

**Investments in Sons and Daughters:
Evidence from the Consumer Expenditure Survey***

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February 2003

ABSTRACT

We test for differences in parental investment in sons and daughters by estimating the effect of child gender on household expenditures. Using Consumer Expenditure Survey data from 1990 to 1998, we find that the expenditures of married-couple families with one son do not differ significantly from those of couples with one daughter in most spending categories, including education and ‘adult goods’ such as alcohol and tobacco. However, families with a son spend significantly more on housing and personal care services than do families with one daughter, and families with one daughter spend more on clothing. Housing expenditures are examined in detail for one-child and two-child households, and the results interpreted in terms of an economic model of the family in which marital surplus, and therefore incentives to invest in the family, depends on child gender.

* Prepared for the Joint Center for Poverty Research 2002 September Research Institute, “Family Investments in Children’s Potential: Resources and Behaviors that Promote Children’s Success,” Chicago, IL, September 19-20, 2002. We are grateful to Ekaterina Stepanova and Anoshua Chaudhuri for excellent research assistance, and NIH/NICHD for research support (R01 HD42785-01).

INTRODUCTION

Recent research finds that child gender has important and wide-ranging effects on parental behavior and family outcomes in the United States. Three themes emerge from this literature: (1.) both marital and nonmarital relationships with sons are more stable than those with daughters, (2.) fathers are more involved with the family if they have sons than if they have daughters, and (3.) parents in families with sons tend to play more traditional roles than parents in families with only daughters. These empirical patterns are consistent with differential effects of sons and daughters on the ‘surplus’ that parents receive from their marriage or relationship, relative to being single. If a son increases marital surplus more than a daughter, then the birth of a son reduces the probability of divorce, and also increases the incentive of partners to invest further in the marriage, or the family as a whole.

Differential investments in sons and daughters may take the form of gender bias in resources allocated to children, such as medical care or education. However, direct spending on investments in human capital is not the only way that parents influence their children’s attainments. Haveman and Wolfe [1995] note: “parents make a variety of . . . choices such as fertility, location, and family stability that both influence the returns to productive efforts and directly affect the well-being of members of the family.” Parental investments in family life, including time spent with partner and children and expenditures on household public goods such as recreation, shelter, and community, will both benefit children directly and contribute to the stability of the family itself. To the

extent that these aspects of family behavior vary by child gender, they represent a source of differential treatment of sons and daughters.

There has been little research on what is perhaps the most obvious indicator of differential investment in American families: expenditures by families with sons and daughters. Taubman [1990] concludes that there is little evidence of differential treatment of children by gender in bequests, transfers, and educational attainment. Behrman, Pollak and Taubman [1986] find that the slightly lower education levels of daughters in one sample are consistent with equal parental concern for sons and daughters if we allow for an optimal investment response to gender wage differentials. However, little is known about other dimensions of household spending and their relationship to child gender.

In this paper we test for differences in the expenditure patterns of U.S. households with sons and daughters. We focus on differences in expenditures on family public goods such as housing and durables, using samples of married couple families with a single child or with two same-sex children from the Consumer Expenditure Survey.

We find that housing expenditures are substantially and significantly higher for families with a son, compared to families with a daughter. This finding is consistent with our hypothesis that sons increase marital surplus and thus investments in family. However, there are no significant effects of child gender on other durables, such as automobiles and furniture, and the housing differential is not statistically significant for two-child families. The only other spending categories exhibiting child-gender differences are clothing and personal services. Higher expenditures on clothing by

families with a daughter can be attributed to the preferences of boys and girls (or their parents), but it is puzzling that families with a boy spend nearly 10 percent more on beauty parlors and health clubs than do families with a girl. We speculate that this may reflect a greater transfer of marital surplus to mothers of boys than mothers of girls, but more disaggregated expenditure data is required to provide a convincing test of this hypothesis.

CHILD GENDER AND FAMILY INVESTMENTS

Child gender appears to influence a variety of family outcomes, including time use, the quality of relationships, and the stability of the household. Several authors have reported that, in the United States, having a son relative to a daughter increases the likelihood that a marriage will remain intact (Spanier and Glick 1981; Morgan, Lye and Condran 1988; Mott 1994; Katzev et al 1994). Other researchers, using non-American data, have failed to find significant child gender effects on divorce rates (Bracher et al. 1993; Diekmann and Schidheiny 2001). In a recent study, Morgan and Pollard [2002] find that sons reduced the probability of divorce during the period 1960-79, but also find that the child gender effect is 'attenuated sharply' in later periods. Lundberg and Rose [2002] find that the birth of a son speeds the transition into marriage when the child is born before the mother's first marriage. On net, there appears to be substantial evidence in U.S. data that sons increase the stability of their parent's relationship, but this child gender effect may have declined in recent years.

The most striking well-documented difference between families with sons and families with only daughters is the extent and type of involvement of fathers: fathers of

boys tend to have stronger ties to the family than fathers of girls. Men spend more time with their sons (Yeung et al 1999), and also with their children overall (Barnett and Baruch 1986; Harris and Morgan 1991), if they have sons. Fathers of sons are more involved with their children's discipline, schoolwork and other activities than are fathers of daughters (Lamb et al 1987, Morgan et al 1988), and unmarried fathers engage in more caretaking and playful interactions with toddler sons than with toddler daughters (Lundberg, Rose, and McLanahan 2003). Moreover, mothers report greater emotional attachment of their husbands to sons than to daughters (Morgan et al.).

Increased father involvement is believed to have positive effects on the parents' relationship. Several authors (Barnett and Baruch, Katzev et al 1994, Cox et al 1999, Mizell and Steelman 2000) report greater satisfaction of partners in marriages with sons than with only daughters. Teachman and Schollaert [1989] find that couples whose first child is male tend to have a subsequent child sooner, and attribute this finding to the greater stability of the relationship associated with the birth of a son. ¹

Child gender affects not only parental time with children, but also time devoted to market work: marriages with sons are characterized by more traditional gender roles than marriages with daughters. Lundberg and Rose [2002] find that men work about 40 hours per year more after the birth of a son relative to a daughter, and that the hourly earnings of fathers of sons increase more after childbirth than do the earnings of fathers of daughters. The increase in labor supply appears to be at the expense of men's leisure, rather than time with the child.

¹ There is also a literature in child development that documents differences in how parents socialize their sons and daughters. See Maccoby [1998] for a survey.

Clearly, family dynamics differ for couples with sons and couples with daughters. Marriages with sons tend to be more stable and more traditional, and are characterized by greater father involvement on a variety of dimensions. These patterns suggest that either the mother, the father, or both parents place a higher value on father interaction with sons than with daughters, and that this increases the perceived value of marriage, relative to divorce. This has important implications, not just for marital stability, but also for incentives to make additional investments in the family.

These implications can be derived from an economic model of the family that has been extended to incorporate child gender effects on the gains to marriage. Standard models of the family emphasize the gains to coresidence and shared consumption that accompany marriage (or cohabitation). In addition to love (interdependent preferences) and enjoyment of shared time (leisure complementarities), there are two distinct sources of gains to marriage: returns to specialization and exchange, and joint consumption of household public goods (including children). These gains can be enhanced by the tangible and intangible investments made by a husband and wife: investments in children, in household skills, in family activities or infrastructure. These investments will increase the gap between potential well-being as a married couple and as single individuals—marital surplus—but will also increase the prospective losses should the marriage end.

Why might sons increase marital surplus? Increased father involvement in parenting can generate surplus in two distinct ways. First, if fathers are more productive at parenting sons than daughters, perhaps because they play a special role in the emotional

and social development of boys, then having a son increases the value of marriage (or coresidence) relative to single parenthood. Second, fathers may simply place a higher value on marriage and family if they have a son. This preference may be due to gender bias on the part of fathers, or to the bonding that occurs when fathers spend more time with the child and are more involved with family activities.

These two stories, though they postulate very different roles for child gender in family decision-making, have a number of common predictions. Both are consistent with empirical evidence that fathers spend more time with sons than with daughters, although the motivation for parent-child activities is different. Both models also imply that sons reduce the probability of divorce. With lower probabilities of marital dissolution, couples with sons should make more marriage-specific investments. These investments may take the form of a more traditional division of labor, which is consistent with the results in Lundberg and Rose [1999], but other types of investment, such as housing expenditures or avoidance of dysfunctional behaviors, may be characteristic of families with boys as well.

One important difference in the empirical implications of these two models concerns the relative well-being of mothers and fathers. If sons directly increase the utility of fathers, then a standard bargaining model of the household predicts a shift of household resources from fathers to mothers. This redistribution could be observable as increased leisure among mothers of sons, or increased consumption of private commodities typically consumed by women.

In this paper, our focus will be on differences in expenditures in ‘family investment’ categories such as housing and consumer durables, but we present a broader comparison of expenditure patterns by one-son and one-daughter families. Since most household wealth consists of equity in housing, expenditures on housing represent the principal tangible investment made by American families. This analysis is similar to studies of consumption patterns in developing countries, such as Deaton [1989]. His approach, which has been applied to a number of countries, involves estimating the effect of the demographic composition of the household on the shares of expenditures on various goods. A difference in the joint effects of gender by age category implies gender bias in household behavior. In a variation on this approach, Deolalikar and Rose [1998] estimate the effect of the sex of a child at birth on household expenditure levels, rather than shares, by category. We are not aware of any study that has examined child gender effects on the expenditure patterns of U.S. households.

There are several possible sources of family consumption response to child gender in addition to our hypothesized investment effect, some of them reflecting son preference and others simply differences in the biology, tastes or activities of boys and girls. For example, expenditures on food and clothing for sons and daughters may differ due to differences in appetite or fashion consciousness.

DATA: THE CONSUMER EXPENDITURE SURVEY

The Consumer Expenditure Survey (CEX) has gathered information on the expenditures, income and assets of a large sample of American households since 1980.

The survey is conducted quarterly by the Census Bureau for the Bureau of Labor Statistics, and is used to construct consumption baskets for the Consumer Price Index. The survey consists of two parts: an interview survey that includes monthly out-of-pocket expenditures such as housing, apparel, transportation, health care, insurance, and entertainment, and a diary survey that includes weekly expenditures of frequently purchased items such as food and beverages, tobacco, personal care products, and nonprescription drugs and supplies. A household or ‘consumer unit’ in this survey consist of all residents of a housing unit who are related by blood, marriage, adoption, or some other legal arrangement. Approximately 1,500 households are added to the survey each quarter; they are then interviewed for up to four consecutive quarters about expenditures during the past three months.

For this study, we have used the family extracts from the CEX made available by the National Bureau of Economic Research. In these extracts, the four possible quarterly records for each household are matched to form one annual record, and the more than 600 detailed spending, income, and wealth categories in the raw data are aggregated into 109 categories that are consistent over time and allow the data to be calibrated to National Income Account aggregates.

Our first sample consists of married couple families with one resident child age 18 or under who entered the CEX sample from the first quarter of 1990 through the second quarter of 1998.² Only families who were in the CEX sample for a full year were included. Some characteristics of this sample, and the subsamples of families with sons

² The third and fourth quarters of 1998 are not yet available, and the third and fourth quarters of 1995 are unavailable due to a change in the sampling frame that made these subsamples noncomparable.

and with daughters, are reported in Table 1. It is important to note that full fertility histories are not available for these families: some couples with one child will go on to have additional children, and some couples with more than one child will be in the sample because older children are no longer in residence. There are no significant differences between the parental ages, child age, or total income of one-son and one-daughter families.

[Table 1 about here]

Child sex at birth is a random variable, but there are some possible sources of selection into our one-boy and one-girl subsamples that need to be considered in interpreting our results. First, the son effects on marriage and divorce discussed above imply that sons are more likely to live in married couple families, though an increase in perceived marital stability may encourage couples to have a second child sooner, removing them from the one-child sample. On the other hand, if son preference leads couples whose first child is a son to be less likely to have a second child, the one-child sample will also over-represent sons. Finally, different co-residence decisions by teenage sons and daughters may influence the composition of our sample with older children. In general, sample selection via child gender effects on divorce, marriage, or fertility-stopping behavior should lead to a smaller sample of families with girls with stronger parental preferences for girls, and this will bias our results against finding son-preference in expenditures. One indicator of sample selection would be a difference between the sex ratio (the number of boys divided by the number of girls times one hundred) in our sample and in the population. However, our sex ratio of 102 is not significantly different

from the sex ratio of 5 to 14 year-olds in the United States, which is 105 (U.S. Census 2001).

The focus of this study is on differences in expenditures in ‘family investment’ categories such as housing and consumer durables. We also present a broader comparison of expenditure patterns by one-son and one-daughter families. Means and standard deviations of expenditures for a wide, but not exhaustive, set of categories are presented in Table 2. Expenditures are deflated using the Personal Consumption Expenditure deflator, and expressed in 1996 dollars. For housing, we look at both owner-occupied housing (the probability of home ownership, and a comprehensive cost of housing that includes mortgage payments, taxes, utilities, and maintenance) and total housing. Expenditures on medical care and education reflect investments in human capital, but medical expenses may also reflect differences in health status or injury rates among boys and girls. Two other aggregate categories—transportation and entertainment/recreation-- include both durable goods and services. Food, clothing, and a set of miscellaneous consumption categories suggested in the discussion above, are also included.

[Table 2 about here]

RESULTS: CHILD GENDER AND SPENDING PATTERNS OF ONE-CHILD FAMILIES

Table 3 reports the coefficient on a dummy for male child in OLS regressions in which the dependent variable is household expenditures in 1996 dollars for selected

expenditure categories. These effects control for the age of husband and wife, the education level of each, whether the child was over 10 years of age, total expenditure and expenditure squared, but a specification without these controls leads to an almost identical pattern of child gender results. Also included in the regression are dummy variables for the quarter (from 1990:1 to 1998:2) in which the family entered the CEX sample to control for change in economic activity and seasonal effects on sample attrition.

[Table 3 about here]

For most expenditure categories, there are no significant differences between the spending of one-son and one-daughter families, and this is true for more detailed sub-categories as well as the aggregates reported. Our investment hypothesis receives some support from the differential housing expenditure of families with sons and daughters: total housing costs are significantly higher for families with sons. The ‘boy effect’ on housing is nearly 4% of average housing costs, and other indicators of investment in housing, such as maintenance and renovations, show a consistently positive relationship with sons, though these effects are not statistically significant.

We find neither evidence of greater investments in the education and health human capital of either sons or daughters in one-child families, nor any indication of gender discrimination with respect to the two purely ‘adult’ goods--tobacco and alcohol--that are identified in the data set.

Clothing expenditures by families with a daughter are significantly higher than clothing expenditures in families with a son, but spending on ‘personal care services’ is higher in families with sons. The latter result is somewhat surprising, and is robust to changes in specification and the sample period. It is difficult to see how this difference in a category that includes barbers, beauty parlors, and health clubs could reflect direct spending on children rather than a re-allocation of parental spending.

Table 4 takes a closer look at total housing expenditures, allowing interaction effects between child gender and the child’s age, and between child gender and family income. Column 1 reports the raw difference between the housing spending of one-son and one-daughter families—more than \$600 per year. Column 2 introduces the standard set of controls, as well as more detailed dummy variables for child age showing that, controlling for total expenditure, housing expenses decline as the child ages. The other specifications show that the positive effect of a son on housing expenses is limited to families with children age 5 in the sample as a whole—and for these families the boy premium is nearly 7 percent of total housing expenditure. Families with above median income exhibit a stronger son effect than low-income families even when their children are under 5. The intensification of son-daughter differences as the children enter school-age is also characteristic of patterns of parental interactions with children, and with some estimates of son effects on relationship stability (Morgan et al., Lundberg and Rose 2003).

[Table 4 about here]

We also compare the housing expenditure of married couple families with two same-sex children. The sample is described in Table 5—once again, no significant differences appear between the families with only sons and those with only daughters. Table 6 shows that the general pattern of spending is similar to that in one-child families, but the effect of sons is smaller and no longer significant. Other specifications that control for the age of the older child as well as the younger child yield the same result.

[Tables 5 and 6 about here]

DISCUSSION AND AGENDA FOR FUTURE RESEARCH

Our hypothesis that families with a son will invest more in household public goods receives modest support from the empirical results summarized above. Housing costs constitute 44 percent of the total expenditures reported by our sample, and one-child families with a son spend 4 to 7 percent more on housing than families with a daughter. This effect is more pronounced when the child is age 5 or over, and is smaller and not significant in two-child families. Child gender differences in spending on other household public goods, such as furniture and durables and many housing sub-categories, have the expected sign but are not significant in this sample of households. We find few other child gender differences in expenditure patterns: a positive effect of daughters on clothing expenditure and a positive effect of sons on personal service spending. We expect parents who enjoy a higher marital surplus—i.e. who expect to be better off together than apart—to expect a longer-lasting relationship and to be willing to make more marriage-specific investments. A substitution away from spending on clothing to spending on housing by parents of boys can be regarded as a shift from consumption to

investment. Greater expenditure on household public goods by families with boys is also consistent with the picture that emerges from the literature on child gender and the family overall: the presence of a boy results in greater stability, more intense father involvement, and a more traditional division of labor than the presence of a girl. Other possible explanations for the observed differences in housing spending would rely on the need for space to accommodate the size and activity of sons (though the spending differential appears at an age when boys and girls are the same size), or on a desire for a higher quality neighborhood to reduce the probability of risky behavior by boys. More detailed information about housing characteristics would be needed to examine these hypotheses.

The positive effect of sons on personal care services presents a puzzle, since this category appears to be dominated by 'women's goods.'. This result suggests some redistribution from fathers to mothers, and is consistent with the hypothesis that boys directly increase their father's utility, relative to girls. A disaggregation of some expenditure categories into men's, women's and children's goods could permit a more comprehensive analysis of the effect of child gender on intrahousehold distribution.

Table 1
Sample Characteristics
Married Couples with Exactly One Coresident Child Under 19
Consumer Expenditure Survey: 1990-1998

Variable	Total sample N=2404		One son families N=1214		One daughter families N=1190	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Child age	7.9	6.3	7.9	6.3	7.9	6.3
Age of wife	36.5	8.6	36.6	8.7	36.4	8.4
Age of husband	39.0	9.5	39.2	9.6	38.9	9.5
Total income	49,133	40307	49,149	42080	49,117	38432

Table 2
Mean Annual Expenditures in Major Expenditure Categories
Married Couples with Exactly One Child, in 1996 Dollars
Consumer Expenditure Survey: 1990-1998

	Mean	Std. Dev.
Total Expenditure	38390.48	24222.95
Food	5792.98	2732.82
Food at home	4197.09	1696.34
Food away from home	1569.45	1634.44
Clothing and Clothing Services	1809.16	1606.45
Medical Care	1877.32	1848.98
Drugs	160.80	360.93
Medical supplies and equipment	86.65	170.08
Physicians and dentists	617.21	1000.49
Hospitals	108.41	535.01
Health Insurance	900.79	1105.50
Transportation	8241.59	8809.96
Cars, parts, and gasoline	6831.15	8421.59
Auto insurance	957.43	826.59
Airline fares	317.25	731.10
Entertainment and Recreation	2775.39	2709.37
Books, publications, toys	585.44	554.35
Recreation and sports equipment	901.81	1656.50
Recreation services	1288.13	1399.60
Education	1056.17	2279.06
Higher education	336.63	1733.10
Nursery, elementary	626.42	1416.17
Other education	93.12	404.51
Housing		
Home ownership	0.77	0.42
Cost of owned housing (mortgage, property tax, maintenance, utilities)	8269.60	10239.43
Total housing costs (rental + owned)	11907.12	10121.27
Utilities	1851.52	895.24
Home maintenance	765.80	2154.74
Other		
Tobacco	311.93	514.92
Alcohol	185.23	291.51
Jewelry and watches	203.33	631.90
Personal care services (barbers, beauty parlors, health clubs)	328.29	283.93
Furniture and durable household equipment	1197.31	1938.24
Telephone	868.63	568.59
Domestic service (insurance, babysitting, cleaning, gardening)	848.01	1618.37
Contributions to religious, welfare, and political organizations	588.45	1451.11

**Table 3: Effect of Male Child on Annual Expenditures
Married Couples with Exactly One Child, 1996 Dollars
Consumer Expenditure Survey: 1990-1998^a**

Number of observations	2401-2404 ^b
Total Consumption	253.89

Consumption Aggregates

Food	14.92
Clothing	-142.445**
Medical Care	37.00
Transportation	-248.15
Entertainment and Recreation	-37.36
Education	-5.643

Housing

Home ownership (probit)	-.012
Cost of owned housing (home-owners only)	346.60
Total housing costs	431.20*

Food, personal care, and household

Food at home	44.31
Food away from home	-23.71
Tobacco	3.84
Alcohol	-10.13
Jewelry and watches	-6.62
Personal care services	29.13**
Furniture and durables	18.85
Domestic service	-60.10

^a Controls for parent's age and education, total expenditure and expenditure squared, child age, and quarter family entered survey included.

^b Extreme outliers more than 10 standard deviations above 99th percentile deleted.

**Table 4: Effect of Male Child on Total Annual Housing Expenditures
Married Couples with Exactly One Child*^a
Consumer Expenditure Survey 1990-1998
(1996 dollars, standard errors in parentheses)
(N = 2401)**

	(1) ^b	(2)	(3)	(4)	(5)	(6)
Boy	619.95 (345)	447.34 (218)	-13.44 (339)	-13.31 (339)	-260.89 (371)	-397.44 (407)
Boy-age interactions						
5 plus			789.34 (445)		761.54 (444)	1003.88 (537)
5 to 9				977.54 (622)		
10 to 14				618.36 (618)		
15-18				777.64 (570)		
Boy-income interactions						
Above median income					539.19 (329)	
Above median income*under age 5						844.15 (501)
Above median income*age 5 and over						332.25 (417)
Child age						
5 to 9		-226.93 (333)	-619.79 (400)	-716.52 (458)	-622.53 (400)	-614.55 (400)
10 to 14		-970.69 (389)	-1355.8 (446)	-1275.8 (491)	-1358.5 (445)	-1347.2 (446)
15 to 18		-2210.2 (410)	-2609.0 (467)	-2606.7 (501)	-2605.4 (467)	-2597.2 (467)
R-squared	0.612	0.617	0.618	0.618	0.618	0.619

^a Controls for husband's age and education, wife's age and education, total expenditure and expenditure squared, and quarter family entered the sample also included.

^b Without controls.

Table 5
Sample Characteristics
Married Couples with Exactly Two Coresident Children Under 19 of Same Sex

Variable	Total sample N=1617		Two son families N=833		Two daughter families N=784	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Younger child's age	6.5	4.8	6.6	4.8	6.5	4.9
Older child's age	10.2	4.9	10.3	4.9	10.0	5.0
Age of wife	36.1	6.4	36.2	6.4	36.0	6.4
Age of husband	38.5	7.0	38.5	6.9	38.6	7.2
Total income	49,033	38031	49,582	37952	48,450	38130

**Table 6: Effect of Male Children on Total Annual Housing Expenditures
Married Couples with Two Children of Same Sex^a
Consumer Expenditure Survey 1990-1998
(1996 dollars, standard errors in parentheses)
(N = 1617)**

	(1)	(2)	(3)	(4)
Boys	218.76 (313)	224.28 (312)	83.37 (482)	-10.79 (384)
Boy-age of younger child interactions				
5 to 9			495.37 (758)	
10 to 14			8.71 (804)	
15-18			-7.73 (1331)	
Boy-income interactions				
Above median income				487.76 (463)
Above median income*under age 5				
Above median income*age 5 and over				
Younger child's age				
5 to 9		-1211.3 (414)	-1469.1 (571)	-1222.5 (414)
10 to 14		-1026.5 (490)	-1030.2 (646)	-1027.1 (490)
15 to 18		-2123.4 (745)	-2128.6 (976)	-2152.5 (745)
R-squared	0.570	0.574	0.574	0.574

^a Controls for husband's age and education, wife's age and education, total expenditure and expenditure squared, and quarter family entered the sample also included.

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