Preschoolers with working mothers

An analysis of the determinants of child care arrangements

Evelyn L. Lehrer *

Economics Department, University of Illinois at Chicago, P.O. Box 4348, Chicago, IL 60680, USA

Abstract. This research examines the determinants of child care mode choice for the preschool-age children of working mothers. Attention is focused on two main questions. First, do increases in economic resources raise the likelihood that center care arrangements will be employed? And second, is there a quality-quantity tradeoff in the context of child care? A multinomial logit analysis of data on preschoolers from the 1982 National Survey of Family Growth (conducted in the United States) yields positive answers to both of these questions.

A. Introduction

Studies of "child quality" in the economic and demographic literature have taken two major forms. In one line of research, attention is focused on *outcomes*. For example, Leibowitz (1977) examines the determinants of children's performance on ability tests; Fleisher (1977) analyzes the correlates of children's IQ scores, educational attainment and wages later in life; Blake (1981) studies the factors influencing results on cognitive achievement tests, grades in school, and academic aspirations. In the second type of research, the dependent variable is some measure of *inputs*, or resources devoted to children. For instance, Hill and Stafford (1974) study the influences of education on the amount of time devoted by mothers to child care; Chiswick (1986) and Chamnivickorn (1988) examine how religious and ethnic groups with varying degrees of labor market success differ in the time devoted by mothers to home activities. Most of the studies on inputs have focused on variations among households in the maternal time input. Less

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attention has been paid to the quality of *substitutes for her time*, an issue that has grown in importance with the rising labor force participation rate of women with young children.

Recent work by Leibowitz et al. (1988) has emphasized a very important point overlooked in previous research: in the analysis of child care arrangements, infants (ages 0−2 years), preschoolers (ages 3−5 years), and older children should be studied separately, because the optimal form of care is likely to differ by age. The present study focuses on preschoolers.

Arrangements used by working mothers include care by a relative, by a babysitter in the child's home, by a babysitter in her home (frequently in the form of family day care, with several children in attendance), and in a day care center or nursery school. Although there is substantial heterogeneity in terms of quality within each of these categories, several characteristics of the latter mode, noted in the psychology literature, make it an attractive arrangement for the care of 3−5 year olds compared to the alternative substitutes for mother's care. Caregivers in these institutions are more likely than babysitters or relatives to have some college education and/or training in early childhood education. Higher levels of schooling and child related preparation have been found to be associated with decreases in the amount of restrictions placed on children, increases in encouragement, and a greater emphasis on the development of children's verbal skills (Berk 1985). Day care centers usually offer a wider variety of formal learning experiences, with a stronger emphasis on the educational (as distinguished from the purely custodial) component of care (Belsky et al. 1982). Other advantages of day care centers include opportunities to interact with peers, and an environment richer than that in many homes in educational play materials and stimulation. The fact that many non-working mothers send their preschoolers to nursery schools also suggests that this experience is widely regarded as having a favorable effect.

Do increases in the household's economic resources raise the probability of using center care for preschoolers? The evidence to date is mixed. Based on data from the National Longitudinal Survey of Young Women, Leibowitz et al. (1988) find that increases in the mother's wage raise the odds of relying on center care rather than on unpaid care. The father's income and the mother's hours of work, however, appear to have no effect.[1]

The present research re-examines these issues using data from the 1982 National Survey of Family Growth (NSFG) and the multinomial logit technique. In addition, the quantity-quality tradeoff hypothesis (Becker and Lewis 1973) is studied in the context of child care. If the parents of a preschooler need to make arrangements for other children as well, does this decrease the likelihood that the preschooler will be taken to a day care center? This is an issue that has not been investigated before. Indeed, very little is known about the substitute care arrangements made by parents with two or more young children.

The paper is organized as follows. Section B describes the data set and variables, and develops hypotheses regarding the influence of various factors on child care mode. Section C reports the empirical results. The closing section presents

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[1]   Although there are several other studies on child care mode choice in the economic and demographic literature, none of them presents separate analyses by child's age.

a summary of the main findings, a discussion of their implications, and suggestions for further research.

B. Data and methodology

The data set

Conducted by the National Center for Health Statistics, the 1982 National Survey of Family Growth was addressed to 7,969 women aged 15–44 of all marital statuses living in the United States. The survey contains marital, contraceptive, and pregnancy histories, as well as information on the respondents' socio-economic background. Very importantly for the present purposes, the child care arrangements made by working mothers for each of their children aged 12 and under are documented. The unit of observation in this study is the preschool-age child. For those respondents with two or more children aged 3–5, one child is randomly selected for inclusion in the sample. Cases with illegitimate codes for key variables are eliminated, as well as the small number involving more than one arrangement for the child. Twenty-eight cases for which free day care center arrangements were reported are also excluded.[2] The resulting sample size is 652.

Table 1. Child care arrangements for preschoolers

	Number	Percentage
Day care center	188	28.8
Babysitter in her home	135	20.7
Babysitter in child's home	65	10.0
Relative	264	40.5
Total	652	100.0

The dependent variable

Child care mode is the dependent variable. Four categories are considered: (a) day care center, (b) babysitter in her home, (c) babysitter in the child's home, and (d) relative. A frequency distribution for the sample is shown in Table 1. Although the main focus of this study is on the determinants of whether or not center care is used for the preschooler, consideration of more detailed categories is instructive as will become clear below.

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[2]   It has been noted that inclusion in the analysis of subsidized day care center arrangements would blur the economic distinction between center care and other arrangements and lead to underestimating the effects of economic variables on the odds of using center care (Lehrer and Kawasaki 1985). The models presented in this paper were estimated both ways. The qualitative conclusions from the two analyses are the same, but the estimated effects of the economic variables on the probability of relying on center care are generally somewhat smaller in magnitude when free day care arrangements are included, as expected.

Some of the distinctive features that generally make day care centers an attractive arrangement for 3−5 year olds were noted above. In addition, the various forms of care differ in other dimensions. An important one is cost. The 1982 NSFG documents whether the child care arrangements are paid for, but the actual dollar amounts are not reported. Evidence from other sources suggests that a babysitter in the child's home is usually the most expensive arrangement, followed by day care centers and care in the babysitter's home.[3] Relatives who take care of children frequently do not receive monetary compensation; however, they are often paid in services or favors (Rodes and Moore 1976, 2:7−5).[4] The relative mode can thus be intensive in the mother's time. Travel time is also a factor. Of the arrangements with relatives in the present sample, only 41% took place in the child's home. For both a day care center and a babysitter in her home, all the compensation is monetary and travelling with the child to and from the place of care is involved.[5] Similar amounts of time are likely to be required. In-home care by a babysitter is the least time intensive arrangement. There are neither payments in services nor travel time in this mode. In addition, babysitters who come to the child's home usually do housework as well (e.g., cleaning, cooking), reducing the mother's responsibilities in these areas.[6] Thus, most parents who select this mode are really purchasing two services − child care and household help. Viewed this way, a babysitter in the child's home may not be the most expensive form of child care. The better off families may be able to purchase these services separately − from a day care center, a cleaning agency, and a neighborhood restaurant, for example.

Economies of scale and flexibility are other important dimensions. Most arrangements with relatives and babysittters are characterized by significant economies of scale. In contrast, day care centers generally offer small or no discounts for additional siblings, and ceteris paribus, are less attractive for parents

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[3] Weekly child care costs in four major cities for children aged 2−5 in 1985 were as follows (Friedman 1985, cited in O'Connell and Bloom 1987):

	Family day care (Outside child's home)	Day care center	Babysitter in child's home
Boston	$ 40 − 160	$ 75 − 110	$ 260 − 340
St. Louis	$ 35 − 40	$ 50 − 70	$ 165 and up
Dallas	$ 35 − 70	$ 50 − 70	$ 165 − 200
San Francisco	$ 55 − 85	$ 65 − 90	$ 165 − 200

Because of data limitations, most previous studies have grouped all babysitters in one category (e.g., see Duncan and Hill 1975; Lehrer and Kawasaki 1985). The economic distinctions between day care centers and babysitting arrangements are, of course, obscured when all such arrangements are classified in the same group.

[4] In the present sample, 39% of arrangements with relatives are reported to involve payment. Exactly what this figure means, however, is not clear, because the survey question as to whether these arrangements are "paid for" is ambiguous and open to different interpretations.

[5] A "free" babysitting arrangement was reported for 16 cases in the sample, 11 of them corresponding to babysitters who work in their own homes. It is likely that some exchange of services was involved in these exceptional situations. The results were not substantially affected by the inclusion or exclusion of this small number of observations.

[6] The phrasing "*mother's* responsibilities" reflects the fact that although men's contribution to household work has increased somewhat over the past decades, the amount of time spent by the average husband on these tasks remains small (Hofferth and Moore 1979).

seeking a common arrangement for two or more children.[7] In addition, day care centers often charge fixed amounts (for the whole day) and are usually closed on evenings and weekends, providing little flexibility for the part-time working mother.

Finally, while center care may be best for preschoolers, a key feature of quality care for infants is a low ratio of children to caregivers (Belsky et al. 1982). Care by a babysitter in the child's home or by a relative are likely to be the modes with most favorable ratios. Perhaps because parents prefer these informal arrangements for their infants, few day care centers have programs for children under three. For older children (aged 6–12), care is usually needed only a short time before or after school. Few institutions offer such care, and most of the arrangements for 6–12-year olds are with relatives or babysitters (90% in the present survey). Parents who have an infant and a preschooler or a school-age child and a preschooler may thus face some difficult choices concerning child care. Quality or availability considerations may dictate arrangements with a babysitter or a relative for the infant or the school-age child. If so, the day care option for the preschooler may appear quite expensive, compared to the alternative of relying on the same home arrangements at little or no additional cost.

The explanatory variables and their expected effects on child care mode

The definitions and means of the explanatory variables employed in the analysis are displayed in Table 2. The first set of variables is used as a proxy for the level of economic resources in the home, excluding the mother's contribution. Two-parent households are divided into three groups according to whether the father's earnings are in the lowest, middle, or upper segment of the income distribution. The variable "unmarried" equals 1 if the mother is single, widowed, divorced, separated, or informally married.[8] Two-parent households with father's earnings in the lowest group constitute the omitted category used as benchmark.

Families in the higher income groups can afford the more expensive forms of care. Higher levels of income may also facilitate access to the desired mode (e.g., moving to a neighborhood where it is available). If center care is regarded as optimal for preschoolers, increases in the level of the household's resources would be expected to raise the odds of relying on this mode as opposed to the less expensive arrangements with a relative or a babysitter in her home. The sign of the effect of increases in resources on the odds of relying on center care as opposed to a babysitter in the child's home is ambiguous, however. Empirically, only a small fraction of the arrangements for preschoolers take the form of in-home care by a babysitter (10.0% in the present sample). Thus, whether the probability of using

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[7]   Most parents with two or more children in substitute care use a common arrangement (89% in the present sample).

[8]   There are 21 cases of unions reported as informal marriages in this sample. These cases were classified in the "unmarried" group, since it is likely that the marital partner is not the child's father, and that his contribution to child care decisions and costs is small. Possibly because only a few cases are involved, virtually the same results were obtained with these observations classified in the "married" group.

Table 2. The explanatory variables

Variable	Definition	Mean
Marital status and income		
Married-middle income group	= 1 if mother is married and father's income is in the second or third quartile[a]	0.37
Married-upper income group	= 1 if mother is married and father's income is in the fourth quartile	0.18
Unmarried	= 1 if mother is separated, divorced, single, widowed or informally married	0.31
Characteristics of mother's employment		
Log of hourly wage	Natural logarithm of mother's hourly wage	1.68
Hours of work	Number of hours mother works per week	35.67
Siblings in substitute care		
One sibling: 0 – 2	dummy variables which equal 1 if the preschooler	0.19
One sibling: 3 – 5	has one sibling in substitute care in the age category	0.06
One sibling: 6 – 12	indicated	0.19
Two or more siblings age 12 or under	= 1 if the preschooler has two or more siblings in substitute care age 12 or under	0.15
Control variables		
Black	= 1 if mother is of black race	0.54
South	= 1 if region of residence is South	0.48
Outside SMSA	= 1 if place of residence is not an SMSA	0.24

[a] Husband's income is coded in 18 categories in the survey. The geometric mean of the endpoints is used. Because of this construction of the income variable, it was not possible to divide the distribution into four parts with exactly the same number of cases

center care rises or falls as economic resources increase is likely to be dominated by how this change affects the odds of relying on center care as opposed to a relative or a babysitter in her home.

The next variables in Table 2 are the mother's wage (in log form) and her hours of work. Different interpretations have been given to these factors in previous studies on child care arrangements. Following a long tradition in the economics literature, Duncan and Hill (1975) and Lehrer and Kawasaki (1985) view the mother's wage primarily as a proxy for the value of female time, and reason that an increase in such value should be associated with decreased reliance on the modes of care that tend to be more intensive of the mother's time. Hours of work are viewed in the latter study as an indicator of the feasibility of various forms of care. Mother's labor force activity on a part-time basis may facilitate the sharing of child care responsibilities between husband and wife, and may also make care by an older sibling or other relative a feasible alternative. As noted earlier, day care centers provide little flexibility for mothers who work part time.

These hypotheses predict that increases in the mother's wage raise the odds of relying on center care rather than a relative, decrease the odds of relying on center care rather than a babysitter in the child's home, and have no impact on the odds of relying on center care as opposed to a babysitter in her home. In addi-

tion, as the mother's hours of work rise, the odds of using center care rather than any of the other modes is predicted to increase.

Leibowitz et al. (1988, p. 207) have argued that in two-earner households there may be an asymmetry between the effects of the father's and the mother's contribution to the economic resources of the family, child care being regarded as an expense to be paid primarily out of the mother's earnings:

> If families view the wife as *choosing* between home and market but see the husband's employment as given, they may also see the wife's earnings as the appropriate source of payment for child care, since she would provide the care if she did not work.

In the context of the present model, this view implies that the main influence of the mother's wages and hours of work is an income effect. Increases in these variables are expected to raise the odds of relying on center care as opposed to care by a relative or a babysitter in her home, more so than increases in the husband's contribution.

The next set of variables in Table 2 indicate the presence and number of other children in the household also in substitute care. By diluting the parental resources of time, energy, and money, such children are likely to reduce the parents' ability to use the preferred arrangement – a day care center – for the care of the preschooler. The presence of another child needing care also introduces incentives to rely on babysitters or relatives, because these modes typically involve substantial economies of scale. The probability of center care is thus expected to be highest for the preschooler who is the only young child in the family, and to decline as the number of children increases. Among preschoolers who have a sibling also needing arrangements, the reduction in the probability of center care is expected to be smallest when the sibling is also a preschooler, because in this case parents seeking a common arrangement would experience no conflict in terms of the optimal mode for each child.

Previous research has emphasized the benefits of wide spacing between children; indeed, child spacing has been used as an indicator of child quality (Nerlove and Razin 1981). The argument is that the longer the interval between births, the greater the time and monetary resources that parents can devote to each child. If the reduction in the probability of using center care for the preschooler associated with the presence of a sibling is in fact smallest when the sibling is also a 3–5-year-old child, there may be an influence operating in the opposite direction in terms of the quality of substitute care, for children in two-earner households. The child quality-spacing linkage may thus be more complex than previously thought.

The last variables in Table 2, indicating place of residence and race, are used to control, at least in part, for supply factors.[9] Child care centers are more widely available in the South and in large metropolitan areas (U.S. Child Development Office 1975; U.S. Department of Health, Education and Welfare 1978; Abt 1977).

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[9]   Unfortunately, the 1982 NSFG contains no direct information on accessibility to the various modes, a deficiency shared by most data sets. For an exception, see Yaeger (1978).

Table 3. Multinomial logit estimates (*t*-ratios in parentheses). * Significant at 0.05 level

	Day care center vs. relative	Day care center vs. babysitter in her home	Day care center vs. babysitter in child's home	Babysitter in her home vs. relative	Babysitter in her home vs. babysitter in child's home	Babysitter in child's home vs. relative
Marital status and income						
Married – middle income group	0.6876*	0.3342	−0.6238	0.3533	−0.9581	1.3114*
	(2.1)	(0.8)	(−0.9)	(1.0)	(−1.4)	(2.0)
Married – upper income group	0.9536*	0.4968	−0.9518	0.4568	−1.4486*	1.905*
	(2.4)	(1.1)	(−1.3)	(1.1)	(−2.0)	(2.8)
Unmarried	0.2243	−0.0952	−1.1944	0.3195	−1.0992	1.4187*
	(0.6)	(−0.2)	(−1.7)	(0.9)	(−1.6)	(2.1)
Characteristics of mother's employment						
Log of hourly wage	0.8274*	0.8871*	0.3705	−0.0596	−0.5166	0.4570
	(2.8)	(2.7)	(1.0)	(−0.2)	(−1.5)	(1.4)
Hours of work	0.0387*	0.0393*	0.0492*	−0.0006	0.0099	−0.0105
	(2.8)	(2.7)	(2.8)	(−0.05)	(0.6)	(−0.7)
Siblings in substitute care						
One sibling: 0–2	−0.7379*	−0.7608*	−1.889*	0.0229	−1.1286*	1.1514*
	(−2.5)	(−2.3)	(−4.4)	(0.07)	(−2.6)	(2.7)
One sibling: 3–5	−0.5037	−0.3535	−1.0514	−0.1501	−0.6979*	0.5478
	(−1.2)	(−0.7)	(−1.4)	(−0.3)	(−0.9)	(0.8)
One sibling: 6–12	−0.7876*	−1.1304*	−1.3413*	0.3428	−0.2109	0.5536
	(−2.7)	(−3.6)	(−2.8)	(1.2)	(−0.4)	(1.2)
Two or more siblings age 12 or under	−1.5566*	−1.2613*	−2.6879*	−0.2954	−1.4267*	1.1313*
	(−4.1)	(−2.9)	(−5.3)	(−0.9)	(−3.0)	(2.6)
Control variables						
Black	−0.4689*	0.3834	0.8272*	−0.8523*	0.4438	−1.2961*
	(−2.1)	(1.5)	(2.3)	(−3.5)	(1.2)	(−3.6)
South	0.0121	0.4770	0.6178	−0.4649	0.1408	−0.6057
	(0.05)	(1.9)	(1.8)	(−1.9)	(0.4)	(−1.8)
Outside SMSA	−0.9191*	−0.0293	−0.4394	−0.8897*	−0.4100	−0.4797
	(−3.5)	(−0.09)	(−1.1)	(−3.0)	(−1.0)	(−1.3)
Constant	−2.6890*	−2.7019*	0.1464	0.0129	2.8484*	−2.8354*
	(−3.0)	(−2.8)	(0.1)	(0.02)	(2.5)	(−2.6)

And the probability of extended-family members living in the household or community is generally higher in the black population.

It may be noted in Table 2 that 54% of the children in the sample are black. This high percentage reflects in part the greater labor force participation of black women with young children. In addition, the black population was oversampled in this survey, leading to an overrepresentation of black children. The implications of this are discussed in the next section.

C. Findings

The multinominal logit coefficients and their t-ratios are reported in Table 3. These estimates provide information on the sign and statistical significance of each influence.[10] Their magnitudes can be ascertained from the probabilities in Table 4. These probabilities also indicate the direction of the total effects.[11]

Table 4. Estimated probabilities for selected values of explanatory variables

	Day Care Center	Babysitter in her home	Babysitter in child's home	Relative
Reference child[a]	0.23	0.41	0.13	0.23
Marital status and income				
Married − low income group	0.17	0.43	0.05	0.34
Married − upper income group	0.24	0.38	0.19	0.19
Unmarried	0.16	0.44	0.16	0.25
Characteristics of mother's employment				
Wage = $ 3 per hour	0.16	0.48	0.11	0.26
Wage = $ 9 per hour	0.30	0.35	0.14	0.20
Hours = 26	0.16	0.44	0.16	0.24
Hours = 46	0.30	0.37	0.15	0.19
Siblings in substitute care				
No siblings	0.45	0.27	0.07	0.21
One sibling 0−2	0.24	0.30	0.23	0.23
One sibling 3−5	0.33	0.28	0.14	0.25
Two or more siblings	0.13	0.28	0.29	0.29
Control variables				
Black	0.24	0.30	0.06	0.39
South	0.29	0.33	0.09	0.29
Outside SMSA	0.16	0.30	0.14	0.40

[a] The characteristics of the benchmark preschooler are the following: the mother is married; the father's income is in the middle group; the mother's wage and hours of work are equal to the mean; the child has one sibling age 6 − 12 in substitute care; the race is white, and residence is in an SMSA, not in the South

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[10] For any given variable, knowledge of the coefficients in three columns permits calculation of the other three coefficients. The *t*-values, however, cannot be inferred, and for this reason the entire set of coefficients and *t*-ratios is reported. Other advantages of reporting all the estimates are noted in section D.

[11] For example, if an increase in an explanatory variable raises the odds of using mode 1 rather than modes 2 or 3, but decreases the odds of relying on mode 1 rather than mode 4, does the probability of using mode 1 rise or fall? The figures in Table 4 provide the answer.

Marital status and income

An increase in the father's earnings from the lowest to the middle income group raises the odds of relying on center care as opposed to a relative ($t = 2.1$). The odds of relying on a day care center rather than either of the two babysitting arrangements, however, are not affected significantly ($t = 0.8$ and -0.9). In addition, further increases in the father's income from the middle to the upper group have no significant effects on the likelihood of using center care. This can be seen by noting that the differences in the coefficients associated with "married – middle income group" and "married – upper income group" in columns 1, 2 and 3 are small (and insignificant), or by observing that the probability of relying on institutional care increases from 0.17 to 0.23 when income rises from the first to the second income group, increasing to only 0.24 for the upper income group. Thus, changes in the father's income influence child care mode choice, but the role of this factor appears to be limited.[12] It is also interesting to note that ceteris paribus, the odds of relying on center care rather than on any of the other modes are not significantly different for unmarried mothers and married women with husband's income in the lowest quartile (*t*-values are 0.6, -0.2 and -1.7).

Characteristics of mother's employment

The likelihood of relying on center care rather than a relative or a babysitter in her home increases significantly with the mother's hours of work (*t*-ratios are 2.8, 2.7, and 2.8). A two-standard deviation increase in hours of work from 26 to 46 h raises the probability of relying on center care from 0.16 to 0.30, almost a 100% increase. This may reflect in part an income effect, but probably more importantly, the lack of flexibility of center care for part-time working mothers, coupled with the fact that employment on a part-time basis often makes informal arrangements feasible and convenient.

The likelihood of relying on center care also increases with the mother's wage (*t*-ratios are 2.8, 2.7, and 1.0). The magnitude of the effect is large. An increase in the mother's wage from \$ 3 to \$ 9 per hour, approximately a two-standard deviation change, almost doubles the probability of relying on center care, from 0.16 to 0.30.

The hypothesis that the mother's wage is primarily a proxy for the value of female time predicts a positive coefficient for the mother's wage in column 1, a zero coefficient in column 2, and a negative one in column 3. The hypothesis that the mother's wage is primarily capturing an income effect implies positive coefficients in columns 1 and 2, with an ambiguous prediction for column 3. The results show significantly positive coefficients in the first and second columns, and an insignificant coefficient in the third column. The expected and actual signs are summarized in Table 5. These findings may be interpreted as indicating that (a) the signs of the income and price effects in columns 1 and 2 are as expected, and

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[12]   It may also be noted that in preliminary runs a distinction was made between the second and third quartiles, with a dummy variable for each. The differences between the coefficients of these variables were negligible, and for this reason the two groups were combined.

Table 5. Price and income effects associated with mother's wage

	Day care center vs. relative	Day care center vs. babysitter in her home	Day care center vs. babysitter in child's home
Expected signs			
Price effect	+	0	−
Income effect	+	+	?
Actual signs	+	+	not significant

(b) a positive income effect is operating in column 3, cancelled out by a price effect of approximately equal strength.

Overall, the results are consistent with the hypothesis that increases in the mother's earnings play a greater role on the probability of relying on center care than do changes in the father's earnings. In part this is because strong positive income effects associated with the mother's wage are reinforced in one important case (the choice between center care and relative) by a positive price of time effect. As shown below, re-estimation of the model including mother's education among the explanatory variables lends further support to the view that the influences associated with the father's income are weaker.

Education

Table 6 indicates that increases in the mother's education (measured in years of schooling) raise the odds of relying on center care as opposed to any of the other modes (*t*-values are 4.6, 2.2, and 2.4). As education rises from 8 to 12 and 16 years of schooling, the probability of using center care increases from 0.11 to 0.20 and to 0.32 − a large effect. It has been suggested in earlier research that more educated mothers are more efficient in obtaining and applying information relevant to child quality (Leibowitz 1977). The present results strongly support this view in the context of child care arrangements.

Because education and wages are correlated, it is not surprising to note, in comparing the first three columns in Tables 3 and 6, that the coefficients on the mother's wage variable decrease somewhat when education is included in the model. Some reduction in the coefficients of father's income is also to be expected, because of the correlations between (a) the spouses' schooling levels, and (b) education and earnings. It is surprising to observe, however, that the father's income coefficients in the first column decline substantially in magnitude and actually become insignificant. This result suggests that to a large extent, the greater reliance on center care by families with father's income in the middle or upper income groups is an education effect. Interestingly, the coefficients associated with "married − upper income group" in columns 5 and 6 of Table 6 are very similar in magnitude and significance to their counterparts in Table 3, implying that the influence of this variable on the odds of relying on in-home care by a babysitter as opposed to a relative or a babysitter in her home is truly an income effect.

Table 6. Multinomial logit estimates: mother's education included[a] (t-ratios in parentheses)

	Day care center vs. relative	Day care center vs. babysitter in her home	Day care center vs. babysitter in child's home	Babysitter in her home vs. relative	Babysitter in her home vs. babysitter in child's home	Babysitter in child's home vs. relative
Mother's education	0.2387*	0.1217*	0.1706*	0.1170*	0.0489	0.0681
	(4.6)	(2.2)	(2.4)	(2.2)	(0.7)	(1.0)
Marital status and income						
Married – middle income group	0.4546	0.2421	−0.7775	0.2125	−1.020	1.2321
	(1.3)	(0.6)	(−1.1)	(0.6)	(−1.5)	(1.9)
Married – upper income group	0.4082	0.2461	−1.3369	0.1620	−1.5831*	1.7451*
	(1.0)	(0.5)	(−1.8)	(0.4)	(−2.2)	(2.5)
Unmarried	0.1344	−0.1174	−1.2622	0.2518	−1.1448	1.3966*
	(0.4)	(−0.3)	(−1.8)	(0.7)	(−1.6)	(2.1)
Characteristics of mother's employment						
Log of hourly wage	0.6804*	0.8059*	0.2533	−0.1255	−0.5526	0.4271
	(2.2)	(2.5)	(0.7)	(−0.5)	(−1.6)	(1.3)
Hours of work	0.0371*	0.0383*	0.0480*	−0.0012	0.0096	−0.0108
	(2.7)	(2.6)	(2.7)	(−0.1)	(0.6)	(−0.7)

[a] The siblings, race, and residence variable are held constant

* Significant at the 0.05 level

Table 7. Child care arrangements: preschoolers with one or more siblings in substitute care

	One sibling 0-2		One sibling 3-5		One sibling 6-12		Two or more siblings under 12	
	n	%	n	%	n	%	n	%
Same arrangements								
Day care	18	14.0	10	22.7	17	13.9	7	7.0
Relative or babysitter	91	70.5	28	63.6	90	73.8	80	80.0
Multiple modes	6	4.7	2	4.5	0	0.0	4	4.0
Different arrangements								
Day care for preschooler	8	6.2	2	4.5	10	8.2	4	4.0
Relative or babysitter for preschooler	4	3.1	1	2.3	4	3.3	4	4.0
Multiple modes for preschooler	2	1.6	1	2.3	1	0.8	1	1.0
Total: Same arrangements	115	89.1	40	90.9	107	87.7	91	91.0
Total: Different arrangements	14	10.9	4	9.1	15	12.3	9	9.0
	129	100.0	44	100.0	122	100.0	100	100.0

Siblings

Siblings influence the child care mode chosen for the preschooler in a major way. When the preschooler is the only child for whom arrangements are made, center care is used with a probability of 0.45. The probability falls to about half of this amount if there is a sibling in substitute care in the 6-12 age category (0.23) or in the 0-2 age group (0.24). And the probability drops to 0.13 if arrangements are made for two or more siblings.[13] These effects are large in magnitude and highly significant.

It was hypothesized that the presence of a sibling aged 3-5 would depress the probability of relying on center care by a smaller amount than the presence of either a younger or an older sibling in substitute care, because there is no conflict in choosing the most appropriate mode when the children are of very similar ages. The estimated probabilities of center care for the preschooler are consistent with this view. The probability is 0.33 when the sibling is also a preschooler, compared to 0.23 and 0.24 when the sibling is in the 6-12 or 0-2 age categories, respectively. The estimates for a sibling in the 3-5 age group are based on only 40 cases, however, and the differences between these coefficients and those for the older and younger ages are not significant at conventional levels.[14] Thus, the question as to whether the age of the sibling matters when there are two children in substitute care cannot be answered conclusively here. The descriptive statistics in Table 7 are suggestive, however. They show that parents who rely on substitute

[13] A distinction by age was not made for the case of two or more siblings in substitute care, because of the small number of observations in this cell. In any event, there is not much variation in the variable of interest here: in the vast majority of cases with two or more siblings in substitute care, at least one is in an age group different from that of the preschooler.

[14] Pairwise comparisons of the coefficients associated with "one sibling – 3-5" in the first three columns with their counterparts for "one sibling – 0-2" and "one sibling – 6-12" yield insignificant *t*-values.

care for two or more siblings tend to make the same arrangements for all children: the percentage of households using the same arrangement ranges from 88% when there is a sibling 6–12 to 91% when there are two or more siblings under age 12.[15] The common arrangement is most likely to be center care when there is only one sibling in substitute care, also a preschooler. In 23% of the cases, households with two preschoolers choose center care as the common arrangement, compared to 14% when the sibling is in the 0–2 or 6–12 age brackets. Thus, the age of the sibling appears to matter. Further research on this issue with a larger body of data is warranted.

Working parents of young school-age children (6–12) do not always make arrangements for them, for various reasons. Sometimes, the mother only works during school hours. In other cases, the parents have flexible work hours and can coordinate their schedules so that before and after school care arrangements are not necessary. And some children are unsupervised early in the morning or between the time school ends and the time a parent arrives to the home.[16] In light of this, the model in Table 3 was re-estimated with the variables redefined in such a way as to identify the presence of siblings (as opposed to the presence of siblings *in substitute care*). The corresponding probabilities of reliance on center care in Table 4 remained substantially unchanged, with two exceptions: (a) the probability associated with "one sibling aged 6–12" is 0.31 (compared to 0.23 for "one sibling aged 6–12 in substitute care"), and (b) the probability associated with "two or more siblings" is 0.20 (compared to 0.13 for "two or more siblings in substitute care"). Thus, the arrangements chosen for the preschooler are more sensitive to the presence of siblings also in substitute care than they are to the presence of young children for whom special arrangements are not made.[17] This is not surprising, since all children dilute resources, but the economies of scale argument applies only to children in substitute care.[18]

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[15]   The four categories in Table 1, with the addition of "multiple modes," are used to ascertain whether or not a common arrangement is employed. To the extent that some parents use the same mode but different caretakers for two siblings – an unlikely situation – the figures in Table 7 may overstate the true fraction of households relying on common arrangements.

[16]   For 15% of the cases in the sample, the number of siblings aged 6–12 exceeds by 1 or more the number of siblings in substitute care in this age group.

[17]   In preliminary runs, a variable indicating the presence of a sibling 13 years of age or older was also included in the model. This variable was expected to have a negative effect on the probability of relying on center care for the preschooler, both because of the dilution of resources associated with an extra child, and because a teenager is a potential caregiver after school hours. No significant effects were discerned, however, perhaps in part because teenagers were present in only 12% of the cases. This variable was dropped from the model.

[18]   The smaller effect associated with the variables indicating siblings, as opposed to siblings in substitute care, may also reflect in part the fact that the former variable is measured with more error in this data set. The siblings variables are constructed on the basis of the respondents' pregnancy histories. On the other hand, the variables regarding siblings in substitute care are based on questions the respondents answered for each child in the household for whom arrangements are made, including any adopted or step children.

Table 8. Estimated probabilities of relying on center care: effects of mother's wage and siblings allowed to differ by race

	White sample	Black sample
Reference child[a]	0.20	0.27
Mother's wage		
$ 3 per Hour	0.16	0.15
$ 9 per Hour	0.23	0.42
Siblings in substitute care		
No siblings	0.48	0.44
One sibling 0 − 2	0.21	0.29
Two or more siblings	0.08	0.20

[a] The characteristics of the benchmark preschooler are the following: the mother is married; the father's income is in the middle group; the mother's wage and hours of work are equal to the mean for the appropriate racial group; the child has one sibling in substitute care in the 6 − 12 age category; residence is in an SMSA, not in the South

Control variables

Residence in the South and in SMSAs is associated with higher probabilities of reliance in the center care mode, as expected; the effects associated with Southern residence are only marginally significant, however. Ceteris paribus, the probabilities of attending a day care center are approximately equal for black and white preschoolers (0.24 and 0.23). Black mothers are substantially more likely than their white counterparts to rely on relatives and less likely to rely on babysitters − probably reflecting a difference by race in the availability of caregivers within the family.

Differences by race

To ascertain whether the effects on child care mode choice of the economic and family structure variables differ by race, the model was re-estimated separately for the two groups (results not reported). Because of the small subsample sizes, many of the standard errors are large, producing imprecise estimates. In general, the point estimates suggest that the direction of the effects does not vary by race. However, the influences associated with the presence of siblings appear to be larger (in absolute value) in the white sample, and the opposite holds for the mother's wage variable. To take this into account, the model in Table 3 was re-estimated, adding interaction terms between race on the one hand, and mother's wage and the siblings variables on the other.[19] The resulting probabilities, reported in Table 8, support the view that the impact of mother's wage is more pronounced in the black population, while the magnitude of the quantity-quality tradeoff is larger among whites.

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[19] Because of the very small cell size, no attempt was made to identify race differentials in the effect of a sibling aged 3 − 5.

D. Conclusions

The present paper has examined the determinants of the probability of using center care for preschoolers within the context of a multinomial logit model. Several methodological and substantive implications may be drawn from this analysis.

Four child care modes have been considered – center care, a babysitter in her home, a babysitter in the child's home, and a relative. Differences among these arrangements have been identified, ranging from the characteristics of the caregiver and the emphasis placed on the educational component of child care, to monetary and time costs, economies of scale, and flexibility of scheduling. Although this classification is by no means ideal, substantial intra-mode variability remaining, it represents an improvement over the broader categories employed in earlier investigations (Duncan and Hill 1975, 1977; Lehrer and Kawasaki 1985; Leibowitz et al. 1988).

This study underscores the importance of reporting the entire set of multinomial-logit coefficients and *t*-ratios. With one exception (Lehrer and Kawasaki 1985), all previous studies have chosen one arrangement – usually the non-market mode – as the benchmark, reporting only the effects of changes in the explanatory variables on the odds of using the various modes relative to the reference arrangement (e.g., Kurz et al. 1975; Robins and Spiegelman 1978; Leibowitz et al. 1988). Following this approach, Table 3 would contain only columns 1, 4 and 6. It is clear from the presentation in Sect. C that the estimates in the other three columns are crucial for understanding the complex ways in which various factors influence child care mode choice.

At the substantive level, increases in the father's income level are found to raise the probability of using center care for preschoolers. The effect, however, is non-linear. The only distinction that matters is that between the lowest quartile and the higher income groups. And this influence appears to be mostly an education effect. No significant differences in the likelihood of relying on center care are discerned between single mothers and their married counterparts with husbands' earnings in the lowest quartile. Increases in the mother's wage raise the probability of using center care substantially, an effect that persists even when education is controlled for. This influence is interpreted as reflecting in part an income effect, in part a value of time effect. The greater role on child care arrangements played by the mother's wage supports the hypothesis that for decisions concerning child care, there is an asymmetry between the father's and mother's contribution to economic resources.

The likelihood of reliance on center care also rises significantly with mother's hours of work. Although this variable has been taken as exogenous here, a case can be made that there is simultaneity in the child care mode and female labor supply decisions. Modelling these variables as jointly dependent would be a useful extension of this analysis and a promising avenue for further research.

Educational attainment emerges as another important factor. The probability of center care increases markedly with the mother's schooling level. The better educated mothers are more likely to perceive center care as optimal and to choose this arrangement for their preschoolers.

The presence and number of siblings in substitute care have a strong influence on the mode used for the preschooler, indicating that there is a very real quality-quantity tradeoff in operation. The presence of two or more siblings in substitute care (as opposed to none) reduces the probability of relying on center care for the preschooler by as much as 32 percentage points. When the preschooler has one sibling, the age of the sibling appears to matter, although the evidence on this issue is weak because of sample size limitations. Further research on this question may increase our understanding of the implications of spacing for child quality.

Among households that rely on market arrangements for the care of their children, expenditures on child care represent a substantial fraction of the total family income – approximately 10% overall, and as high as 20% – 26% among lower income families (Hofferth 1987). Child care has clearly become a major item in the budgets of many families. The magnitude of time costs for those who rely on non-market arrangements is likely to be substantial also. Perhaps the greatest void in our knowledge on child care is in the area of non-market arrangements. Efforts in this direction have begun (Presser 1988), and will continue in the years ahead. Given the different meanings of quality care for children of different ages, future investigations on the determinants and implications of child care mode choice should continue to focus on narrowly defined age groups.

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