of cognitive skills 24 months would increase by 1% to 5%. The impacts of such a policy would be even higher for mothers whose expectations were < the median.	NA

Table 2: Parental Investments

Study	Micro - Data, N	Identification strategy and specification	Effects of the shock	Heterogeneity in mechanisms/effects
Fryer, Levitt, and List (2015). Effect of parental incentives on early childhood cognitive and non-cognitive achievement.	Longitudinal data collected for the study includes pre-test characteristics of the sample of children & families (year of data collection is 2011), children's test scores in the middle of the treatment year (January 2012) & at the end of treatment (May 2012) N= 260 families.	Randomized field experiment. Families were randomly assigned to 3 groups: 1: parents paid in cash or via direct deposits for attendance at early-childhood sessions; N=74; Treatment 2: parents paid for attendance in early-childhood program attendance via deposits into a trust which can only be accessed when the child enrolls in college; N=84; Control group: parents not paid & did not attend early-childhood sessions; N=99.	Children of parents who participate in the intervention: Cognitive (PPVT; Woodcock Johnson III Test of Achievement scores): no effect. Non-cognitive (Blair and Willoughby Executive Function scores, Preschool Self-Regulation Assessment score): +0.23 SD.	Positive effects only among whites and Hispanics (little impact on Black children). Students who started below the median non-cognitive skills, experienced no benefits in cognitive or non-cognitive outcomes, while those who started with above the median non-cognitive skills, experienced increases on both cognitive & non-cognitive skills.
Hsin (2012). Ask whether maternal time investments from 0-12 compensate or reinforce birth weight differences and whether effects differ by SES.	1) Time diaries from the PSID-CDS; time diaries are child-specific, the PSID collected time diaries & child info for up to two randomly selected children within each family; time-diaries sample weekdays & weekends for 24 hours; N1,516 children, or 758 sibling pairs.	Sibling FE stimates of the effect of birth endowments on parental investments & include interactions between child endowment & characteristics such as mother's education or family income Models include rich controls, interactions between birth endowments*SES, and splines to measure family SES.	Overall effect of birth endowments on parental time investments & the interaction between BW*mother's characteristics: Total hours per week: no effect Hours devoted to activities that develop the child's human capital (reading, playing, doing hobbies, etc): no effect.	By mother's educ: College educated mothers compensate by investing more in LBW children: children receive +0.65 SD (total time), +1 SD (educational time). Mothers with <=12 years of education concentrate resources on higher BW children: non-LBW children receiv +0.17 SD total time & -0.10SD educational time than LBW siblings.

Table 2: Parental Investments

Study	Micro - Data, N	Identification strategy and specification	Effects of the shock	Heterogeneity in mechanisms/effects
Yi, Heckman, Zhang, and Conti (2014). Asks how Chinese parents alter investments in twins at ages 6-18 in response to the serious illness of one twin at age 0-3.	Chinese Child Twins Survey (CCTS); includes detailed info on family health & educ investments for e/child; conducted in 2002 to 2003 in the province of Kunming, China; N=1,694 households with twins.	Early health shocks affect children both biologically and by affecting parental responses. Assume that "the within-twin variation in early health shocks is random and exogenous." To estimate effects of health shocks on child's outcomes and address the possibility that family investments may be endogenous, authors use an IV based on within-twin variations in BW, gender and HH level variables (rural indicator, maternal working sector, age, ethnicity, and schooling).	When a twin child suffered from a serious disease at ages 0-3: Parental investments: Health investments in the sick twin ($ spent on medical treatment, medicine, health products): + RMB 305 (+$49 US) (+35% = +0.39 SD). Educational investments in the sick twin (tuition + $ spent on books, stationery, home tutors, tutoring class): RMD -182 (-$30 US) (-20% = -0.15 SD). Child outcome results suggest that parental investments equalize health but increase disparities in education in favor of the healthier twin.	Rural areas: Increase in health expenditures in favor of the sick twin is not accompanied by a decrease in educational expenditures. Urban areas: the fall in educational expenditures on the sick child offsets the cost of medical expenses. Compensating investments and reinforcing educational investments are more precisely determined among high education mothers and in female twins. Wealthier households have more reinforcing educational investments.

Table 4: Policies that Affect Household Resources

Study	Micro - Data, N	Identification strategy and specification	Effects of the shock	Heterogeneity
Panel A: Policies to Increase Material Household Resources				
Adhvaryu, Fenske, and Nyshadham (2016). Effects of cocoa price shocks in Ghana in year of birth on mental and physical adult health.	1) Cocoa prices time series. 2) EGC-ISSER Socioeconomic Panel; baseline data on cocoa production Nov. 2009 to April 2010; plots of land & type of crops, 10 regions; data also includes Kessler Psychological Distress scale-10 questions. N= 7,741 individuals. 3) Demographic and Health Survey; waves: 1988, 1993, 1998, 2003, 2008; nationally representative cross-sections women 15-49.	HH's in the cocoa-producing regions of Ghana experience changes in the real producer price of cocoa as income shocks, while HH's in regions that do not produce cocoa are unaffected by these fluctuations. Linear models include region r and year of birth t FE and individual and HH controls; some specifications include region linear & quadratic time trends, rainfall & temperature controls, as well as household FE.	A 1 SD rise in the cocoa price in the year of birth: Kessler Psychological Distress scale: -2pp (-0.08 SD; -1.0%). Severe distress (Kessler scale>10): -3pp (-0.13 SD; -4.5%). Physical health: Height: +1.23cm (no avg. height provided in descriptive stats) BMI, savings, occupation: no effect.	By gender: very mild differences across males and females. By timing of exposure: Shocks in the first 4 years of life have significant effects, though effects are largest in the YOB.
Almond, Hoynes, and Schazenbach (2011). Effects of introduction of the U.S. Food Stamp Program on birth weight and fertility.	Vital statistics - Natality & death records 1959-1977; N~2M observations per year. SEER population data (to construct fertility rates).	Use the county-by-county rollout of the FSP. Model regressions include county level controls, county and year of birth FE, state*year FE, interactions of pretreatment county characteristics with time trends. Event time study: Authors do not have information about FS participation or data to impute eligibility (e.g., income). So they use the 1980 CPS to calculate FSP participation rates for women with a child <5.	Food stamps during pregnancy increase BW by: Whites +2.04 gr (effect size= 0.06%) Blacks +3.45gr (e.s. =0.08%). Estimate of TOT effect (after adjusting by participation rate) on BW: Whites: +15 to 20gr (effect size: 0.5-0.6%) Blacks: +13 to 42 gr (0.4-1.4%). No statistically significant effects on fertility or neonatal mortality.	Largest impacts at lower BWs. LBW: -7% for whites, -5% to -11% for blacks. Poor counties face +3.41g BW, no effect in wealthier counties. Larger effects in the South and in urban counties. Larger impacts for older mothers. Black single mothers experienced larger impacts than all black women.

Table 4: Policies that Affect Household Resources

Study	Micro - Data, N	Identification strategy and specification	Effects of the shock	Heterogeneity
Panel A: Policies to Increase Material Household Resources				
Aizer, Eli, Ferrie, and Lleras-Muney (2016). Examines the long run effects of the US Mother's Pension Program on child survival by comparing mothers who were accepted and those who were rejected from the program.	1) Individual-level administrative records of applicants to the Mothers' Pension program: N=16,000 children from 11 states who were born 1900-1925. 2) WWII enlistment records. 3) 1940 census records. 4) Social Security Death Master File (DMF); name, date of birth, date of death, SSN for 88 million deaths reported from 1965-2012. Authors matched administrative data to census, WWII, & death records. Able to match 48% of sample to a unique death record. Females could not be matched due to name changes.	Compare children of mothers who applied to the MP transfers & were given the receipt, to the children of mothers who applied for transfers but were denied. Rejected mothers were on average slightly better-off based on observable characteristics. Hence, the effects of the program are likely to understate the benefits of the program. Models include state-level, time-varying characteristics (i.e., ratio of state manufacturing earnings to national manufacturing earnings, laws governing school attendance, expenditures on social programs, education & charitable institutions, hospitals & prisons); county-level characteristics in 1910, county & cohort FE.	Effect of access to the Mother's Pension program: Longevity: +1.5 years (+2.1%) (no standard deviations provided in descriptives). Prob(of survival past age 70): +10-20%. Prob(of survival past age 80): 9-15%.	Effects are driven by the poorest families in the sample.
Akee, Simeonova, Costello, et al (2015). The effect of a permanent increase in unearned household income on children's emotional, behavioral, health, and personality traits.	The "Great Smoky Mountains Study of Youth": longitudinal survey of 1,420 children aged 9, 11, 13 years at the survey intake, who were recruited from 11 counties in western NC; follow-ups occur annually until ages 16, 19, 21 N=6,050 children.	A casino opened on the Eastern Cherokee reservation and part of profits were distributed per capita to all adult tribal members (Transfer= $4,000 annually; amount comparable to TANF or SNAP). DD: Compare outcomes for adolescents who resided in households with extra income (youngest and middle age cohorts of American Indian children) to adolescents who were not exposed to the extra income by age 16 (the oldest age cohort). Models include individual FE, age FE, age*race FE	Child resides in a household that receives the unearned income transfers due to the casino revenues: Behavioral disorders: -0.27 SD Emotional disorders: -0.36 SD Personality traits: Conscientiousness: -0.43 SD Agreeableness: -0.31 SD Neuroticism: no effect	Income transfer improved child outcomes through better parent-child relationsp and not necessarily through more parental time investments "parents who receive the $ provide investments in their childrenwith lower than avg. personality traits and lower than avg. amounts of behavioral and emotional problems" (i.e., compensatory responses)

Table 4: Policies that Affect Household Resources

Study	Micro - Data, N	Identification strategy and specification	Effects of the shock	Heterogeneity
Panel A: Policies to Increase Material Household Resources				
Barham, Macours, and Maluccio (2013). Examine the effect of Conditional Cash Transfers received in utero to age 2 vs. ages 2-5 in Nicaragua on cognitive and health outcomes.	1) Household data from the phase -in & follow-up of the randomized CCT experiment; years 2000 & 2010; N= 171 boys in the "early treatment" group + N= 197 boys in the "late treatment group" born up to 1 year after CCT started (Oct, 2001).	42 localities in 6 municipalities were randomized into early-treatment (21) vs. late treatment (21); groups were stratified by their poverty level Treatment group - "early-treatment" boys were exposed to the program from in-utero to age 2. Control group "late treament" boys were exposed from ages 2 to 5. Models include birth month FE, stratification dummies to account for the stratification in the randomization (i.e., poverty).	Boys exposed to the program in utero up to age 2 vs. ages 2-5: Cognitive outcomes: +0.15 SD Anthropometrics: no effect.	NA
Bharadwaj, Lundborg, and Rooth (2014). Explore whether low birth weight affects how one is affected during economic downturns.	1) Swedish registry data on births: data on all twins born in 1929-1956; N=5,000 twins. 2) UREG: data on individual years of schooling, 1990-2007. 3) Income data: equivalent of W2 records in the US, 1981-2005. 4) Statistics Sweden: provides info on occupation for 1985 and 1990.	Compare cohorts who were born years before the economic crisis (1985-1990) with cohorts born few years after the crisis (1993-1998); Include twin FE. Assumptions: Post-birth investments within twin pairs are not correlated to birth weight.	A 10% increase in BW: Receives unemployment insurance: -1% (no SD available) Years receiving UI: -0.4 years (-80%) "a 10% increase in BW (approx. 260 grams) results in a 0.008pp lower prob of being on unemp insurance."	One potential mechanism driving the effects is "occupational sorting in the pre- crisis years". Affected cohorts were less likely to be employed in the public sector and less likely to enter a white collar job.
Black, Devereux, Løken, and Salvanes (2014). Effect of a 1 year childcare subsidy at age 5 on parental behavior and teen GPA.	1) Administ. data covering the entire population of Norway, cohorts: 1986-1992; authors link individuals to their parents through unique identifiers. N=367,836 obs. 2) Municipality-level data on childcare prices and family income cutoffs in the 1990s.	Exploit sharp discontinuities in the price of childcare (CC) by income. Compare outcomes of children whose HH income was just less than a cutoff to those of children whose HH income was just above a cutoff. Also estimate a parametric specification that controls for indiv/HH charact & cohort by municipality FE, as well as sibling FE.	Being eligible for lower CC prices at age 5: No change in use of child care, so subsidy only increased income. GPA: +0.30 of a SD Oral exam grade: +0.30 of a SD Main result: A 1% increase in family income at age 5: would increase scores by about 0.04 of a SD Sibling FE: similar by less precise.	NA

Table 4: Policies that Affect Household Resources

Study	Micro - Data, N	Identification strategy and specification	Effects of the shock	Heterogeneity
Panel A: Policies to Increase Material Household Resources				
Chetty, Hendren, and Katz (2015). Examine two hypotheses: 1) moving to a lower-poverty neighborhood improves LT outc. for children who moved young? 2) the gains decline with child's age at move?	1) Moving to Opportunity data includes demographic, SES, school data, criminal victimization, income, transfer receipt; There are 11,276 children in the MTO data, of whom 8,603 (76%) were born <= 1991. ii) annual data on residential neighborhood (census tract) using 1990 & 2000 Censuses; 2005-2009 American Community Surveys. 2) Federal income tax returns data, 1996-2012. *MTO records were linked to the tax data by SSN (86% success).	Experiment: families were randomly assigned to 3 groups. 1) Experimental grp: was offered subsidized housing voucher + requirement to move to a census tract w/poverty rate <10%. 2) Section 8 voucher grp: was offered a standard subsidized housing voucher w/no additional contingencies. 3) Control grp: was not offered a voucher (but retained access to public housing). *Authors replicate ITT models as in Kling et al. (2007). Models also include interactions of age at RA * treatment indicators.	Effects on children <age 13: 1) Voucher (experimental) group Income: $1,624 (+14%). Attends college: +2.5pp (+15%) Prob(live in a poor neighborhood as an adult): -4% Prob(single parent): -15% (only for females) 2) Section 8 Income: no effect. Attends college: no effect Prob(live in a poor neighborhood as an adult): -7% Prob(single parent): no effect Effects on children >=age 13 Little (or sometimes negative) effects on older children.	Gains from moving to lower-poverty areas decline with child's age at move. The extra federal income taxes that young children in the experimental group would obtain during their mid-twenties, would offset the incremental cost of providing voucher treatment relative to providing public housing
Dahl and Lochner (2012). Effects of changes in U.S. Earned Income Tax Credit on child test scores, mean age=11 at testing.	1) Child Supplements of the NLSY, longitudinal data, N=4,500 children. Includes PIAT scores for children 5+ from 1988 to 2000 (biannually). (Children took each individual test at most 5 times.) N= 4,412 children born to 2,401 mothers.	Identification comes primarily from the substantial expansion of the EITC schedule between 1993 and 1995. Child FE + IV (instrument for HH income: predicted EITC income due to regulatory changes & not due to changes in family structure). Models include year FE, controls for other state-level policies, a fifth-order polynomial in lagged pretax income & an indicator for positive lagged pretax income as a baseline "control function", national trends.	A $1,000 increase in income: PIAT score (combined math & reading test scores): +0.06 SD. Reading recognition: +0.04 SD. Reading comprehension: +0.06 SD. Math: 0.06 SD. 1st stage coefficient: 1.270** Overall effect: from 1987–1999, the median EITC payment for eligible two-child families increased by $1,670 (2000 dollars), implying a test score increase of 0.010 of a SD for this group.	Test gains are larger for children from disadvantaged families (minorities: +0.08 SD, children in unmarried families: +0.08 SD, children of mothers with HS or less educ: +0.05 SD), for younger children (ages<12 the effect is: +0.08 SD), and for boys (+0.09 SD).

Table 4: Policies that Affect Household Resources

Study	Micro - Data, N	Identification strategy and specification	Effects of the shock	Heterogeneity
Panel A: Policies to Increase Material Household Resources				
Del Boca, Flinn, and Wiswall (2013). Asks how cash transfers affect parental investments in children in the U.S.	1) Longitudinal data from Child Development Supplement of the PSID; first 2 waves (CDS-I & CD-II) 1997 & 2002-3, include child time diaries & rich demographic and SES HH data, N= 3,500 children residing in 2,400 HH (authors also use the PSID waves 1997, 1999, 2001, 2003).	Authors estimate the parameters of a production function for child outputs using a Cobb-Douglas production function & simulation methods (using PSID-CDS data).	Estimates suggest that parental time inputs are more valuable than monetary inputs in producing child quality. Time is relatively most valuable when children are young. Suggests that monetary transfers may have small impacts on child quality because a significant fraction of thetransfer is spent on other HH consumption and the leisure of the parents.	NA
Hoynes, Miller, and Simon (2012). Effects of changes in U.S. Earned Income Tax Credit on incidence of low birth weight.	1) Vital Statistics micro data, 1984-1999, collapsed to cells defined by state, month-year, parity of birth, mother's education, marital status, race, age; N=47,687 cells. 2) March Current Population Survey combined with the NBER TAXSIM model to compute average EITC benefits.	Exploit tax-reform (1986, 1990, 1993) induced variation in the federal EITC across time & family size. 1) DD: Compare 2nd & higher order births (treatment) to 1st births (control). Models include effective tax year FE, state FE, & rich demographic controls. 2) Event study. 3) Panel FE model to measure the generosity of the EITC using the maximum EITC credit.	2nd parity or higher births, relative to 1st births: LBW: -3.5% for the full sample (no SD available) (effects are larger for 3rd or higher order births than 2nd births). An increase of $1000 treatment on the treated (TOT): LBW: -6.7%.	LBW: larger effects (-10.8%) for infants of single and less educated mothers. By race: African American infants largest reduction in LBW (-5.1% vs. whites -1.6%). Effects on Hispanics are small (-1.9%).
Hoynes, Schazenbach, and Almond (2016). Effect of exposure to the U.S. Food Stamp Program (FSP) from 0-5 years on adult health (age 25 plus).	Panel Study of Income Dynamics (PSID); 3,000 HHs; use waves until 2009. The "Survey of Economic Opportunity subsample"; N=1,900 low-income & minority HHs selected from an existing sample (adjust for nonrandom sample using PSID weights).	DD model: Exploit variation in roll-out of FSP across counties & over birth cohorts in exposure to the FSP. DDD: use variation across subgroups w/varying propensities to use FSP. Models include controls for county, year of birth, interview FE, state linear time trends, county-yr of birth controls.	Increasing the share from no FSP exposure to full exposure in utero to age 5): Metabolic syndrome Z-score (obesity, high blood pressure, diabetes, heart attack): -0.3 SD (TOT: -0.24 SD) (largest effects on males 0.5 SD). Weak improvements in other health outcomes: diabetes, health status, disability, smoking. Gains from FSP are large and increasing with exposure up to age 5.	Largest effects on males: 0.5 of a SD. Economic self-sufficiency: +0.3 of a SD for women only. Adult health impacts of FSP are minimal if child is exposed only after age 5.

Table 4: Policies that Affect Household Resources

Study	Micro - Data, N	Identification strategy and specification	Effects of the shock	Heterogeneity
Panel A: Policies to Increase Material Household Resources				
Gould, Lavy, and Paserman (2011). Effects of material resources such as running water, electricity, and sanitation during childhood on outcomes at age 56-61 of Yemenite immigrants to Isreal.	1) Authors conducted a survey in 2006 of the entire population of immigrants who were born in Yemen between 1945 and 1950 and arrived in Israel during 1949 and 1950. N= 2,927 individuals who were sorted into 233 different locations. 2) Census data for 1961.	Authors exploit quasi-random variation in the living conditions experienced by Yemenite children after being airlifted to Israel in 1949. Models regress a person's outcome on the conditions experienced in childhood and on family/indiv background.	Running water, sanitation, and electricity in early childhood - Results for girls and women only: HS matriculation: +9pp (+33%) (no SD provided). Post-secondary: +6pp (4.7%). Years of schooling: +0.6 (5.3%). Age at 1st marriage: +0.6pp (2.7%). Fertility (N_children): -0.2pp (-5%). Employed: +7.2pp (11.3%). Self-reported health problems: -6.2pp (-15.5%). No effect on disability. 2nd generation effects in the full sample: HS matriculation: 3.2pp; College degree: 3.3pp (baseline means not provided).	By gender: Effects are mainly for women which could be due to: i) gender discrimination in the allocation of scarce resources or ii) a stricter enforcement of traditional norms in rural areas. By age: Authors include an interaction between treatment variables and YOB & find that older women experience much larger impacts (results not shown).
Lindo (2011). Health effects of parental job displacement on child's birth weight.	1) PSID; waves: 1968– 1997 (author stops in 1997 due to concerns in how job displacement is measured). Author uses the PSID's Childbirth & Adoption History Supp. (CAHS) to measure children's outcomes i.e., birth weight in ounces is available for children born in 1985+; N= 1,607 births.	Compare the outcomes of children born after a displacement to the outcomes of those born before. Mother FE. Models also include education-group trends and industry trends.	Child was born after his/her father's job displacement: Birth weight: -4.8% (approx. 5 ounces decline).	Mother's with >HS have higher percent declines in family income, are more likely to work, and to work for more hours. Potential mechanisms: Husbands' earnings: -22% Family income: -13%. Men's work activity: no change. Mother's employment status: no change. Food spending: no change.

Table 4: Policies that Affect Household Resources

Study	Micro - Data, N	Identification strategy and specification	Effects of the shock	Heterogeneity
Panel A: Policies to Increase Material Household Resources				
Carlson (2015). Examine the direct consequences of job loss on birth outcomes, isolating anticipatory effects.	1) Dates of major job losses & information on the warnings given to the local community using notices filed under the Worker Adjustment & Retraining Notification (WARN) Act. 2) Natality data, 1999-2008. *The author constructs a county–month panel data set including all 422 counties in AL, NY, TX, & WA; N=7,113,083 births & 2,626 WARN notices.	Exploit county-month variation in the occurrence of job losses through announced notices Models include county-specific quadratic time trends, county of birth, year of birth, & calendar month of birth FE.	Being exposed to anticipatory dislocations during pregnancy: Birth weight: -15 to -20 grams (-0.4% to -0.06%). Gestational age: -0.5 to -0.8 days (-0.2% to -0.3%). LBW= +1pp (+16.4%) Strongest effects are associated with exposure to notices in 3rd trimester.	Potential mechanisms: physiological stress responses or increased levels of unhealthful behavior.
Golberstein, Gonzales, and Meara (2016). Effects of economic recessions (measured by UR and HPI) on child and adolescent mental health.	1) National Health Interview Survey (NHIS), years 2001-2013; nat. The child's mental health questionnaire (SDQ score) has 5 domains: emotional symptoms, conduct pb's, hyperactivity-inattention, peer problems, prosocial behaviour. Mental health treatment & medication use are only available for 2005-2007. 2) Economic variables are obtained from the BLS & from the Freddie Mac Housing Price Index (HPI).	Exploit the state and quarter variation in the unemployment rate (UR). Models include state & quarter FE, individual and family covariates, & state linear time trends.	A 1SD increase in the UR: SDQ score (index of mental health severity; higher index, worse mental health): +2.3% in the "mental health severity 1/10 scale" and +11% in the "likely psychological problem". Emotional difficulty score: +4.8% in the "mental health severity 1/10 scale" and +10.4% in the "likely psychological problem". Use of special education services for children's emotional problems: +5.7%.	Parental unemployment, reduced family income & higher family stress are likely to influence child mental health. The impacts were stronger among households where parents have < college, are non-white, or are in the bottom income quintiles. Authors also find little differences by child's gender or by child's age (comparing children vs. adolescents).

Table 4: Policies that Affect Household Resources

Study	Micro - Data, N	Identification strategy and specification	Effects of the shock	Heterogeneity
Panel A: Policies to Increase Material Household Resources				
Gutierrez (2014). Effect of birth during economic crisis in Peru on infant mortality, education and employment at 15-18 years.	1) National Household Survey (Encuesta Nacional de Hogares, ENAHO), 8 waves: 2004-2011; data on educational & health outcomes at later ages; N=39,846 children. 2) DHS data, 3 waves: 1991, 1996 & 2000; data on mother's health & child's mortality; N=11,275 children.	Estimate a two-sample instrumental variable model: 1) Regress child mortality in 1st year of life on dummy for YOB interacted by mom's education. 2) Regress outcome @age 15 on dummy for YOB interacted by mom's education. 3) Ratio of coefficients of interest in 1) & 2) shows the effect of early-life health shocks on future outcomes. Models include rich controls and some specifications include trends.	Exposure to the crisis and being born to less educated mothers: Prob(dying in the 1st year of life): 1% (no Table 1 available). Chronic illness: +2.36pp (no Table 1 available). Complete primary education (ages 15-18): -1.7pp. Employment (ages 15-18): no effects. Calculates upper and lower bounds on the effects by assuming: i) there is no selection; ii) there is no scarring effect.	Mother's education: the increase in infant mortality during the crisis was particularly severe for children born to less educated mothers.
Lavy, Schlosser, and Shany (2016). Children conceived in Ethiopia and born in Isreal after their parents migrated. Effects of early childhood conditions on outcomes at 18-20.	1) High school administrative data linked to demographic records for all Ethiopian children born 1992-1992; data include student's birth date, date of immigration, country of origin of students & parents, student demographics (parental education and number of siblings), current schooling status; data collected in 2007-2011; N=1,951 students.	Exploit the timing of the immigration shock of Ethiopian jews to Israel in the May 1991. DD: 3 groups by the gestational age at the time of the immigration: 1) Children whose mothers arrived after conception but before week 8 of gestation. 2) Children whose mothers arrived at 8-24 weeks of gestation; 3) Children whose mothers arrived after week 25 of gestation but before birth. Models include cohort & month of birth FE and rich controls.	Exposure to Israel's better conditions before week 8 of gestation: Matriculation diploma: 12.2% (0.07 SD). Quality of matriculation diploma (more challenging study programs during high school): +33% (0.39 SD). Math credits: +39.6% (0.32 SD). English credits: +33% (0.37 SD). No effect on high school completion. All efffects are driven by exposure in the first 8 weeks of gestation (i.e., no effect of exposure after week 8).	By gender: Effects are only significant among girls. By parental education: Effects are stronger for children from families with higher parental education. (Though most immigrants had low levels of education.)

Table 4: Policies that Affect Household Resources

Study	Micro - Data, N	Identification strategy and specification	Effects of the shock	Heterogeneity
Panel A: Policies to Increase Material Household Resources				
Loken, Mogstad, and Wiswall (2012). Effects of Norwegian oil boom on family income and child outcomes at 29 plus.	Administrative registers for the entire population, provide information on educational attainment, IQ, & family income during childhood, 1967-2006; control variables: sex, birth year, marital status, N of children, SES (years of education, IQ, income, etc), personal identifiers for one's parents, family identifiers, geographic identifiers for county of birth; N=202,000 children.	1) Show that the linear FE estimator identifies a weighted average of the marginal causal effects. 2) Use a Blinder-Oaxaca decomposition to measure the contribution of different weights to the differences between linear OLS, FE, & IV estimates. IV: instrument for family income using the regional & time variation in the economic boom after the oil discovery. Also include sibling FE.	A 1 SD increase in family income: Years of Education - Models without income squared: No effects in IV or FE. Models including income squared: IV: +0.74 (child in poor family), +0.05 (child in rich family). FE: +0.22 (child in poor family), +0.02 (child in rich family).	Effects are larger in the lower part of the income distribution.
Meckel (2015). Examines the effects of anti-fraud efforts in the WIC program which resulted in the shotdown of some small operators.	1) Administrative data about WIC vendors in Texas. 2) Prices from Nielsen Homescan data: representative panel of consumers w/product level-data on all purchases; includes product type, date & location of purchase, & on the purchaser; N=430,000 purchases (11,400 stores). 3) Individual birth records that provides informatio on WIC participation of pregnant women and on ZIP code of residence of the mother, 2005-09; N= 1 million mothers on WIC.	Exploit the staggered county-level roll out of a fraud reduction program in Texas through the introduction of the Electronic Benefit Transfer (EBT) that replaced paper vouchers. DDD model: exploit variation in the exact timing of EBT rollout across counties, years and months, and WIC product and WIC store. Assumption: the exact timing of EBT rollout is uncorrelated with endogenous trends.	The anti-fraud reform: (1) Eliminated most pre-existing fraud among stores (violations declined 15%) (2) Caused 10-26% of single outlets to drop out of WIC (no change for chains) (3) Reduced WIC participation among eligible mothers by 3-5% (4) Reduced the likelihood that a mother has at least one WIC store in her ZIP code (a fall of 10-25%) (5) Increased the prices on WIC products within single outlet WIC stores by 9% (6) Reduced welfare by 3-4% of the value of benefits received	The largest declines in WIC participation among stores and women occur in high-poverty ZIP codes. Only fraudulent stores select into the program in high-poverty areas, suggesting that fraud implicitly subsidizes program access in these areas.

N

Table 4: Policies that Affect Household Resources

Study	Micro - Data, N	Identification strategy and specification	Effects of the shock	Heterogeneity
Panel A: Policies to Increase Material Household Resources				
Milligan and Stabile (2011). Effects of child benefit payments in Canada on child outcomes from 0-10.	1) National Longitudinal Survey of Children and Youth (NLSCY), provides family income & demographics; 6 biannual cycles: 1994–95 to 2004–05; followed children aged 0–11 to age 10-21; N=108,000 children. 2) Survey of Labour & Income Dynamics (SLID) used to simulate the aggregate benefits (instruments).	Exploit the variation in child benefits across province, year, and family-type (N of children in a household) due to changes in legislation. Instrument: actual child benefit level in a given year, province,, family size is instrumented with a simulated tax benefit computed using a tax & benefit calculator. Models include a set of individual/ family characteristics, and control variables for time and province effects.	An increase of $1,000 in child benefits: Education: Repeating a school grade: no effect; Math score: +0.069 SD (+1.6%); PPVT: no effect Prob (not been diagnosed with a learning disability): +2.8pp (+1.0% = 0.16 SD) Emotional/behavioral well-being: Physical aggression: -0.106 SD (-14%)	Most significant effects are driven by boys, not girls. For girls, there is a significant effect on physical aggression (-.14 SD for boys; -.22 SD for girls).
Scholte, van den Berg, and Lindeboom (2015). Influence of economic conditions early in life on the impact of adverse life events and on physical health later in life.	1) Longitudinal Aging Study Amsterdam (LASA); 5 waves: 1992-1993, 1995-1996, 1998-1999, 2001-2002, 2005-2006, (N=2869, 2001, 1571, 1132, 799 persons). Data includes info on: functional limitations, heart disease, stroke, cancer, respiratory diseases, peripheral artery disease, diabetes and arthritis.	Ask how shocks in later life affect functional limitations in later life AND whether individuals exposed to recessions early in life respond differently to later-life shocks than other adults. Strategy: IV + individual FE. Instrument: Business cycle at birth (boom or recession). Regressions include interactions btw: (indicator for a recession at birth) * (adverse later life events).	N of functional limitations later in life: Chronic disease: +8.6% (Chronic disease)*(early-life recessions): +10.5% This result indicates that the effects of chronic diseases on functional limitations are exacerbated by adverse early-life conditions	Effects of chronic disease and (Chronic disease)*(early-life recessions) are only positive & significant among males.

Table 4: Policies that Affect Household Resources

Study	Micro - Data, N	Identification strategy and specification	Effects of the shock	Heterogeneity
Panel A: Policies to Increase Material Household Resources				
Rossin-Slater (2013a). Effect of closures of WIC clinics in Texas on birth outcomes.	1) Texas Birth & admin. records 2005–2009; data includes mothers' maiden name, DOB, counties of birth, ZIP codes of residence; allows linking of siblings & determining whether mothers had an operating WIC clinic in their ZIP code during pregnancy; N = 1,937,003 births (612,694 siblings). 2) WIC clinic locations come from TX Dept. of State Health Services; includes names, address/ZIP codes, & opening/ closing dates in 2005 –2010 (N=578 ZIP codes; 114 experienced openings/ closures).	Exploit the within-ZIP-code variation in WIC clinic openings/closings. Compare births by mothers who did & did not have a WIC clinic in their ZIP code during pregnancy & control for mother-FE with IV (to account for migration, measurement error, & the mechanical correlation between gestation & WIC participation (instrument: dummy for whether mother would have had an open WIC clinic during her current pregnancy in the ZIP code of her 1st pregnancy assuming 39 weeks gestation). Models include individual controls, YOB & MOB FE, ZIP code-FE, county linear time trends.	The presence of a WIC clinic in a mother's ZIP code of residence, during her pregnancy: Food benefit take-up: +6% Pregnancy weight gain: too little weight (<7.3 kg): -2pp; too much weight (>18 kg): +3pp (among those with <=HS educ) Diabetes: +1.3pp (among those with <=HS educ) Gestational hypertension: +1.3pp (among those with <=HS educ) Birth weight: +27gr (+0.8%) (full sample)	Strongest effects for mothers with high school or less, who are most likely eligible for WIC services (0.74% WIC take-up vs. 0.07% among other moms). The increase in BW is concentrated in the middle of the BW distribution.
Rossin-Slater (2013b). How did changes in paternity establishment laws affect young children's access to resources and health outcomes in the U.S.?	1) Paternity establishments in hospital, N=601 state-year obs. 2) CPS-CSS & March CPS, 1994-2008 child support supplements (CSS); N=8,974 who respond to CSS); 3) NHIS data 1997-2010 restricted sample of child files; provides info on child mental & physical health. 4) Fragile Families & Child Well-Being Study.	Exploit variation in the timing of in hospital paternity establishment across states. Models regress a child outcome on the in hospital paternity establishment dummy, rich individual controls, state & child birth year FE, & state-specific time trends. Author imputes birth year = survey year − child age − 1 since interview year are in March.	Paternity establishment no effects on time spent father & child. Child private health insurance: -2.65pp (-3.89%). Child physical health (asthma, ear infection): no effects. Any well-visits: -1.99pp (-2.53%). Any doctor visits: -1.48pp (-1.78%). Child mental health: no effects. Income, poverty status, or welfare benefit receipt: no effects.	No differences by mother's race.

Table 3: Two-Shock Studies

Study	Micro - Data, N	Identification strategy and specification	Effects of the shock	Heterogeneity in mechanisms/effects
Adhvaryu, Molina, Nyshadham, and Tamayo (2015). Examine the effect of a conditional cash transfer program on the impacts of rainfall shocks in Mexico. Outcomes measured at 12 to 21 years.	1) Baseline and follow-up surveys of HHs in Progresa; 1997, follow-ups every 6 months for the first 3 years of the program (1998 to 2000). 2) ENCEL 2003; a HH survey of the 506 localities that were part of the original evaluation. 3) Mexico's National Meteorological Service provides rainfall data, 1975-2003. Data were matched using GPS coordinates, N=14,464.	Exploit two orthogonal sources of exogenous variation: 1) Parents' resources at the time of a child's year of birth & state of residence (proxied by local rainfall) & 2) The returns to investing in education during adolescence (via the RCT program Progresa). Model includes dummy for rainfall shock, Progresa exposure, the interaction btw rainfall shock and Progresa, state FE, birth year FE, & rich controls.	Exposure to adverse rainfall in the YOB: Years of educ: -0.57. Mitigating impact of Progresa: +0.1 yrs for each year in the program. On average, Progresa mitigated 60-80% of the effect of the shock. Woodcock-Munoz tests (letter-word identification, applied problems, & dictation): -0.22 to -0.25 SD.	Effects of Progresa are larger for children with lower endowments (i.e., those who were affected by the rainfall shock).
Aguilar and Vicarelli (2015). Exposure to extreme precipitation in Mexico due to El Nino and outcomes at age 2-6.	1) 3 waves of longitudinal household data from Mexico's Progresa conditional cash transfer program: 1997, 2000, 2003; N=6,264 children. Data NOT nationally representative.	1) DD model: Compare children in villages that experienced rainfall shocks vs. children in regions that did not. Model includes individual controls + village and year of child's birth FE. 2) Mitigating impacts of Progresa: Use random selection of villages into Progresa to estimate the effect of early vs late (2 yrs difference) allocation to treatment. Use the administrative selection rule for Progresa recepients to estimate an RD.	Exposure to El Nino: Height: -0.43 to -0.71 inches (~-2% = -0.2 SD). Stunting: +13pp (0.3 SD). Weight: -0.84 pounds (-2.5%=-0.13 SD). PPVT=-15% (-0.34 SD). Working memory= -18% (-0.44 SD). Visual-spatial thinking= -13% (-0.5 SD). Gross motor skills: no effects. Effects were not mitigated by Progresa.	1) Effects were more pronounced for children affected in the 1st two years of life versus prior to birth: Height: -0.71inches vs. -0.56 inches. PPVT=-21% vs. -15%. Working memory= -19% vs. -15%. Visual-spatial thinking= -13% vs. -12%.

Table 3: Two-Shock Studies

Study	Micro - Data, N	Identification strategy and specification	Effects of the shock	Heterogeneity in mechanisms/effects
Gunnsteinsson, Adhvaryu, Christian et al. (2016). Effect of nutritional supplements in Bangladesh in mitigating the effects of tornados on infants.	1) RCT took place in 2001-2007, N=18,767 infants, 41 sectors (20 received supplements, 20 placebo). 2) Survey on the effects of the tornado 2005; collected data on damages, deaths (the tornado affected 17 of the 41 sectors).	Exploit data from an RCT of a nutritional supplementation program for newborns & mothers. A tornado occured on March 20th, 2005. Authors exploit 3-sources of variation: 1) RCT of vitamin A suppl.; 2) spatial variation in tornado exposure; 3) variation in trimester of pregnancy exposed to tornado. DDD: compare babies born at different times (within & outside of a window around the tornado), across sectors affected by & unaffected by the tornado.	Tornado exposure in early pregnancy: BW: -14pp (-0.6% =-0.03 of a SD). Height: -0.54cm (-1.2%= -0.23 of a SD). Mid-upper arm circumference: -0.29cm (-0.31% = -0.35 of a SD.) Head circumfernce (HC): -0.54cm (-1.7% = 0.33 of a SD). Chest circumference (CC): -0.34cm (-1.1% =-0.16 of a SD).	Those treated with vitamin A at birth through the RCT were effectively protected from the shock in terms of antropometric outcomes at 6 months. There was little protective effect of maternal supplementation during pregnancy.
Rossin Slater and Wust (2015). Explore main effects and interactions between high quality preschool childcare and a nurse home visiting program. Examine effects on children and children's children.	1) Digital Atlas of the Danish Historical & Admin. Geography: includes individual & municipal-level data; source of outcomes data for 2nd generation. 2) Historical data on state-regulated CC centers: address, year established, number of children (collapsed to municipality* year*gender cells) (N=3,600 cells). 3) Nurse Home Visiting Program (NHV): Date program approval for all minicipalities over 1937-1949 from the Danish National Archives. 4) Inpatient records, 1994-2010. N=869,273 observations.	DD model: Exploit the municipality*year variation in CC center approvals & in the NHV program rollout. Identifying assumptions: (1) the timing of approvals is uncorrelated w/other municipal time-varying characteristics that also predict outcomes; (2) the timing of approvals is uncorrelated with the NHV program rollout.	LT impacts of the CC program: Years of schooling: +2% Only compulsory education: -11% Labor mkt: +1.6% wages (males) Mortality: -10% (females). Intergenerational effects of CC: Years of schooling (@age 25): +0.4% Only compulsory educ @age 25: -6%. But interactions of CC and NHV program and negative, suggesting substitution: Most positive effects of child care reduced by 80% suggesting that subsidized child care much less effective when NHV is already in place.	Interaction effects on education and on income were mostly driven by males (even persistent on the second generation), while effects on mortality were larger for females.

Table 4: Policies that Affect Household Resources

Study	Micro - Data, N	Identification strategy and specification	Effects of the shock	Heterogeneity in mechanisms/effects
Panel B: Maternity Leave Policy				
Baker and Milligan (2015). Expansion of paid maternity leave in Canada on children's outcomes at age 4-5.	1) National Longitudinal Survey of Children and Youth (NLSCY), 1994/5 to 2008/09. N~10,000 obs. Authors sample multiple cohorts before and after the reform so that any age effects average out. 2) Labour Force Survey (LFS) that includes data on labor force status.	Exploit the variation in time at home post-birth induced by the maternity leave reform extending maximum length of paid leave from 25 to 50 weeks. IV (instrument for time at home: dummy for whether child was born after the law change (i.e., December 31, 2000). Models include time trends & rich individual controls.	A 1month increase in maternal care: Cognitive: PPVT: -5.7% of a SD; "Who am I? test": -5.1% of a SD Behavioral outcomes (hyperactivity, anxiety, physical aggression, & indirect aggression): no effect	By child's gender: negative & significant effects only for boys. By mother's educ (HS or less vs. >HS): effects seem to be only negative & significant for children of more educated mothers.
Carneiro, Loken, & Salvanes (2013). Effect of an unexpected extension of paid maternity leave in Norway on the education and wages of children at age 30.	Norwegian Registry data: covering the population of Norwegians up to 2007 and a providing month and year of birth, education, labour market status, earnings, age, gender, data on families. Authors are able to link data on individuals with parents. N~42,600 obs.	Two strategies: 1) RD: comparing children of eligible mothers born just before and just after July 1, 1977 when maternity leave expanded from 12 weeks unpaid to 4 months paid plus up to 12 months unpaid. 2) DD: Treatment: Difference between mothers who had a child in June and those who had a child in July 1977. Control: Difference between mothers who had a child in June and those who had a child in July of 1975, 1977, and 1978.	Children of mothers who benefited from PAID maternity leave: HS drop-out (refers to a 3 yr HS diploma): -2pp (-7% = -0.04 SD). Ever started college (at age 30): +2pp (+5% = 0.04 SD). Wages (at age 30): +5% to +6.2%.	Children of less educated moms experienced a higher decline in HS drop out: (-3.6pp vs. -1.8pp), more college attendence (+3pp vs. no effect), BUT no effect on earnings by age 30 (children of more educated moms had 5.7% increase in earnings). Effects of the reform are larger for mothers who would have taken little unpaid leave.
Dahl, Loken, Mogstad, and Salvanes, (2013). Effect of an unexpected change in paid maternity leave in Norway on parental earning, fertility, LFP and child test scores.	1) Social security registers, 1992-onwards. Multiple years merged using individual identifiers. Authors do not observe actual eligibility, therefore, predict eligibility using labor earnings the year before birth. N=21,838.	RD: exploit the discontinuity from the reform being contingent on the birthdate of the child. A series of reforms extended paid maternity leave from 18 weeks to 35 weeks. Authors exploit this type of variation from 6 different maternity leave reforms in Norway. Since take-up is very high ITT ~ATE. Models include time trends & rich individual controls; also include quadratic trends on each side of the discontinuity.	The expansion of the paid ML: 1) Did not crowd out unpaid leave 2) Effects on individual outcomes: No effects on test scores, school drop-out, parental earnings, mother's LFP after birth (rate of returning to work two years after the birth), completed fertility, marriage or divorce: no effects. 3) Cost-benefit analysis "Paid maternity leave is regressive."	NA
Danzer and Lavy (2016). Effect of an Austrian maternity leave reform extending leave from 12 to 24 months on test scores at age 15.	1) OECD's PISA data, 2003 & 2006; includes student-reported background information (e.g., gender, birth year, month, nationality, attitudes), parents (education, nationality, occupation), & school (e.g., school programme, location, school size, resources); Not included: DOB, maternal labour market participation at the time of birth, duration of leave taking of mothers. N=764.	Exploit an amendment to parental leave legislation that came in effect on July 1, 1990 which extended paid leave from 12 to 24 months. Identification strategy uses: 1) RD 2) DD - RD Treatment group: children born after July 1st 1990 and before December 31st 1990. Control group: children born in the 1st half of 1990 (& in 1987). Models include rich mother controls & month of chld's birth FE. Estimates are ITT since actual leave taking is not observed.	No effects on PISA test scores in the full sample.	Mothers with post-secondary: +0.20 SD (math), +0.22 SD (reading), +0.21 of a SD (science), Boys: +0.33 SD (reading), +.40 (science). Mothers with less than post-secondary education: -0.14 SD (reading). Boys -.27 SD (reading), -.23 SD (science). Girls no effect. Girls no effect.

Table 4: Policies that Affect Household Resources

Study	Micro - Data, N	Identification strategy and specification	Effects of the shock	Heterogeneity in mechanisms/effects
Panel B: Maternity Leave Policy				
Rossin-Slater (2011). Effects of extensions of unpaid maternity leave on birth outcomes and fertility in the U.S.	1) Vital Statistics natality & mortality 1989-1997 collapsed into birth-year/birth-month/county/ mother-education/mother-race/mother-age/ mother marital-status cells; N=5,806,669 cells. 2) County Business Patterns (CBP), 1989-1997, to estimate the likelihood that a resident of a county is employed in a firm with 50 or > employees/year. 3) Quarterly Workforce Indicators (QWI) to check the firm-size procedure. 4) 1990 Census by county of birth to construct county-level controls. Link datasets by county & year (>98% of cases matched).	Exploit variation in pre-FMLA maternity leave policies across states & variation in which firms are covered by FMLA provisions. DD & DDD: Compare the likely eligible & likely ineligible groups before & after FMLA, & across states. Likely eligible group: those employed by a firm with >= 50 employees. Models control for rich county-level & mother controls, month-of-birth, year-of-birth, state FE, state specific time trend. Estimates are ITT given that author does not observe leave-taking.	DDD results: BW: +6.5gr (+0.2%=+0.01 SD). Gestation length: +0.04% (0.008 SD). LBW: -0.2% (0.01 SD). Prob(preterm): -3% (0.1 SD). Infant mortality: -2.5% (-0.017 SD). Risk factors or complications at birth: no effects. Overall fertility: no effects. Parity at birth: increase in first-parity births and a decrease in later parity births. Laws encouraged some previously childless women to give birth.	By mother's education & marital status: Married college mothers VS. single mothers with out college: BW: +9.2gr (+0.3%=+0.02 SD) vs. 7.1gr (0.2%=0.016 SD). Gestation length: +0.06% (0.012 SD) vs. no effect. LBW: -0.2% (0.01 SD) vs. -0.3% (0.012 SD). Prob(preterm): -2.7% (0.1 SD) vs. no effect. Infant mortality: -10% vs. no effect. Changes in parity at birth driven by single, less than college mothers.

Table 4: Social and Parental Investments

Study	Micro - Data, N	Identification strategy and specification	Effects of the shock	Heterogeneity in mechanisms/effects
Panel C: Child Care				
Aizer and Cunha (2014). Head Start effects on outcomes measured at age 7.	National Collaborative Perinatal Project (NCPP); children & parents were followed before birth up to age 7; waves: 8 mths, 1, 4, 7 years after birth; years of birth: 1959-1965, 12 cities. N=10,157 obs. Sample includes 8-mth Bayley score; authors argue that the Bayley is more predictive of later human capital than birth weight.	Exploit the introduction of Head Start in 1966 in a model with sibling FE. Older siblings had no acces to HS. Focus on the ability of initial endowments to predict parental investments at age 8 months & at age 7. Regression models include an interaction between HS_enrollment*Investments_8mths and controls for HS_enrollment, investments at 8mths, individual covariates, & family-FE.	The effect of HS* Bayley score at 8mths (Sibling-FE): Child IQ (age 4): 16.5% SD. Cogn. Achievement age 7 (ONLY signi. for those w/high initial HK): IQ: 10.4% SD. Reading: no effect. Math score: 16.0% SD. Parents invest more in highly endowed children. Preschool invest. & early HK are complements in the prod. of late HK. Degree of reinforcement increases w/family size.	The impact of HS is largest for those w/higher early cognitive development at age 8 mths. By age 7, the effect of HS on IQ & achievement have faded except for those with the highest endowments.
Attanasio, Di Maro, and Vera-Hernandez (2013). Impact of a preschool program in Colombia (Hogares Comunitarios, HC) on children's nutrition at age 2-6.	1) Survey of Familias en Accion (conditional cash transfer program in Colombia): representative of poor individuals in rural areas; focus on 65 towns where preschool program was not implemented; years 2002, 2003, & 2005-6; N=2,413 children. 2) ENDS: a more complete version of the DHS 2005; basic household demographics, children anthropometrics & participation in HC; urban areas, includes poor and less poor; N=6,179 children.	To address the endogeneity of HC participation authors instrument using: i) distance from the residence to the nearest nursery, ii) the median fee in the town, iii) the capacity of the HC programme in the town (filled + vacant HC slots / N of eligible children in the town). Model covariates include the N of children aged 2-6 in the town, the distance to other amenities (school, health centre and town hall), mother & head's ages & education levels and mother's height, as well as town-level variables.	Exposure to HC: Height-for-age: +0.88 SD (FeA sample); +1.23 SD (ENDS sample). Atendance to HC: Height-for-age: +0.4 SD (FeA sample); +0.83 SD (ENDS sample). "A 60-month-old child that has spent 24 months in an HC would be 0.35 SD (FeA) or 0.49 SD (ENDS) taller."	The impact of the programme is considerably higher for lower quantiles & almost zero for the top quantiles.

Table 4: Social and Parental Investments

Study	Micro - Data, N	Identification strategy and specification	Effects of the shock	Heterogeneity in mechanisms/effects
Panel C: Child Care				
Attanasio, Fernandez, Fitzsimons et al. (2014). Effects of a psychosocial and nutritional intervention in Colombia on outcomes at 12-24 months.	Baseline was collected in Feb-May 2010 & follow-up in Sept-Dec 2011; duration of the program was 18 months. Data collection includes rich measures of child cognitive tests & physical health, HH characteristics, at ages 1-2. N=1,420 children in 96 muncipalities (out of the 1,100 in Colombia). Sample sizes: Control (n=318) Stimulation (n=318) Supplementation (n=308) Both interventions (n=319).	RCT in 96 towns in Colombia using a 2×2 factorial design There were 4 interventions: i) psychosocial stimulation alone (n=318), ii) micronutrient supp. alone (n=308), iii) both combined (n=319), iv) control (n=318). Models include tester effects (two for each region), baseline level of the outcomes, sex, and a second order polynomial in age.	Psychological stimulation: Cognitive scores (Bayley-III): +0.26 SD (3.7%) Receptive language: +0.22 SD (5.4%) No effects on expressive language, fine motor skills, height, weight, hemoglobin. Micronutrient supplementation had no effect on any outcomes. Interactions between psychosocial & nutritional interventions had no effects on any outcomes.	NA
Baker, Gruber, and Milligan (2015). What are the long-run impacts of interventions that foster a deterioration in non-cognitive skills?	1) Canadian National Longitudinal Study of Children and Youth; biannual btw 1994-951 & 2008-09; focus on children 0-9; N~2,000 obs. 2) Test Scores: School Achievement Indicators Program (SAIP); Pan Canadian Assessment Program (PCAP); PISA scores; 1993-2012. 3) Health and Well-Being data: Canadian Community Health Survey (CCHS) and Canadian Health Measures Survey (CHMS); 2001-2013. 4) Criminal Behavior: Stats Canada's Uniform Crime Reporting Survey (UCRS); years: 2006-2013.	In 1997, Quebec introduced a very low cost universal child care program for children aged 0-4. This program increased maternal labor supply and use of CC in Quebec (Baker, Gruber, and Milligan, 2008). DD: compare the pre and post program outcomes of children/ teenagers in Quebec, to the corresponding outcomes of child/teenagers in the rest of Canada. Models include province dummies, year dummies, as well as individual controls.	Children enrolled in child care at ages 0-4 in Quebec: Self-reported (worse) health: +0.07 SD (+3.4%) (a positive effect means worse health). Life satisfaction: +0.30 SD (+14.0%) (a positive effect means worse). Quality of life: +0.35 SD (+14.6%) (a positive effect means worse). Criminal behavior: rates of accusations: +3.7% rates of convictions: +4.6% Test scores: no effects/opposing effects across math/science "There is no strong evidence that the Quebec Family Plan had a lasting impact on children's cognitive development".	By gender: "effects on criminal behavior, aggression, and hyperactivity are concentrated in boys, who also see the largest deterioration in non-cognitive skills".

Table 4: Social and Parental Investments

Study	Micro - Data, N	Identification strategy and specification	Effects of the shock	Heterogeneity in mechanisms/effects
Panel C: Child Care				
Campbell, Conti, Heckman et al. (2014). Effect of Carolina Abecedarian Project on health outcomes at age 30.	Surveys of children, parents, teachers include data on cognition, personality, health, achievement,& behavior; participants followed at ages 12, 15, 21, 30, mid-30s. Collected biomedical data (e.g., blood samples). N=111 children (57 treat , 54 control).	Randomization of children into control & treatment groups. Due to VERY small samples (N=111), authors use estimation methods that involve exact (small-sample) block permutation tests + boostrapping of standard errors.	Disadvantaged children randomly assigned to treatment at 0-5 have: 1) Fewer risk factors for cardiovascular & metabolic diseases in their mid-30s (stronger effects on males): systolic blood press.: -17mm Hg; metabolic syndrome (males): -25%; prehypertensive (females): -0.24; obesity & hypertension: difference of 38.9% btw treatments & controls. 2) More health care utilization at age 30 (males): +22.8%. 3) Lower risk of overweight in early-life (males): -40%. Those who are obese at age 30s were already obese at ages 0-5.	Larger impacts on overweight, obesity & hypertension, healthcare utilization for males.
Carneiro and Ginja (2014). Effect of U.S. Head Start program on outcomes observed in teens and young adults.	Children of the National Longitudinal Survey of Youth (CNLSY); annual survey from 1979 until 1994 and biannual since then; authors use until 2008. Nationally representative. N=5,433 children 3-5.	RD: exploit selection criteria on HH income (& on family size) Main regressions include Head Start participation, HH income (measured at age 4), & a parametric but flexible function of yr, state, family size, family struct., HH income (measured at age 4) Discontinuity in the prob(take-up of HS) around income eligibility threshold is not sharp so authors instrument using determinants of eligibility. 1st stage only signif. for males (F-stat=17).	Effects only estimated for boys (1st stage regression only signif. for boys) Participation in HS (IV results): Overweight: -29% (0.74 SD) Needs special health equipment: -29% (1.29 SD) Behavioral problems: -0.6 of a SD (not given as a %) Engagement in criminal act.: -22% (young adults) (0.56 SD)	No first stage for girls.

Table 4: Social and Parental Investments

Study	Micro - Data, N	Identification strategy and specification	Effects of the shock	Heterogeneity in mechanisms/effects
Panel C: Child Care				
Conti, Heckman, and Pinto (2015). The impacts of two early-life US programs (Perry Preschool Project (PPP) & Carolina Abecedarian Project (ABC)) on LT health and health behaviors.	1) PPP longitudinal data: follow-ups collected annually from age 3 until 4th grade; includes measures of intelligence, academic aptitude, achievement tests, assessments of socio-emotional development, school records starting at kindergarten through secondary education. 2) ABC longitudinal data: follow-ups collected at ages 12, 15, 21, 30. N=7,400.	Treatment randomization with long-term follow-up: The paper accounts for small sample sizes, multiple hypothesis testing, and non-random panel attrition. Effects are estimated by gender due to both biological and behavioral considerations.	Participating in an early-childhood program: 1) PPP (outcome observed at ages 27 and 40): Prob(having a healthy diet): +15pp (males) (no SD available). Prob(engaging in regular physical activity): +33pp (females). Prob(of being a daily smoker): -20pp (males) Avg. N of cigarettes/day: falls from 8.7 @age 27 to 6.5 at @40 (males). 2) ABC (outcome observed at age 34): Obesity: no effects Overweight: no effects Prob(Diastolic blood pressure): -15% (males) Prob(Systolic blood pressure): -12% (males) Hypertension I: -76% (males) Hypertension II: -62% (males) Prob(ever been hospitalized): +35pp (males).	Both programs improved the health outcomes and healthy behaviors of males only. Externalizing behavior in early-life is a key mediator of the effect of PPP on smoking among males, while enhancements in cognitive skills are a key mediator of PPP on physical activity. Task orientation and child's BMI are important mediators for high blood pressure and hypertension in later-life (males) in ABC.
Gelber and Isen (2013). Effects of Head Start on parental investments in children.	The Head Start Impact Study was an experiment in which some children were treated with Head Start while the controls were not. Many controls were in other preschools. Outcomes were measured in the fall of 2002 (after their enrollment in HS) & in the Spring of 2003, 2004, 2005, 2006 (N=4,061 children).	Exploit the random selection of 1st-time applicants (ages 3 & 4) to HS for the fall of 2002. HS experiment: children on waiting lists for 84 nationally representative HS programs (353 HS centers) were selected into: Treatment: group enrolled in HS (N=2,479 children) Control: group that was not granted access to HS (N=1,582 children).	While enrolled in HS: Parental involvement w/child (includes all activities): +0.15 SD. Reading & writing: +0.19 SD. Math: +0.19 SD. Qualitative parenting: +0.07 SD. Rules & routines: 0.12 SD. Tracking child learning: 0.23 SD. After child was enrolled in HS: Parental investment in children: +0.06 SD. Reading & writing: no effect. Math: +0.10 SD. Qualitative parenting: +0.07 SD. Rules & routines: +0.09 SD. No effect on father involvement or parent-school involvement in either condition.	Across HS programs, programs that raised children's cognitive test scores more also raised parents' involvement w/children. No evidence of differential impacts across: i) father present; ii) gender; iii) Fall 2002 income of the parents; iv) number of siblings; v) whether child entered HS at age 3 or 4.

Table 4: Social and Parental Investments

Study	Micro - Data, N	Identification strategy and specification	Effects of the shock	Heterogeneity in mechanisms/effects
Panel C: Child Care				
Gertler, Heckman, Pinto, et al. (2014). Effect of psychosocial stimulation and nutrition in Jamaica on child outcomes at age 20-22.	The Jaimaican Study: Longitudinal data that follows (N=129; 64 treatment + 65 control) poor & stunted children and a comparison group (N=84) of non-stunted. Urban representative data were used to compare samples: i) the 1992 Jamaican Survey of Living Conditions; ii) the 2008 Jamaica Labor Force.	Randomized intervention: Treated/control groups were all stunted, lived in same neighborhoods, had same age/sex. The two groups differ in terms of: mother's education & weight-for-height (treated group was more disadvantaged) & mother's employment (treated group higher than control). The comparison NON-stunted group is a more advantaged group of children (although not as advantaged as the average population in urban Jamaica).	Psychological stimulation treatment: Earnings: +42% (effect sizes: na) Employment or LFP: no effect. Compared w/the NON-stunted group, treated children catch-up in earnings, while the control group (stunted children w/o intervention) lag behind in earnings. Nutrition supplementation treatment: NO effects on ANY of the outcomes.	Treated males are more likely to be enrolled in school & to be enrolled full-time. Have a higher cognitive factor & are more likely to be expelled from school. Females are more likely to increase their years of schooling, have any college education, have higher exam grades, & better externalizing & internalizing behaviors.
Havnes and Mogstad (2011). Effect of being born after a child care reform in Norway on outcomes at age 30.	1) Longitudinal database that covers every resident from 1967 to 2009, includes rich data on all HH members; N=341,170 children. 2) administrative register that covers all child care institutions eligible for public subsidies from from 1972 to 2009. Datasets are merged using unique identifiers for each individual.	Exploit temporal & spatial variation in child care availability induced by the staged expansion. Compare adult outcomes for 3 to 6 year olds before/after the reform, from municipalities where CC expanded a lot & municipalities little increase. Non-linear DD methods to estimate quantile treatment effects & local linear regression estimates of the program effects by family income. Order the municipalities by the pp increase in CC coverage rates from 1976 to 1997, divide sample at the median, the upper half are treatment municipalities & lower half are the controls.	The child care reform: Earnings (age 30): +9,000 NOK peaks at the 11th percentile (+2.5%= +0.06of a SD) ; +5,000 NOK bwt the 15t-60th percentile (+1.4%= 0.03 of a SD); & then fade out. Gini coefficient: declined from .306 to .296 "universal child care has a small but non-negligible equalizing effect." Intergenerational income elasticity: -2.5pp.	Results show substantial heterogeneity in child care effects by family income. Children from high income households suffer a mean loss of 8000 NOK while children from low income households experience a gain of 9000 NOK. No differences by gender.

Table 4: Social and Parental Investments

Study	Micro - Data, N	Identification strategy and specification	Effects of the shock	Heterogeneity in mechanisms/effects
Panel C: Child Care				
Heckman, Pinto, and Savelyev (2013). Effect of Perry Preschool on outcomes up to age 40.	1) Data on the Perry preeschool randomized experiment: N= 123 children (51 females (25 treatment & 26 control) & 72 males (33 treatment & 39 control)); follow-ups: ages 3–15, 19, 27, and 40.	1) Exploit the randomized controlled trial design of the program to identify the causal effect of the treatment on measured skills and on adult outcomes. 2) Use an econometric model that estimates the relationship btw outcomes & experimentally induced changes in measured skills. Three stage procedure: 1) estimate the measurement system; 2) from the theoretical equations in 1), estimate the skills for each participant; 3) estimate the relationship btw participant skills and lifetime outcomes.	1) Program effects on cognition and personality skills (kernel density graphs): Cognition (Stanford-Binet Intelligence Test): increases only in the right tail of the distrib (and for females). Externalizing behavior: strong reductions for males (at all levels of the distrib) and females (left tail). Academic motivation: increases at all levels of the distrib except at right tail (and for females only). 2) Effect of cognition and personality skills on outcomes: Cognition: increases achievement tests and certain labor market outcomes. Externalizing behavior: affects crime, labor market, and health behaviors. Academic motivation: boosts education and reduces LT unemployment.	By gender: there are significant differences.
Kline and Walters (2016). Re-examine the Head Start Impact Study. Account for participation of controls in other preschool programs.	The Head Start Impact Study was an experiment in which some children were treated with Head Start while the controls were not. Many controls were in other preschools. Outcomes were measured in the fall of 2002 (after their enrollment in HS) and in the Spring of 2003, 2004, 2005, 2006 (N=4,061 children).	Conduct a calibration exercise that accounts for the fact that ~1/3 of Head Start children were drawn from another public preschool setting. Thus, the cost of providing preschool to these children is over-estimated if we ignore this. Also assumes that the short-run impacts of Head Start on test scores are the best predictors of future outcomes, in line with previous studies which have shown initial "fade out" followed by long-term effects.	Head Start is about as cost effective as other publicly funded preschools, and under reasonable assumptions, has positive rates of return. Ignoring the fact that Head Start draws from other preschools substantially overstates its cost.	The children who are most likely to benefit from Head Start are least likely to participate. Hence, an expansion that brought these chidlren into the program would have even higher payoffs.

Table 4: Social and Parental Investments

Study	Micro - Data, N	Identification strategy and specification	Effects of the shock	Heterogeneity in mechanisms/effects
Panel D: Medical Care and Insurance				
Bharadwaj, Loken, and Nielson (2013). Examine the effect of additional medical care for infants over 1500g on infant mortality and test scores in Norway and Chile.	Chile: 1) Health: Vital statistics and death records 1992-2007. N= 6,109 births in the bandwith of VLBW. 2) Education records: 2002-2010 Universe of students 1st-8th grades. 95% cases matched. Norway: 3) Health: Medical Birth Registry, 1967–1993; universe, twins. 4) Education: Norwegian Registry Data, covers population, ages 16–74 in 1986–2008. Includes basic SES data (educ, age, labor mkt, family info, etc.). N=2,477 births in window. Test scores measures at age 6-8. 72% cases are matched.	RD: Exploit variation in birth weight around the cutoff of VLBW (1500gr) or less than 32 weeks gestation to identify effect of neonatal health care on mortality/education. Compare children just under and over 1,500 grams to examine difference in outcomes as a result of extra medical treatments.	Being VLBW compared to children just above 1,500gr: Infant mortality: -4.4pp (Chile; avg infant mortality =10.9%),. -3.1pp (Norway; avg infant mortality =4%). Test scores: +0.15 of a SD (Chile; math score); 0.22 of a SD (Norway; national exam) . Introduction of surfactant therapy helped improve educational outcomes for VLBW. Predicted effects on wages: +2.7% (0.15 SD) (Chile); 1.8% (Norway).	NA
Daysal, Meltem, Trandafir, and Van Ewijk (2015). Effects of home delivery on newborn deaths in the Netherlands.	1) Perinatal Registry of the Netherlands, 2000–2008, annual dataset that links 3 datasets of individual birth records collected by midwifes (LVR-1), obstetricians (LVR-2), & pediatricians (LNR), covers 99% of the primary care & 100% of the secondary care provided during pregnancy & delivery in the Netherlands, N=356,412 births. 2) Statistics Netherlands data on income & educ. at the postal code level. 3) 2005 Dutch National Atlas of Public Health for exact address and the availability of obstetric wards for each hospital.	Use the variation in distance from a mother's residence to the closest hospital with an obstetric ward (exogeneity?) as an IV for a hospital delivery. Models include year, month, & day of the week of the birth FE, rich maternal controls, and avg HH income in the postal code of residence of the mother.	Giving birth in a hospital vs. at home (IV results): A 10.81pp increase in the share of hospital births reduced 7-day (28-day) mortality by 49% (46%) btw 1980-2009). 5-minute Apgar score: no effects 1st stage: distance is a strong predictor of whether she gives birth in a hospital or at home (F-stat ~28): 7.5pp (11% at the mean).	By income: baseline results are driven entirely by births to mothers residing in postal codes with less than the median of the avgerage monthly HH income in the postal code (1,929 euros). 2SLS estimates are similar when the sample is split by maternal ethnicity, median age (29 years), median gestational age (280 days) or median birth weight (3,410 grams).

Table 4: Social and Parental Investments

Study	Micro - Data, N	Identification strategy and specification	Effects of the shock	Heterogeneity in mechanisms/effects
Panel D: Medical Care and Insurance				
Sievertsen and Wust (2015). Effects of longer post partum hospitalizations on mother and child readmission and children's schooling achievement at age 7 in Denmark.	1) Danish National Birth Cohort (hospital admissions), 1985-2006, N=714,562 births. 2) Survey data: Danish National Birth Cohort, 1997-2003; pregnant women were invited to participate in 2 pre-birth & up to 4 post-birth surveys (at 6 & 18 months, 7 years & 11 yrs); includes maternal health behaviors, investments in children's health & development, & mother-reported child health; N=100,000 births. 3) Data on the 9th-grade GPA are available for cohorts who completed 9th-grade in 2002-2012 (cohorts born 1987-1997).	Exploit county-by-county introduction of mandatory same-day discharge on the day of birth in a difference-in-differences framework. Models include county and year FE, as well as county-specific quadratic trends in birth year.	Same-day discharged newborns: Prob(1st-month hospital readmission): +75% (+0.15 SD). Readmission after 1st month: no change N of contacts mother & child with general practitioner in 1st month of child: +0.48 (+126% = 0.54 SD). N of contacts mother & child with general practitioner up to age 3: no effect. Children's 9th grade GPA: -0.1 SD. Test score in Danish: -0.12 SD.	Long term effects are strongest for at-risk children: "Children of at-risk mothers (defined by their age, education, income) appear to drive the negative effect of same-day discharge on schooling outcomes at age 15." GPA: declines by -0.19 SD in the at risk group.
Meyer and Wherry (2016) examine the effect of the Medicaid expansions on mortality in affected cohorts.	1) Admin data: mortality records from the National Vital Statistics System (NVSS) Multiple Cause of Death files for the years 1979 to 2011 2) March Supplements to the Current Population Survey (CPS): use a random sample of 500 children of ages 0-17 from each year of the 1981-1988 CPS and estimate the childhood eligibility for this pooled sample for each birth month N= 864 children (ages 4-23)	RD: exploit the discontinuity induced by Medicaid expansions that extended eligibility only to children born after Sept. 30, 1983. Poor children gained 5 additional years of eligibility if they were born in October 1983 rather than just one month before. Control group: cohorts of children born just before the birthdate cutoff.	Children born after September 30, 1983: Internal-cause mortality rate: Ages 4-7, 8-14, 19-23: no effect. Outcome at ages 15-18: -19% (blacks only). External-cause mortality rate: Outcome at ages 4-7: no effect. Outcome at ages 8-14: -13% (blacks only). Outcome at ages 15-18: +8% (whites only). Outcome at ages 19-23: -10% (blacks only).	By race: Medicaid expansions had a sizeable decrease in the internal mortality rate of older black teens.

Table 4: Social and Parental Investments

Study	Micro - Data, N	Identification strategy and specification	Effects of the shock	Heterogeneity in mechanisms/effects
Panel D: Medical Care and Insurance				
Miller and Wherry (2014). Effects of Medicaid expansions to older children on health status in young adulthood.	1) National Health Interview Survey (NHIS), years 1998 to 2012 N= 95,855 individuals . 2) Administrative data on hospitalizations from the Nationwide Inpatient Sample (NIS) provided by the Healthcare Cost & Utilization Project, includes data on 46 states, N=3 million hospital visits (excluding pregnancy).	Exploit variation in the timing & generosity of Medicaid and SCHIP eligibility for pregnant women & children across states. Construct a simulated eligibility measure of the generosity of state eligibility rules to instrument for the fraction of individuals eligible for Medicaid coverage. Authors construct Medicaid coverage measures by age groups: prenatal period, ages 1-4, 5-9, 10-14, 15-18. Model: outcome regressed on Medicaid eligibility in prenatal period, ages 1-4, 5-9, 10-14, 15-18, & on individual & state-level control variables, state of residence, year of birth (age), & survey year dummies.	A ten percentage point increase in eligibility during the prenatal period (or during childhood): Obesity: -1.4pp (-7%) (no SD) (in utero). BMI: -1.5 kg/m2 (-7% = -0.25 SD) (in utero). Adult hospitalizations (excluding pregnancy): -2.7% (no SD) (ages 1-4). Preventable hospitalizations: -7% (in utero). Hospitalizations related to endocrine, nutritional, metabolic & immunity disorders: -8% (in utero). No effects on health status, on any health limitation, or on psychological distress (Kessler scale).	Larger effectsof coverage in utero.
Wherry, Miller, Kaestner, Meyer (2015). Effects of Medicaid expansions to older children on health status in young adulthood.	Uses data from the Healthcare Cost and Utlization Project (individual level hospital discharge and Emergency Department records from participating states) to examine exposure to Medicaid expansions given state and year of birth on number of visits as adults. N~58,000.	RD: exploit the discontinuity induced by several early Medicaid expansions that extended eligibility only to children born after September 30, 1983. Treatment group: children in families with incomes at or just below the poverty line gained 5 additional years of eligibility if they were born in October 1983 rather than just one month before. Control group: cohorts of children born just before the birthdate cutoff.	Children born after September 30, 1983: At age 15: Hospital visits: no effect. Emergency department visits: no effect. At age 25: Hospital visits: no effect (for non-blacks) Emergency department visits: no effect (for non-blacks)	Effects were concentrated among Blacks: Hospital visits: -7% to -15% (Blacks only). Emergency department visits: -2 to -5% (Blacks only). No effects were observed on non-Blacks.

Table 4: Social and Parental Investments

Study	Micro - Data, N	Identification strategy and specification	Effects of the shock	Heterogeneity in mechanisms/effects
Panel D: Medical Care and Insurance				
Brown, Kowalski, and Lurie (2015). Expansions of Medicaid coverage to older children and effects on labor force participation and income at age 28-31.	1) IRS-Compliance Data Warehouse (CDW), 1996 -2012; allows individuals + parents to be followed; N=4,911,040 females and 5,129,194 males. Authors link children to parents in 1997, & follow the parents in all other years. 2) Medicaid Statistical Information System (MSIS). 3) Social Security Administration data on mortality.	Exploit the variation in public insurance eligibility by cohort & state due to the Medicaid & SCHIP expansions in the 1980's & 90's. Authors exploit variation in total years of eligibility during childhood. Variation is at the state, month, and age group level. Models include FE for each birth month cohort, & each state at age 15, plus individual/HH controls. IV (instrument: simulated eligibility based on the fraction of the sample eligible for Medicaid at state & cohort year, at each age from ages 0 to 18).	For each additional year of simulated Medicaid eligibility: Cumulative income and payroll tax payments (@age 31): +$1,561 (of a base of $35,268) (+4.4%) (no dstandard deviations provided). Income: +$186 (on a base year of 20,623) (+0.9%). Years of education: +0.9 years (no avg. years of schooling provided).	By gender: "Females earned more in cumulative wages by age 28."
Cahodes, Kleiner, Lovenheim, and Grossman (2016). Effects of Medicaid expansions to older children on high school and college education of 22-29 year olds.	1) American Community Survey (ACS) 2005-2012, provides educational variables; allows matching each repondent to the state of birth. 2) March Current Population Survey (CPS), used to calculate Medicaid eligibility by age, state, year, & race. 3) Youth Risk Behavior Surveillance System (YRBSS) to explore mechanisms (i.e. teen health behaviors). N=5,494 obs.	Exploit the state-level expansions of Medicaid and the State Children's Health Insurance Program that took place in the 1980s & 1990s. IV (instrument for actual eligibility using Medicaid eligibility of a fixed population in each age, state, year, & race). Identification assumption: Medicaid rules are not changing due to unobserved cross-cohort trends that also affect educational attainment. Models include rich aggregate-level controls, state-of-birth FE & calendar year FE.	A 10pp increase in avg Medicaid eligibility between the ages of 0-17: IV results High school drop-out: -0.5pp (-5%) (-0.10 of a SD). College attendance: +0.7 to 1.0pp (1 to 1.5%) (0.08 of a SD). College completion: 0.9 to 1.0pp (3.3 to 3.7%) (0.08 of a SD).	By race: An interaction between Medicaid Xa d nonwhite shows that: "Medicaid expansions helped to reduce the racial gap in HS completion..." By age: Authors show results of health insurance access by age: ages 0-1 vs. ages 2-17. Find larger effects on older children.

Table 4: Policies that Affect Household Resources

Study	Micro - Data, N	Identification strategy and specification	Effects of the shock	Heterogeneity in mechanisms/effects
Panel E: Policies to Increase Maternal Education				
Carneiro, Costas, and Parey (2012). Effect of changes in maternal education on health and test scores at ages 7-8 and 12-14 in the U.S.	National Longitudinal Survey of Youth 1979 (NLSY79), women and their children only; annual survey from 1979 to 1994 and biannual since. Authors use data until 2008. N=7,555 children from 3,191 mothers.	IV approach: instrument for materal education is variation in schooling costs during the mom's adolescence (IVs: local tuition fees, distance to college, local labor market variables). Since IVs may be weak, authors also use a limited information maximum likelihood. Models include county & cohort FE, & aggregate trends as well rich controls for mother's ability.	A year of mother education (IV estimates): Whites: Cognition (PIAT): +9.4% of 1 SD (math), +5.5% (reading) (ages 7-8); +6.0% of 1 SD (math), +5.2% (reading) (ages 12-14). Behavioral problems index: -6.6% (ages 7-8), -7.7% (ages 12-14). Grade repetition: -1.5% (ages 7-8), -2.1% (ages 12-14). Health (overweight/obesity): no effect. Blacks: Cognition (PIAT): +10.3% of 1 SD (math), +7.3% (reading) (ages 7-8); +8.3% of 1 SD (math), +7.2% (reading) (ages 12-14). Behavioral problems index: -6.8% (ages 7-8), -4.9% (ages 12-14). Grade repetition: -1.7% (ages 12-14). Health (overweight/obesity): weak effects.	The effect of maternal education persists into adolescence. Heterogeneity across races.
McCrary and Royer (2011). Effect of mother's high school education on fertility and infant health in California and Texas.	1) Administrative (confidential) dataset on all births in CA & TX with data on mother's date of birth, education, infant health, pregnancy behaviors (e.g., smoking, drink), paternal characteristics; N=800,000 births per year. 2) Public-use Natality Detail Files, 1969–1988, (only years for which daily birth counts by state are available).	Exploit age-at-school-entry policies to identify the effect of female education on fertility & infant health (i.e., exploit the fact that the year in which a person starts school is a discontinuous function of exact date of birth and determines when they can legally drop out). Compare women born just before & after the school entry date. Authors claim that school entry policies do not affect fertility.	Mother was born after the school entry date: Education at motherhood: -0.14 years (-1.3%) in CA and -0.24 years (-2.1%) in TX (no standard deviations provided). No effects on Infant health (LBW, gestation, infant mortality). Risky maternal behaviors: Maternal smoking: +13% (no SD). Drinking: -20% (no SD). Mother has STDs: no effect.	By race/ethnicity: "For black women, the effect on LBW is consistent with education improving well-being, while for white women is of the opposite sign."

Table 5: The "Missing Middle" and Latent Effects

Study	Micro - Data, N	Identification strategy and specification	Effects of the shock	Heterogeneity in mechanisms/effects
Bharadwaj, Eberhard, and Neilson (2013). Examines effects of BW on test scores from 1st to 12th grade in Chile.	1) Chile's birth records, 1992-2002. Twins/siblings are identified by using a mother ID; N=15,740 twin pairs. 2) Education data comes from the RECH (National student registry) database, the SIMCE (Math, Science, & Language Arts), and the PSU dataset (college entrance exam on math & language), that consists of administrative data on the grades/test scores of every student in the country , 2002-2008; database provided by the Ministry of Educ. of Chile. Approximately 4 million students observed ~4 times.	Over time, depending on parental preferences (compensatory or reinforcing), test score diff's within sibling or twin pairs will converge or diverge. Parents may find it harder to invest differentially in twins. Compare OLS, sibling, and twin FE estimates.	A 10% increase in BW: Math & language scores: +0.04 to 0.06 of a SD. Relationship is stable from 1st grade through HS. Being VLBW: Math & language scores: -0.1 to -0.2 of a SD. OLS & twins estimators are similar in 1st grade(~0.04 of a SD) but OLS estimates decline over time (e.g., in 8th grade the OLS estimate is 0.2 of a SD & the twins estimate is 0.5 of a SD). Authors claim this is explained by parental investment.	By mother's educ: The relationship btw BW & test scores for children (twins) of mothers with & w/o a HS degree is statistically identical (0.04 of a SD due to a 10% increase in BW) - a possible explanation for this result is that inequality aversion does not vary by mom's education. By SES: similar relationships in low and high SES schools/families. Results show a non-linear relationship btw BW & academic outcomes.
Figlio, Guryan, Karbownik, and Roth (2013). Examines effects of LBW on test scores in 3-8th grade in Florida.	Universe of births in Florida from 1992-2002 matched to subsequent universe of Public school system records (includes children in 3rd to 8th grade) based on first & last name, DOB, SS#. Nearly all potentially matchable children are matched. Sample is conditioned on: those remaining in the state of FL & attending public school. Authors select twins (sample of twins is followed from birth through middle school). N=14,000 pairs of twins.	Authors estimate Twin FE models (to account for potential unobservable determinants of cognitive ability that could be correlated w/BW); neonatal health is measured using ln(BW); controld for a gender dummy, and a dummy for within-twin-pair birth order. Authors hold gestation length constant. Estimates are identified by variation in fetal growth rates.	A 10% increase in BW: Cognitive test (Florida Comprehensive Assessment Test, FCAT): +0.045 SD (OLS: +0.031 of a SD). Math test: +0.050 of a SD. Reading: +0.039 of a SD. Predicted effects on wages are: 3/4 of those in Black, Devereux, and Salvanes (2007). Effects on cognition are 60%-88% of those found in Black, Devereux, and Salvanes (2007). These effects do not change between ages 9-14.	Authors estimate models by: same sex twins (vs opposite sex), gender, same sex composition (GG vs BB), mother's race, ethnicity, immigration status, education (<12, 12-15, >15), zip code median income (bottom, middle, top), marital status, age at birth (<=21, 22-29, 30-35, >=36) and find: that a 10% increase in BW is associated with a 0.04 SD increase in cognitive tests for all. Slightly larger effect for more advantaged children.

Table 5: The "Missing Middle" and Latent Effects

Study	Micro - Data, N	Identification strategy and specification	Effects of the shock	Heterogeneity in mechanisms/effects
Robinson (2012). Hypothesises that LBW infants with evidence of slower brain growth will have worse outcomes at age 4-7 than LBW infants with a brain sparing pattern of slower growth.	1) Collaborative Perinatal Project, longitudinal survey of newborns in one of 12 major U.S. cities, 1959 -1974, waves: ages 4, 8, & 12 months of age, and at 4, 7, and 8 years of age; N=47,019 individuals. 2) A 50% sample of all US births from 1968, reported by Hoffman et al. (1974); provides ability to get percentile data broken down by both gender/race;	Decompose LBW infants into: i) those whose head circumfrance is proportionate to their weight; ii) those with evidence of brain sparing. Hypothesis: "Human capital should be affected through decreased cognitive function caused by brain growth restriction in utero -- a potential mechanism for the fetal origins hypothesis." Models regress child outcome on indicators for whether a child was AGR & SGR, and on rich individual controls and sibling FE.	Find no cognitive effects of LBW in group with brain sparing. In group with effects on brain size: Welsher IQ scores (ages 4 & 7): -3 to -4pp (-4.2% = 0.27 of a SD). Congenital malformations: 1.6 times higher. Prob(vision, hearing, & speech abnorm.): +1.5 to 2.3 times higher Even with brain sparing: Congenital malformations: 1.3 times higher. Prob(vision, hearing, and speech abnorm.): +1.2 to 1.5 times higher.	NA

Table 6: Summarizing the Effects of Shocks on Birth Weight, Test Scores, and Wages

Shock	Study	Elasticity
Panel A: Outcome= Birth Weight		
Alcohol	Barreca and Page (2015)	A 1-month increase in the minimun legal drinking age leads to a 0.03% decline in LBW (or a statistically non-significant 1.2% decline on BW).
Disease	Schwandt (2016)	A 10% increase in maternal influenza hospitalizations in pregnancy leads to a 0.2% decline in BW (or a 7.2% increase in LBW).
Income	Almond, Hoynes, and Schazenbach (2011)	A 10% increase in annual income leads to a 0.5% increase in BW (or a 6.0% decline in LBW).
Income	Hoynes, Miller, and Simon (2015)	A 10% increase in annual income leads to a 1.0% increase in BW (or a 11.0% decline in LBW).
Income	Rocha and Soares (2015)	A 10% increase in rainfall shocks during pregnancy leads to a 1.8% decline in BW (no LBW estimates are provided).
Income & Stress	Lindo (2011)	Father's (own) unemployment leads to 4.8% decline in BW (or a statistically non-significant 2.5% increase on LBW).
Maternity leave	Rossin-Slater (2011)	A 1-month increase in maternity leave during pregnancy leads to a 0.16% increase in BW (or a -0.16% decline in LBW).
Nutrition	Almond and Mazumder (2011)	A 1-month increase in fetal nutritional disruption, leads to a 0.6% decline in BW (no LBW estimates are provided).
Nutrition	Rossin-Slater (2013)	A 10% increase in the availability of WIC clinics leads to a 0.4% increase in BW (or a 1.7% decline in LBW only for mothers with HS or less).
Pollution	Currie, Graff Zivin, Meckel, Neidell, Schlenker (2013)	A 10% increase in pollution (the N of districts with water contamination) leads to a 7.5% increase in LBW (no BW estimates are provided).
Pollution	Currie and Walker (2011)	A 10% increase decline in NO2 from cars (along with associated decreases in other pollutants leads to a 10% decline in LBW.
Smoking	Bharadwaj, Johnsen, and Løken (2014)	A 10% decrease in smoking (the proportion of women smoking) during pregnancy leads to a 1.3% decline in BW.
Stress	Carlson (2015)	A 10% increase in anticipated job losses in pregnancy leads to a 0.2% decline in BW (or a 16.0% increase in LBW).
Stress	Persson and Rossin-Slater (2016)	Exposure to the death of a close relative during pregnancy reduces BW by 0.5% (or a 20% increase in LBW).
Stress	Quintana-Domeque and Rodenas-Serrano (2016)	A 10% increase in violence (terrorist attacks) during pregnancy leads to a 0.2% decline in BW (no LBW estimates are provided).
Violence	Aizer (2011)	A 10% increase in violence (the probability of personal assault) during pregnancy leads to a 10.0% decline in BW (no LBW estimates are provided).
Panel B: Outcome=Test Scores		
Alcohol	von Hinke Kessler Scholder, Wehby, Lewis, and Zuccolo (2014)	A 10% increase in the probability of consuming alcohol during pregnancy leads to a 0.05 SD decline in test scores.
Disease	Bhalotra and Venkataramani (2013)	A 10% decrease in diarrhea mortality rates leads to a 0.14 SD increase in test scores.
Disease	Venkataramani (2012)	A 10% decline in the cases of malaria at the year of birth leads to a 0.2 SD increase in test scores.
Disease	Ward and Phipps (2014)	A 10 unit increase in the Influenza rate leads to a 0.3 SD decrease in test scores.
Education (mother)	Carneiro, Meghir, and Parey (2012)	1-year increase in mother's education leads to a 0.1 SD increase in test scores.

Table 6: Summarizing the Effects of Shocks on Birth Weight, Test Scores, and Wages

Shock	Study	Elasticity
Panel A: Outcome= Birth Weight		
Income	Black, Devereux, Løken, and Salvanes (2014)	A 10% increase in annual income at age 5 leads to a 0.4 SD increase in test scores.
Income	Dahl and Lochner (2012)	A 10% increase in annual income at ages 5-11 leads to a 0.15 SD increase in test scores.
Income	Milligan and Stabile (2011)	A 10% increase in annual income at ages 0-5 leads to a 0.14 SD increase in test scores.
Maternity leave	Baker and Milligan (2016)	A 1-month increase in paid maternity leave at ages 6-12 months leads to a -0.057% SD decline in test scores.
Nutrition	Almond, Mazumder, and Van Ewijk (2011)	A 1-month increase in fetal nutritional disruption (Ramadan exposure), reduces test scores by 0.07 SD.
Nutrition	Fitzsimons and Vera-Hernandez (2014)	A 1-month increase in breastfeeding leads to a 0.2 SD increase in test scores.
Nutrition	Greve, Schultz-Nielsen, Tekin (2015)	A 1-month increase in fetal nutritional disruption (Ramadan exposure), reduces female (ONLY) test scores by 0.26 SD.
Pollution (radiation)	Black, Bütikofer, Devereux, and Salvanes (2014)	A 10 unit increase in pollution (air/ground radiation) in utero leads to a 0.3 SD decline in test scores.
Pollution	Bharadwaj, Gibson, Graff-Zivin, and Nielsen (2016)	A 10 unit increase in pollution (CO) in utero leads to a 0.4 SD decrease in test scores.
Pollution	Sanders (2012)	A 10 unit decline in pollution (TSP) at the year of birth leads to a 0.1 SD increase in test scores.
Stress	Aizer, Stroud, and Buka (2016)	A 10% increase in cortisol during pregnancy leads to a 0.12 SD decrease in test scores.
Weather	Shah and Millett Steinberg (2016)	A 10% increase in the proportion of districts/year that experience a rainfall shock leads to a 0.02 SD decline in test scores.
Weather	Aguilar and Vicarelli (2015)	A 10% increase in rainfall shocks leads to a 0.02 SD decline in test scores.
Panel C: Outcome=Wages		
Alcohol	Nilsson (2015)	A 1-month increase in alcohol exposure during pregnancy leads to a 3.4% decrease in wages.
Child care	Gertler, Heckman, et al (2014)	A 1-month increase in psychosocial stimulation in early-life leads to a 1.75% increase in wages.
Child care	Havnes and Mogstad (2011)	A 10% increase in child care subsidies leads to a 1.4% increase in wages.
Disease (worms)	Baird, Hicks, Kremer, and Miguel (2016)	A 1-month increase in deworming school-aged children (age ~12) leads to a 0.15% decrease in wages.
Disease	Bhalotra and Venkataramani (2015)	A 10% decline in infant pneumonia death rates leads to a 7.0% increase in wages.
Disease	Beach, Ferrie, Saavedra, and Troesken (2016)	A 10% decrease in typhoid mortality rate leads to a 5.0% increase in wages.
Disease	Schwandt (2016)	A 10% increase in maternal influenza hospitalizations in pregnancy leads to a 1.1% decline in wages.
Health care	Brown, Kowalski, and Lurie (2015)	A 1 year increase in Medicaid coverage eligibility at ages 0-18 leads to a 4.8% increase in wages.
Maternity leave	Carneiro, Løken, and Salvanes (2015)	A 1-month increase in paid maternity leave leads to a 1.4% increase in wages.
Nutrition	Adhvaryu et al., (2016)	A 10% increase in (the availability of) iodized salt in utero leads to a 0.4% increase in wages.

Table 6: Summarizing the Effects of Shocks on Birth Weight, Test Scores, and Wages

Shock	Study	Elasticity
Panel A: Outcome= Birth Weight		
Pollution	Isen, Rossin-Slater, and Walker (2015)	A 10-unit decrease in pollution (TSP) in-utero leads to a 1.0% increase in wages.