

# Parental Spending on School-Age Children: Structural Stratification and Parental Expectation

Lingxin Hao<sup>1</sup> · Wei-Jun Jean Yeung<sup>2</sup>

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**Abstract** As consumption expenditures are increasingly recognized as direct measures of children’s material well-being, they provide new insights into the process of intergenerational transfers from parents to children. Little is known, however, about how parents allocate financial resources to individual children. To fill this gap, we develop a conceptual framework based on stratification theory, human capital theory, and the child-development perspective; exploit unique child-level expenditure data from Child Supplements of the PSID; and employ quantile regression to model the distribution of parental spending on children. Overall, we find strong evidence supporting our hypotheses regarding the effects of socioeconomic status (SES), race, and parental expectation. Our nuanced estimates suggest that (1) parental education, occupation, and family income have differential effects on parental spending, with education being the most influential determinant; (2) net of SES, race continues to be a significant predictor of parental spending on children; and (3) parental expectation plays a crucial role in determining whether parents place a premium on child development in spending and how parents prioritize different categories of spending.

**Keywords** Parental spending on children · SES · Race · Parental expectation · Quantile regression

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✉ Lingxin Hao  
hao@jhu.edu

Wei-Jun Jean Yeung  
ariywj@nus.edu.sg

<sup>1</sup> Department of Sociology, Johns Hopkins University, 3400 N. Charles Street, Baltimore, MD 21218, USA

<sup>2</sup> Department of Sociology and Asia Research Institute, National University of Singapore, Singapore, Singapore

## Introduction

Multiple institutions, including families, government, and nonprofit organizations, invest in children. Among these institutions, the family is the largest investor. Of the total investment in U.S. children aged 0–18, which amounted to nearly 15 % of the U.S. gross domestic product (GDP) in 1992, two-thirds was made by parents (Haveman and Wolfe 1995). According to Schor (2004), the growth of household spending on children stemmed from the rise of a child-targeted consumption culture beginning in the 1980s. More recently, Kornrich and Furstenberg (2013) documented that parental spending on children aged 0–24 increased by more than 50 % from 1972 to 2007, and suggested that the trend was driven mainly by soaring college education costs.

Investment in children is a core mechanism by which advantages and disadvantages are transmitted across generations. How and why parents spend on children has long-term implications for children's life chances. As parents of different backgrounds differ in their decisions about allocating resources to invest in their children, they shape intergenerational mobility patterns for social groups. The growing achievement gap between children from rich and those from poor families (Reardon 2011) and the persistent achievement gap by race (Magnuson and Waldfogel 2008; Yeung and Pfeiffer 2009) merit the call for a better understanding of this intergenerational mechanism. Few systematic studies, however, have examined how this mechanism operates through parental spending, and our study fills this void.

This article aims to achieve the following objectives. We first provide a comprehensive picture of how parental SES and race stratify American parental spending on categories of expenditure for individual school-age children. We then examine the differential roles of the three SES dimensions—parental education, occupation, and income—in shaping parental spending on individual children. Third, we investigate the extent to which race affects parental spending on children above and beyond SES effects. Fourth, we analyze how parental expectations for children and children's characteristics influence parental spending on individual children. To these ends, we apply quantile regression modeling to household consumption data from the Panel Study of Income Dynamics (PSID) and unique child-level expenditure data from the PSID Child Supplements. Through analyzing the role of structural stratification and parental expectations in family investment in children, our study establishes an essential mechanism for the intergenerational transmission of advantages and disadvantages.

## Background

The literature on parental investment in children is large and diverse. To draw on its strengths and address its limitations, we selected the four empirical strands most relevant to our investigation. We start with a discussion of methodological considerations for consumption data. Then we review the work on SES and racial gaps in expenditures on children and the influence of child characteristics on parental spending, noting the strengths and limitations of these selected bodies of literature.

Household consumption is a more recent and more targeted measure of children's economic well-being and parental investment in children than household income or

household wealth. Household income (sometimes measured by household poverty status) has long been used as an indicator of children's material well-being (Blank and Schoeni 2003; Eggebeen and Lichter 1991; Western et al. 2008). Household wealth is also used as a measure of children's economic well-being. The racial wealth gap has been found to be greater than the racial income gap among families with children (Conley 1999) and single-mother families (Hao 1996; Lupton and Smith 2003), and this gap has been examined for its relationship to gaps in children's development (Yeung and Conley 2008). Household income and wealth are not necessarily appropriate measures of children's material well-being, however; large discrepancies between family income and consumption among single-mother families, for example, were found in Edin and Lein's ethnographic study (1997). Moreover, in a quantitative study, Meyer and Sullivan (2008) found that income trends differed from consumption trends among single-mother families, as public assistance and private support for single-mother families alleviated consumption pressures. These researchers suggest using household consumption expenditure to better measure children's economic well-being. In our view, the validity of household-level expenditure in measuring children's economic well-being could be further improved. Aggregate household consumption does not allow a researcher to investigate how parents' differential expectations for individual children and different child characteristics among siblings may affect parental spending behavior. Our study addresses this limitation by measuring parental investment in children using child-level parental spending in addition to aggregate household spending.

Distinguishing between household income and household consumption helps clarify conceptually that household income measures resources, while household consumption measures the results of resource allocation. Economic studies on household consumption routinely describe consumption within income brackets and treat consumption as a function of income (e.g., Meyer and Sullivan 2008). Household income is only one of the three aspects of parental SES that have a profound impact on parental investment in children; yet, parental education and occupation—the other two aspects of SES—are seldom considered in the household consumption literature. In this study, we stress the differential effects of the three aspects of SES in determining resource allocation behavior.

A large body of literature on household consumption centers on the black-white gap, focusing primarily on the allocation of comparable income to categories of expenditure between black and white households. Ongoing popular debates focus on whether blacks spend too much money on designer clothes and pricey cars and do not invest sufficiently in education (e.g., Cosby and Poussaint 2007). Charles et al. (2007b) showed that blacks spend about 30 % more than whites with comparable incomes on “visible goods,” such as clothes, cars, and jewelry, but they demonstrated that such spending patterns reflect blacks' seeking social status in communities where they do not have adequate access to resources and opportunities, and not just a cultural preference. At the same time, low-expenditure black households spend a lower percentage of their total expenditure on education than do their white counterparts (Fan and Lewis 1999; Omori 2010). In addition, controlling for family SES, black children have less access than their white counterparts to extracurricular activities in athletics and fine arts (McNeal 1995).

The extant literature is inconclusive about how family SES and race jointly determine parents' spending on children. The literature on the black-white gap highlights persistent racial gaps between income-comparable blacks and whites. In contrast,

ethnographic data on black and white middle-income parents' concerted cultivation of middle-class values suggest that race is no longer a significant factor shaping parenting behavior among middle-income families (Lareau 2003).

Another thread of the literature examines how children's characteristics affect parental spending. Children's gender has a nuanced effect: although expenditures of only-son families do not differ significantly from those of only-daughter families in most spending categories, only-son families spend significantly more on housing but less on clothing than do only-daughter families (Lundberg and Rose 2004). In our view, children's birth order and health endowment and parental expectations for individual children are important factors that parents consider in allocating resources to each of their children.

Drawing from the literature, this article uses consumption expenditure to measure parental investment, conceiving consumption as a result of parental resource allocation and highlighting the SES and race stratification of such allocation. This article also addresses five limitations in the literature: (1) a focus on household income as a measure of parental investment in children; (2) the use of aggregate household expenditure as a measure of parental investment in individual children; (3) a lack of attention to parental education and occupation when examining differences in child expenditure by SES; (4) a lack of consensus about whether the effect of race remains significant after family SES is accounted for; and (5) the failure to consider parents' agency, such as expectations for individual children with different characteristics, for investment in children.

## Conceptual Framework

Our conceptual framework draws from stratification, human capital, and child-development theories to understand parental spending on children. The framework considers structural forces and parents' agency in allocating resources to individual children.

The classical thought of Weber (1946) considers powerful social strata as "social carriers" of ways of living. This is consistent with a developmental psychology approach, which recognizes that parental SES influences parenting behaviors (Davis-Kean 2005; Smith et al. 1997). Applied to the study of parental spending on children, SES determines parents' allocation of family resources to the next generation. Institutional arrangements sustain the SES structural influences, and institutional rules exacerbate families' SES constraints. For instance, affluent parents are capable of paying for private school tuition or expensive extracurricular activities for their children, whereas poor parents are not. In addition, children of affluent parents live in nice and safe neighborhoods where they participate in enriching activities, such as sports and community activities, and associate with positive adult role models and peers. In contrast, children of low-income parents are exposed to communities that suffer from multiple disadvantages, including high unemployment, financial dependency, and institutional disinvestment (Hagan and Peterson 1995; Land et al. 1990).

In addition, the aspects of SES may play different roles in parental investment in children. Household income is routinely taken as a strong correlate of household consumption (Kornrich and Furstenberg 2013; Meyer and Sullivan 2008). Middle-class parents arrange educational, social, and athletic activities for their children to impart them with experiences necessary for a middle-class upbringing (Lareau 2003). Education may inform parents about how they should expend resources on children in

order to enhance child development (Eccles 2005). Independent of earnings, the types of jobs parents have influence their expectations for their children and their parenting behavior (Kohn 1969).

Beyond family SES, racial stratification contributes to the uneven investments in children. Racial minorities tend to be concentrated in racially segregated neighborhoods; have limited access to goods and services for child development; attend low-achieving public schools; and participate in crowded, poor-quality extracurricular programs. These institutions constrain the availability and accessibility of black parents' investment in children's development. When opportunities for upward mobility are blocked, black parents may use visible goods and outward appearances to enhance their social statuses in the community (Charles et al. 2007a, b; Dardis et al. 1981). The "cultural adaptation" explanation sees racial differences in parenting practices as being a direct result of black parents' socioeconomic and structural disadvantages (Bradley et al. 2001; Brooks-Gunn and Markman 2005). The structural rationale embedded in this cultural adaptation explanation may account for racial differences in parental spending on children.

These structural rationales explain why SES and race transmit advantages and disadvantages across generations. Human capital theory helps us understand why parental education, occupation, and expectation also matter from an agency point of view. The Becker-Tomes model (1986) assumes that parents care about their children's future (altruism); and for that purpose, parents invest in children, and make "[expenditures] on skills, health, learning, motivation, 'credentials,' and many other characteristics" (Becker and Tomes 1986:S5). This theory suggests that parental SES—a composite of education, occupational prestige, and income (Duncan 1961)—plays a role in the mechanism of intergenerational transmission. Parental education and occupation inform what to invest in, and parental expectation for a child determines the levels and categories of spending on that child, under the budgetary constraint from family income. Parents' expectations for their children's cognitive and socioemotional development lead parents to invest in development-promoting categories of spending on children. Parental expectation for each child corresponds to that child's characteristics. If the expected future returns to education are lower for females than males, then parents will be less inclined to invest in daughters than sons. If parents hold a preference for the firstborn, they may spend more on that child (Steelman and Powell 1991). A child's birth weight is a crude indicator of the child's health endowment, and thus parents' allocation of resources may vary by a child's birth weight (Conley and Bennett 2000).

In our analysis, we control for other factors that may affect family spending on children. Receiving in-kind public assistance (housing, food, and energy) should reduce family's spending on these items. Having more adults in a family may increase income. According to the resource dilution hypothesis (Anastasi 1956; Blake 1989), the more children in the family, the fewer resources there are to allocate to any given child.

In summary, our conceptual framework features both structural and agency explanations. Social stratification by SES and race, together with parents' education, occupation, and expectations for children of different characteristics, explains parental allocation of resources in spending on individual children. In contrast to previous literature focusing on the role of income and race, we distinguish the impact of parental education and occupation from income and reevaluate the race effect above and beyond SES effects. This framework guides our investigation into parental spending on individual children. We derive three hypotheses from this framework. We expect that

parental education, occupation, and income stratify parental spending in the same direction but to different degrees (H1); black-white gaps in parental spending do not disappear after controlling for SES (H2); and parental expectation for a child positively affects parents' spending on that child (H3).

## Data and Methods

Data on family expenditure are scarce and often drawn from a single source: the Consumer Expenditure Survey. When it comes to data on spending on each individual child, the data are even scarcer. This study exploits unique child-level data from the two waves of Child Development Supplement (CDS-I and CDS-II) and family-level data from the main files of the Panel Study of Income Dynamics (PSID). The PSID is a longitudinal study that was initiated in 1968 on a nationally representative sample of approximately 5,000 American households, with an oversample of black families. Beginning in the late 1990s, the PSID started to include a series of household expenditure items most important for child development.<sup>1</sup> In 1997, the PSID added a supplemental study that collected data from about 2,400 PSID families that had at least one child under age 13 (Child Development Supplement CDS-I). The CDS-I randomly selected up to two children in each family. In 2002–2003, the second wave of the CDS (CDS-II) followed the CDS-I sample of children, then aged 5–18.<sup>2</sup> An important addition to the CDS-II is a set of comprehensive child-specific expenditure items, reported by the child's primary caregiver (90 % were mothers). These items reflect monetary spending that parents and other persons residing in or outside the household had made for the focal child over the past 12 months, including tuition, school supplies, tutoring, extracurricular lessons, sports, community activities, cultural activities, toys/presents, vacations, clothes/shoes, car-related costs (for children aged 16–18), food, health-related costs, summer camps, and allowances. The analytic sample with expenditure data consists of 1,966 families and 2,893 children.

Expenditure data consist of many raw variables and require meticulous care in creating variables for analysis. The high quality of the PSID and CDS-II expenditure data (Li et al. 2010) makes this task manageable and yields valid and reliable measures. The child consumption module asks questions that implicitly correspond to child development domains. Each item allows respondents to report multiple providers, including custodial parent, noncustodial parent, kin, and nonkin. The amount questions allow for various accounting periods, including daily, weekly, monthly, and annually. These strategies greatly improve item response rates. Our coding of family consumption data was checked against the coding developed by Schoeni and colleagues.<sup>3</sup> Applying the principles of family expenditure coding to the creation of codes for parental spending on individual children, we treated a subcomponent of spending as nonmissing so long as at least one item under the subcomponent is nonmissing. For

<sup>1</sup> The PSID consumption data have been validated to be of high quality and correspond well with other external data sets, such as the Consumer Expenditure Survey (Li et al. 2010).

<sup>2</sup> The majority of children were interviewed in 2003 (61 %), with a small proportion of children interviewed in 2002 (39 %). For simplicity, we will refer to the CDS-II year as 2003 in subsequent text.

<sup>3</sup> We thank Dr. Robert Schoeni for providing the SAS codes to create family expenditures using the PSID main file used in Charles et al. (Charles et al. 2007a) so that we could check our Stata codes.

example, for other education-related subcomponent, if the spending for a child is nonmissing in private tutoring but missing in extracurricular math class, we did not treat this as a missing case because we had data on his/her private tutoring spending. Although such handling is not ideal, we believe that the benefit of keeping a nonselected sample and exploiting the available data fully outweighs the assumption that missing a spending item means missing the whole spending category. Applying this principle yields small missing fractions, from 0.1 % for the dental insurance subcomponent to 5 % for the toys subcomponent. These values of the 0.1 % to 5 % missing cases in each subcomponent were imputed using a single-equation regression imputation. Most missing cases did not miss all subcomponents of spending, and the 14 cases that did were not included in the analytic sample.

### Child-Specific Spending Variables

We created four variables to measure parental spending on individual children: a total amount and three selected categories. Total spending includes school-related, social-cultural, status-signaling, and all other items for individual children. The school-related category includes tuition, school supplies, and tutoring. The social-cultural category includes extracurricular lessons, such as drawing and music; sports; community activities; cultural activities, such as museum/theater-going; toys and presents; and vacations. The status-signaling category includes clothes, shoes, and car-related costs. Other expenditure items include weekday and weekend daycare, summer care, food, additional health insurance, healthcare costs, and allowance.

### Family-Shared Spending

In addition to child-specific spending, a family also has many shared household-level expenses. Following economists' work (Charles et al. 2007a), family-shared spending covers costs of housing (mortgage interest payments or rent, property tax, home insurance, and utilities), shared food (including food at and away from home) and transportation (car down payments, car lease payments, car loan payments, car insurance, gasoline costs, and public transportation and taxi costs), and family health insurance, but excludes spending on children's education, childcare, and other child-related costs. Family-shared spending is measured for one equivalent person, using the equivalence scale recommended by the Panel on Poverty and Family Assistance, National Research Council (Citro and Michael 1995).<sup>4</sup> This measure facilitates valid comparisons of family-shared spending across families of various compositions.

### Explanatory Variables

The first set of key explanatory variables describes parental SES, including parental education (the higher of two parents), parental occupational prestige, and family income.<sup>5</sup> The next key variable is race: non-Hispanic white, non-

<sup>4</sup> The recommended equivalence scale is  $(\text{number of adults} + (\text{number of children} \times 0.7))^{0.7}$ .

<sup>5</sup> A composite SES is used for descriptive purposes.

Hispanic black, and a residual race category (including Hispanic, Asian, and other races of small cell sizes). Another key explanatory variable is parental expectation, or how many years of schooling parents expect the focal child to attain; this variable is measured in CDS-I, five years before CDS-II, when child consumption is measured. This lagged parental expectation should not be influenced by conditions in CDS-II, such as family resources, family structure, and children's academic performance, thereby reducing the potential reciprocity between family resources and parental expectation. Important child characteristics include gender, only child, first-born of two or more children, and low birth weight. Control variables are family wealth, public assistance (whether the family received housing, food, and energy subsidies), family structure (two biological parents, single mother, or other), householder's age, child's age, number of adults, number of children, metropolitan residence, and region of residence.

### Analysis Plan

We employ quantile regression to test our hypotheses because quantile regression is appropriate for identifying potentially differential effects of SES, race, and parental expectation across the distribution of parental spending on children. Concerning the distribution of income or consumption, most previous research is descriptive, providing such descriptive measures as the Gini coefficient, quantiles, and quantile ratios for the whole population or for subpopulations defined by race, class, or other social groupings separately. Although these descriptions are useful, it is important to identify the potentially differential effects of a social grouping across the distribution of consumption, holding other social groupings and covariates constant.

In quantile regression, "quantile" is a general term for the median, deciles, percentiles, and any position in the distribution of a continuous variable, such as expenditure. Whereas the median divides the population into upper and lower halves along a ranked dependent variable, a nonmedian quantile divides the population into two parts of different proportions: for example, the second decile marks the lower 20 % and the upper 80 % of the dependent variable. Quantiles are associated with the cumulative population proportions ( $0 < p < 1$ ). The quantile at  $p = .2$  is the second decile, the quartile at  $p = .5$  is the median, and the quantile at  $p = .8$  is the eighth decile. Analogous to linear regression, which estimates the conditional mean of the response variable, quantile regression estimates the conditional quantiles. Unlike ordinary least squares (OLS) estimation based on least squares, the estimation of quantile regression is based on minimizing the weighted absolute distances, with a weight of  $(1 - p)$  for data points below a specific quantile and a weight of  $p$  for data points above the specific quantile. In the quantile regression model at the second decile, for example, families in the lower 20 % are given the weight of .8, while the upper 80 % are given the weight of .2. Quantile-regression estimation is based on the whole sample, just as the OLS. The [appendix](#) briefly introduces the model setup, the estimation method, and the goodness of fit of the quantile regression models (Hao and Naiman 2007; Koenker 2005; Koenker and Machado 1999).



## Results

### Descriptive Results

Table 1 lists the average amount and percentage of family-shared spending and child-specific total and component spending. The annual family-shared expenditure for an equivalent person was \$12,975 in 2003. The child-specific annual total expenditure was \$5,409 for a child aged 5–18. School-related spending (\$428) accounts for 7.9 % of the child-specific total. The average school-related spending was low, on average, because only 10 % of children attended private schools (with \$3,069 per year for tuition among private-school attendees). Other school-related spending, such as that on school supplies and tutoring, was also very low. Social-cultural spending amounted to \$1,675 and accounted for 31 % of the total, with toys, presents, and vacations making up the bulk of this type of spending. Spending on status-signaling was \$732 per year, accounting for 13.5 % of the total. Other big expenditure items included food (\$1,393) and health-related expenses (\$629).

**Table 1** Weighted distribution of spending items for children

Spending	Average Amount	Percentage
Family-Shared Spending <sup>a</sup>	12,975	100
Number of Families	1,966	
Child-Specific Total Spending	5,409	100
School-Related, Subtotal	428	7.9
School tuition	278	5.1
School-related, other	150	2.8
School supplied	113	2.1
Tutoring	38	0.7
Social-Cultural, Subtotal	1,675	31.0
Lessons: Music, art	143	2.6
Sports	154	2.9
Community activities	34	0.6
Cultural activities	119	2.2
Toys/presents	759	14.0
Vacations	466	8.6
Status-Signaling, Subtotal	732	13.5
Clothes/shoes	590	10.9
Car-related costs (age 16+)	142	2.6
Others, Subtotal	2,574	47.6
Food	1,393	25.8
Health insurance and care	629	11.6
Childcare	335	6.2
Allowance	217	4.0
Number of children	2,893	

<sup>a</sup> The family-shared expenditure is for one equivalent person.

Table 2 shows various measures of inequality in the family-shared spending, child-specific total spending, and three categories. The deciles from first (P10) to ninth (P90) express the degree to which the parental spending spreads. The first decile of the family-shared total is \$5,533, indicating that 10 % of families spent at most \$5,533 in 2003 on family-shared goods and services for an equivalent person. The median (P50) is \$11,586 (50 % of the families spent at most this level), and the ninth decile is \$21,532 (90 % of the families spent at most this level). The child-specific total spreads widely: \$1,665 at the first decile, \$4,540 at the median, and \$10,417 at the ninth decile. School-related spending is dispersed: \$20 for the first decile and \$725 for the ninth decile. The deciles for social-cultural and status-signaling spending also spread widely.

The P80/P20 decile ratio provides information about the degree of polarization. Although families at the eighth decile spend 2.3 times what families at the second decile do on family-shared spending, the ratio for child-specific total spending is even larger at 3.3. Among the three categories, the P80/P20 ratio is the largest at 6.7 for school-related spending, second largest at 5.2 for social-cultural, and the smallest at 4.0 for status-signaling. This more complete information on the distribution through deciles and decile ratios provides a richer understanding of inequality. In contrast, summary measures, such as the Gini, give an overall inequality measure for the entire distribution. The Gini is much lower for family-shared spending (.284) than for the total

**Table 2** Unequal spending on children: Total and component spending

Inequality Measures	Family-Shared Spending	Child-Specific Spending			
		Total	School-Related	Social-Cultural	Status-Signaling
Decile					
P10	5,533	1,665	20	270	180
P20	7,581	2,330	30	490	249
P30	8,881	2,925	50	724	300
P40	10,086	3,620	60	940	400
P50	11,586	4,540	100	1,200	500
P60	13,203	5,328	100	1,490	550
P70	15,207	6,185	150	1,910	700
P80	17,814	7,710	200	2,550	1,000
P90	21,432	10,417	720	3,540	1,500
P80/P20 Ratio	2.3	3.3	6.7	5.2	4.0
Gini	0.284	0.375	0.800	0.467	0.500
Group Median					
Low SES	8,110	2,633	50	590	400
Middle SES	11,314	4,620	100	1,220	500
High SES	16,329	6,120	100	2,070	525
Black	8,093	3,220	60	735	400
White	12,920	5,252	100	1,540	500

parental spending on specific children (.375). Among the three categories, the highest Gini is for school-related spending (.800), the second highest is for status-signaling spending (.500), and the third is social-cultural spending (.467). All three of these are much higher than the Gini for family-shared and child-specific total spending.

The bottom part of Table 2 shows between-group inequality via the median differences of SES groups and racial groups. Three patterns are worth noting. First, SES gaps are larger than racial gaps. Second, although social-cultural spending differs across the three SES groups, the largest gap in school-related spending and status-signaling spending is between the low-SES group and the middle- and high-SES groups combined. Third, the black-white gap is especially large for social-cultural (\$735 for blacks and \$1,540 for whites), but quite small for status-signaling expenditures (\$400 for blacks and \$500 for whites).

Table 3 presents the patterns of explanatory variables within spending decile groups, which can help shed light on the relationship between an explanatory variable and the distribution of a spending variable, as well as the quantile regression estimation at a specific decile. We examine these patterns across four quintile groups (lower 20 %, lower 50 %, upper 50 %, and upper 20 %) of child-specific total spending. Overall, children in the lower 20 % and 50 % groups are more disadvantaged than those in higher 50 % and 20 % groups. Children in the lower groups are likely to have parents who are black and have lower education, occupational prestige, income, and educational expectation. They are also likely to have less wealth, be a single mother, be working part-time or unemployed, and receive public assistance. Quantile regression is capable of capturing the effects of this concentration of disadvantages in lower spending groups. In the quantile regression at the second decile, for example, the .8 weights for the bottom 20 % spending group and the .2 weights for the upper 80 % spending group effectively and realistically capture the disadvantages of children at and below the second decile of spending.

## Quantile Regression Results

We conducted quantile regression analysis at the seven deciles (from P20 through P80) of each of the five dependent variables (family-shared spending, child-specific total spending, and three child-specific categories, all log-transformed).<sup>6</sup> Graphical representations are useful for depicting patterns based on large-volume results, and thus we use such an approach for the summary interpretation at the end of this section. Estimates at extreme ends are usually less stable because those in the sample falling below (or above) the extreme end is small. Our sample size of 1,966 families and 2,893 children is sufficient to ensure stable estimates at quantiles from the second to eighth deciles. Substantively, the spread of expenditure between the second and eighth deciles (Table 2) is sufficiently large. The disadvantages are concentrated in the lower 20 % spending group (Table 3), supporting our choice of selectively examining the second decile (P20), the median (P50), and the eighth decile (P80). We examine the estimate for an explanatory variable for the *level* at the quantile and the cross-quantile equivalence of estimates to determine the *shape* of the conditional distribution in question. The estimates at P20, P50, and P80 are reported in Tables 4, 5 and 6. Standard errors

<sup>6</sup> We replace zero spending with \$1 so as to include all sample families and individual children in analysis.

**Table 3** Distribution of explanatory variables within quantile groups of child-specific total spending

Variable	Total	Lower 20 %	Lower 50 %	Upper 50 %	Upper 20 %
Stratification Variable					
Higher parent education	13.38	11.16	12.28	14.49	14.59
Parent occupation	39.95	30.25	35.19	44.72	45.47
Family income (in \$10,000s)	7.03	3.43	4.72	9.35	11.05
White	0.63	0.31	0.49	0.77	0.76
Black	0.16	0.27	0.22	0.09	0.08
Parental Educational Expectation for the Child	15.14	14.10	14.66	15.64	15.83
Child Characteristics					
Girl	0.50	0.53	0.50	0.51	0.51
Only child	0.11	0.05	0.08	0.15	0.19
First child of 2+ children	0.44	0.59	0.52	0.35	0.32
Low birth weight	0.06	0.07	0.07	0.05	0.07
Control Variable					
Wealth in \$100,000	1.85	0.50	0.80	2.91	4.07
Public assistance	0.14	0.35	0.23	0.04	0.04
Mother part-time work	0.20	0.19	0.19	0.20	0.18
Mother full-time work	0.48	0.35	0.42	0.55	0.58
Parent age	42.40	40.55	41.45	43.34	43.27
Single mother	0.21	0.30	0.25	0.17	0.16
Other family type	0.07	0.06	0.07	0.07	0.06
Number of adults	2.11	2.09	2.10	2.13	2.08
Number of children	2.22	2.83	2.46	1.99	1.92
Child age 12–14	0.17	0.16	0.16	0.17	0.16
Child age 15+	0.44	0.36	0.41	0.47	0.49
Number of Sample Children	2,893	662	1,658	1,235	481

are reported in parentheses in Tables 4 and 5, but they are omitted from Table 6 to save space. Estimates for the key explanatory variables and important controls are reported in the tables, although estimates for other controls are not (again, to save space). At the bottom of the table are  $R$  statistics at the  $p$ th quantile, which can be used to compare the current model with the model including only the intercept at that same quantile.<sup>7</sup>

### *Family-Shared Spending*

Table 4 presents the results for family-shared spending using the sample of 1,966 families. Because family-shared spending is at the family level, Table 4 does not include variables pertaining to specific children, such as parental expectation, birth

<sup>7</sup> See more details in the [appendix](#).

weight, birth order, age, and gender. The  $R$  statistics of .388 at P20 and .293 at P80 show a better fit at the lower decile than the upper decile of family-shared spending.

We use Table 4 to illustrate how to read the estimates. The three aspects of SES, rather than a single composite, enter the model to yield their respective estimates. Family-shared spending and each aspect of SES are log transformed so that the estimates are in the form of elasticity (i.e., a percentage increase in a SES aspect is associated with a certain percentage change in spending). Lowercase letters (a, b, or c) indicate a significance level of .05 for the difference in two estimates between P20 and P50, P20 and P80, and P50 and P80, respectively.<sup>8</sup> Family-shared spending is positively elastic with SES variables: a 1 % increase in parental schooling increases family-shared spending by 0.217 % at P20, 0.228 % at P50, and 0.236 % at P80 (and their cross-decile differences are not significant). The elasticity of family-shared spending with family income, however, differs significantly across the three deciles.

Elasticity is a form of standardized coefficient, facilitating cross-covariate comparisons within the model at a given decile. Through testing the equivalence of these elasticity estimates at a given decile, we can judge the relative importance of the three SES variables. The symbol of a single diamond (◆) indicates a significance level of .05 between parental education and occupation, and a quadruple diamond (♠) indicates the same significance level between parental education and family income. Testing the equivalence of SES aspects at a given decile identifies that the elasticity of parental education is significantly stronger than that of parental occupation, while parental education is as important as family income at all deciles of family-shared spending being examined.

The coefficients for being black can be transformed to the black-to-white ratios of spending. All else being equal, this ratio increases from  $e^{-.129} = .879$  at P20, to  $e^{-.128} = .880$  at P50, to  $e^{-.099} = .906$  at P80. The negative race effect is statistically similar across quantiles. The direction of the coefficients for other covariates is as expected: family wealth and maternal full-time work increase family-shared spending, whereas public assistance and greater numbers of adults and children reduce family-shared spending.

### *Spending on Individual Children*

Table 5 (for total child-specific spending) and Table 6 (for categories of child-specific spending) provide evidence to test our working hypotheses. The  $R$  statistics of models for child-specific spending are lower than those for family-shared spending. In the appendix, we explain why  $R$  statistics for quantile regression should not be taken as we usually do with OLS, given that quantile-regression's  $R$  statistics based on absolute differences are substantially smaller in scale than the analogous  $R$  squared for OLS based on squared differences.  $R$  statistics can be used to compare the fits at different quantiles.

Our first hypothesis (H1) posits differential impacts of parental SES variables. Table 5 shows that the elasticity of parental education for child-specific total spending

<sup>8</sup> We tested the equivalence of estimates for a covariate across quantiles through a simultaneous quantile regression estimation. The bootstrap variance-covariance matrix with 50 replicates (from `sqrreg` in Stata) was used to determine the significance levels.

**Table 4** Quantile regression estimates for log family-shared spending

Variable	P20	P50	P80
Stratification Variable			
Parental education elasticity	0.217** (0.069)	0.228♦*** (0.062)	0.236** (0.082)
Parent occupation elasticity	0.079** (0.029)	0.099*** (0.018)	0.117*** (0.027)
Family income elasticity	0.295 <sup>a,b</sup> *** (0.030)	0.233 <sup>a,c</sup> *** (0.028)	0.147 <sup>b,c</sup> *** (0.037)
Black	-0.129*** (0.034)	-0.128*** (0.028)	-0.099** (0.035)
Control Variable			
Wealth elasticity	0.004* (0.002)	0.005*** (0.001)	0.007*** (0.002)
Public assistance	-0.387*** (0.074)	-0.310*** (0.045)	-0.366*** (0.039)
Mother fulltime work	0.060 <sup>a,b</sup> * (0.042)	-0.053 <sup>a</sup> * (0.032)	-0.061 <sup>b</sup> * (0.036)
Parent age	0.001 <sup>a,b</sup> (0.002)	0.005 <sup>a</sup> *** (0.001)	0.007 <sup>b</sup> *** (0.001)
Single mother	-0.018 (0.033)	-0.050* (0.033)	-0.073* (0.031)
Number of adults	-0.110*** (0.019)	-0.128*** (0.014)	-0.116*** (0.013)
Number of children	-0.069*** (0.011)	-0.090*** (0.010)	-0.077*** (0.016)
Constant	9.479*** (0.068)	9.928*** (0.058)	10.206*** (0.057)
R	.388	.335	.293

Notes: The model controls for the residual race category, mother part-time work, other family type, metropolitan area, and region. Bootstrap standard errors are shown in parentheses.

<sup>a</sup> P20 and P50 are significantly different.

<sup>b</sup> P20 and P80 are significantly different.

<sup>c</sup> P50 and P80 are significantly different.

♦Parental education elasticity and parental occupation elasticity are significantly different.

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$

is significantly larger than parental occupation at P20 and P50. It is also significantly larger than both parental occupation and family income at P80. Similar yet unique patterns are found for spending components (Table 6): parental education has a stronger elasticity than parental occupation and family income at P20 of school-related, and P20, P50, and P80 of social-cultural; parental education has a stronger elasticity than parental occupation at P50 and family income at P80 of status-signaling. This suggests

**Table 5** Quantile regression estimates for log child-specific total spending

Variable	P20	P50	P80
Stratification Variable			
Parental education elasticity	0.393 $\blacklozenge$ *** (0.110)	0.273 $\blacklozenge$ ** (0.095)	0.414 $\blacklozenge$ *** (0.073)
Parent occupation elasticity	0.096** (0.035)	0.050* (0.030)	0.067* (0.037)
Family income elasticity	0.210 $\blacklozenge$ *** (0.032)	0.158 $\blacklozenge$ *** (0.031)	0.068 $\blacklozenge$ *** (0.027)
Black	-0.325*** (0.052)	-0.274*** (0.039)	-0.250*** (0.044)
Parental Expectation	0.047*** (0.008)	0.034*** (0.008)	0.035*** (0.009)
Child Characteristics			
Girl	-0.001 (0.024)	0.000 (0.033)	-0.009 (0.046)
Only child	0.065* (0.047)	0.121* (0.053)	0.170** (0.062)
First child of 2+ children	-0.119*** (0.025)	-0.093** (0.035)	-0.085* (0.046)
Low birth weight	-0.075* (0.049)	-0.050* (0.046)	0.001 (0.057)
Control Variable			
Wealth elasticity	0.004* (0.002)	0.006* (0.003)	0.006* (0.004)
Public assistance	-0.011 (0.050)	-0.098* (0.042)	-0.154* (0.063)
Mother full-time work	0.003 (0.048)	0.046* (0.047)	-0.040* (0.049)
Parent age	-0.001 (0.002)	-0.002* (0.002)	0.002 (0.003)
Single mother	0.006 (0.049)	-0.008 (0.039)	-0.021 (0.048)
Number of adults	-0.074** (0.025)	-0.047* (0.020)	-0.030* (0.025)
Number of children	-0.093*** (0.017)	-0.071*** (0.017)	-0.058** (0.022)
Child age 12–14	0.076* (0.047)	0.016 (0.035)	-0.041* (0.056)
Child age 15+	0.068 $\blacklozenge$ * (0.035)	0.055* (0.037)	0.039 $\blacklozenge$ * (0.044)
Constant	8.383*** (0.095)	8.749*** (0.080)	9.212*** (0.100)

**Table 5** (continued)

Variable	P20	P50	P80
<i>R</i>	.210	.190	.159

*Notes:* Models 1 and 2 control for the residual race category, mother part-time work, other family type, metropolitan area, and region. Bootstrap standard errors are shown in parentheses.

<sup>a</sup> P20 and P50 are significantly different.

<sup>b</sup> P20 and P80 are significantly different.

<sup>c</sup> P50 and P80 are significantly different.

◆ Parental education elasticity and parental occupation elasticity are significantly different.

❖ Parental education elasticity and family income elasticity are significantly different.

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$

partial support for H1 and identifies the stronger role parental education plays in allocating resources to individual children.

We hypothesized significant race effects after controlling for parental SES (H2). The race effects on family-shared spending, child-specific total spending, and the three components remain strong after we control for parental SES. For example, the black-to-white ratio in total spending on individual children ranges from  $e^{-.325} = .723$  to  $e^{-.250} = .779$ . Thus, the evidence supporting H2 is strong.

We also found stronger effects of parental SES and race on child-specific spending than family-shared spending. Parental SES aspects are more strongly elastic with child-specific total spending than with family-shared spending; for example, at P20 the elasticity for parental education is .217 for family-shared spending (see Table 4), whereas it is higher at .393 for child-specific total (see Table 5). The parental SES is also more elastic for school-related and social-cultural expenditure, with an exception for status-signaling (see Table 6). The race effects are also larger for child-specific spending variables than for family-shared spending.

We hypothesized that parental expectation is an important factor influencing how parents allocate their resources (H3). The result for child-specific total lends empirical support to this hypothesis. A one-year increase in expected schooling increases the total spending by 4.5 % at P20, 3.7 % at P50, and 2.8 % at P80. Thus, when compared with a parent whose expectation for a child is high school education, a parent with an expectation of college education increases the total spending on the child by 18.0 % at P20, 14.8 % at P50, and 11.2 % at P80. These estimates were tested and found not to differ statistically across deciles. The boosting effects of a one-year increase in expected schooling are relatively strong for social-cultural spending (8.3 %, 5.6 %, and 4.9 % at the three deciles, respectively) and school-related spending (7.2 %, 5.3 %, and 6.1 %), but relatively weak for status-signaling spending (4.6 %, 3.8 %, and 3.2 %). Overall, these estimates support H3.

Our confidence in the importance of parental expectation is grounded on two reasons. First, many factors affecting both parental expectation and parental spending are included in the modeling. The availability of a rich set of variables from PSID and CDS-II enables us to control for family wealth, receipt of public assistance, and child birth weight, which are often unavailable in other data sources. Controlling for these



**Table 6** Quantile regression estimates for component spending on specific child: School-related, social-cultural, and status-signaling

Variable	School-Related				Social-Cultural				Status-Signaling			
	P20	P50	P80	P80	P20	P50	P80	P80	P20	P50	P80	P80
<b>Stratification Variables</b>												
Parental education elasticity	0.897 <sup>◆◆◆</sup> *	0.357 <sup>h*</sup>	0.495*	0.828 <sup>◆◆◆</sup> *	0.734 <sup>◆◆◆</sup> *	0.664 <sup>◆◆◆</sup> *	0.129*	0.193 <sup>◆</sup> *	0.129*	0.193 <sup>◆</sup> *	0.298 <sup>◆◆◆</sup> *	
Parent occupation elasticity	0.121*	0.023 <sup>c</sup>	0.158*	0.048*	0.086**	0.100*	0.032*	-0.008	0.032*	-0.008	0.061*	
Family income elasticity	0.122*	0.100**	0.107*	0.302 <sup>a,b</sup> **	0.215 <sup>a,c</sup> **	0.095 <sup>b,c</sup> **	0.121*	0.061*	0.121*	0.061*	0.071**	
Black	-0.168*	-0.154*	-0.254*	-0.461**	-0.405 <sup>c</sup> **	-0.502 <sup>c</sup> **	-0.228 <sup>b</sup> **	-0.153**	-0.228 <sup>b</sup> **	-0.153**	-0.031 <sup>b</sup>	
Parental Expectation	0.062 <sup>◆◆◆</sup> *	0.058 <sup>◆◆◆</sup> *	0.080 <sup>◆◆◆</sup> *	0.077 <sup>b</sup> **	0.061 <sup>◆◆◆</sup> *	0.055 <sup>b</sup> **	0.058 <sup>◆◆◆</sup> *	0.040 <sup>◆◆◆</sup> *	0.058 <sup>◆◆◆</sup> *	0.040 <sup>◆◆◆</sup> *	0.035 <sup>◆◆◆</sup> *	
<b>Child Characteristic</b>												
Girl	0.106*	0.059*	0.000	0.043*	0.066*	0.004	-0.009	0.026*	-0.009	0.026*	0.056*	
Only child	-0.004	-0.021	0.097	0.137*	0.182*	0.204**	-0.043	0.093*	-0.043	0.093*	0.090*	
First child of 2+ kids	-0.011 <sup>b</sup>	-0.059*	-0.232*	-0.092*	-0.106**	-0.088*	-0.043*	-0.067*	-0.043*	-0.067*	-0.054*	
Low birth weight	-0.005	0.049	0.255*	-0.048	-0.021	-0.029	-0.038	-0.131*	-0.038	-0.131*	-0.065	
<b>Control Variable</b>												
Wealth elasticity	-0.005 <sup>b</sup> *	-0.003 <sup>c</sup> *	0.018 <sup>b,c</sup> **	-0.001	0.000	0.003*	0.006*	0.000	0.006*	0.000	-0.002	
Public assistance	-0.204*	-0.145*	-0.299**	-0.164*	-0.128*	-0.196 <sup>◆◆◆</sup> *	-0.065*	-0.035	-0.065*	-0.035	-0.073*	
Mother full-time work	0.093*	0.051	-0.060	-0.017	-0.011	-0.014	-0.144*	-0.014 <sup>c</sup>	-0.144*	-0.014 <sup>c</sup>	-0.209 <sup>c</sup> **	
Family head age	-0.002	0.001	0.010*	0.000	-0.001	-0.001	-0.010 <sup>a,b</sup> *	0.000 <sup>a</sup>	-0.010 <sup>a,b</sup> *	0.000 <sup>a</sup>	0.001 <sup>b</sup>	
Single mother	0.049*	-0.009	0.135*	0.003	0.035	-0.028	0.152*	0.140**	0.152*	0.140**	0.105*	
Number of adults	-0.174 <sup>a,b</sup> **	-0.057 <sup>a</sup> *	-0.016 <sup>b</sup>	-0.099**	-0.065*	-0.070*	-0.010	0.034*	-0.010	0.034*	0.017	
Number of children	-0.061*	-0.094**	0.012	-0.076*	-0.039*	-0.024*	-0.123**	-0.065*	-0.123**	-0.065*	-0.050*	
Child age 12-14	0.280 <sup>◆◆◆</sup> *	0.171**	0.047	0.019	0.067*	0.028	0.072*	0.072*	0.072*	0.072*	0.085*	
Child age 15+	0.104*	0.191 <sup>c</sup> **	-0.057 <sup>c</sup>	-0.121 <sup>b</sup> *	-0.033*	0.007 <sup>b</sup>	0.127 <sup>b</sup> *	0.215 <sup>c</sup> **	0.127 <sup>b</sup> *	0.215 <sup>c</sup> **	0.445 <sup>b,c</sup> **	
Constant	3.884 <sup>◆◆◆</sup> *	4.549 <sup>◆◆◆</sup> *	5.866 <sup>◆◆◆</sup> *	7.378 <sup>◆◆◆</sup> *	7.663 <sup>◆◆◆</sup> *	8.202 <sup>◆◆◆</sup> *	5.870 <sup>◆◆◆</sup> *	6.245 <sup>◆◆◆</sup> *	5.870 <sup>◆◆◆</sup> *	6.245 <sup>◆◆◆</sup> *	6.884 <sup>◆◆◆</sup> *	

**Table 6** (continued)

Variable	School-Related			Social-Cultural			Status-Signaling		
	P20	P50	P80	P20	P50	P80	P20	P50	P80
R	.066	.057	.054	.244	.211	.197	.052	.049	.080

*Note:* The models controls for the residual race category, mother part-time work, other family type, metropolitan area, and region.

<sup>a</sup> P20 and P50 are significantly different.

<sup>b</sup> P20 and P80 are significantly different.

<sup>c</sup> P50 and P80 are significantly different.

♦ Parental education elasticity and parental occupation elasticity are significantly different.

♣ Parental education elasticity and family income elasticity are significantly different.

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$

covariates helps reduce much of the potential confounders of parental expectation. Second, the measure of parental expectation is a five-year lagged variable. Given that the lagged expectation is not influenced by the family's current conditions and the child's current performance, the estimate approximates the true effect more closely than that when the current parent expectation is used.

Nonetheless, unobserved parental heterogeneity remains a threat to the causal inference of parental expectation. Unmeasured parental psychological dispositions, lifestyles, and cultural values could affect both parental expectation and spending on a child's development, thus biasing the estimate for parental expectation. One way to assess parental heterogeneity is to use a sibling (fixed-effects) model. Unfortunately, CDS-II did not include all age-appropriate children but only randomly selected two if a family had more than one child, resulting in very thin data for a sibling model. To get a sense of how unobserved parental heterogeneity might bias our estimate for parental expectation, we performed a sensitivity analysis using the limited sibling data. The number of sample families with two sample children is 887 of a total of 1,996 families in our analytic sample. The two siblings in each of the 887 families provide limited within-family variation and impose a great constraint on reliable estimates of the sibling model. We explored fixed-effects conditional mean models to detect potential bias in estimates using the sibling data. With these sparse data, we still detected a positive effect of parental expectation for specific children on the school-related spending at the .05 significance level. The size of this within-family estimate almost doubles the size of the corresponding estimate of the conditional median model without the fixed effects. For other spending components, however, the sibling within-family estimate for parental expectation has a large standard error. These nonsignificant results suggest that we could neither confirm nor rule out any confounders of parental expectation in our quantile regression models for child-specific total, social-cultural, and status-signaling.

Estimates for child characteristics show that they do matter. First, there are no overall gender differences in child-specific total spending. More specifically, parents at P20 and P50 of school-related and social-cultural expenditures invest more in girls than in boys; and parents at P50 and P80 of status-signaling expenditures spend more on girls than on boys. All this refutes the traditional notion that sons are more important than daughters. Second, estimates for the birth-order variables support a resource-dilution story rather than an affective story because the results show greater spending on an only child and less on the first child of two or more siblings. This collectively rebuts the traditional notion that the firstborn is more important than the later-born. Third, the pattern of low birth weight is noteworthy. On child-specific total spending, low birth weight has a negative, significant coefficient at P20 and P50 but virtually no effect at P80. With limited resources, parents in the bottom half of the spending group may be less willing to pay for the same goods and services for children with health and endowment limitations than for children of normal birth weight. With more resources, parents in the top 20 % spending group invest in children regardless of birth weight. When we examine spending on school-related items, parents at P80 actually spend more on low birth weight children, perhaps to compensate for the low birth weight.

Among important controls, family wealth, public assistance, maternal fulltime work, and family size have expected effects on child-specific and family-shared

expenditure. At first glance, the negative sign of family wealth measured with net worth (“generalized log transformed”)<sup>9</sup> on school-related spending at P20 and P50 may be surprising. Note that the lower half of the school-related distribution is more likely to be in the lower half of the net worth distribution. Children in families with negative net worth (greater debts than assets) are better-off than those from families with zero net worth (usually no assets and no debts), such that an “increase” from negative net worth to zero net worth is associated with a reduction in school-related spending (mainly private school tuition) at the lower half of the school-related distribution.

### *Graphic Views of Selected Covariates*

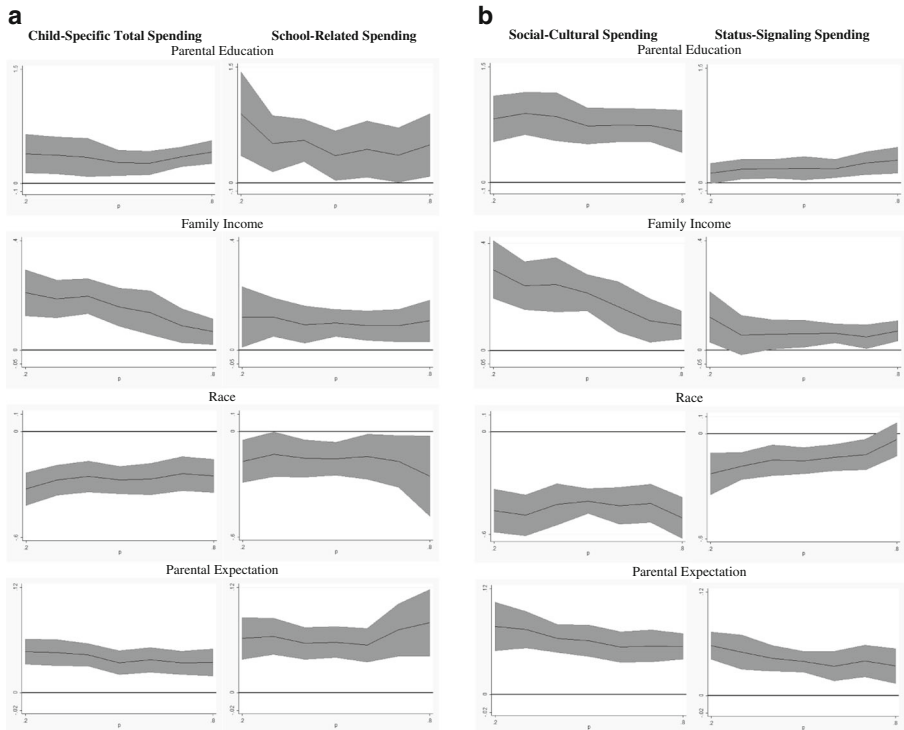
Tables 5 and 6 provide exact estimates of our quantile regression at P20, P50, and P80. Graphs of the estimates from P20 through P80, with their 95 % confidence envelopes, offer interesting overviews. Figure 1a and b depict the patterns for four selected key explanatory variables: parental education, family income, race, and parental expectation. In each graph, the  $x$ -axis indicates  $p \in [.2, .8]$ , and the  $y$ -axis indicates the corresponding coefficient estimates (elasticity for parental education and family income, log scale difference in spending between blacks and whites, and the percentage change in spending due to a one-year increase in parental expectation). The shaded areas in the graphs indicate the 95 % confidence envelope of the estimates. If the envelope is above the  $x$  line at  $y = 0$ , the estimates are positive and statistically significant; otherwise, they are negative and statistically significant. Three patterns emerge from Fig. 1a and b. First, the magnitudes of the selected covariates are largest for social-cultural, followed by child-specific total. Second, the confidence envelopes are narrowest for child-specific total, followed by social-cultural. Third, the curves of the elasticity of family income with child-specific total and social-cultural spending are clearly downward along  $p$ , such that the percentage increase is higher at the lower end than at the higher end, thereby contracting the distribution.

## **Conclusions**

It has been increasingly recognized that consumption expenditures are more direct measures of children’s material well-being than family income or wealth. Studies on family expenditures on children are rare, however, and have been based on household-level consumption data. Little is known about how family SES, race, parental expectation, and child characteristics shape parental spending on different types of expenditures for individual children. This article fills this gap in the literature by developing a conceptual framework that draws from stratification theory, human capital theory, and the child development perspective, and applying quantile regression modeling to the unique child-level expenditure data from the PSID and its Child Supplements.

This article’s conceptualization of parental spending on children contributes to a better understanding of the intergenerational transfer process, which implicates disparities in U.S. children’s well-being documented in extant literature, such as SES and

<sup>9</sup> We first log transform the absolute value of net worth, which is then assigned the original sign of net worth.



**Fig. 1** **a** Quantile regression point and 95 % confidence envelope estimates: Child-specific total and school-related spending. **b** Quantile regression point and 95 % confidence envelope estimates: Social-cultural and status-signaling spending

racial gaps in academic achievement and risky behavior. Social stratification theory guides us to examine SES and race simultaneously, revealing their partial effects on children’s expenditures. Human capital theory and the child development perspective point us toward the unique roles of parents’ own education and expectations for their children’s development in resource allocation behavior. The quantile regression modeling of child-level data extends previous descriptive analyses of household-level consumption data to provide insights into how and why family spending on a child varies across different positions of the spending distribution. Although the causal effects of parental education, occupation, family income, and race on parental spending are defensible, parental expectation may be confounded with psychological dispositions, lifestyles, and cultural values. Because these unobservable factors affect both parental expectation and parental spending, they threaten their causal relationship. We reduced this threat by controlling for variables that relate to lifestyle, such as family wealth and public assistance receipt, and by measuring parental expectation five years earlier than the time when spending data were collected. In addition, a sensitivity analysis using a fixed-effect sibling model on the sibling sample, a small subset of the analytic sample, confirmed the causal effects of parental expectation on school-related spending. We could not rule out, however, that the estimates for parental expectation on child-specific total, social-cultural, and status-signaling categories may be correlative rather than causal.

With these conceptual and analytic improvements and caveats, our estimates provide a comprehensive picture of parental investment in domains of child development and offer several major findings. First, the results offer a nuanced understanding of the differential roles of SES variables, beyond the sole focus on family income, with parental education being the most important one. Second, we find that, in contrast to Lareau's (2003) finding, being black continues to have a significant, substantial, negative effect on all measures of parental spending, even after parental SES variables are held constant. This finding is also in contrast to the previous finding about blacks' spending on visible goods: we actually find that black parents spend less on status-signaling items than do comparable white parents, particularly in the lower expenditure groups. Third, the estimates reveal stronger effects of SES and race on child-level spending than those on family-shared expenditure. Fourth, we show the crucial role of parental expectation in placing a premium on child development and setting priorities in different spending categories corresponding to child developmental domains. Fifth, quantile regression helps identify differential effects of covariates across quantiles. The differential effects refer to (1) family income, which has a stronger effect on the lower end than the upper end of the child expenditure distribution, particularly for the social-cultural category; and (2) birth weight, which has a negative effect on the lower half but no effect on the upper half of the child-level total expenditure. These two patterns potentially contribute to growing SES disparities among children. Finally, by using child-level data, we show that parents do not spend more on boys than on girls and that the first child does not receive more investment when other characteristics are held constant, contesting two traditional ideas about parental investment behavior.

This study also makes a theoretical contribution by providing important links missing in the literature of intergenerational transfers regarding how parental SES and race are related to the cognitive and noncognitive development of the child generation. Consumption expenditures on specific categories, such as school-related, social-cultural, and status-signaling, are daily expenses that cumulatively affect development throughout childhood. Given the same set of parental resources, such as family income and wealth, we show that parental education, race, parental expectation, and child characteristics can significantly shape how parents allocate a fixed amount of resources to different consumption categories. By distinguishing different consumption categories corresponding to child developmental domains, we show the power of nonfinancial parental attributes in influencing different investment strategies in children that may have long-term implications for children's developmental outcomes and life chances.

This study also suggests theoretical counterpoints to the consumption literature. The notion of taste is used repeatedly as an assumption in consumption economics and marketing research. Departing from this tradition, our study seeks explanations from structural factors. We conceive parental education as being translated into parental knowledge about children's developmental needs and show its strong explanatory power. In addition, we conceive early parental expectation for a child's education as the parents' goals for bringing up the child. Knowledgeable, goal-oriented parents would prioritize their investment in individual children to enhance their developmental outcomes. Overall, parental education and parental expectation present a set of constraints and opportunities that cannot be taken as mere tastes. Our finding that race remains a significant factor for parental spending after SES and parental expectation are

held constant may reflect racial tastes at a first glance. It is likely, however, that the racial effect reflects neighborhood constraints. In residentially segregated neighborhoods, public-funded programs—such as after-school programs—may be the only available and accessible providers of social-cultural activities. These usually crowded and poor-quality programs, more than racial tastes, may explain why black parents spend less on social-cultural items.

From the findings of this article, we draw policy implications for interventions outside public assistance to reduce the inequality in spending on children. Lower parental education and expectation are associated with a lack of child development knowledge and a low motivation to invest in children, especially among those in low-spending groups. Thus, providing only financial resources to needy families without imparting child development knowledge and instilling high expectations for children is an incomplete solution. In addition, the substantially lower spending on children's social-cultural activities among black parents than comparable white parents could be alleviated by policy measures. Although public-funded extracurricular programs exist, many of them do not match up to middle-class whites' parental spending on social-cultural activities. Increasing both quantity and quality of public-funded extracurricular programs may supplement the deficit in parental spending, and thus help level the playing field of inequality in child development.

## Appendix: Brief Introduction to Quantile Regression Modeling

Quantile regression (QR) modeling is a natural extension of linear regression modeling, providing a fuller characterization of the whole distribution of the response variable, introduced by Koenker and Bassett (1978) and Koenker (2005) and disseminated to social science researchers by Hao and Naiman (2007). The term quantile is denoted by  $Q^{(p)}$ , where  $0 < p < 1$  indicates the cumulated proportion of population sorted by the response variable (here, consumption expenditure). The QR model offers two advantages. First, it estimates the relationship of a covariate with expenditures at different locations of the expenditure distribution, directly addressing the nature of expenditure inequality. Second, the robust property of quantile regression models is their insensitivity to the top-coding expenditure practice used in surveys including the PSID. In contrast, OLS regression estimates are for the conditional mean of the response variable and are sensitive to the top coding issue.

Let log equivalence-scaled family-shared expenditures or child-specific expenditures be  $y_i$  for family  $i$ <sup>10</sup>;  $\mathbf{R}_i$  be a vector of three dummy variables indicating blacks, Hispanics, and other race, with whites being the reference;  $\mathbf{X}_i$  be a vector of family characteristics; and  $\mathbf{Z}_i$  be a vector of child characteristics. The full quantile regression model used in this article is shown in Eq. (1):

$$\begin{aligned} y_i &= \beta_0^{(p)} + \beta_1^{(p)} \mathbf{R}_i + \beta_2^{(p)} \mathbf{X}_i + \beta_3^{(p)} \mathbf{Z}_i + \varepsilon_i^{(p)}, \\ Q^{(p)}(y_i | \mathbf{R}_i, \mathbf{X}_i, \mathbf{Z}_i) &= \beta_0^{(p)} + \beta_1^{(p)} \mathbf{R}_i + \beta_2^{(p)} \mathbf{X}_i + \beta_3^{(p)} \mathbf{Z}_i. \end{aligned} \quad (1)$$

<sup>10</sup> Families with no expenditures are included by adding \$1 to every family's expenditure.

The three sets of covariates are entered incrementally. The model is estimated at selected deciles ( $ps$ ) and four sets of results are reported for four deciles: the first decile, the second decile, the fifth decile (median), and the eighth decile. Unlike OLS estimation based on least squares, the estimation of quantile regression is based on minimizing the weighted absolute distances, with a weight of  $(1 - p)$  for data points below a specific quantile and  $p$  for data points above the specific quantile. For example, in the quantile regression model at the first decile, families in the lower 10 % are given 0.9 weight, and the upper 90 % the 0.1 weight. Like OLS, quantile regression estimation is based on the whole sample rather than a subsample. We estimate the specified quantile regression models using Stata.

Under the independent and identically distributed (i.i.d.) assumption of errors, asymptotic standard errors (large-sample approximations) can be used to make inferences for quantile regression estimates (which can be obtained from `-qreg-` in Stata). The i.i.d. error assumption, however, is unlikely to hold. The often-observed skewness and outliers make the error distribution depart from i.i.d. and asymptotic standard errors have been found highly sensitive to minor deviation from the i.i.d. error assumption. Therefore, the bootstrap method should be used. Bootstrap standard errors can be obtained using `-bsqreg-` in Stata. When we test whether the effect of a covariate differs significantly across quantiles, we need a covariance matrix of the coefficients across quantiles, which can be obtained using the bootstrap approach through a simultaneous quantile regression command `-sqreg-` in Stata. The recommended number of resamples in bootstrap (reps in Stata) is 50–200. This article reports the results from 50 repetitions because they are similar to the results with 200 repetitions.

The goodness-of-fit statistic for quantile regression is  $R(p)$  for  $p$ th quantile, analogous to  $R^2$  of linear regression models (Koenker and Machado 1999). Like  $R^2$ ,  $R(p)$  lies between 0 and 1. Unlike  $R^2$ , which measures the relative fit of two models in terms of residual variance,  $R(p)$  measures the relative fit of two models at a specific quantile in terms of an appropriately weighted sum of absolute residuals. This difference has three implications: (1) although  $R^2$  is interpreted as the percentage of *variation* in the dependent variable explained by the model,  $R(p)$  may be interpreted as the percentage of appropriately weighted *absolute differences* in the dependent variable explained by the model; (2)  $R^2$  based on squared differences should be greater than  $R(p)$  based on absolute differences; and (3)  $R(p)$  constitutes a local measure of goodness of fit for a particular quantile, rather than a global measure of goodness of fit over the entire conditional distribution, like  $R^2$ .

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