

Are Public Expenditures Associated with Better Child Outcomes in the U.S.? A Comparison across 50 States

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Our article utilizes variation across the 50 U.S. states to examine the relationship between public expenditures on children and child outcomes. We find that public expenditures on children are related to better child outcomes across a wide range of indicators including measures of child mortality, elementary school test

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scores, and adolescent behavioral outcomes. States that spend more on children have better child outcomes even after taking into account a number of potential confounding influences. Our results are robust to numerous variations in model specifications and to the inclusion of proxies for unobserved characteristics of states. Our sensitivity analyses suggest that the results we present may be conservative, yet our findings reveal a strong relationship between state generosity toward children and children's well-being.

The government spends approximately \$6,000 per child each year on education, social programs, and tax credits for parents. Two-thirds of this amount is determined at the state and local level, suggesting that expenditures on children could vary widely across the 50 states. In the tradition of cross-national research, we use this state-level variation to examine the relationship between public expenditures and child outcomes.

Understanding how variations in state expenditures affect child outcomes is particularly important in the current policy and fiscal contexts. In recent years, more policymaking authority has devolved from the federal to the state level. The 1996 welfare reform legislation transferred greater autonomy to states, leading to increases in policy variation. The impending reauthorization of the welfare reform act, recent changes in state education policies, and different approaches to Children's Health Insurance Programs (CHIPs) promise even greater variation in the coming years. Added to this, many states are facing their worst budget deficits in 50 years and may be forced to cut social programs (Lav & Johnson, 2003; National Governors Association, 2002).

A leading rationale for public expenditures on children is that today's investments will yield future returns by producing a healthy and productive workforce (Blank, 1997). This article examines the association between public expenditures on children and measures of child well-being in the short term. We analyze child outcomes in several domains: child health and mortality, standardized test scores, child poverty, and adolescent behavior. If public expenditures are associated with positive child outcomes in the short term, they are also likely to be associated with longer-term outcomes such as increased earnings, reduced crime and imprisonment, and reduced welfare dependence in adulthood.

Our measures of public expenditures are uniquely comprehensive and detailed. We build upon work by Bainbridge (2002), which estimates public expenditures on children across more than 30 social programs and tax credits in 1996. Our expenditure data allow us to estimate the relationship between specific types of expenditures such as Medicaid or public education and health- or education-related child outcomes. In addition, we estimate the relationship between child outcomes and a broad measure of public expenditures that represents the sum total of what children receive from public sources.

One important limitation of our article is that our analysis is cross-sectional. As in any cross-sectional analysis, omitted variable bias is a concern. If some

unmeasured characteristic of states, such as a generous disposition toward children among state citizens, leads to both high public spending on children and better child outcomes, then the observed relationships in our article may be spurious. On the other hand, unmeasured characteristics of states, such as the extent of children's need and hardship, may be related to high spending but *worse* child outcomes. In the latter case, unmeasured characteristics of states may lead us to underestimate the relationship between public spending on children and child outcomes. On balance, the direction of bias from omitted variables is unclear.

Although we cannot fully address concerns about omitted variables, we take several steps to strengthen confidence in our results. We include what we feel are the most important observed characteristics of states as control variables. We test the convergent and discriminant validity of our models by examining whether particular expenditures (e.g., educational expenditures) are more strongly related to outcomes in the corresponding domain (e.g., test score outcomes) and less closely related to outcomes outside of that domain (e.g., low birth weight). We also control for proxies for state generosity and test the robustness of our results to variations in our model specifications. None of these strategies fully addresses omitted variable bias, but together they strengthen our confidence in the reported results.

The following sections review prior research, discuss our data and methods, present results, and end with a discussion of the findings.

Prior Research

Compared with other industrialized countries, welfare state spending in the U.S. is relatively low and child poverty rates are relatively high (Bradbury & Jantti, 1999, 2001; Cornia, 1997; Kamerman & Kahn, 1997; Kenworthy, 1999; McLanahan & Garfinkel, 1995; Phipps, 1999a, 1999b; Smeeding, Danziger, & Rainwater, 1997; Smeeding, Rainwater, & Burtless, 2002). Many studies suggest that meager benefits and high rates of child poverty in the U.S. are linked. Blank and Hanratty (1993), for example, report that child poverty would be dramatically reduced if the U.S. were to adopt the Canadian welfare state programs. Other research has shown that the introduction and expansion of social programs as part of the War on Poverty coupled with the strong economy of the late 1960s led to a large decline in child poverty between 1960 and 1970 (Danziger, Haveman, & Plotnick, 1986; Haveman, 1994; Seccombe, 2000; U.S. Census Bureau, 2002). Similarly, the strong economy of the late 1990s and the large expansion of the Earned Income Tax Credit (EITC) in the middle of the decade are credited with further reductions in child poverty (Burtless & Smeeding, 2002).

The full effects of social spending on child well-being are not captured by the official U.S. poverty rate, however. Spending on in-kind programs, such as Medicaid, food stamps, and housing has increased rapidly since the mid-1960s,

yet these expenditures are not reflected in the U.S. poverty rate (Burtless, 1986, 1994). For this reason, researchers and policymakers must look beyond the poverty rate to capture the total effects of social spending on children.

Health and nutrition expenditures are omitted in calculating poverty rates, but, at least in theory, we would expect these expenditures to lead to better child health outcomes. Health expenditures may reduce the infant mortality rate and the percentage of children born with a low birth weight by improving access to and quality of prenatal and neonatal health care. Health expenditures may also reduce child mortality by improving access to and quality of health care provided to children.

Some evidence supports the theory that health expenditures improve children's health outcomes. The introduction of Medicaid in 1965 and expansions of eligibility and services in the 1980s and 1990s were associated with a decline in infant and child mortality and improvements in child health. But, the expansion of the Medicaid public health insurance program had no effect on the percentage of children born with low birth weight (Currie & Gruber, 1996; Lykens & Jargowsky, 2002; Mayer & Sarin 2005; see Meara et al., 2002 for a review). A recent study found that WIC, the Special Supplemental Nutrition Program for Women, Infants, and Children, was associated with better birth outcomes for children (Bitler & Currie, 2005).

In theory, we would expect educational expenditures to be associated with better educational outcomes such as higher test scores and higher rates of high school completion. Educational expenditures may improve educational outcomes by allowing for smaller class sizes and lower student-to-teacher ratios. School resources may also improve student outcomes by allowing for higher teacher salaries, which may attract more experienced and educated teachers.

Empirical research has vigorously debated the question of whether education expenditures do in fact improve educational outcomes. This debate was sparked off by the 1966 Coleman report, which found that the effects of school resources on student outcomes were overshadowed by family influences and the racial and socioeconomic composition of the school (Coleman et al., 1966). In recent decades a body of research has developed in support of the "money doesn't matter" thesis (Hanushek, 1989, 1994, 1996, 2001; Hanushek & Somers, 2001; Hoxby, 2002). This research has pointed to the increase in per pupil expenditures and the decrease in the student/teacher ratio over time and to the lack of concurrent gains in test scores as evidence that more school resources do not produce better outcomes.

At the same time, other researchers have provided counter evidence that school resources do make a difference in educational outcomes. The Tennessee Project STAR class size experiment provided strong evidence that reductions in class size in the early years of schooling had positive effects on test scores (Krueger, 1997; Krueger & Whitmore, 2001; Mosteller, 1999). The Project STAR evaluation

also found evidence that the positive effects of smaller classes persisted over time and that test score gains were largest for black students. The evidence from Project STAR was consistent with findings from an earlier evaluation of class size reductions in Indiana (Mosteller, 1999). Mayer (2001) also found evidence that state educational spending was associated with educational attainment. A related body of research linked educational spending to longer-term outcomes and found that educational expenditures were associated with greater future earnings (Akin & Garfinkel, 1977; Card & Krueger, 1992).

The generally mixed evidence on the relationship between expenditures and child outcomes in prior research means that it is unclear whether to expect government expenditures to be associated with better child outcomes at the state level. Theoretically, there are several reasons why our analysis may fail to detect a relationship between expenditures on children and child outcomes. As suggested by some prior research, parental investments of time or money and other environmental influences on child well-being may overwhelm the effects of public expenditures. Or, higher expenditures may not translate into better child outcomes if the expenditures are used ineffectively. For instance, New York State spends more than any other state on Medicaid, and recent news stories have reported huge waste and fraud in the New York Medicaid system that have inflated expenditures without benefiting patients (Levy & Luo, 2005). Also, public expenditures may be allocated very differently within states, with some states concentrating spending on the poorest families, other states distributing expenditures more evenly, and some states spending the most on kids who need it the least. It is possible, then, that state data may be at too broad a level of aggregation to reveal a relationship between expenditures and outcomes. Therefore, null findings may indicate that expenditures do not improve child outcomes or that the relationship between expenditures and outcomes occurs at a more local level.

Data and Methods

Public Expenditures

Our data on public expenditures on children were collected by Bainbridge (2002) from a variety of sources that include over 30 types of social programs and tax credits. All of the expenditure data pertain to 1996. In our analysis we estimate the relationship between aggregate public expenditures and a range of child outcomes. In addition, we estimate relationships between education and Medicaid expenditures and related outcomes. Expenditure amounts are divided by the number of children in the state to make expenditure measures comparable across states.

The programs and tax credits covered include old-age, survivor's, disability, and social security benefits; cash assistance (Aid to Families with Dependent

Children (AFDC), emergency assistance, general assistance); Supplemental Security Income; federal tax deductions/credits (interest paid deduction, Earned Income Tax Credit (EITC), child care tax credit); food stamps; other nutrition programs (school lunch/breakfast, WIC, child and adult care food program, summer food service program); child care and early education programs (child care development block grant); Title IV at-risk child care, and AFDC/transitional child care); Head Start and pre-K (federal and state); Social Services Block Grant/Title XX (total and child care portions); Community Services Block Grant; Medicaid for children; Maternal and Child Health Block Grant; Unemployment Insurance; Worker's Compensation and Black Lung; Child Welfare/foster care; LIHEAP (energy assistance); veterans' benefits; and child support enforcement. The most noteworthy omissions from our comprehensive expenditure measure are housing subsidies, which were not available by state, and state EITCs, which were also not estimated.

The aggregate public expenditure measure is a comprehensive measure of what children receive from public/governmental sources. Most of the programs and tax credits included in our measure do not benefit children exclusively. Bainbridge (2002) used U.S. Department of Agriculture (USDA) estimates of the proportion of family consumption by children to estimate the proportion of public expenditures that go to children. Generally, the rules for allocating public expenditures to children are that money directly spent on children (e.g., expenditures on education or nutrition programs such as school lunch or breakfast) is counted in total, while money spent on families (e.g., Medicaid, Food Stamps, AFDC, EITC) is allocated to children based on USDA estimates of the proportion of family consumption by children (Lino, 1997). For example, according to our formulas 16% of Medicaid expenditures and 35% of food stamp expenditures, on average, went to children.

Child Outcomes

The outcome data are measured at the state level and come from the Annie E. Casey Foundation's Kids Count data collection project and from the National Center for Education Statistics. As shown in Table 1, the indicators span the age range from birth to adolescence as well as a range of domains. Indicators pertain to 1996 except where otherwise noted.

The health and mortality indicators come from data from the Center for Disease Control and Prevention and the National Center for Health Statistics, compiled in the Kids Count database. The test score data were available for between 35 and 43 states from the National Assessment of Educational Progress (NAEP) reports (U.S. Department of Education, 1999a, 1999b, 2001). The math scores were measured in 1996, but the reading and writing scores were measured in 1998. Because the expenditure data cover 1996, expenditure levels do not correspond precisely to reading and writing score outcomes.

Table 1. Definitions of Child Outcomes

Domains	Child Outcomes
Health and mortality	Infant mortality (deaths to infants less than 1 year old per 1,000 live births)
	Low birth weight (percentage of babies born < 2,500 grams (5.5 pounds))
Standardized test scores	Child death rate (deaths per 100,000 children aged 1–14 years)
	Low 4th grade math scores (percentage of 4th graders with low math scores)
	Low 8th grade math scores (percentage of 8th graders with low math scores)
	Low 4th grade reading scores (percentage of 4th graders with low reading scores)
	Low 8th grade reading scores (percentage of 8th graders with low reading scores)
	Low 8th grade writing scores (percentage of 8th graders with low writing scores)
	High school dropout rate (percentage of teens 16–19 years who are not enrolled in high school and are not high school graduates)
Adolescent indicators	Idleness rate (percentage of teens 16–19 years not in school or working)
	Young teen birth rate (births per 1,000 females ages 15–17 years)
	Teen birth rate (births per 1,000 females ages 15–19 years)
	Property crime arrest rate (arrests per 100,000 youths ages 10–17 years)
Child poverty	Violent crime arrest rate (arrests per 100,000 youths ages 10–17)
	Child poverty rate (percent)

The teen birth rate and young teen birth rate were compiled by the Kids Count project from data from the Center for Disease Control and Prevention and the National Center for Health Statistics. The high school dropout and idleness measures were estimated from the Current Population Survey for the Kids Count project and represent an average for 1995–1997. Crime arrest rates were compiled by Kids Count from the National Archive of Criminal Justice Data at the University of Michigan. Arrest rates are an indicator not only of juvenile delinquency but also of the vigor of enforcement of property and violent crime laws. Our last indicator is the child poverty rate, defined as the percentage of children 0–18 years old who fell below the U.S. poverty line in 1996. The child poverty data come from the U.S. Census Bureau, Small Area Income and Poverty Estimates Program, and were compiled as part of the Kids Count data collection project.

Control Variables

In our analysis we include controls for parental (monetary) investments in children, parents' education, family structure, and racial and ethnic composition at the state level. We test the sensitivity of our results with the inclusion of additional control variables or to the exclusion of some of the control variables.

States may vary systematically in private resources invested in children. States with wealthier citizens have a greater capacity to invest in social programs because of the richer tax base. Therefore, the effect of public expenditures on outcomes may actually reflect the effect of parents' income on both public expenditures and outcomes. To control for this confounding influence, we include a measure of "parental investments" in children. Our measure of parental investments is derived using USDA estimates of expenditures on children (Lino, 1997). The USDA calculates average per child outlays based on family structure (one- or two-parent), family income group (low, medium, or high), family size, age of child, and region of the country. A common critique of the USDA method is that it overestimates housing costs. In our estimates of expenditures on children, housing costs are reduced using Lino and Johnson's (1995) Engel marginal cost method. To obtain state estimates of expenditures on children, we multiplied each cell in the USDA table by the number of children in the March Current Population Survey that match that cell and summed the results. Public cash programs are then subtracted from the parental investments to avoid double counting. In our sensitivity analysis we substitute median income in a state for a consumption-based measure of parental investments.

Parents' education is likely to be related to child outcomes and may influence public expenditures on children. We control for the proportion of adults in a state with a high school degree and the proportion of adults with a college degree, which we obtained from U.S. Census Bureau estimates. Because the level of public spending in a state is likely to have influenced the educational attainment of the adult population, controlling for adult educational attainment may lead us to underestimate the effects of public expenditures on child outcomes. To gauge the extent of this potential underestimation, we test the sensitivity of our results to the exclusion of the adult educational attainment control variables.

Prior research has found that children growing up with a single parent tend to fare worse on a broad range of indicators compared with children who grow up with two biological parents (McLanahan & Sandefur, 1994). States that have a high proportion of children living with single parents will be likely to have worse child outcomes, on average; therefore, we control for the proportion of families in a state that are headed by a single parent. The estimates are averages from the 1995–1997 Current Population Surveys.

Prior research has also documented the greater incidence of negative outcomes for African American and Hispanic children compared with white children. The worse outcomes for African American and Hispanic children are likely to be related to poverty, residential segregation, discrimination, and family structure. We control for the proportion of children who are African American and the proportion of children who are Hispanic in a state.

We intentionally omit some state characteristics that warrant discussion. State characteristics such as political party leadership and age structure may be related

to the level of public expenditures on children but will not affect the estimated relationship between expenditures and outcomes. For example, the proportion of democratic representatives and the age structure of a state may affect the level of public expenditures, but these state characteristics do not have any clear direct effects on child outcomes. Rather, any effects of the political party of representatives or the age structure of a state on child outcomes are likely to result from their effects on public expenditures.

Methods

In our analysis, we use ordinary least squares regressions to estimate the relationship between public expenditures on children and child outcomes across the 50 states, controlling for potential confounding variables. In most cases, we analyze 50 observations representing each of the U.S. states. In some cases, data were not available in every state. We analyzed *dfbeta* statistics (a measure of the difference in the beta value if a particular observation is omitted) to ensure that no individual states were overly influential in any of our models. Despite wide variation across the 50 states in expenditures and outcomes, with rare exceptions no state had undue influence on the regression estimates. In fact, some of the results reported below would have been strengthened by omitting one or two states with the most influence on our estimates.

Our analysis takes several approaches to strengthen confidence in the observed cross-sectional relationships between public expenditures and child outcomes. First, we control for the most important observed state characteristics: parental investments in children, family structure, parents' education, and racial and ethnic composition. Second, when we find that expenditures are associated with better child outcomes, we compare the effects of expenditures that are theoretically linked to outcomes alongside the effects of expenditures that we do not expect to be related to outcomes. Third, we estimate the effects of expenditures that we expect to be linked to outcomes while controlling for expenditures that should not be related outcomes. The unrelated expenditures serve as a proxy for state generosity toward children. Fourth, we test the sensitivity of our estimates to the inclusion of additional control variables such as child poverty, the exclusion of control variables, and adjustments for the cost of living. None of these strategies fully addresses omitted variable bias, but together they strengthen our confidence in the reported results.

Descriptive Results

Figure 1 displays states ordered from lowest to highest per child expenditure. Figure 1 reveals wide variation across states in public expenditures on children. Aggregate expenditures range from \$3,881 per child in Utah to \$8,500 per child

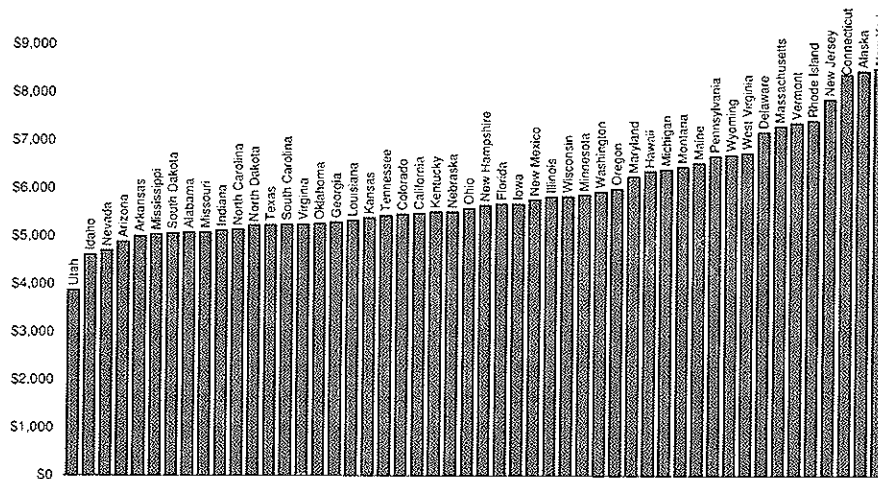


Fig. 1. Total public expenditure per child by state.

in New York. Almost two-thirds of these expenditures are for education. When education expenditures are omitted, the highest state still spends about twice as much as the lowest state and Utah and New York remain the lowest and highest spenders, respectively.

Table 2 shows wide variation across states in the range of child outcomes. The infant mortality rate in the worst state (Mississippi) is 2.5 times as high as the rate in the best state (Maine). This range between the best and worst states is typical. For most indicators the worst state is 2 to 3 times higher than the best state. The range between the best and worst states is even larger for high school dropout, idleness, teen birth, and crime arrest rates. The same states tend to cluster at the two ends of the continuum. The southern states, particularly Louisiana and Mississippi, are consistently among the worst states with respect to child outcomes, whereas the New England states—Connecticut, Maine, New Hampshire, and Vermont—are consistently among the best.

We have seen that expenditures on children and child outcomes vary widely across the U.S. states. In the next section, we estimate the relationship between various measures of public expenditure and child outcomes across the states.

Regression Results

The Relationship Between Expenditures and Outcomes

Table 3 shows regression estimates from a model in which child health and mortality indicators are regressed on Medicaid expenditures and controls for

Table 2. Descriptive Statistics

	Percent or mean	Range	<i>N</i>
Dependent variables			
Infant mortality rate (deaths per 1,000 live births)	7.3	4.4–11.0	50
Low birth weight (percent)	7.3	4.8–9.9	50
Child death rate (deaths per 100,000 kids 1–14 years)	27.4	16.0–41.0	50
Low 4th grade math scores (percent)	37.5	24.0–58.0	43
Low 8th grade math scores (percent)	38.7	22.0–64.0	40
Low 4th grade reading scores (percent)	38.3	22.0–55.0	39
Low 8th grade reading scores (percent)	26.6	16.0–40.0	36
Low 8th grade writing scores (percent)	17.8	9.0–28.0	35
High school dropout rate (percent)	9.3	4.0–17.0	50
Teen idleness (percent)	8.7	4.0–14.0	50
Young teen birth rate (births per 1,000 females 15–17 years)	31.0	15.0–52.0	50
Teen birth rate (births per 1,000 females 15–19 years)	50.9	29.0–76.0	50
Juvenile violent crime arrest rate (arrests per 100,000 youths 10–17 years)	308	50–691	46
Juvenile property crime arrest rate (arrests per 100,000 youths 10–17 years)	2146	822–4095	46
Child poverty rate (percent)	19.0	8.0–32.0	50
Independent variables			
Public expenditures per child (in \$1,000s)	5.913	3.881–8.500	50
Non-education public expenditures per child (in \$1,000s)	2.199	1.364–3.306	50
Education expenditures per child (\$1,000s)	3.713	2.516–5.654	50
Medicaid expenditures per child (\$1,000s)	0.336	0.133–0.752	50
Control variables			
Private expenditures per child (\$1,000s)	6.202	5.096–7.428	50
Families headed by single parent (percent)	26.1	14.0–35.0	50
Adults with high school degree (percent)	82.9	73.8–91.4	50
Adults with college degree (percent)	23.0	14.2–32.5	50
Children who are African American (percent)	12.6	4.4–45.4	50
Children who are Hispanic (percent)	8.0	6.5–46.2	50
Foreign born (percent)	6.2	1.0–24.4	50
Child poverty rate (percent)	19.0	8.0–32.0	50
Median income (\$1,000s)	35.0	25.4–51.1	50
Fair market rent 1 bedroom apartment (\$100s)	4.63	3.30–8.26	50

parental investments in children, family structure, adult educational attainment, and racial and ethnic composition. Medicaid expenditures range from a low of \$133 per child in Idaho to a high of \$752 per child in New York. Medicaid expenditures are not related to the infant mortality rate or the percentage of babies born with low birth weight. However, a \$100 increase in Medicaid expenditures (per child) is associated with a 1.9 percentage point decrease in the child death rate, which represents a 7% decrease relative to the U.S. state average.

For the most part, the relationship between the control variables and the child outcomes conforms to our expectations. Parental investments in children

Table 3. Public Expenditures as Predictors of Child Health and Mortality across 50 U.S. States

Predictors	Infant mortality rate (deaths per 1000 live births)	Low birth weight (percent)	Child death rate (per 100,000 kids 1–14 years old)
Public Investments			
Medical expenditures per child (\$1,000s)	−1.650 (1.390)	−0.245 (0.230)	−18.951** (3.680)
Controls			
Parental investments per child (\$1,000s)	−0.674* (2.240)	−0.087 (0.320)	−3.055* (2.330)
One-parent families (%)	−0.055 (0.990)	0.000 (0.000)	0.287 (1.190)
Adults with a high school diploma ^a (%)	0.113* (2.690)	−0.009 (0.230)	0.456* (2.490)
Adults with a college degree ^a (%)	−0.102* (2.540)	−0.034 (0.950)	−0.705** (4.040)
African-American children (%)	0.128** (6.370)	0.082** (4.530)	0.234* (2.670)
Hispanic children (%)	0.001 (0.060)	0.010 (0.770)	0.088 (1.470)
Intercept	4.746 (1.310)	8.330 (2.550)	19.958 (1.260)
<i>N</i>	50	50	50

Note. *t*-values are in parentheses. ** $p < .01$, * $p < .05$.

^aAdults aged 25 years and over.

are associated with reduced infant mortality and child death rates, although not with reductions in low birth weight. The proportion of families headed by a single parent is positively associated with low birth weight and mortality in a bivariate model but not in the multivariate model in Table 3 because of the high correlation between family structure and racial composition. We would expect greater levels of adult educational attainment in a state (a proxy for parents' education) to be associated with better child health and mortality outcomes, and the results for college education follow our expectations. Adult high school education, however, is positively related to infant and child mortality, which is not expected. Consistent with prior research, states with a greater proportion of African American children have higher rates of low birth weight and infant and child mortality.

Table 4 shows the relationships between three different measures of public expenditure and child health and mortality. This table compares the effects of Medicaid expenditures (Model 1) with those of non-Medicaid expenditures (Model 2) and the broader measure of public expenditures (Model 3). In each model, control variables are included that hold constant differences in parental investments in children, family structure, adult education levels, and racial and ethnic composition across states. As shown previously, Medicaid expenditures are related to the child death rate but not to birth outcomes. In Models 2 and 3, we find that broader measures of public expenditures are not significantly related to birth outcomes or

Table 4. Three Measures of Public Expenditures as Predictors of Child Health and Mortality across 50 U.S. States

Predictors	Infant mortality rate (per 1,000 live births)	Low birth weight (%)	Child death rate (per 100,000 kids 1–14 years old)
1. Medical expenditures per child (\$1,000s)	–1.650 (1.390)	–0.245 (0.230)	–18.951** (3.680)
2. Non-Medical public expenditures per child (\$1,000s)	–0.532 (1.190)	0.610 (1.570)	–3.753 (1.750)
3. Total public expenditures per child (\$1,000s)	–0.112 (0.720)	0.068 (0.490)	–1.260 (1.680)
<i>N</i>	50	50	50

Note. *t*-values are in parentheses. Models control for parental expenditures on children, single-parent families, adult education, and racial and ethnic composition.

** $p < .01$. * $p < .05$.

Table 5. Public Expenditures as Predictors of Standardized Test Scores across 50 U.S. States

Predictors	Low math scores, 4th grade (%)	Low math scores, 8th grade (%)	Low reading scores, 4th grade (%)	Low reading scores, 8th grade (%)	Low writing scores, 8th grade (%)
Public Investments					
Education expenditures per child (\$1000)	–3.441* (2.580)	–3.818* (2.500)	–4.041* (2.340)	–2.400 (1.380)	–2.324 (1.610)
Controls					
Parental investments per child (\$1,000s)	–3.999 (1.910)	–2.608 (1.220)	–2.641 (1.190)	–2.677 (1.230)	–3.376 (1.890)
One-parent families (%)	0.591 (1.560)	0.787 (1.930)	0.174 (0.400)	–0.021 (0.050)	–0.050 (0.140)
Adults with a high school diploma ^a (%)	–0.020 (0.070)	–0.587* (2.160)	0.202 (0.660)	0.018 (0.060)	0.336 (1.340)
Adults with a college degree ^a (%)	0.140 (0.490)	0.281 (0.950)	–0.314 (0.960)	–0.029 (0.090)	–0.097 (0.360)
African American children (%)	0.338* (2.270)	0.285 (1.830)	0.314 (1.970)	0.306 (1.840)	0.152 (1.110)
Hispanic children (%)	0.189 (1.850)	0.111 (1.040)	0.288* (2.640)	0.158 (1.450)	0.083 (0.910)
Intercept	51.990 (2.190)	85.342 (3.540)	48.412 (1.830)	45.696 (1.850)	20.145 (0.990)
<i>N</i>	43	40	39	36	35

Note. *t*-values are in parentheses. ** $p < .01$, * $p < .05$.

^aAdults aged 25 years and older.

the child death rate. The set of results in Table 4 are consistent with what we would predict: expenditures targeted directly at child health are more strongly related to child health outcomes than expenditures targeted at other areas such as education.

Table 5 shows significant relationships between public spending on education and better scores on math tests in 4th and 8th grade and on reading tests in 4th grade. Education expenditures range from a low of \$2,516 per child (not per pupil)

Table 6. Three Measures of Public Expenditures as Predictors of Standardized Test Scores across 50 U.S. States

Predictors	Low math scores, 4th grade (%)	Low math scores, 8th grade (%)	Low reading scores, 4th grade (%)	Low reading scores, 8th grade (%)	Low writing scores, 8th grade (%)
1. Education expenditures per child (\$1,000s)	-3.441* (2.580)	-3.818* (2.500)	-4.041* (2.340)	-2.400 (1.380)	-2.324 (1.610)
2. Noneducation public expenditures per child (\$1,000s)	2.206 (0.610)	5.124 (1.370)	5.017 (1.470)	5.197 (1.730)	3.661 (1.220)
3. Total public expenditures per child (\$1,000s)	-2.056 (1.810)	-2.014 (1.480)	-1.590 (1.110)	-0.417 (0.310)	-0.934 (0.780)
<i>N</i>	43	40	39	36	35

Note. *t*-values are in parentheses. Models control for private expenditures on children, single-parent families, fair market rent, and parents' education. *** $p < .01$, ** $p < .05$.

in Utah to a high of \$5,654 per child in New Jersey. An extra \$1,000 expenditure on education is associated with a 3.4 to 4.0 percentage point reduction in low scores on math or reading tests. In percentage terms, these reductions are about 10 percent relative to the U.S. state mean on these indicators.

Most of the control variables are not significantly related to test score outcomes, but the exceptions conform to expectations. A higher proportion of high school graduates in a state is associated with better 8th grade math scores. A higher proportion of African American children is associated with lower 4th grade math scores. A higher proportion of Hispanic children in a state is associated with lower 4th grade reading scores.

Table 6 shows the relationship between three different measures of public expenditure and standardized test scores. Model 1 repeats results from Table 5. Model 2 uses noneducation expenditures as the measure of public expenditure. As we would expect, education expenditures are more strongly related to test score outcomes than noneducation expenditures. Noneducation expenditures are positively related to low test scores, but the effect is not statistically significant. Model 3 combines education and noneducation expenditures together and finds that this aggregate measure of expenditures on children has a weaker effect on test scores than education expenditures alone.

Table 7 shows that larger expenditures on education are associated with lower rates of high school dropout and teen birth. An extra \$1,000 public expenditure per child is associated with a 1.4 percentage point decrease in the high school dropout rate, a 3.1 percentage point drop in the birth rate of young teens (15–17 years), and a 5.5 percentage point drop in the birth rate of teens (15–19 years). In percentage terms, \$1,000 in education spending is associated with a 10–15% reduction relative to the state average for each of these indicators. Education expenditures are not associated with the teen idleness rate, the property crime arrest rate, the violent crime arrest rate, or child poverty.

Table 7. Public Expenditures as Predictors of Adolescent Outcomes and Child Poverty across 50 U.S. States

Predictors	High school dropout rate (%)	Teen Idleness rate (%)	Young teen birth rate (%)	Teen birth rate (%)	Property crime arrests per 100,000 youths 10-17	Violent crime arrests per 100,000 youths 10-17	Child poverty rate
Public Investments							
Education expenditures per child (\$1000)	-1.371** (2.970)	-0.209 (0.480)	-3.132** (3.150)	-5.474** (3.730)	-257.294 (1.830)	42.058 (1.420)	-0.047 (0.080)
Controls							
Parental investments per child (\$1,000s)	1.659* (2.350)	0.076 (0.110)	-0.105 (0.070)	-0.065 (0.030)	-119.181 (0.550)	-10.770 (0.240)	-2.758** (2.970)
One-parent families (%)	0.432** (3.400)	0.274* (2.270)	0.444 (1.620)	0.673 (1.660)	5.460 (0.140)	3.403 (0.420)	0.220 (1.320)
Adults with a high school diploma ^a (%)	-0.104 (1.060)	-0.070 (0.750)	0.101 (0.480)	0.276 (0.880)	143.414** (4.330)	10.895 (1.560)	-0.420** (3.250)
Adults with a college degree ^a (%)	-0.188 (1.860)	-0.182 (1.900)	-0.675** (3.110)	-1.200** (3.740)	-48.268 (1.560)	5.393 (0.830)	-0.388** (2.920)
African American children (%)	-0.065 (1.340)	-0.023 (0.490)	0.440** (4.180)	0.498** (3.210)	15.466 (0.980)	9.094** (2.750)	0.082 (1.280)
Hispanic children (%)	0.075* (2.170)	0.074* (2.270)	0.453** (6.100)	0.584** (5.330)	19.883 (1.840)	7.329** (3.230)	0.171** (3.770)
Intercept	5.918 (0.700)	11.452 (1.420)	29.696 (1.630)	47.893 (1.780)	-7429.805 (2.720)	-1073.005 (1.870)	71.880 (6.450)
N	50	50	50	50	46	46	50

Note. *t*-values are in parentheses. ** $p < .01$, * $p < .05$.

^aAdults aged 25 years and older.

For the most part the control variables in Tables 5 and 7 have the expected effects. However, parental investments are positively associated with the high school dropout rate. This relationship is surprising and is partially driven by an outlier. Nevada, which has the highest rate of high school dropout, also has a relatively high level of parental investment in children. When Nevada is excluded, the coefficient on parental investments drops to 1.07 and becomes insignificant.

Table 8 shows the relationship between three different measures of public spending and adolescent outcomes and child poverty. Model 1 repeats the results from Table 7. Model 2 shows that noneducation expenditures are associated with an *increase* in teen idleness and violent crime arrest rates but not significantly related to other adolescent outcomes or to child poverty. Model 3 shows that total public expenditures on children have a similar but weaker relationship to adolescent outcomes and child poverty as education expenditures. As expected, education spending is more strongly linked to adolescent behavioral outcomes than noneducation spending is.

Sensitivity Analysis

In order to increase our confidence in the relationships estimated in Tables 3, 5, and 7, we tested the sensitivity of our results against several different model specifications. The conclusions from the results presented above were largely unchanged by the variations in the model and in some cases were strengthened. In several of the model variations, new effects emerged: education expenditures, for example, became significantly related to reading and writing test scores.

We tested the sensitivity of our results to the inclusion of controls for the percentage of foreign born or the child poverty rate; to the substitution of median income for our measure of parental investments; and to the application of a cost-of-living adjustment to expenditure measures.¹ Each of these modifications yielded results that were as strong as or stronger than those presented previously. In some of these modified models, new effects emerged. In models that controlled for foreign born or median income and in the model that applied a cost-of-living adjustment, education expenditures were related to better reading and writing test scores.

We also tested the sensitivity of our results to the omission of controls for adult educational attainment in the state, which are likely to be endogenous. To the extent that state expenditures on education are correlated over time and that parents attended schools in the same states in which they are raising children, public spending may be correlated with parents' educational attainment. Therefore,

¹One-third of the public expenditure amount was adjusted to account for variations in housing costs across states. The cost-of-living adjustment was calculated as $((1/3 * \text{state public expenditure}) / (\text{state fair market rent} / \text{average fair market rent across states})) + (2/3 * \text{state public expenditure})$. A similar adjustment was applied to parental investments in children in this model.

Table 8. Three Measures of Public Expenditures as Predictors of Adolescent Outcomes and Child Poverty across 50 U.S. States

Predictors	High school dropout rate (%)	Idleness rate (%)	Young teen birth rate (%)	Teen birth rate (%)	Property crime arrests per 100,000 youths 10-17	Violent crime arrests per 100,000 youths 10-17	Child poverty rate (%)
1. Education expenditures per child (\$1,000s)	-1.371** (2.970)	-0.209 (0.480)	-3.132** (3.130)	-5.474** (3.730)	-257.294 (1.830)	42.058 (1.420)	-0.047 (0.080)
2. Non-education public expend per child (\$1,000s)	-0.522 (0.460)	2.270* (2.450)	-1.985 (0.800)	-4.876 (1.300)	-57.954 (0.160)	221.959** (3.350)	0.243 (0.180)
3. Total public expenditures per child (\$1,000s)	-0.903* (2.430)	0.146 (0.420)	-2.158* (2.700)	-3.942** (3.350)	-169.067 (1.490)	49.559* (2.170)	0.000 (0.000)
N	50	50	50	50	46	46	50

Note. *t*-values are in parentheses. Models control for parental expenditures on children, single-parent families, adult education, and racial and ethnic composition. **, $p < .01$, * $p < .05$.

controlling for parental educational attainment may mask some of the true effect of public expenditures on children's outcomes.

As we would expect, some of the relationships between expenditures on children and child outcomes were strengthened when these parental education control variables were omitted. In particular, the relationships between educational expenditures and test scores, high school completion, and teen birth rates were stronger when adult education controls were omitted.

We saw previously that education expenditures were significantly related to math test scores, high school dropout rates, and teen birth rates. We tested the sensitivity of these results to the inclusion of a control variable that measures noneducation public expenditures. If the generosity of noneducation expenditures was a reflection of a state's commitment to children, controlling for these expenditures should, to some extent, account for unobserved state characteristics. Controlling for noneducation expenditures did not alter the previously observed relationships between education expenditures and math test scores, high school dropout rates, and teen birth rates. Moreover, when noneducation expenditures were controlled for, significant relationships emerged between higher education expenditures and better reading and writing test scores, lower rates of teen idleness, and lower property crime arrest rates. We found similar results when we used AFDC benefit levels in place of noneducation expenditures as a proxy for state commitment to children.

In sum, we tested a number of variations to our regression models and the estimated relationships between public expenditures on children and child outcomes presented in Tables 3, 5, and 7 were found to be quite robust and perhaps conservative. These results provide some evidence that the observed relationships between our measures of public expenditures on children and child outcomes are not explained by unobserved characteristics of states.

Summary

Table 9 summarizes the relationships between public expenditures and child outcomes that were significant at the .05 level. The table expresses the relationship between expenditures and outcomes in terms of percentage reduction in the child indicator (relative to the mean across states) associated with a \$100 or \$1,000 outlay per child. Approximately half of the child outcomes we analyzed are significantly related to public spending. Medicaid and education spending are the most strongly related to outcomes. Broader measures that combined spending on a wide range of programs and tax benefits have weaker effects than Medicaid or education expenditures.

The improvements in child outcomes associated with spending are sizeable in percentage terms. An extra \$100 per child spent on Medicaid is associated with a 7% percent reduction in the child death rate. To put this amount in perspective,

Table 9. Improvements in Child Outcomes Associated with Public Expenditures

Public expenditure	Child outcome	Percent reduction in child outcome associated with public expenditure
\$100 Medicaid	Child death rate	-6.9
\$1,000 Education	Low 4th grade math score	-9.2
	Low 8th grade math score	-9.9
	Low 4th grade reading score	-10.5
	High school dropout rate	-14.8
	Young teen birth rate	-10.1
	Teen birth rate	-10.8

Notes. Percent reduction is the beta coefficient on public expenditure divided by the mean value for the child outcome. Beta coefficients are based on models that regress child outcome on public expenditure amount controlling for parental expenditures, one-parent families, adult education, and racial and ethnic composition.

the range between the lowest and highest state in Medicaid spending is several hundred dollars. Education expenditures are associated with improvements in a wide range of outcomes. An extra \$1,000 spent on education is associated with a 10% reduction in low math and reading scores, a 15% reduction in the high school dropout rate, and a 10% reduction in the teen birth rate. To put this amount in perspective, education spending varies across states by several thousand dollars.

Discussion

Our article took advantage of the wide variation across U.S. states in the amount of public expenditures on children and in child outcomes to estimate the relationship between spending and outcomes. Our analysis follows in the tradition of cross-national research, which has examined how variations in social spending across countries are related to indicators such as the poverty rate. We were interested in whether U.S. states that spend the most on children through social programs and tax credits are also the states that have the healthiest children and the children with the best educational and behavioral outcomes, and whether states that spend the least have the worst child outcomes. By and large, our findings were consistent with these predictions.

Our analysis revealed wide variation in public expenditures on children and in child outcomes across the 50 U.S. states. The highest state on our measures of expenditures or outcomes was typically 2 to 3 times higher than the lowest state. Utilizing this cross-sectional variation, we found that public expenditures on children are indeed related to better child outcomes. Approximately half of the indicators we analyzed—measures of child health and mortality, test scores, and a range of adolescent outcomes—were significantly related to public expenditures. Child poverty was not affected by public expenditures, which is not surprising given that poverty rates do not depend directly on education, nutrition, or health

care expenditures. Our results demonstrate the necessity of looking beyond poverty statistics to gauge the effects of public expenditures on children on child well-being.

Our expenditure data were uniquely comprehensive in covering education, health, nutrition, cash assistance, and many other types of expenditures. However, our broad measure of aggregate expenditures on children does not predict outcomes better than more specific expenditure measures such as Medicaid (for the child death rate) and education (for test scores and adolescent outcomes). Our results show that education expenditures have particularly strong and positive effects on child outcomes, especially test scores and adolescent behavior.

Omitted variables are an obvious concern in a cross-sectional analysis, but a combination of analytic strategies increases our confidence in the reported results. In the results we present, we control for parental expenditures on children, adult educational attainment, proportion of families headed by a single parent, and racial and ethnic composition in the state. Our results are also robust to several variations in model specifications, and robustness checks suggest that the results we present may actually be conservative estimates. By comparing expenditures that are theoretically more closely linked to particular outcomes with expenditures that are less closely linked, we find evidence that the relationship between expenditures and outcomes is nonspurious. The relationships between particular expenditures and targeted outcomes are robust in models that use other types of expenditures or AFDC benefit levels as a proxy for state commitment to child well-being.

Theoretically, it was unclear whether to expect public expenditures to be related to better child outcomes. However, our cross-sectional findings suggest that there is a strong relationship between what states spend on children and how children fare: children tend to fare best in the states that spend the most on children and to fare worst in the states that spend the least. While it remains possible that some unmeasured state characteristics explain both the amount spent on children and child outcomes, our findings imply that reductions in public spending in response to budget deficits would have adverse effects on children and that increases in public spending—particularly spending on education—could yield broad benefits for children.

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