THE MONETARY COST OF RAISING CHILDREN

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ABSTRACT

Purpose – *Under the impetus of federal law, each state is required to develop Guidelines by which to determine presumptive child support awards following divorce. The key federal requirement is that during the specified quadrennial reviews of each state's Guidelines, "a state must consider economic data on the cost of raising children." Our purpose here is to compare presumptive child support awards provided in typical state Guidelines with the actual monetary costs of raising children.*

Methodology/approach – *To this end, we estimate these monetary costs from government data on consumer outlays in households with children as compared with substantially similar childless households. We review and reject current methods for determining child costs: both from income equivalence methods and those offered in annual government surveys; and provide quite different results despite using the same data employed by others.*

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Findings – *Our econometric results indicate much lower monetary costs than reported for either of the two alternatives. Since presumptive child support awards in most states rely on current methods, these findings suggest that existing award structures should be re-evaluated.*

Practical implications – *Current award structures create a financial asset resulting from the gap between presumptive awards and monetary costs for custodial parents. This factor engenders resentment by support payers since it is his or her payments that fund this asset. And this resentment harms relationships between the parents. Increased willingness of non-custodial parents to make their assessed payments is an outcome promoted when payment amounts reflect the actual monetary costs of raising children.*

Keywords: Child costs; Child Support Awards; Child Support Guidelines

INTRODUCTION

Under the impetus of federal law, each state is required to develop Guidelines by which to determine child support awards following divorce. While judges are permitted to deviate from these guidelines, they are then required to give their reasons, so deviations are infrequent. For the most part, court-ordered child support awards follow whatever guidelines are established. How they are constructed is therefore an important matter for payers and recipients.

The law is quite general on the specific criteria by which state Guidelines should be based. The only stated requirement is that during the specified quadrennial reviews of each state's Guidelines, "a state must consider economic data on the cost of raising children."[1] That statutory requirement is the reason for this paper.

In the early sections, we review the economic principles inherent in cost determination, and their application to the cost of raising children. We discuss the advantages and disadvantages of the methods that have been used in the past and why they do not adequately measure the appropriate values. Following that discussion, we report our empirical findings and suggest why our results offer more accurate values.

Finally, we contrast our estimated child costs with the presumptive child support awards contained in the Guidelines employed by four states. Our purpose is to direct attention to the relationship between actual child costs

and award amounts. In all cases, the presumptive award amounts exceed the monetary costs of raising children.

COSTS AND HOUSEHOLD PRODUCTION

Costs reflect the minimum level of expenditures needed to achieve particular purposes.[2] For a firm, they are the outlays used to purchase essential inputs for the production process, while for a household, they are the outlays needed to achieve certain objectives.

In some circumstances, households engage in production as well as consumption activities.[3] Members of a household may purchase items they do not value for themselves but rather as inputs for some other commodity which in turn is valued. Through this process, they are engaged in "household production."[4] Although these outputs can sometimes also be purchased, households may find it more convenient to buy the necessary inputs and produce the outputs themselves.

The cost of a household good produced in this manner is the aggregate cost of the inputs used to produce it. The household's objective is to minimize the short-run costs of producing a desired quantity and quality of a particular household good (the output) by selecting the quantities of market goods (the inputs) needed to achieve that result. The final cost of a household good depends on the prices and quantities of the purchased market goods that are employed.[5]

In the case of raising children, the time spent by parents in this effort is the major factor in the household production function. However, we ignore that input in the analysis below, not because it is unimportant but rather because the utility values and thus the costs to the parent of providing such services are ambiguous. For some parents, raising children may detract from their utility in the same manner as time spent at any other job. They would prefer to be engaged in their regular leisure-time activities. For other parents, their utility would decline if parenting opportunities were not available. Since we cannot distinguish between these alternatives, and since federal law requires that state Guidelines consider economic data on child costs, we deal only with the additional monetary costs of the market goods purchased to produce the household good of raising children.

To be sure, this household good is not homogeneous but rather covers in a vast array of forms and varieties. There is no single way to raise children and no single figure for the costs of doing so. Although this point seems self-evident to us, it is denied by various writers who allege that child

costs are limited to subsistence levels.[6] Just as many consumer items differ according to their attributes, so also do the process of raising children.

This analytic structure rests on that proposed in Becker's *A Treatise on the Family*.[7] He posits a household utility function that depends in part on the level of nonmarket household goods consumed, which in turn are produced from the purchased market goods used in their production. Becker writes, "commodities (household goods) do not have market prices because they are not purchased, but they do have shadow prices equal to the cost of production."[8] He explains further, "the relevant shadow prices are determined by marginal, not average, costs of production."[9] In the analysis below, we follow this approach.

Within a household which includes children, the adults have preferences that encompass both their parenting activities and their envisioned child outcomes.[10] Based on these preferences, certain market goods are purchased, and it is the cost of these goods that represents monetary child cost.[11] *These costs are those borne for child rearing as a household good but which would not have been borne otherwise.*[12]

ECONOMIC COSTS AND MONETARY COSTS

An important issue is the relationship between economic and monetary costs. For the most part, these costs track each other; but not always. Economic costs are broader than monetary costs in that they can include non-pecuniary, opportunity costs. Consider the following examples which relate specifically to the costs of raising children.

Suppose a married couple without children lives alone in a two-bedroom apartment, where they use the second bedroom as a den. Then a child is added to the household; they remain in the same apartment; and the den is transformed into a nursery. In this example, what housing costs should be attributable to the child? The household pays no additional monetary costs although the adults in this example are deprived of the use of a den. The economic cost of the child includes this opportunity cost even if there are no additional monetary costs.

Interestingly, those were the exact circumstances noted in a press account of a US Department of Agriculture (USDA) report on the cost of raising children. In her account, the journalist observed:

> The biggest expense on the [USDA] list is housing, which I think is kind of silly in my case because my husband and I would probably live in the same size house regardless of whether we had a son or not … My son isn't really adding to our housing costs.[13]

What the journalist is suggesting is that in her circumstances, there are no monetary housing costs due to her son, whether or not there are associated opportunity costs. Her concept of cost is limited to the monetary cost involved.

Another example applies to transportation costs. Suppose a "stay at home" parent uses the family car to drive her children to their activities; although without children in the household, she would use the same car to visit friends or museums. If the distances involved were similar, what transportation costs appropriately apply to the children? Although the monetary costs might be minimal since levels of expenditures were similar, there again could be non-pecuniary opportunity costs. However and critically, there might be little inclination for her to behave in the same manner with children as she did without children, so there are no easy means to identify those opportunity costs, or even to know if they exist.

Another point of distinction between monetary and economic costs follows from recognizing that with given levels of disposable income, spending more on children means spending less on the adults in the household. Measuring full economic costs therefore means including the consumer surplus foregone on these adult goods as part of child costs, in addition to the monetary expenditures actually made on children. For this reason, economics costs can exceed, often substantially, total monetary outlays.

Whatever the advantages resulting from the economic concept of costs, it suffers from the need to define a broad measure of household welfare or utility which is the same for households with and without children. This factor intrudes because differences between economic and monetary costs necessarily involve measuring opportunity costs. The proxies used for this purpose raise important issues which we explore in detail below. Before doing so, however, we review the policy context in which these issues arise.

SETTING CHILD SUPPORT GUIDELINES

As noted above, the 1988 federal legislation requires states to establish guidelines on penalty of having certain federal funds withdrawn. The statute also requires that these guidelines be founded on the available economic data on the cost of raising children. The leading data source, then as now, is the Consumer Expenditure Survey (CEX) compiled by the United States Bureau of the Census, which gathers detailed data within broad categories of expenditure patterns in US households. However, for many

expenditure categories, such as the important ones of housing, food, and transportation, these data apply to the household rather than to individuals. To many observers, that was a critical flaw in using these data since what was needed were outlays made specifically for children.

Just a few years earlier, a short volume had appeared which seemed to offer a solution (Espenshade, 1984). Published as a report to the Urban Institute in Washington, the author used this same data source but with a possible answer to the question of how to derive the cost of children from household data. As stated by his book, Espenshade's approach was

> to develop an index of a family's material standard of living and then apply this index to a comparison of the living standards of families that may differ substantially in income, consumption and family size and composition. … [The index used was simply] the percentage of total current consumption expenditure devoted to food consumed at home. … [Using this index,] two families with the same value [of this percentage] … have the same standard of living regardless of other differences with respect either to the volume of total consumption or to family size and/or composition. (Espenshade, 1984, p. 19)

In other words, richer or poorer, with children or without, two households would be considered to have the same welfare or utility levels if they spent the same proportions of their income on food; and households which spend less proportionately on food were considered better off. Strikingly, his empirical results, which were relied upon so commonly afterwards, rested fundamentally on this particular assumption. The child cost estimates which underlie many state Guidelines rely on economic data as filtered through this specific methodology.

Whatever the technical defects of this approach, which are explored in the next section, income equivalence measures of child costs such as the one suggested by Espenshade have become standard. In one form or another, they have been adopted in most states. While there are differences, largely in terms of which index is used to define welfare equivalence in households with and without children, they rested on the premise that *child costs could be measured through the indirect means of finding the compensation required to return adults in a household with children to utility levels they had reached without children while ignoring any utility gained from the presence of children*.

What is unclear in the general adoption of this approach was whether it was recognized that the amounts obtained in this manner could far exceed the actual amounts spent on children. One reason for this neglect may have been that the results obtained from these income equivalence methods largely tracked the child cost figures reported in the annual surveys published

by the USDA. For the most part, those surveys measured per capita expenditures within the various categories. Little effort was made at tracking household costs within expenditure categories as between households with and without children, which is the approach that follows directly from Becker's treatise.

THE TWO ALTERNATE METHODS

Before proceeding to our derivation of monetary costs, we examine further the two alternate methods which have been used to measure child costs. The first of these does not measure direct expenditures at all but rather defines the cost of raising children as the income equivalence of a child. Under this method, the economic cost of raising children is determined by the compensation required to return the household's adults to the welfare or utility levels they would have reached hypothetically in the absence of children, while specifically ignoring any utility they receive from having children.[14] In the prior example, it represents the compensation required to make up for the loss of the den that had been turned into a nursery.

As might be expected, finding an appropriate welfare or utility measure with which to make such comparisons is no easy matter. Critically, whatever measure is employed, its application requires comparing utility levels in two very different states of the world: households with children and those without children. To make such comparisons requires that household preferences remain the same with children as without, or what are referred to as state-independent preferences. If, on the other hand, household preferences with children are substantially different from those present in the absence of children, such that there are state-dependent preferences, then conceptually this method cannot be used to make adequate comparisons.

There is a large economic literature on this subject. Its widespread conclusion is that utility functions are state-dependent and that one cannot accurately compare preferences (or utility functions) in different circumstances. These issues have been studied most often in the two settings: evaluating preferences related to insurance outcomes[15] and in different health circumstances.[16] However, the same issue applies to comparing preferences in such different circumstances as having a child and being childless. The common observation that adult preferences change sharply when a child arrives supports this conclusion.

There are further questionable assumptions required to obtain results from income equivalence measures. Since its proponents can hardly observe

actual utility functions across large segments of the population, they necessarily employ generalized proxies. While Espenshade used the share of outlays on food in the household budget to represent welfare or utility levels, in what is often referred to as the Engel model, the more widely used Rothbarth model imputes the same utility levels to households with the same consumed levels of a specified adult-only good.[17] *A frequently used adult good is adult clothing so that child costs are estimated by the difference in aggregate spending in households with and without children but which spend the same proportions of their total expenditures on adult clothing*.

While dollar figures can be obtained from both the Engel and Rothbarth models, they require major limitation be imposed on the underlying household utility functions in order to draw any conclusions from the results obtained. On this point, Folbre (2008) writes:

> it is … impossible to directly measure the happiness of households with and without children … [and that the empirical proxies employed] are based on arbitrary assumptions about the relationship between material standards of living and happiness.

Other economists reach the same conclusion.[18] Browning, for example, following his review of these issues notes "it is difficult to see why this [approach] commands any widespread attention."[19] And Pollack and Wales (1979) reach the same outcome and judge such methods as "illegitimate."[20]

Because welfare or utility functions may differ widely between households with and without children, there are really no adequate means to compare the utility levels under the two circumstances. Therefore, there are no adequate means available to measure the relevant opportunity costs. All we can really do is measure the higher level of expenditures occasioned by the presence of children in a household. Those outlays represent the additional monetary expenditures associated with having children, and thereby comport with commonly accepted measures of household costs.

In the empirical analysis below, we offer estimates of these increased costs. To determine the monetary cost of children, we employ available data on household expenditures. In this effort, our approach is similar to that taken by the USDA in its annual reports. Where we differ with the USDA reports is not in their use of actual expenditure data but rather in the empirical methodology employed.

Prior to 2008, the USDA estimated expenditures for leading household collective goods such as housing, food, and transportation on a per capita basis by dividing the expenditures for a given category of outlays by the number of people in the household.[21] A variant of the USDA approach is

that employed by Lazear and Michael (1998). Instead of simply dividing expenditures for these household goods by the number of people in the household, Lazear and Michael allocate those costs to children in the same proportion as they observe for individual private goods. Since they find that an average family spends about 38% as much on a child as on an adult ($38 per child for every $100 spent per adult),[22] they allocate that proportion of household expenditures for housing, food, and transportation to each child in the household.

Whichever variant is employed, the USDA approach violates the economic principle that allocation decisions depend on marginal rather than average costs. Optimal decisions require balancing the additional benefits with the additional costs from any proposed action, which includes the decision to bring children into the household. And if that is the correct measure of cost to use when the original decision was made, it applies as well through the life of the decision. Both the USDA and the Lazear/Michael methods describe average costs and therefore do not represent the incremental costs of raising children.

Interestingly, the USDA authors have more recently taken a half step toward the correct marginal cost approach. In most recent reports, the authors reject the use of per capita housing outlays and suggest instead that "the presence of a child in a home does not affect the number of kitchens or living rooms, but does affect the number of bedrooms." For this reason, they write, a child's housing costs should be limited to "the average cost of an additional bedroom."[23] Implicit in that approach is the assumption that the same household with children would live in a similar dwelling but with one more bedroom. While that may sometime be the case, it will not always be so. Recall the reporter's account of her own housing expenses quoted earlier. In making this methodological shift, the USDA authors offer no supporting evidence that households with children spend more on housing, although of course that may often be the case.

Consider the den-nursery example mentioned earlier. The income equivalence method seeks to determine the child's housing costs by estimating the payment required by adults in the household to compensate them for the loss of the den through its transformation into a nursery. In contrast, the revised USDA method fixes the child's housing costs as the additional rental charge required to acquire a larger unit with an additional bedroom. *Neither approach estimates the additional expenditures actually made to raise the child.*

In the empirical analysis below, we employ the appropriate marginal cost concept to determine the costs of raising children. Within each of the

same household cost categories used in the USDA reports, we determine actual expenditures made with and without children for similar households in similar circumstances. To be sure, our approach ignores any utility foregone by the loss of the den in our example. However, as suggested above, utility valuations on specific items in the presence or absence of children can vary widely. Presumably, adults with and without children have quite different preferences over their use of living space, and all that can readily be concluded is that there is no adequate means by which to determine that element of cost. Our approach is therefore limited to determining the monetary costs of raising children.

THE EMPIRICAL FRAMEWORK

The computations reported here employ the same data source used by USDA: the CEXs conducted by the United States Census Bureau on characteristics, income, and expenditures for individual consumer units.[24] In this study, we employ data reported in each of four years, 2006–2009, rather than relying on only a single survey year as the USDA reports do.[25]

The principles described above ideally refer to an identical household that appears in two states of the world: the first without children, and the second with one or more children. The relevant measure of cost is then found by comparing expenditures between the two alternate states. To make this approach operational in an empirical analysis, we aggregate and compare similar households with and without children.[26]

Since parenting practices stem from a cultural foundation, they are likely to vary across regions and income classes. The latter may be particularly important because higher incomes permit increased expenditures on children. For this reason, we control for both factors in the empirical analysis below. We also distinguish between two-parent (married) and one-parent (single) households, since that factor also may lead to different child rearing practices.

To be sure, the available data do not permit a perfectly detailed analysis of individual practices and necessarily leave much variation unexplained. For this reason, we anticipate finding substantial variation around the central tendencies provided in the estimating equations. Our estimates provide child costs for the average household within the indicated income, region, and family structure categories.

As noted earlier, we use four years of CEX data. Observations from each yearly survey, which are reported in nominal dollars, are combined

with an adjustment made for changes in the average price level from the relevant year to the present, so that all costs are measured in 2011 dollars.[27] Across the four survey years from 2006 to 2009, we have a sample of 19,055 households for which all necessary data and information are available, with roughly 4,000−5,700 observations in each survey year. Of these households, 62% are married households, which include a husband and wife, and 38% are headed by single persons. Of the married households in our sample, 48% include at least one child and the rest do not include children. For single households, only 17% include at least one child.

Average income for the married households in the sample was $93,751, with a median value of $75,069. For single households, average household income was $41,643 and median household income was $31,992. Because these income values are averages over a four-year period, they are more akin to permanent than current incomes. Furthermore, these values apply to the entire household and thereby do not permit us to investigate how individual adult incomes influence expenditures on children.

In this sample, 94% of married households and 95% of single households live in urban areas. Moreover, the percentages of married and single households across the four census regions (Northeast, Midwest, South, and West) are evenly distributed, with 36% of the total in the South, just over 20% in both the Midwest and West, and just under 20% in the Northeast.

For each household in this sample, the CEX reports expenditure data for several broad categories, including the seven expenditure categories we analyze in this paper: Housing, Food, Transportation, Childcare and Education, Children's Clothing, Health Care, and Entertainment. We employ these data to determine the monetary cost of raising children in each of these categories.[28] A more detailed discussion of the data and variables used in the empirical analysis is contained in a Data Appendix available from the authors.

For household expenditures in each of these categories, we estimate the following regression equation:

$$E_i = a + bY_i + c_1K_1 + c_2K_2 + c_3K_3 + d\mathrm{CA}_i + \sum e_iX_{ij}$$

where E are category expenditures made by the ith household, Y_i is its income, K_j is one when there are j children in the ith household and zero otherwise, CA_i is the ChildAge measure derived by the U.S. Bureau of Labor Statistics (BLS) from the CEX data[29] and X_{ij} are dummy variables that reflect other household characteristics, specifically whether a household

lies in an urban or rural area, and also the region of the United States in which it is located.

For a childless household, the different values of K_j are all zero as is the variable indicating the age of children in the household. As a result, the coefficients on K_j, together with that for the associated CA_i variable, indicate the additional expenditures made on each cost category, E_i, when there are one, two, or three or more children in the household as compared with when there are none. The estimated values of the coefficients c and d thereby indicate the marginal category cost of including that number of children of a particular age distribution in the household.

We estimate this regression equation separately for five sub-samples of households by distinguishing between married and single households and for different income classes. Following the approach used in the USDA reports, the married household sample was divided into three equal sub-samples of 3,927 households each; the first sub-sample included all those with household income less than approximately \$56,000, while the second included those with income levels between approximately \$56,000 and \$101,000, and the third contained households with incomes greater than \$101,000. Then, to maintain as much comparability as possible, the first sub-sample for single households included all those with incomes below the same benchmark of roughly \$56,000; there were 5,710 households in that category, or 78% of all single households. The remaining 22% of single households with middle to high incomes were placed in the final sub-sample of 1,564 members.

THE ISSUE OF ENDOGENEITY AND THE QUANTITY–QUALITY TRADE-OFF

Before presenting our empirical results, we consider the issue of endogeneity, which can arise if the monetary cost of raising children substantially affects the number of children in the household. To be sure, a household's current number of children cannot be influenced by its current level of expenditures overall or in any category, and it is those expenditures that are measured by the data used here. When specific outlays are made, the number of children is already determined and not a decision variable. At the same time, the number of children may well have depended on anticipated outlays in the future which are correlated with current outlays.

As noted above, the full costs of raising children include both the time costs of the parents and the additional monetary costs of the household;

and there are reasons to believe that the former may be more important than the latter. There is evidence that two parents together, on average, provide nearly 21 hours of childcare per week,[30] which can be compared with a standard work week of 40 hours. Since monetary child costs rarely account for half of a household's total income, this comparison suggests the predominance of time costs.[31] In that case, it is unlikely that small changes in the monetary costs of child rearing would have an important impact on the decision to have more or fewer children.

However, there are various reasons why the number of children in a household and family income could be jointly determined. Not only does the number of children influence labor supply decisions particularly for women,[32] but also because expenditure patterns within the household are affected by its composition.[33] For these reasons, we include an income variable in our estimating equations as well as divide our overall sample according to income classes and marital status.

More relevant for our purposes is that where the monetary costs of raising children are greater, families may choose to have fewer children but spend more on each of them. In that case, there could be a quality–quantity trade-off, as proposed originally by Becker.[34] However, that factor is also accounted for in our regression equations, which measure not the average amounts spent per child but rather their marginal expenditures. Furthermore, the empirical evidence on this question is mixed. Consider the following three studies, which provide evidence on this trade-off.

The first study examines effects on child-related expenditures due to exogenous changes in family size. From his approach, the author finds that adding an additional sibling reduces prospects that older siblings will attend a private school or have their own bedroom.[35] These results are consistent with Becker's hypothesis that the quality and quantity of children are substitutes in household expenditures.

A second empirical study reaches a different conclusion. Looking at effects of third or more children on performance outcomes of prior children, the authors find that once instruments are included in the equations, there is "no evidence for negative consequences of increased sibship size on outcomes."[36] This paper suggests that the quality and quantity of children are neither complements nor substitutes.

Finally, a third study reaches a still different conclusion. It emphasizes the role played by a child's initial endowment as measured by his or her birth weight. The authors report "within family, the child with higher birth weight receives more investment in the form of higher quality

parenting … [so that] postnatal investments are greater for more highly endowed children."[37] They conclude:

> 1) early human capital and investments are complements in the production of late human capital, 2) parental investments reinforce differences, and 3) the degree of reinforcement increases with family size.[38]

Despite Becker's original supposition, whether the quality and quantity of children in a household are complements or substitutes remains an open question.

This issue is relevant for our empirical findings on the cost of children because improved quality is costly so that the shadow price of children increases with the quality level sought. It was for this reason primarily that we divided our sample of households into five sub-samples where each can be considered as representing a distinct quality level for children raised in those households. In effect, we are estimating the cost of raising children at, for example, an upper income and married quality standard. Child quality is then indicated by the income level and marital status of the household, and our cost estimates pertain to children raised under conditions where a particular quality level is sought.

If we could rely completely on this assumption, that would be the end of it. The number and age of children in a household would be exogenous and the resulting estimates would be unbiased. However, to the extent that quality levels differ within and not merely between our five sub-samples, then an element of endogeneity could appear. Households seeking higher quality child outcomes could spend more on their children than those less concerned with this matter so that the estimated coefficients pertaining to the number and age of children could be biased. That result could occur because the estimates are affected directly by an omitted variable indicating child quality.

While this problem may be present, it is attenuated by the income and marital status groupings within which the estimates are derived. Furthermore, for the expenditure categories that represent household collective goods, it seems unlikely that child quality objectives play a major role. Adults typically put their own interests first when major household decisions are made.[39] On the other hand, for the primary child-specific expenditure categories of Childcare and Education, and Children's Clothing, the endogeneity problem could be more pronounced.

Even if the endogeneity problem is present in these two expenditure categories, a critical question is the direction of the resulting bias. When the quality and quantity of children are substitutes, as Becker hypothesized,

then the estimated coefficients should be biased downward, while if they are complements, any bias goes in the opposite direction. However, as observed above, that matter remains an open question. These factors may be substitutes for one child but complements for larger numbers of children. What is apparent is that the direction of any remaining bias remains uncertain.

THE EMPIRICAL RESULTS: OVERVIEW

In the sections below, we estimate the regression equation specified above for seven leading household cost categories that appear in the CEX data set. For some categories, we get robust and statistically significant results, while for others, notably health care expenditures, we do not. Overall, the empirical results provide considerable insight into the contribution of children to household costs. Finally, we offer estimates of the aggregate monetary costs of raising children using the approach described above in comparison to estimates obtained from the two leading alternative approaches as well as with presumptive child support awards.

To be sure, the regression equation estimated below is a simple representation of the more complex process by which marginal child costs are actually determined. The equation accounts for the factors most likely to influence these costs such as income, child age, the number of children, and various demographic factors. In this paper, however, we do not fully unravel the complexities by which actual child costs are determined, or even estimate them with maximum econometric precision. Our data set is too limited for that. Instead, our analysis is intended to indicate which categories of marginal child costs are most significant and which do not greatly influence these costs. Another purpose is to compare our results with those obtained from the alternate methods often consulted in policy debates.

THE EMPIRICAL RESULTS: HOUSING

In most households, housing is the largest category of expenditures.[40] However, it is a household collective good that all members consume jointly. That fact, however, does not mean that these outlays should simply be divided among the household members to determine individual shares. Instead, as emphasized above and acknowledged in the most recent USDA

report, monetary costs are measured by how much greater are housing outlays in the presence of a child than they would be otherwise. Again, the relevant economic concept is the marginal cost of including a child or children in the household.[41]

The regression results for housing expenditures are presented in Table 1. Even though the sub-samples are limited by income levels, household income within each category still remains a highly significant factor affecting household expenditures on housing. The income coefficients are highly significant for each of the five sub-samples. Similarly, housing expenditures are significantly higher in urban than rural areas, and in the Northeast and West than in the Midwest and South. For comparison, we also present the results of estimating the regression equation for each cost category without the regional dummies, since regional distinctions frequently are not significant.

For our purposes, the most interesting results are those for the child indicator variables, K_j, for households with one, two, and three or more children, respectively (labeled here as Kids1, Kids2, and Kids3+). In nearly all cases, the coefficients for housing expenditures are highly statistically significant.

We pay particular attention to the size of the coefficients for the various child indicator variables. For low-income married households, those with one child spend on average between $970 and $995 per year more on housing than do comparable childless households; while those with two children spend on average between $1,439 and $1,522 more per year. In the case of comparable households with three or more children, their outlays rise slightly less to between $1,320 and $1,346, again as compared with childless households in the same sub-sample.

The marginal cost of the second child is the difference between the coefficients of Kids2 and Kids1; and therefore we also test the significance of the difference between these coefficients. As indicated, this difference is statistically significant for these households. They spend between $469 and $527 more on housing with two children than they had spent for only one. Note however, that the marginal housing cost of the second child is only about half of that spent with only one child.

Furthermore, for these households, there is no indication here that housing costs for three or more children are any greater on average than for two children. The coefficient for Kids3+ is somewhat smaller although the difference is not statistically significant. Our best estimate is that for these households, the marginal housing cost of children beyond the second is

Table 1. Housing Costs.

Income Group	Constant	Income	ChildAge	Number of Children			Urban	Northeast	Midwest	West	R^2	N
				Kids1	Kids2	Kids3 +						
Married households												
Low	−324.67	0.11**	14.51	969.81**	1,438.92**†	1,319.86**	1,284.67**	1,319.15**	226.79	1,061.27**	0.18	3,927
	(−1.25)	(22.25)	(0.52)	(5.57)	(8.05)	(6.61)	(6.48)	(7.62)	(1.49)	(7.00)		
	1,207.02**	0.11**	12.93	994.75**	1,521.92**†	1,345.54**					0.15	3,927
	(6.25)	(22.46)	(0.46)	(5.63)	(8.39)	(6.64)						
Middle	−948.38	0.10**	−129.94**	1,133.05**	1,852.55**†	2,162.91**†	2,096.85**	1,541.70**	778.98**	2,228.23**	0.08	3,927
	(−1.36)	(12.55)	(−3.20)	(4.14)	(6.85)	(6.31)	(5.30)	(5.45)	(3.05)	(8.58)		
	1,703.80**	0.10**	−132.44**	1,188.15**	1,920.14**†	2,282.15**†					0.06	3,927
	(2.81)	(12.78)	(−3.21)	(4.29)	(7.00)	(6.58)						
High	−1,979.81	0.07**	−247.39**	2,660.91**	4,110.62**†	4,493.77**†	4,639.86**	2,603.14**	239.63	2,650.34**	0.20	3,927
	(−1.62)	(28.08)	(−3.26)	(5.06)	(8.09)	(6.82)	(4.09)	(4.88)	(0.45)	(5.26)		
	3,495.86**	0.08**	−240.59**	2,757.54**	4,211.62**†	4,588.27**†					0.19	3,927
	(6.40)	(28.48)	(−3.14)	(5.21)	(8.24)	(6.91)						
Single households												
Low	352.71*	0.12**	−51.65	1,045.79**	1,402.35**	1,134.08**	655.88**	388.70**	−205.88**	490.09**	0.27	5,710
	(1.89)	(41.95)	(−0.86)	(3.83)	(5.25)	(3.44)	(3.86)	(3.46)	(−2.00)	(4.43)		
	1,039.01**	0.13**	−47.29	1,045.78**	1,398.59**	1,116.99**					0.26	5,710
	(11.43)	(42.42)	(−0.79)	(3.82)	(5.21)	(3.38)						
Middle/high	1,725.59	0.07**	411.10	−495.17	4,720.49**†	2,181.6	1,463.99	2,057.13**	−121.39	2,542.14**	0.18	1,564
	(1.12)	(15.09)	(1.18)	(−0.29)	(2.91)	(0.92)	(0.99)	(3.38)	(−0.19)	(4.60)		
	4,211.57**	0.07**	327.59	−148.13	4,952.19**†	2,794.18					0.16	1,564
	(8.74)	(15.16)	(0.93)	(−0.09)	(3.03)	(1.17)						

*Indicates 90% confidence.
**Indicates 95% confidence.
†Indicates 95% confidence in difference from Kids1 coefficient.

zero. Taken together, these findings suggest the presence of scale economies in housing, especially with a third child in the household.

The estimated parameters are a bit larger for low-income single households. With one child, housing costs are $1,046 more per year than childless, single households, which in turn is about 6% per year more than is spent by comparable married households. This suggests having one child increases housing expenditures for low-income single households by more than for married households with comparable incomes. In contrast, for middle/high-income single households, there is no evidence in these data that including a single child in the household increases average housing costs at all.

However, that is not the case for any additional children. Housing costs in single households are approximately $1,400 more per year for two children, which is about 5% less per year than in married households. While the coefficient for Kids2 is significantly different from zero, it is not significantly greater than that for Kids1, which means that we cannot reject the hypothesis that housing costs are the same in these households. As before, housing costs for three or more children are somewhat lower than for two children, at just over $1,100 per year, although this difference is again not statistically significant. Interestingly, the housing coefficient for Kids3+ is lower than that for Kids2 in three of the five sub-samples but even when higher in the other two sub-samples, the difference is not statistically significant. This finding suggests that housing costs for three or more children are often not greater than for two children. Overall and for all income classes, there appear to be substantial economies of scale in children's housing costs.

The estimated coefficients for both middle-income and high-income married households are understandably higher. For high-income married households, with incomes greater than approximately $101,000, housing costs with one child are $2,709 per year higher as compared with childless households. In the case of single households, with incomes greater than approximately $56,000, the results are somewhat different. The regression coefficients for these households with one child are not significant, which indicates that housing expenditures are generally about the same as in single households with no children.

A possible explanation for this result is that a common housing unit occupied by these households includes two bedrooms, which leads to the same housing costs regardless of how the second bedroom is used. With two children, however, additional housing costs in high-income single households are sharply higher, ranging from roughly $4,700 to $4,900 per

year. Furthermore, the coefficients for three or more children are not statistically significant and are not meaningfully different from those in single households with two children.

These equations also include the "ChildAge" variable derived by the BLS from underlying data in the CEX about the ages of children in each household. As noted earlier, it has values running from 0 to 7 where higher values indicate the presence of older children. Interestingly, this variable is not generally statistically significant in the housing regressions. For most households, housing costs of younger and older children are not widely different. Even where the coefficient is significant (for middle- and high-income married households), it is negative, implying that older children are slightly less costly, although the differences here are minimal.

There are other interesting features of these regression equations. Housing expenditures in urban areas are always higher than those in rural locales; and higher in the Northeast and West than in the Midwest and South. In addition, higher incomes, even within these limited income categories, lead generally to higher expenditures for housing. For married households, an additional dollar of income leads to 11 cents more spent on housing in low-income households, 10 cents more in middle-income households, and 8 cents more in high-income households. For single households, the results are comparable: 13 cents additional expenditures follow from each dollar of income for low-income households and 7 cents for high-income single households. As expected, increased incomes lead to greater expenditures on housing especially for low-income households.

THE EMPIRICAL RESULTS: FOOD

Like Housing, Food is consumed collectively in the household so the CEX data are reported only for total household outlays. The dependent variable in the estimating equations is household outlays for food, whether consumed within the home or outside.[42] The regression equations are again estimated for the five income groups, and the results are given in Table 2.

As with Housing, even within income groups, household income remains an important factor affecting these outlays, but with a smaller impact; less than 5 cents of an additional dollar of income is spent on food. Interestingly, the region of the country in which a household is located is not typically a significant explanatory variable, nor is the urban/rural divide except for high-income married households.

Table 2. Food Costs.

Income Group	Constant	Income	ChildAge	Number of Children			Urban	Northeast	Midwest	West	R^2	N
				Kids1	Kids2	Kids3 +						
Married households												
Low	1,358.19**	0.04**	65.30**	274.82**	473.73**†	792.94**†	163.73*	18.50	−245.58**	24.49	0.12	3,927
	(10.89)	(16.34)	(4.92)	(3.29)	(5.53)	(8.28)	(1.72)	(0.22)	(−3.36)	(0.34)		
	1,467.22**	0.04**	66.02**	289.35**	494.88**†	795.81**†‡					0.11	3,927
	(16.10)	(16.24)	(4.97)	(3.47)	(5.78)	(8.33)						
Middle	1,766.53**	0.02**	112.69**	−123.10	486.89**†	1,017.33**†‡	283.28*	163.08	−269.98**	188.78*	0.07	3,927
	(6.54)	(8.13)	(7.15)	(−1.16)	(4.63)	(7.64)	(1.84)	(1.48)	(−2.73)	(1.87)		
	2,019.85**	0.02**	112.85**	−99.21	499.21**†	1,029.29**†‡					0.06	3,927
	(8.68)	(8.16)	(7.13)	(−0.93)	(4.74)	(7.73)						
High	1,462.64**	0.02**	171.35**	34.80	741.37**†	1,376.55**†‡	1,168.77**	358.69**	−495.94**	114.78	0.12	3,927
	(3.65)	(18.47)	(6.87)	(0.20)	(4.45)	(6.37)	(3.14)	(2.05)	(−2.87)	(0.69)		
	2,518.46**	0.02**	171.05**	63.98	777.46**†	1,383.92**†‡					0.11	3,927
	(14.11)	(18.88)	(6.84)	(0.37)	(4.66)	(6.38)						
Single households												
Low	884.61**	0.04**	97.37**	112.21	565.52**†	973.76**†‡	146.22**	−47.84	−220.74**	95.38**	0.19	5,710
	(10.86)	(28.13)	(3.73)	(0.94)	(4.85)	(6.78)	(1.97)	(−0.98)	(−4.92)	(1.98)		
	959.68**	0.04**	100.75**	115.38	566.57**†	977.08**†‡					0.18	5,710
	(24.24)	(28.54)	(3.85)	(0.97)	(4.85)	(6.78)						
Middle/high	1,827.86**	0.01**	321.80**	−610.27	513.92†	1,548.30**†	315.47	415.57**	−206.50	359.19**	0.14	1,564
	(4.22)	(10.53)	(3.30)	(−1.27)	(1.13)	(2.34)	(0.76)	(2.44)	(−1.18)	(2.32)		
	2,269.36**	0.01**	311.78**	−563.81	537.17†	1,660.82**†‡					0.13	1,564
	(16.90)	(10.64)	(3.19)	(−1.18)	(1.18)	(2.50)						

*Indicates 90% confidence.
**Indicates 95% confidence.
†Indicates 95% confidence in difference from Kids1 coefficient.
‡Indicates 95% confidence in difference from Kids2 coefficient.

Unlike housing expenditures, the ChildAge variable is always a significant explanatory factor in food costs. With older children in the household, we find higher expenditures on food, which increases with income. Also important is the number of children in the household. Overall, the presence of children in a household increases expenditures on food. However, the increase for the first child is not significant for any group except for low-income married households. Except in that case, adding a single child to the household does not substantially increase average food costs. Beyond one child, however, the increased cost of food can be quite pronounced. In all five sub-samples, two or more children significantly increase household spending on food, and, unlike the case of housing expenditures, three or more children lead to further increases in expenditures on food relative to households with two children. Strikingly, the marginal food cost per child beyond the second does not appear to decline with the number of children in the household.

For example, in low-income married households, additional food costs are approximately $484 per year for two children, increasing to approximately $795 per year for three or more children. The increases are even higher in low-income single households, $566 and $975 per year, respectively; although high-income married households see bigger increases in food expenditures for two or more children than comparable single households. Apparently, regardless of marital status or income level, food budgets are minimally affected by the presence of a first child but are affected substantially by the presence of a second child, and again for three or more children.

THE EMPIRICAL RESULTS: TRANSPORTATION

Transportation services are consumed both individually and collectively within the household. For a given trip, automobile costs are largely the same regardless of the number of passengers. However, it could be that many trips would not be made in the absence of children.

The available data provide total household expenditures on transportation, and comparable regression equations employing these data are provided in Table 3. As before, household income directly affects transportation expenditures in all categories. Among low-income married households, 7 cents from each additional dollar of income, on average, is spent on transportation as compared to 5 cents of each additional dollar

Table 3. Transportation Costs.

Income Group	Constant	Income	ChildAge	Number of Children			Urban	Northeast	Midwest	West	R^2	N
				Kids1	Kids2	Kids3 +						
Married households												
Low	277.49	0.07**	38.68	260.11	168.06	376.81**	−293.93	−133.70	−225.77	116.30	0.07	3,927
	(1.14)	(16.11)	(1.49)	(1.59)	(1.00)	(2.01)	(−1.58)	(−0.82)	(−1.58)	(0.82)		
	−5.10	0.07**	39.68	279.58*	188.46	395.86**					0.07	3,927
	(−0.03)	(15.96)	(1.53)	(1.72)	(1.13)	(2.12)						
Middle	1,964.23**	0.05**	100.54**	−203.00	153.70	−66.41	−312.61	−317.18	−458.29	−282.14	0.01	3,927
	(2.58)	(5.84)	(2.26)	(−0.68)	(0.52)	(−0.18)	(−0.72)	(−1.02)	(−1.64)	(−0.99)		
	1,504.22**	0.05**	101.16**	−190.56	151.57	−71.77					0.01	3,927
	(2.30)	(5.76)	(2.27)	(−0.64)	(0.51)	(−0.19)						
High	3,648.72**	0.02**	263.46**	554.37	−507.97	248.01	−208.80	−364.37	127.35	707.39	0.02	3,927
	(2.78)	(8.69)	(3.23)	(0.98)	(−0.93)	(0.35)	(−0.17)	(−0.64)	(0.22)	(1.31)		
	3,603.47**	0.02**	262.97**	548.48	−484.18	274.88					0.02	3,927
	(6.19)	(8.66)	(3.22)	(0.97)	(−0.89)	(0.39)						
Single households												
Low	422.61**	0.05**	63.85	84.42	102.63	52.47	−275.32**	17.73	74.12	49.38	0.10	5,710
	(2.99)	(24.30)	(1.41)	(0.41)	(0.51)	(0.21)	(−2.14)	(0.21)	(0.95)	(0.59)		
	204.29**	0.05**	64.67	72.06	94.96	37.15					0.10	5,710
	(2.98)	(24.22)	(1.43)	(0.35)	(0.47)	(0.15)						
Middle/high	−363.08	0.05**	387.24	−812.65	−232.03	640.23	187.18	25.92	−113.85	100.14	0.09	1,564
	(−0.26)	(11.65)	(1.24)	(−0.53)	(−0.16)	(0.30)	(0.14)	(0.05)	(−0.20)	(0.20)		
	−175.47	0.05**	380.43	−772.68	−213.13	691.17					0.09	1,564
	(−0.41)	(11.70)	(1.22)	(−0.51)	(−0.15)	(0.33)						

*Indicates 90% confidence.
**Indicates 95% confidence.

among low-income single households. As income levels increase, for both types of households, these amounts decline.

As with Food, but somewhat surprisingly for Transportation, the urban/rural divide does not appear to have a significant effect on transportation costs except in the case of low-income single households. In these circumstances, expenditures made in rural areas are higher, perhaps due to a relative lack of lower-cost public transportation options in rural areas.

Strikingly, for this category of expenditures, the number of children in the household is never a significant factor explaining expenditures, with the sole exception of low-income married households with three or more children. Apparently, only in that case does the number of children lead to higher transportations costs, by approximately $386 per year. In all other circumstances, our regression estimates give no indication that the presence of children leads to increased transportation costs independent of the age of children in a household. However, the ChildAge variable is only significant in middle-income to high-income married households, but then merely by $101 and $263 per year, respectively.

THE EMPIRICAL RESULTS: CHILDCARE AND EDUCATION

Unlike the previous categories of household expenditures, outlays on Childcare and Education are made specifically for children. We therefore expect them to be more closely related to the presence of children in the household.

Because few if any outlays in this category are made in households without children, there are a large number of zero values for the dependent variable. This clustering of observations at a single value creates a well-known statistical problem with a standard econometric specification available to account for it, which is termed a Tobit regression.[43] Therefore, we estimated the regression equations for expenditures on Childcare and Education using Tobit regressions rather than linear (ordinary least squares) regressions.[44] Table 4 reports the results.

As reported there, high-income households, whether married or single, spend more on their children for these services than for Food. Low-income married households spend roughly an additional $1,220–$1,450 per year on childcare and education costs. Low-income single households spend slightly more at $1,740–$1,940 per year. High-income households spend

Table 4. Childcare and Education Costs (Tobit).

Income Group	Constant	Income	ChildAge	Number of Children			Urban	Northeast	Midwest	West	R^2	N
				Kids1	Kids2	Kids3 +						
Married households												
Low	−2,608.81**	0.02**	−22.00	1,229.26**	1,448.06**†	1,386.71**	−70.31	−84.36	126.57*	−94.05	0.06	590
	(−15.68)	(8.45)	(−1.56)	(13.69)	(15.86)	(14.24)	(−0.75)	(−0.98)	(1.78)	(−1.33)		
	−2,672.41**	0.02**	−22.14	1,219.46**	1,432.35**†	1,384.31**†					0.06	590
	(−18.55)	(8.47)	(−1.57)	(13.61)	(15.76)	(14.26)						
Middle	−4,357.33**	0.02**	−75.38**	2,520.83**	2,806.23**†	2,917.45**†	−148.73	−396.16**	81.61	58.18	0.04	1,061
	(−12.98)	(6.41)	(−3.65)	(18.44)	(20.61)	(18.79)	(−0.86)	(−3.04)	(0.73)	(0.52)		
	−4,488.61**	0.02**	−76.04**	2,511.63**	2,800.39**†	2,933.18**†					0.04	1,061
	(−15.09)	(6.31)	(−3.68)	(18.41)	(20.60)	(18.90)						
High	−8,660.28**	0.01**	−95.42**	5,524.43**	6,531.47**†	7,213.56**†‡	594.09	−223.52	392.20	−31.16	0.03	1,427
	(−11.85)	(8.43)	(−2.11)	(18.11)	(22.12)	(20.81)	(0.91)	(−0.80)	(1.44)	(−0.12)		
	−8,032.26**	0.01**	−92.87**	5,519.25**	6,524.38**†	7,222.10**†‡					0.03	1,427
	(−22.32)	(8.37)	(−2.05)	(18.12)	(22.14)	(20.84)						
Single households												
Low	−1,935.65**	0.01**	−186.29**	1,758.78**	1,933.26**†	1,763.63**	−136.85	−92.39	50.46	106.64*	0.08	488
	(−14.15)	(7.97)	(−8.15)	(15.50)	(16.84)	(12.90)	(−1.39)	(−1.33)	(0.82)	(1.69)		
	−2,040.16**	0.01**	−184.33**	1,744.02**	1,921.11**†	1,761.58**					0.08	488
	(−19.98)	(7.91)	(−8.08)	(15.43)	(16.78)	(12.92)						
Middle/high	−4,522.32**	0.01**	−478.05**	5,314.45**	7,178.30**†	6,848.68**†	−466.28	−433.51	−239.35	−481.64	0.06	217
	(−4.90)	(2.50)	(−3.39)	(7.35)	(10.12)	(6.96)	(−0.55)	(−1.17)	(−0.64)	(−1.45)		
	−5,216.91**	0.01**	−459.79**	5,255.77**	7,117.20**†	6,737.58**†					0.06	217
	(−12.24)	(2.38)	(−3.29)	(7.35)	(10.10)	(6.90)						

*Indicates 90% confidence.
**Indicates 95% confidence.
†Indicates 95% confidence in difference from Kids1 coefficient.
‡Indicates 95% confidence in difference from Kids2 coefficient.

even more: approximately \$5,520–\$7,220 in married households and \$5,255–\$7,180 in single households. A consistent theme in these findings is that household outlays on Childcare and Education represent a major share of total child costs.

Although outlays to cover childcare and educational expenses are higher in higher income categories, they do not increase substantially with increased incomes within each sub-sample. Although income remains a significant factor, a dollar of additional income leads to only an additional cent or two in childcare and educational spending. Similarly, neither the urban/rural divide nor the geographic region has a significant effect on these expenditures.

On the other hand, adding more children to a household within each sub-sample leads to significantly greater expenditures for these services, but only up through a second child. Strikingly, there is no statistically significant support for finding that these outlays continue to increase in the presence of a third or more children. For low-income households, whether married or single, outlays with three or more children are apparently lower than those with two children. A possible explanation is that older children in larger, low-income families can look after their younger siblings, resulting in lower monetary childcare or schooling costs. In middle- and high-income households, the estimated coefficients for three or more children are higher than for two children, but the difference between coefficients is statistically significant only in high-income married households.

An important feature of the results for Childcare and Education is the finding that older children have lower costs, implying that these outlays are mainly for childcare. The ChildAge coefficients are always negative and statistically significant everywhere except in low-income married households. For these expenditures, older children lead on average to lower costs.

THE EMPIRICAL RESULTS: CHILDREN'S CLOTHING

The next category of children's expenditures is that for Children's Clothing. Again, since these outlays are used specifically by children, the relevant observations are generally zero for childless households. Since those observations are necessarily zero, there is a cluster of observations at that value, which again requires the Tobit correction. These results are presented in Table 5.

Table 5. Children's Clothing Costs (Tobit).

Income Group	Constant	Income	ChildAge	Number of Children			Urban	Northeast	Midwest	West	R^2	N
				Kids1	Kids2	Kids3 +						
Married households												
Low	−381.13**	0.00**	−11.32**	325.48**	407.22**†	478.58**†‡	−27.34	−11.00	14.85	−9.44	0.05	1,348
	(−13.65)	(5.93)	(−3.85)	(18.75)	(23.10)	(24.88)	(−1.41)	(−0.63)	(0.99)	(−0.65)		
	−405.32**	0.00**	−11.34**	324.23**	404.88**†	478.08**†‡					0.05	1,348
	(−18.41)	(5.93)	(−3.85)	(18.72)	(23.04)	(24.95)						
Middle	−396.23**	0.00**	−11.66**	339.65**	436.27**†	540.47**†‡	−35.40	−6.82	41.99**	22.43	0.03	1,698
	(−7.86)	(3.13)	(−3.75)	(17.03)	(22.23)	(22.95)	(−1.28)	(−0.34)	(2.33)	(1.23)		
	−412.78**	0.00**	−11.71**	337.21**	435.61**†	541.71**†‡					0.03	1,698
	(−9.42)	(3.10)	(−3.77)	(16.93)	(22.20)	(23.05)						
High	−389.92**	0.00**	−19.55**	455.17**	623.79**†	750.01**†‡	−26.29	−5.20	13.51	24.23	0.03	1,905
	(−6.42)	(2.92)	(−4.86)	(17.16)	(24.52)	(24.13)	(−0.47)	(−0.20)	(0.53)	(1.01)		
	−405.49**	0.00**	−19.51**	454.21**	623.38**†	750.29**†‡					0.03	1,905
	(−14.27)	(2.86)	(−4.86)	(17.14)	(24.56)	(24.15)						
Single households												
Low	−387.45**	0.00**	−28.40**	428.21**	493.65**†	538.00†	−62.76**	0.78	−1.67	0.86	0.07	940
	(−14.06)	(7.36)	(−4.86)	(15.30)	(17.81)	(16.10)	(−2.82)	(0.05)	(−0.12)	(0.06)		
	−445.85**	0.00**	−28.09**	427.04**	492.90**†	535.18**†					0.07	940
	(−24.01)	(7.25)	(−4.80)	(15.24)	(17.76)	(16.01)						
Middle/high	−460.27**	0.00	−33.92*	561.71**	872.04**†	889.19**†	−43.43	6.78	50.92	−67.27*	0.06	308
	(−4.31)	(0.40)	(−1.86)	(6.12)	(9.94)	(7.21)	(−0.44)	(0.16)	(1.20)	(−1.69)		
	−505.25**	0.00	−29.05	534.79**	856.58**†	859.65**†					0.06	308
	(−11.73)	(0.23)	(−1.60)	(5.87)	(9.79)	(6.99)						

*Indicates 90% confidence.
**Indicates 95% confidence.
†Indicates 95% confidence in difference from Kids1 coefficient.
‡Indicates 95% confidence in difference from Kids2 coefficient.

Again, we see that income, even within each sub-sample, is statistically significant in all but one case (high-income single households) but is effectively zero, so that an additional dollar of income has a minimal impact on expenditures. Similarly, neither the urban/rural distinction nor regional differences appear as important causative factors. In contrast, the ChildAge variable is always negative, and is significant in all but one case (high-income single households), indicating that greater outlays for clothing are made generally for younger children.

More relevant for our purposes are the estimated coefficients for the three-child indicator variables. In all cases, they indicate the anticipated positive and significant values. Of interest is the finding that, at similar income levels, outlays on Children's Clothing are generally higher in single than in married households. At low-income levels, married households spend an additional \$325, \$407, and \$479 per year on clothing for one, two, and three-plus children, respectively; comparable single households spend \$428, \$493, and \$538 per year, or between 12% and 32% more. At higher incomes, married households spend considerably more on children's clothing, ranging from \$454 per year for one child to \$750 per year for three or more children. High-income single families spend slightly more: \$562 per year for one child to \$889 per year for three or more children. In married households at all income levels, spending on children's clothing increases significantly from one to two children, as well as from two to three or more children. In single households, however, this difference is significant only between one and two children, but not for any additional children.

THE EMPIRICAL RESULTS: HEALTH CARE

Initially, we estimated similar Tobit equations for household outlays on health care, but the results were both different and disappointing. Few of the coefficients for the presence of children in the household were significant and many were negative. An important reason for these results is that, unlike other expenditure categories, households pay directly only a minor share of their health care costs. For high-income households, employers pay the largest share of these outlays in the form of health insurance benefits, which are not included in taxable earnings. In contrast, for low-income

households, government agencies and charitable organizations often provide many health care services at minimal direct cost.

Furthermore, unlike other expenditure categories, these costs are strongly influenced by the age of the adults in the household. Older adults spend far more on health care than younger adults or children, both in total and out-of-pocket, which is another factor that confounds the empirical analysis. Because many households without children include older adults, we constructed a more limited sample of households designed to be more comparable to those that include children. This sub-sample is limited to households without children but where the older adult is less than 60 years of age.

Table 6 summarizes some relevant data on health care expenditures by the households in our CEX sample. As indicated there, households with children spend $1,053 per year on average on health care, which is less than the amount spent by households without children of $1,173 but greater than the $805 per year spent by childless households where the primary adult is under age 60. Moreover, this latter difference (between $1,053 and $805) is statistically significant at the conventional 5% confidence level. Interestingly, households with children spend significantly more than childless households only in single households.

Another distinctive feature about health care costs is that they are highly skewed. Most households make out-of-pocket payments of less than $200 per year; these households represent about 60% of the total for both those with and without children. At the other end of the spectrum, 14% of all households, whether with or without children, spend more than $1,000 per year. Households apparently treat health care costs differently than other types of expenditures. Not only they are closely related to the age of the adults in the household but they also depend heavily on external factors, which accounts for their highly skewed distribution.

Although these data suggest that single households with children may spend more on health care than do comparable households without children, this observation offers little insight on the amounts actually spent on children. For high-income single households, the average yearly difference between households with and without children is $258 (i.e., $917 per year less $659 per year); of which $159 (61%) are higher out-of-pocket costs and $99 are higher average insurance premiums. However, our estimating equations yield no indication that these average differences can be linked to the presence or number of children.

Table 6. Summary of Health Care Costs.

Panel A: Composition of Health Care Costs

($avg/Year)	Married			Single		
	Low	Middle	High	Low	Middle/High	Total
With children						
Observations	1,632	1,913	2,068	984	282	6,879
Average age of reference person	37	40	43	37	44	40
Insurance premiums	$339	$661	$872	$176	$432	$569
Out-of-pocket costs	$258	$528	$774	$162	$484	$484
Total health care costs	$596	$1,190	$1,646	$337	$917	$1,053
Without children						
All households						
Observations	2,295	2,014	1,859	4,726	1,282	12,176
Average age of ref. person	61	54	53	51	47	53
Insurance premiums	$962	$958	$1,033	$333	$427	$672
Out-of-pocket costs	$587	$733	$947	$208	$415	$501
Total health care costs	$1,549	$1,691	$1,980	$542	$842	$1,173
Households with ref. person <60 years old						
Observations	914	1,272	1,344	2,965	1,044	7,539
Average age of ref. person	45	46	48	38	42	42
Insurance premiums	$406	$687	$810	$163	$334	$420
Out-of-pocket costs	$387**	$579	$798	$135	$325**	$385**
Total health care costs	$793**	$1,266	$1,608	$298*	$659**	$805**

Panel B: Distribution of Out-of-Pocket Health Care Costs (Observations by Income Group)

	Married			Single		
	Low	Middle	High	Low	High	Total
With children						
$0/year	777	555	357	545	86	2,320
	48%	29%	17%	55%	30%	34%
<$100/year	276	327	303	179	51	1,136
	17%	17%	15%	18%	18%	17%
$100–$200/year	133	158	203	73	22	589
	8%	8%	10%	7%	8%	9%
$200–$500/year	200	321	383	101	59	1,064
	12%	17%	19%	10%	21%	15%
$500–$1,000/year	123	264	360	46	28	821
	8%	14%	17%	5%	10%	12%
>$1,000/year	123	288	462	40	36	949
	8%	15%	22%	4%	13%	14%
Without children						
$0/year	594	417	300	2,146	496	3,953
	26%	21%	16%	45%	39%	32%
<$100/year	314	300	239	974	237	2,064
	14%	15%	13%	21%	18%	17%

Table 6. (*Continued*)

Panel B: Distribution of Out-of-Pocket Health Care Costs (Observations by Income Group)

	Married			Single		
	Low	Middle	High	Low	High	Total
$100–$200/year	235	192	174	453	124	1,178
	10%	10%	9%	10%	10%	10%
$200–$500/year	436	371	363	606	185	1,961
	19%	18%	20%	13%	14%	16%
$500–$1,000/year	324	301	295	295	105	1,320
	14%	15%	16%	6%	8%	11%
>$1,000/year	392	433	488	252	135	1,700
	17%	21%	26%	5%	11%	14%

*Indicates statistically differences in average cost with vs. without children with 90% confidence.
**Indicates statistically differences in average cost with vs. without children with 95% confidence.

Table 7. Summary of Entertainment Costs.

	Married			Single		
	Low	Middle	High	Low	Middle/High	Total
Number of observations						
With children	1,632	1,913	2,068	984	282	6,879
Without children	2,295	2,014	1,859	4,726	1,282	12,176
Total	3,927	3,927	3,927	5,710	1,564	19,055
Entertainment expenditures ($avg/year)						
With children	$445	$1,019	$2,050	$369	$1,283	$1,111
Without children	$487	$935	$1,807	$346	$914	$753

THE EMPIRICAL RESULTS: ENTERTAINMENT

Our final category of household expenditures for children refers to Entertainment. Table 7 summarizes entertainment spending by households with and without children in each of our five sub-samples. The data indicate that households with children spend substantially more on average on entertainment than those without children. Across all households, households with children spend $1,111 per year on entertainment as compared with $753, or 48% less, for households without children. Furthermore, such differences persist across all household types except for low-income

married households. At high-income levels, married households with children spend $243 (13%) more per year, and single households with children spend $369 (40%) more per year. In relative terms, therefore, single households spend more on entertainment in the presence of children than do comparable married households. These differences are statistically significant.

As with other expenditure categories, we estimated regression equations for entertainment expenditures in the same form as those reported earlier. Table 8 reports the results, which indicate that neither the presence, number, or age of children in a household significantly explain its entertainment outlays. For single households, none of the estimated coefficients for the number of children is statistically significant. For married households, the estimated coefficients are both positive and significant for middle-income households with two children and for high-income households with three or more children. The corresponding cost estimates are approximately $202 and $468, respectively. There is no indication in these results that low-income married or single households bear any entertainment costs for their children, or that having one child results in additional entertainment costs in any of the sub-samples. Strikingly, only for middle/high-income single households are the ChildAge variables positive and significant.

AGGREGATE MONETARY CHILD COSTS

The CEX data set also includes expenditures used exclusively by adults such as Adult Clothing and Beverages as well as for miscellaneous expenditures such as those on Personal Care Items and Reading Material. Presumably, increased outlays on children lead to lower outlays in such categories as well as to lower savings and taxes.

In the discussion above, we considered seven categories of expenditures (i.e., Housing, Food, Transportation, Childcare and Education, Children's Clothing, Health Care, and Entertainment), which together accounted for between 72% and 82% of total household expenditures in each of the five sub-samples:

Married households	
Low income	82%
Medium income	79%
High income	75%
Single households	
Low/medium income	79%
High income	72%

Table 8. Entertainment Costs.

Income Group	Constant	Income	ChildAge	Number of Children			Urban	Northeast	Midwest	West	R^2	N
				Kids1	Kids2	Kids3+						
Married households												
Low	105.13**	0.01**	−14.68**	−49.67	−0.55	−13.15	−68.30*	48.81	47.94*	4.44	0.05	3,927
	(2.13)	(13.03)	(−2.79)	(−1.50)	(−0.02)	(−0.35)	(−1.82)	(1.49)	(1.65)	(0.15)		
	60.21*	0.01**	−14.65**	−54.82*	−6.28	−17.88					0.04	3,927
	(1.67)	(13.19)	(−2.79)	(−1.66)	(−0.19)	(−0.47)						
Middle	120.60	0.01**	3.70	−65.84	202.29**†	89.93	−140.68	118.65	187.17**	171.35**	0.01	3,927
	(0.66)	(5.41)	(0.34)	(−0.91)	(2.82)	(0.99)	(−1.34)	(1.58)	(2.77)	(2.49)		
	89.90	0.01**	3.64	−70.85	202.76**†	94.77					0.01	3,927
	(0.57)	(5.44)	(0.34)	(−0.98)	(2.83)	(1.05)						
High	−391.90	0.01**	28.42	105.91	95.72	461.27**†‡	468.40*	90.51	277.88**	229.22*	0.05	3,927
	(−1.30)	(14.17)	(1.52)	(0.82)	(0.76)	(2.84)	(1.67)	(0.69)	(2.14)	(1.85)		
	189.08	0.01**	29.70	109.45	98.18	474.37**†‡					0.05	3,927
	(1.41)	(14.26)	(1.58)	(0.84)	(0.79)	(2.92)						
Single households												
Low	61.64	0.01**	−0.94	17.05	2.80	−41.25	−49.56	27.36	51.61**	44.40*	0.06	5,710
	(1.59)	(18.43)	(−0.08)	(0.30)	(0.05)	(−0.60)	(−1.41)	(1.18)	(2.42)	(1.94)		
	44.06**	0.01**	−0.85	11.67	−0.50	−46.35					0.06	5,710
	(2.35)	(18.36)	(−0.07)	(0.21)	(−0.01)	(−0.68)						
Middle/high	64.14	0.00**	116.78**	−428.30	308.48†	21.08	277.87	153.46	119.36	233.05**	0.06	1,564
	(0.26)	(6.76)	(2.06)	(−1.54)	(1.17)	(0.05)	(1.16)	(1.56)	(1.18)	(2.60)		
	453.13**	0.00**	108.66*	−398.61	331.49†	64.93					0.05	1,564
	(5.84)	(6.83)	(1.92)	(−1.44)	(1.26)	(0.17)						

*Indicates 90% confidence.
**Indicates 95% confidence.
†Indicates 95% confidence in difference from Kids1 coefficient.
‡Indicates 95% confidence in difference from Kids2 coefficient.

These percentages do not include savings, taxes paid or any changes in the value of household assets, all of which are included in the reported measures of household income.

Although the regression equations reported above provide estimated child costs for the various expenditure categories, aggregating these values requires deciding on the statistical significance of the coefficients to be included. Even when a regression coefficient is not significantly different from zero at conventional confidence levels, the coefficient still offers the best available estimate of the underlying parameter. In addition, the fact that one cannot reject at conventional confidence levels the null hypotheses that the true underlying coefficient equals zero does not mean that the actual coefficient is zero.

Coefficients are statistically significant when the probability of rejecting the null hypothesis (commonly that the true value equals zero) is 5% or less. This procedure minimizes the Type I error of rejecting this null hypothesis when it is actually true; or in other words, of finding a positive or negative effect of the relevant variable when it is actually absent.

Relying exclusively on significance tests, however, means ignoring Type II errors, which are made by accepting the null hypothesis when it is false. In the context of these equations, Type II errors are present when we conclude that particular factors do not contribute to child costs when in fact they do. Because we are also concerned with Type II errors, and do not wish to understate child costs, we do not simply exclude all non-significant coefficients in determining total costs.

Since there are no obvious criteria by which to include or reject non-significant coefficients, we arbitrarily use three alternate values of the relevant *t*-statistic: 0.5, 1.0, and 2.0. Table 9 provides three estimates of total monetary child costs using the alternate *t* values for each of our five sub-samples and for one, two, and three-plus children in the household. These values do not include health care costs since our data are too limited to provide reliable results for this class of expenditures. However, those outlays account for only between 3% and 5% of total household expenditures.[45]

As expected, total child costs are greater with lower *t* values, but not that much greater. The greatest difference appears for single households using a *t* value of 2.0 rather than 1.0. Apparently, the relevant coefficients for single households are estimated with less accuracy than for married households so that estimated costs are substantially greater when a *t* value of 1.0 is used.

There are various regularities which appear in these results. The first is that single households tend to bear slightly higher costs of raising children than do married households. However, the differences are small. Overall,

Table 9. Total Monetary Child Costs by Category, Income Group, and Number of Children ($/Year).

	Number of Children								
	1	2	3+	1	2	3+	1	2	3+
Married households									
Income group	Low			Middle			High		
Income range	≤$55,859			$55,864–$101,113			>$101,120		
Average income	$36,726			$76,307			$168,221		
$t \geq 0.5$	$3,421	$4,291	$4,745	$4,749	$6,663	$7,475	$11,138	$13,706	$15,957
$t \geq 1.0$	$3,376	$4,248	$4,697	$4,749	$6,509	$7,385	$10,478	$13,611	$15,957
$t \geq 2.0$	$2,998	$3,964	$4,570	$4,749	$6,509	$7,385	$10,365	$13,512	$15,855
Single households									
Income group	Low				Middle/High				
Income range	≤$55,837				≥$55,865				
Average income	$27,207				$94,344				
$t \geq 0.5$	$3,969	$5,070	$5,011		$11,409	$18,337	$17,137		
$t \geq 1.0$	$3,857	$4,967	$5,011		$11,409	$18,337	$14,955		
$t \geq 2.0$	$3,610	$4,741	$4,773		$7,838	$14,453	$11,296		

Notes: Based on estimated category costs reported in Tables 1–8, excluding health care costs.

there is no indication here that child costs for single households are lower than for married households.

A second important finding is the appearance of economies of scale in raising children.[46] In none of the sub-samples is the cost of raising two children twice the cost of raising the first child. Furthermore, the cost of raising three or more children is often not much greater than the cost of raising two children. Indeed, for the high income, single household sub-sample, we report slightly lower costs with three-plus children, although that difference is not likely to be statistically significant.

Two factors might explain this result. In the case of expenditures on Childcare and Education, the presence of three or more children in the household may indicate sufficient age differences so that an older child can care for a younger sibling. As expected, this result is stronger in low-income households. In regard to housing costs, there may be more opportunity for shared bedrooms with more children in the household. These considerations suggest that determining the costs of a second or third child by simply multiplying the first child's costs by the number of children in the household leads to greatly inflated child costs.

To place our figures in perspective, we also provide published estimates obtained from the two alternate approaches mentioned earlier. The first is the income equivalence approach, which aims to compare household utility levels with and without children; while the second is the USDA approach, which largely apportions expenditure data according to the number of people in the household. Both alternatives also exclude health care costs. Table 10 shows the child costs estimated under each alternative along with our highest estimates based on t values of 0.5 or more.

As reported in Table 10, our estimates of the costs of raising children are much lower than those offered by the two alternatives. The substantial differences found between our estimates and the two other methods require explanation. Critically, the differences arise not from the underlying data since we all use the same source. Instead, they result from more basic methodological differences.

As noted above, income equivalence methods aim to include non-pecuniary opportunity costs in addition to monetary outlays as part of the cost of raising children. Apparently, estimated non-pecuniary opportunity costs account for a substantial share of overall child costs under that method. Furthermore, the models used to impute household utility levels offer merely rough approximations, which cannot accurately discern differences between households with and without children. In contrast, the

Table 10. Comparison of Total Monetary Child Costs by Analytical Method ($/Year).

		Number of Children								
	Married households	1	2	3+	1	2	3+	1	2	3+
	Income group	Low			Middle			High		
	Income range	≤$55,859			$55,864–$101,113			≥$101,120		
	Average income	$36,726			$76,307			$168,221		
[1]	Comanor et al.	$3,421	$4,291	$4,745	$4,749	$6,663	$7,475	$11,138	$13,706	$15,957
[2]	Center for Policy Research	$6,504	$10,008	$12,216	$10,740	$16,368	$19,764	$16,872	$25,620	$30,828
[3]	USDA	$10,402	$16,643	$19,473	$14,479	$23,167	$27,105	$24,715	$39,543	$46,266

		Single Households					
	Income group	Low			Middle/High		
	Income range	≤$55,837			≥$55,865		
	Average income	$27,207			$94,344		
[1]	Comanor et al.	$3,969	$5,070	$5,011	$11,409	$18,337	$17,137
[2]	Center for Policy Research	*N*/*R*	*N*/*R*	*N*/*R*	*N*/*R*	*N*/*R*	*N*/*R*
[3]	USDA	$10,025	$15,310	$17,593	$21,560	$32,925	$37,836

Sources and notes:
[1] Denotes estimates reported in Table 9 for all coefficients with *t*-statistics ≥0.5.
[2] CPR, "Economic Basis for Updating a Child Support Schedule of Georgia," Appendix B, April 2011.
Betson-Rothbarth estimates at average income levels indicated; excludes childcare and private tuition.
[3] Lino, USDA, May 2011, excluding health care costs for comparability.

empirical findings presented here are limited to monetary costs, which can be estimated with reasonable degrees of assurance.

As between this study and the USDA report, the essential difference is that the latter aims to find individualized cost figures for particular members of the household. As such, its cost estimates are fundamentally per capita cost values even when costs are not the same for all members of the household. In contrast, the cost values offered here rest on a different principle. Instead, we determine the additional cost to the household of including a child or children among its members. These costs apply to the household rather than to an individual member. They reflect the additional cost of producing the household good of raising children.

CHILD COSTS AND CHILD SUPPORT PRESUMPTIVE AMOUNTS

To determine the policy implications of our revised child cost estimates, we compare them with the presumptive child support amounts indicated in the Guidelines of four states: Maryland, Georgia, Colorado, and Ohio. These states are merely illustrative. The first three states rely on child costs as measured by income equivalence methods, while the fourth relies on adjusted USDA estimates.

Maryland is typical of these states; its support guidelines are well described in a recent state report. Parental expenditures on children are measured by Rothbarth methods (Econometrica, Inc., 2013, pp. 3–12). The approach used by Colorado is similar (State of Colorado, 2014) with differences between them largely resulting from the age of the data employed and state income tax rates. As indicated in Table 11, the presumptive amounts set in these states are roughly similar. In contrast to Maryland and Colorado, Georgia's guidelines rest on averages of the two variants of the income equivalence method currently in use. The first relies on the assumption that household well-being can be measured by the percentage of household expenditures for food and the second for adult clothing (Policy Studies, Inc., 2005, p. 10; see also Center for Policy Research, 2010). Our final example is Ohio where the guidelines rely on "USDA data for estimating actual expenditures," but then adjusted for income levels (Ohio Department of Job and Family Services, 2013, pp. 5, 13).

For each of these illustrative states, we derive presumptive child support awards under the assumption that the entire household income is earned by the non-custodial parent while at the same time all of the custodial time for a

Table 11. Illustrative Child Support Presumptive Amounts, 2014 ($/Year).

	Maryland	Georgia	Colorado	Ohio
(I) Low income	$6,840	$7,548	$6,492	$6,330
$36,726 or $3,061/mo.				
Comanor et al.	$3,421	$3,421	$3,421	$3,421
Center for Policy Research	$6,504	$6,504	$6,504	$6,504
USDA	$10,402	$10,402	$10,402	$10,402
(II) Middle income	$12,192	$12,180	$11,388	$9,473
$76,307 or $6,359/mo.				
Comanor et al.	$4,749	$4,749	$4,749	$4,749
Center for Policy Research	$10,740	$10,740	$10,740	$10,740
USDA	$14,479	$14,479	$14,479	$14,479
(III) High income	$21,786	$18,744	$18,072	$15,218
$168,221 or $14,018/mo.				
Comanor et al.	$11,138	$11,138	$11,138	$11,138
Center for Policy Research	$16,872	$16,872	$16,872	$16,872
USDA	$24,715	$24,715	$24,715	$24,715

Assumptions: 100% income to NCP; 100% time to CP; 1 child. See also notes to Table 10.

single child lies with the custodial parent. We make these assumptions to direct attention to the relationship between estimated child costs and award amounts.

The resulting amounts are provided in Table 11. As indicated there, support amounts in Maryland and Georgia are always greater than the corresponding Rothbarth estimates, while in Colorado they lie above these estimates for only medium- and high-income households. In Ohio, on the other hand, award amounts lie below the comparable USDA estimates and also those derived from income equivalence methods. Note that Ohio's support amounts lie below those reported in the other three states despite their reliance on the higher USDA figures. *In all cases, however, the presumptive child support awards exceed the monetary costs of raising children*. Replacing the income equivalence and USDA methods with one linked directly to actual monetary outlays would correct this overage.

The effect of this overage is to create a financial asset for the custodial parent such that increased custodial time has a monetary value. Moreover, it is an asset whose returns are paid and received in after-tax dollars. Its presence creates an economic incentive to maximize custodial time for the child support recipient even where it might not otherwise be preferred. At the margin, creating this asset leads to different custodial outcomes than would otherwise exist.

Even where actual custody is not at issue, the creation of this financial asset engenders resentment by the support payer since it is his or her payments that fund this asset. And this resentment harms relationships between parents. As a result, nonpayment rates are increased, enhanced enforcement efforts are taken to ensure payment, and children are affected by parental conflict. Overall, *an effective child support system rests on the willingness and ability of non-custodial parents to make their assessed payments, which is an outcome enhanced when payment amounts reflect the actual monetary costs of raising children.*

CONCLUDING COMMENTS

Emphasizing the methodological differences between the different methods used to estimate child costs is the primary purpose of this paper. The empirical findings suggested here could be refined by using a more detailed empirical model, and we hope further research in this direction will be carried out. For this reason, our specific empirical results must be considered as preliminary. At the same time, our findings leave little doubt but that current estimates of the cost of raising children, along with the child support awards that rest on them, are substantially overstated.

As every parent knows, there are substantial costs and benefits of raising children. However, this research suggests that the monetary costs are much lower than heretofore believed.

NOTES

1. 45 CFR § 302.56(h).
2. Perloff (2008). These objectives are not limited to subsistence as is sometimes maintained.
3. Becker (1981).
4. For the theory of household production, see Deaton and Muellbauer (1980).
5. Deaton and Muellbauer (1980, p. 245).
6. Espenshade (1984), Ellman (2004).
7. Becker (1981).
8. Becker (1981, p. 8).
9. Becker (1981, p. 8n).
10. We ignore here the analytic problems inherent in deriving household preferences from those of the adult members, who are the decision-makers of the

household. The economic literature on decision-making within the family is reviewed in Bergstrom (1997).

11. For further elaboration of this approach, including relevant conditions, see Deaton and Muellbauer (1980, chap. 10).

12. Becker's approach is similar. He writes: "Children are usually not purchased but are self-produced by each family, using market goods and services and the own time of parents, especially of mothers. Since the cost of own time and household production functions differ among families, the total cost of producing and rearing children also differs" (Becker, 1981, p. 96).

13. See Marquit (October 4, 2011).

14. Deaton and Muellbauer (1986).

15. Frech (1994), Kremslehner and Muermann (2009).

16. Finkelstein (2009), Edwards (2010).

17. Rothbarth (1943), Deaton and Muellbauer (1986).

18. Browning (1992, pp. 1443–1446).

19. Browning (1992, p. 1443).

20. Pollack and Wales (1979).

21. Although the CEX data set collects expenditures on food for the entire household, it apportions these outlays to children according to data in the USDA food plans, which depend on the ages of household members, household size, and income. See Pollack and Wales (1979, p. 7).

22. Lazear and Michael (1998, p. 87).

23. Lino (May 2011, p. 8) and See also Lino and Carlson (2010).

24. For more information on the Consumer Expenditure Survey, see www.bls.gov/cex and Lino (May 2011, p. 1).

25. Each CEX microdata set reflects interviews conducted every 3 months over five calendar quarters, thus straddling two calendar years. The USDA (2010) report uses data from the 2005–06 CEX (Lino, May 2011, p. iii). Our paper starts with the same data but also includes the subsequent three CEX data sets as well, covering 2007–2009.

26. Children in this data set are those under age 18 who reside in the Consumer Unit and not elsewhere.

27. We adjusted the nominal CEX data for each expenditure category to present-day dollars using the relevant Consumer Price Index published by the BLS as of June 2011 for each category (e.g., housing, food, transportation, education, and clothing).

28. This is the same data source used by Lazear and Michael (1998), and the same cost categories estimated in the USDA reports (with Entertainment included in a "Miscellaneous" cost category).

29. "ChildAge" is defined by the BLS as follows: 0, no children; 1, all children less than 6; 2, oldest child between 6 and 11 and at least one child less than 6; 3, all children between 6 and 11; 4, oldest child between 12 and 17 and at least one child less than 12; 5, all children between 12 and 17; 6, oldest child greater than 17 and at least one child less than 17; 7, all children greater than 17.

30. Guryan, Hurst, and Kearney (2008, p. 27). These data apply to 2003–2006. See also the discussion of parental time as a major share of the costs of children in Apps and Rees, 2002.

31. See also Browning's (1992, pp. 1443–1444) observation that the time costs of children generally exceed the monetary costs.
32. Angrist and Evans (1998).
33. Browning and Lechene (2003).
34. See for example, Becker and Lewis (1974, pp. 81–90), Becker and Tomes (1976, pp. 143–162).
35. Caceres-Delplano (2006).
36. Angrist, Lavy, and Schlosser (2010).
37. Aizer and Cunha (2012).
38. Ibid., p. 22.
39. Lazear and Michael (1998).
40. Since 2008, BLS housing data on which both Lino and we rely include mortgage interest and principal payments for owned homes as well as rental payments for leased homes. They also include utilities, property taxes, maintenance, insurance, and repairs. A full list of the components of this variable is included in the data appendix available from the authors.
41. There may be circumstances where households acquire larger residences in anticipation of having a child. However, only 11% of the childless households in our sample have the oldest person under age 32 where this issue might apply. This factor is therefore unlikely to affect our empirical findings.
42. The CEX data identify food costs within and outside of the home separately, but since that distinction is not specifically relevant to this analysis we use total outlays.
43. See, e.g., Tobin (1958, pp. 24–36), McDonald and Moffitt (1980, pp. 318–321).
44. The coefficients reported here are the corrected values, which indicate the prospective effect on expenditures of the explanatory variable conditional these expenditures being greater than zero. See McDonald and Moffitt (1980, p. 319).
45. This range applies to all sub-samples except low-income married households, where it reaches 7% on average.
46. The presence of these economies has been reported by others. See Lino (2011, p. 17) and Espenshade (1984, p. 29). See also similar results reported for France and Switzerland in Thevenon (2009, p. 21).

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