Determinants of State Child Care Utilization Patterns for Estimating the Size of the Child Care Workforce at the State Level

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Year 2 Full Report

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The Center for the Child Care Workforce (CCW) was founded in 1978 as the Child Care Employee Project and in 2002 merged with the American Federation of Teachers Educational Foundation (AFTEF). CCW/AFTEF continues to carry out CCW's mission as a nonprofit research, education and advocacy organization committed to improving early care and education quality by upgrading the compensation, working conditions and education of early childhood professionals.

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Human Services Policy Center at the University of Washington's Daniel J. Evans School of Public Affairs conducts quantitative research in a wide range of child and family issues, considering relationships among child well-being, financing policy and workforce issues, and seeks to improve the understanding of policy leaders and the general public. Its mission is to improve the well-being of children and families by promoting collaborative and preventive approaches to service across the bounds of professions, disciplines, and service organizations.

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Introduction

To meet the nation's objective of promoting early learning and development, we must improve the professional preparation and occupational stability of the adults who are paid to care for young children. Federal and state policy leaders therefore need accurate information about the size of the child care workforce, the number and distribution of this workforce among various child care settings (centers, family child care, relatives, and other non-relative care), and the ages of the children in care. Unfortunately, traditional workforce sources such as the Bureau of Labor Statistics and the Census Bureau have not been able to provide this information. This report describes a method and results that can be used, in the absence of these data, to derive state-level estimates of the size of the child care workforce.

The Child Care Bureau funded a two-year project, conducted by the Center for the Child Care Workforce and the Human Services Policy Center, to derive a method for producing "demand-based" workforce estimates from parent surveys of child care use, adjusted and enhanced with existing research and secondary sources. In the project's first year, we used a publicly available, nationally representative data source – the National Household Education Survey (NHES) 1999 – to produce national estimates of the size of the child care workforce caring for children age birth to five, by type of setting and age of children. We compared these estimates to those reported by the Census Bureau and the Bureau of Labor Statistics. Not unexpectedly, the major finding to emerge from this comparison was that existing federal data sources are seriously undercounting many types of child care providers, especially paid relatives. Further, the design of these data sources omits both paid caregivers who do not consider themselves part of an occupational category and unpaid workers. Understanding the child care labor market requires considering both of these categories of workers. The results of this first-year effort are summarized in *Estimating the Size and Components of the U.S. Child Care Workforce and Caregiving Population* (Center for the Child Care Workforce and Human Services Policy Center, 2002).

In the second year, having developed and implemented this demand-based approach at the national level, we have turned our attention to the goal of producing state-level child care workforce estimates. Since research has consistently shown state variations in child care patterns (Capizzano, Adams & Sonenstein, 2000; Capizzano & Adams, 2000a; Capizzano & Adams, 2000b), states and policy makers cannot simply apply national estimates to a state population of children from birth to five years old. This report describes the development and results of models that may be used towards the goal of ultimately producing state-level estimates.

State-level child care workforce estimates are critically needed for several reasons. Much of early care and education policy is enacted at the state level, including decisions about financing and quality improvements. Knowing the size of the current child care workforce will assist states in planning such initiatives. As is true in the national arena, state and local planners of compensation initiatives, training programs and financing models often must operate without an accurate estimate of the current number of child care workers, or the number of workers needed to sustain the child care delivery system in the future. In interviews conducted at the beginning of this project, we were told repeatedly by key policy informants that, while they welcome a reliable method for estimating the size of the U.S. child care workforce, adapting such a method for use at the state level was vitally important for the work of state governments, training institutions and private-sector stakeholders.[1]

In order to apply the demand-based approach for estimating the size of the child care workforce, however, demand data must be available that reflect the population of that state, i.e.,

[1] Proponents of compensation initiatives in Pennsylvania and New York told us they are hampered in their efforts to advocate, plan and budget for these efforts without reliable state-level estimates of the number of child care workers or their educational qualifications. California's Children and Families First Commission, which distributes state tobacco tax funds to counties in order to enhance services to children ages 0-5, is concerned about underserved populations of children with special needs, infants, and those whose first language is not English, but is unable to fully assess their ability to support these children without baseline estimates of the number and qualifications of child care workers serving these populations.

representative survey data from parents regarding their child care use. To our knowledge, such utilization-of-care data are available only for about 16 states.[2] Rather than simply illustrating our demand-based approach at the state level, our second-year research has focused on developing statistical models that can be used to generate estimates of child care use for children 0-5 for states where household surveys are unavailable. These models contain both individual-level demographic predictors of patterns of child care use (percentage of children using care, average hours, and child:adult ratios for each type of care), and state-policy and contextual variables that capture variations in child care use among states. These models can then be used to predict the relevant child care use patterns needed for applying our demand-based approach to estimate the size of the child care workforce in a given state.

This report outlines the methods and results of the models developed to predict patterns of child care use for a given state from a combination of individual and state demographic, labor force and policy variables, in the absence of available secondary data on child care use. Our goal is to produce state-level estimates of child care use patterns, based on individual demographics in each state adjusted for key differences between states that we hypothesize may affect these patterns. Our goal is not to develop causal models between state-level variables and individual child care choices, but to measure associations between child care choices and state-level variables.

Our approach should allow us to produce estimates of the size and components of the child care workforce for any state. For states where current household survey data about child care use are available, we can apply our demand-based workforce estimate method directly. For other states, we can estimate child care use from available demographic data and state contextual variables. Once we have state-level estimates on child care use (either directly or indirectly), we can apply the demand-based method to produce workforce estimates.[3]

Our three primary research questions are:

- Is there variation among states in patterns of child care use?
- What is the extent of this state-level variation, once differences in individual demographic characteristics are controlled?
- What state-level policy and demographic variables can help explain state differences in patterns of child care use?

Methods

Data

The National Survey of America's Families (NSAF), conducted by the Urban Institute, collects representative data on a broad range of economic, health and social characteristics of children, adults under the age of 65, and their families. The NSAF sample is designed to be representative of the nation as a whole and of 13 states in particular: Alabama, California, Colorado, Florida, Massachusetts, Michigan, Minnesota, Mississippi, New Jersey, New York, Texas, Washington and Wisconsin. Due to these representative state samples contained in the data, the NSAF has an unprecedented ability to allow the measurement of differences among states on key items of interest.

The NSAF was fielded in 1997 and 1999, and a third round was scheduled for completion by the end of 2002, but data are not yet available. This report is based on data from the 1999 survey, which contains information on over 73,000 adults under age 65, and almost 36,000 children, in over 42,000

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[2] The data sources on child care use that we have identified include the 13 states in the NSAF 1999, the four states for which HSPC has conducted demand surveys as part of the ECE Universal Finance Project and other studies (Illinois, Ohio, South Carolina and Washington), and Minnesota, for which the Wilder Institute conducted a demand survey.

[3] While we might have produced state-level estimates for those states where demand data are available, we had to decide, faced with limited resources, between creating unvalidated estimates for a limited number of states, or developing a methodology that would allow us to generate estimates for any of the 50 states, and chose the latter approach as the one that would have greater long-term usefulness for the field.

households. In addition, we collected state-level policy and contextual information from a variety of sources, and merged it with the NSAF data by state of residence in order to produce a dataset combining individual-level and state-level data. The state variables, described below, came from the U.S. Census Bureau 2000, the Education Week Annual State Policy Survey 2001, the Children's Foundation's 1999 Child Care Licensing Study and 1999 Family Child Care Licensing Study, and state child care bureaus and offices in the 13 NSAF states.

Sample

Our sample for this analysis includes all households with at least one child aged 0-5.[4] Further, since our purpose is to measure differences among states in patterns of child care use, we dropped all households not residing in one of the 13 NSAF states. Our unit of analysis is the child, and our final sample contains 9,467 children within the 13 states. As we modeled child care use patterns separately for children in different age groups, we divided our sample into three age categories: infants (ages 0-1), toddlers (ages 2-3) and preschoolers (ages 4-5). This sample contains 2,906 infants, 3,503 toddlers and 3,058 preschoolers. All cases are weighted with the appropriate school-year child care weights included with the NSAF data.

Variables

Dependent Variables

We analyze the effects of individual demographics and state contextual variables on patterns of child care use. Our dependent variables consist of three measures: 1) use of child care, a dichotomous variable coded as "1" if a child was in a particular type of care at least once a week in the last month, or "0" for otherwise,[5] 2) average time in care per week, a continuous variable of hours per week spent by children in each type of care,[6] and 3) the number of children per adult in the child care setting, as reported by parents, otherwise known as the child:adult ratio, also a continuous variable.[7]

We examine the association between individual-level and state-level variables, and each of the three sets of dependent variables, separately for the four main types of child care: center-based care, family child care (non-relative care outside the child's home), relative care, and other non-relative care (i.e., in the child's home, such as care by a sitter or nanny).

Independent Variables

Both individual-level and state-level variables are included in our final results. The individual-level variables in our models describe characteristics of children and their families. Although our primary goal is to understand whether and how state-level variables affect families' child care decisions, it is necessary to control for key individual characteristics commonly associated with such decisions.

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[4] We use only the school-year cases for our estimates, as described in the NSAF methodology reports (Converse, Safir, Scheuren, Steinbach & Wang, 1999).

[5] Children are often in more than one type of care. Since we measure each care type separately, we implicitly take this into account, since the dichotomous variables for each care type are not mutually exclusive. If we used primary care arrangement as our dependent variable, we would likely underestimate the percentage of children in each type of care, since many children are in multiple care arrangements.

[6] These models are estimated only for children using each type of care with hours greater than zero.

[7] We note the possibility of inaccuracy in such parent reports; one source of information in this regard is a study documenting the extent of parent misreporting of child:adult ratios in center-based care (Willer et. al., 1991). For the present analysis, however, it is not necessary to make adjustments for misreporting, since what we are analyzing is cross-state differences, not actual levels. When we apply these estimates in the workforce estimation routine, we do add a correction factor accounting for this documented error, so as not to overestimate the number of workers in our final results.

Characteristics of Children and Their Families

The characteristics of children and their families are based on self-reported information in interviews with the adult most knowledgeable about the "focal child," i.e., the child aged 0-5 randomly selected in each family for whom care arrangements are asked. The definition of family is broader in this dataset than in others, such as the Current Population Survey. The main difference is that the NSAF includes unmarried partners as family members, while others exclude them; another is that all members of extended families are considered to be in the same family. The following individual-level variables are included in the analysis.

Child's Age

This variable is defined as a child's age in years, since our age groups span more than one year. We expect that parents are more likely to use non-parental care for older children, and that younger children in non-parental care, even within the specified age groups, are more likely to be in certain types of such care, such as relative care (Capizzano, Adams, and Sonenstein 2000; Capizzano and Adams 2000a; Capizzano and Adams 2000b; Hofferth, Schauman, Henke & West 1998).

Number of Children Ages 0-5 in the Household Other than the Focal Child

This variable reflects how many other young children are in a given household. Based on information from the Children's Defense Fund and the Urban Institute, we expect that children in households containing other young children are less likely to be in non-parental child care (Ehrle, Adams & Tout (2002); Schulman 2000).

Number of Children Ages 6-17 in the Household

This variable measures the number of older children, ages 6-17, in a given household. We expect – again, based on information from the Children's Defense Fund and the Urban Institute – that family structure will impact the care arrangements of other children due to the distribution of available resources, mothers' decision-making about employment, and the potential availability of older children to provide some care, albeit for a limited number of hours (Capizzano, Adelman & Stagner 2002; Sonenstein et. al. 2002).

Number of Adults Other than Parents in the Household

This variable measures how many non-parental adults, whether relatives or non-relatives, live in the household with the focal child. The availability of other adults to provide child care assistance is likely to impact child care decisions (Capizzano, Ost & Adams (forthcoming); Leibowitz, Klerman & Waite 1991).

Single Mother

This dichotomous variable, coded as "1" if a mother is single, is likely to affect child care decisions for several reasons. First, for single mothers, paternal care is likely to be less readily available. Second, in order to support their families, single mothers are likely to have higher rates of employment than their married counterparts, and are more likely to need to rely on non-parental care while they are at work or engaged in education or training. These assumptions are based on data from the Current Population Survey, Household Economics Studies, and the Urban Institute (Capizzano, Adams & Sonenstein 2000; Casper 1997).

Household Income and Household Income Squared

Household income is defined as total family income for the previous year.[8] A squared term for household income is also included to capture a possible non-linear relationship between household income and child care use patterns. For example, low-income parents might be similar to high-income parents in their likelihood of using center care, since the former group may have access to subsidies to use in center care settings, and the latter group may prefer and be able to afford center care. These assumptions are based on data from the Urban Institute and from the National Child Care Staffing Study (Phillips, Voran, Kisker, Howes & Whitebook 1994; Sonenstein et. al. 2002).

Mother's Ethnicity

Studies have found significant effects of race and ethnicity on the choice of child care arrangements and hours in care (Ehrle, Adams, and Tout 2001; Fuller, Holloway, and Liang 1996). We use a variable for mother's race that is represented by four dichotomous variables indicating whether or not she is Hispanic, African American, Asian American/Pacific Islander or Native American, as opposed to Caucasian/European American, which is the reference category.[9]

Mother with Bachelor's Degree

Mother's education may be an important determinant of type of care selected or hours in care. For example, Ehrle, Adams, and Tout (2001) found that more educated mothers are more likely to select center care for their young children than less educated mothers. This dichotomous variable is coded as "1" if a child's mother has a four-year college degree, and "0" if otherwise.[10]

Mother's Age

A mother's age is defined in years. Preferences for and use of different types of care may vary by the age of the mother (US Census 1997). We experimented with including "mother's age squared" in our analysis, but regression results indicate that the results do not sufficiently support the possibility of a non-linear relationship between age and child care use to justify its inclusion.

Finally, we do not include mothers' employment as an explanatory variable in the multivariate analysis, although mothers' employment status and child care decisions are clearly interrelated. Including mother's employment status in a regression model could result in simultaneous equations bias, and could bias the coefficients of other variables in the multivariate equations.[11] Similarly, for

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[8] This is a composite variable created by NSAF from data gathered in several question items, and 'blurred' so that individuals in the dataset cannot be identified by their household income. The correlation between the two variables is .97.

[9] This set of dummy variables combines mother's race and ethnicity into a single variable. The small percentage of respondents indicating they were Hispanic, regardless of their race, were coded into the Hispanic category.

[10] We investigated using different measures of mothers' education in our models, including a continuous variable for years of education and a series of dichotomous variables reflecting different levels of education. Results from these models (not shown here) suggested that a single variable for whether or not the mother had a college degree was sufficient to capture the effects of education on child care use patterns; the obtainment of a Bachelor's degree was the point at which mothers' education significantly affects child care use patterns.

[11] The following discussion of endogeneity was taken from Brandon, Maher, Joesch & Doyle (2002).

"Consider the following equations:

(1) Child Care Hours$=a_0 + a_1 *$ Work Hours $+ a_2 *$ X $+u$

(2) Work Hours$=b_0 + b_1 *$ Child Care Hours $+ B_2 *Z + e$

The first equation means that we would like to estimate how Work Hours and other measurable variables X influence child care hours. Child Care Hours also depend on u, the error term, which incorporates other unknown or non-measurable determinants of child care hours. To correctly estimate a_1 requires that u is independent of Work Hours and X. This is unlikely, however, due to the presence of the second equation. One unknown variable could be how mothers value non-parental child care. If mothers believe that non-parental care is beneficial to their children's development, they are likely to increase both child care hours

these same reasons we did not include variables describing the nature of mother's employment that are likely related to her choice of child care, such as whether or not she works non-standard hours. We recognize that patterns of child care use are likely to be different among employed and non-employed mothers, but since we are interested in predicting child care use at the state level, we are not interested in modeling these differences. Our interest is in predicting child care use at the state level, after controlling for individual demographics. As described below, however, we include a variable specifying the percentage of women with young children in the state who are employed, as this variable is not endogenous to the outcome variable of interest (the individual's choice to use child care) but is hypothesized to affect the supply of child care at the state level.

State Variables

The following state variables were tested for inclusion in our models. Not all state variables are included in all sets of regressions, and some, like degree of center regulation, were often too highly correlated with other state variables, such as 75th percentile market rate for center care, to be included in any final models. When such co-linearity was observed, we chose the variable with the strongest theoretical argument for inclusion, as well as its patterns of co-linearity with other variables across all models. Whenever possible, we use variables specific to a particular type of care in models measuring the effects on that type of care.

Number of Licensed Center Slots per Child

This variable is defined as the total number of licensed center slots (capacity) divided by the number of children ages 0-5 in the state.[12] This measure of availability is only approximate, however, since we lack information on how many slots are reserved for children of certain ages, and center availability is likely to vary by age of child. Availability of centers varies considerably among states, from one slot per two children in Florida to one slot per five in Alabama. We expect the availability of center slots to be associated with greater use of center care.[13] It is not clear whether availability of licensed slots is a cause or effect of demand for center care, but for our purposes in this paper, it is sufficient to know the degree of association.

Number of Licensed Family Child Care Slots per Child

This variable is defined as the total number of licensed family child care slots (capacity) divided by the number of children ages 0-5 in the state.[14] Availability of licensed family child care varies greatly among states, from one slot per 2.5 children in Minnesota to one slot per 50 children in Mississippi.[15] We hypothesize that the number of family child care slots per child affects all three dependent variables, and that the availability of family child care slots will be associated with the use of such care.[16]

Percentage of Women with Children Ages 0-5 Who Are Employed

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and work hours. This relationship invalidates a_1 because u is no longer independent of Work Hours. Reciprocally, b_1 is invalid in the second equation because child care hours and e are not independent. Due to the presence of simultaneity bias, therefore, mother's employment status is excluded from the analysis as a right hand side variable." (pp. 71-72)

[12] Sources: Licensed capacity information collected directly from state data sources by CCW; U.S. Census Bureau (2000b).

[13] Hypothesis arrived at after extensive discussions among the authors and other advisors.

[14] Sources: Licensed capacity information collected directly from state data sources by CCW; U.S. Census Bureau (2000b).

[15] Part of the reason for such discrepancy in family child care availability is due to differences in definition. In New Jersey, for example, family child care programs serving more than five children are considered to be licensed centers. In Mississippi, however, a "small" family child care program can care for up to twelve children, and a "large" program can care for more than twelve children.

[16] Hypothesis arrived at after extensive discussions among the authors and other advisors.

This variable is the percentage of women with young children who are employed in each state.[17] We hypothesize that the labor market participation of mothers with young children is associated with the demand and use of different types of non-parental child care (Hofferth 1999; Webster and White 1995). Employment of women varies from 54 percent in Texas to 69 percent in Wisconsin. We further hypothesize that this variable affects type and hours of care only.

Population Density

Population density is defined as the number of people per square mile of land in each state,[18] a figure that may affect the availability of child care arrangements. States with a large proportion of urban areas are likely to have more licensed slots; rural or less densely populated states, by contrast, may be more likely to rely on different types of child care arrangements, such as relatives and neighbors. The most densely populated state in our database is New Jersey, with 1,134 people per square mile of land, and the least densely populated state is Colorado, with 42 people per square mile of land. We hypothesize that population density is associated with all three sets of dependent variables (Capizzano, Adams and Sonenstein 2000).

75th Percentile Market Rate for Center Care

This variable is the standardized measure of the 75th percentile market rate for center care for four-year olds in a given state, as determined by market rate surveys.[19] The cost of full-time center care per month per child is estimated in standard dollar amounts by adjusting the dollar amount by each state's median income. We hypothesize center market rates to be significantly correlated with the use and amount of each type of care.[20]

Regulation of Center-Based Care

This is a count variable of the number of "Yes" scores on the following items: whether all centers are required to be licensed by the state;[21] whether the maximum number of infants per staff member is required to be four or fewer; whether the child:adult ratio for children ages 0-2 is required to be 4:1 or less; whether the state requires regular ratios to be upheld during naptime; whether the state requires centers to observe a maximum group size for children ages 0-3; and whether smoking is prohibited in the center. A high number on this count variable indicates a high degree of regulation. State regulation of center care ranges from 0 in Alabama to 5 in New York. We hypothesize that regulation of center care affects all three dependent variables (Blau 2003; Blau 2001; Gormley 1999; Hofferth and Chaplin (1998); Howes, Whitebook & Phillips 1992).

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[17] Source: U.S. Census Bureau (1999a).

[18] Source: U.S. Census Bureau (2000c).

[19] As the 75th percentile varies within states, we use the 75th percentile for the city, county or region of the state with the highest rates, unless the maximum payment is determined on a statewide basis. Sources: Schulman, Blank & Ewen (2001); data collected by the Human Services Policy Center; U.S. Census Bureau (1999b).

[20] Ideally, we would like to use market rates specific to each type of care, but unfortunately, this information was not available or possible to collect given the constraints of the current project and state administrative agencies. Thus, we use center care market rates in all the care type models, as we expect it to be correlated with the market rate for other types of care.

[21] In some states, centers operated by public or private elementary schools such as state-funded prekindergarten, and/or those affiliated with a religious institution, are exempt from state licensing.

Regulation of Family Child Care

This is a count variable of the number of "Yes" scores on the following items: whether all homes (except for those meeting state criteria to be license-exempt) must meet licensing requirements;[22] whether the child:adult ratio for children ages 0-2 is required to be 3:1 or less; whether providers operating small family child care homes are required to complete 12 or more hours of ongoing training on an annual or biannual basis; whether providers operating large or group family child care homes are required to complete 12 or more hours of ongoing training on an annual or biannual basis; whether providers must complete a registered CPR course on either a pre-service or annual basis; whether the state makes an unannounced inspection or monitoring visit after a complaint is lodged; and whether smoking is prohibited. A high number on this count variable indicates high regulation. The degree of state regulation of family child care ranges from 0 in Florida to 5 in Massachusetts. We hypothesize that regulation of family child care affects all three dependent variables.

State Child Care Spending per Low-Income Child

This variable represents child care spending at the state level for children of low-income families, defined as children in households with income less than two times the federal poverty line. It includes state spending for CCDF and TANF child care subsidy programs and prekindergarten programs. This amount is a sum of state spending from these sources, divided by the number of children birth to 12 in the state in households below two times the federal poverty line, and standardized by state median income.[23] Since child care subsidy policies vary across states in eligibility, number of children served, and relationship between co-payment schedules and income, we constructed this single measure of state spending for a pre-defined population group. We hypothesize that state child care spending on children of low-income families might affect the likelihood of low-income parents using different types of care, and thus might have a significant effect on use of care overall.

Federal Spending On Head Start Per Low-Income Child

This variable is a measure of federal spending on Head Start at the state level, per child in the state living in a household with income below the federal poverty line, standardized by state median income. We included federal spending on Head Start as a separate variable, since it is a different funding stream. We divided federal spending on Head Start in each state by the number of children 0-5 with incomes below the federal poverty line. This per-child expenditure was standardized by state median income.[24] We hypothesize that federal spending on Head Start may affect the likelihood of preschool-age children being in other types of center care.

Percentage of People Living in a Different County One Year Ago

This variable is constructed from data in the 2000 Census on residence one year ago and current residence, and represents the degree of population mobility. We hypothesize that in states with highly mobile populations, parents may be less likely to rely on friends and relatives for child care. New York has the lowest degree of residential mobility, with 3.4 percent of the population living in a different county one year ago, and Colorado has the highest degree of mobility, with a rate of 9.5 percent. We hypothesize that this variable affects all three dependent variables.[25]

Availability of Kindergarten

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[22] This component of the variable is coded as a "no" if states allow registration or certification instead of licensing, which typically involve less stringent requirements for providers, or if states require providers to become licensed on a voluntary basis only.

[23] Sources: Gish (2002); Blank, Schulman & Ewen (1999); U.S. Census Bureau (1999b); U.S. Census Bureau (2000b).

[24] Sources: Head Start Bureau (2000); U.S. Census Bureau (1999b); U.S. Census Bureau (2000b).

[25] Hypothesis arrived at after extensive discussions among the authors and other advisors.

This variable indicates whether states require school districts to offer full-day, half-day, or no kindergarten at all.[26,27] The majority of states require half-day kindergarten, and we hypothesize that the availability of district-provided kindergarten decreases the demand for child care among four- and five-year olds. We include this variable only in models concerning child care hours and rates of use among four- and five-year-olds.[28]

Child:Staff Ratio Mandated by State for Licensed Centers

These variables are the licensed maximum ratios for center care by age of child. Since states generally mandate different child:staff ratios for different age groups of children, we use separate ratio variables for each age group: ages 0-1, ages 2-3 and ages 4-5.[29] We hypothesize that state-mandated ratios affect observed child:staff ratios (Phillips, Howes and Whitebook 1992).

Child:Staff Ratio Mandated by State for Family Child Care

This variable is the licensed maximum ratio for family child care. Since most family child care settings serve mixed age groups of children, this variable is constructed from the child:staff ratio variable that represents the maximum allowable number of children per provider in a given state, regardless of age of child.[30] We hypothesize that these state-mandated ratios affect observed child:staff ratios (Kontos, Howes, Shinn and Galinsky 1995).

Multivariate Analysis

The overall purpose of the analysis is to predict aggregate patterns of child care use at the state level separately for each type of care and age group of child, taking into account individual- and state-level predictors. The purpose of these models is not causal modeling, but measurement of the association between state variation in demographics or policy context and the type and amount of care used in each state at a given point in time. And, because we are interested in aggregate child care use patterns, we do not estimate separate models for different subgroups in the population, for whom patterns and causal relationships between demographics and child care use might vary. For instance, patterns of child care use are likely very different among married and single parents. Our goal is not to establish the different causal trajectories, but rather to predict child care use at the state level, taking into account the individual effect of marital status on child care use. Also, we recognize that parents choose among types of care, and the choice of one type affects the use of another type of care, but these choices should be reflected in our aggregate estimates. Thus, we estimate separate models for each type of care, rather than a single model measuring all child care arrangements simultaneously. Finally, fixed effect or hierarchical linear models would be the appropriate technique for modeling both the individual- and state-level data to correct standard errors due to non-independence among the individual-level dependent variables within each state. Unfortunately, our sample size of households in only 13 states is insufficient for use with these techniques.

We use logistic and ordinary least squares regression techniques to estimate our models for each type of care and age group of child. Logistic regression relies on maximum likelihood techniques to estimate the probability of a certain event. This method is appropriate when the dependent variable is a dichotomous variable, such as whether or not a child is in a certain type of non-parental care. We therefore use logistic regression for the 'use' models. The unstandardized logit coefficients are the change in the log of the odds of the dependent variable for a unit change in each independent variable. The standardized logit coefficients represent the change in odds of the dependent variable for a one-standard-deviation increase in the independent variable, and, thus, are always positive. (When the odds ratio is less than one, this represents a decrease in the likelihood of the dependent variable). For continuous variables such as hours and ratios, ordinary least squares regression is the appropriate

[26] Source: Education Week (2001).
[27] We conducted tests on whether or not we can treat the availability of kindergarten as a continuous variable in our model and determined that it is reasonable to do so.
[28] Hypothesis arrived at after extensive discussions among the authors and other advisors.
[29] Source: The Children's Foundation (1999a).
[30] Source: The Children's Foundation (1999a).

technique. The OLS coefficients represent a change in the dependent variable for a unit increase in the independent variable (unstandardized coefficients) or the change in the dependent variable for a one-standard-deviation increase in the independent variable (standardized coefficients).

We estimate models predicting the three dependent variables concerning patterns of child care use (use, hours and ratios) for each of the four types of care (centers, family child care, relative and other non-relative care) for three age groups of children (infants, toddlers and preschoolers). It is necessary to model child care use patterns separately for each age group, since factors affecting use, hours and ratios are likely to vary by age of child. Thus, for each step in the analysis, we estimate 36 models.

First, we estimate the effect of the individual-level independent variables on the dependent variables. Next, we measure the extent of state differences in child care use after controlling for individual demographics. We did this by including a series of 12 dichotomous variables in all the models with the individual-level variables, in order to measure the degree of state-level variation in patterns of child care use for the 13 states in the NSAF 1999. After determining that states vary in patterns of child care use, even after controlling for individual demographic differences, we estimate our final models. Our final models include the individual demographics variables with state-level contextual, demographic and child policy variables. Due to a high degree of co-linearity with the included state variables, we are unable to include a set of state dummies to capture remaining unmeasured state differences in child care use.

These final models are the outcomes of a series of exploratory analyses measuring the effect of state-level variables hypothesized to affect patterns of child care use, after controlling for individual demographics. The statistical determination of which state-level variables to include involves examining correlations between independent and dependent variables, correlations between the independent variables and the dichotomous state variables, and the level of acceptable co-linearity between the key state variables. For all models, we use the same set of individual-level independent variables. For each of the three dependent variables (use, hours and ratios), the models include the same set of state-level independent variables, with two exceptions: 1) for variables reflecting policies related to family child care or center care, we use the state-level variable consistent with that type of care, and 2) we only include the availability-of-kindergarten variable for the preschool age group. We keep this consistency across types of care, since factors affecting use or hours in one type of care are likely to have a contrasting impact on another type of care.

Results

Results of Descriptive Analysis

Is there variation among states in patterns of child care use?

Table 1 presents descriptive statistics on the level of state variation in the three dependent variables for each of the four types of care. This information represents the degree of variation across states in use, hours and ratios for center care, family child care, relative care and other non-relative care. Our multivariate models estimate the extent to which this degree of variation across states can be explained by individual demographic and state-level demographic and policy differences.

Depending on the type of care, we find a variation of eight to 20 percentage points among states in child care use. The category of “other non-relative care” shows the smallest degree of state variation, and family child care shows the largest, with a 20-percentage-point spread among states. We also find variation among states in the average number of hours children spend in each type of care, with the greatest being a spread of 10 hours in the category of non-relative care. States vary in average child:staff ratios as well, especially for family child care.

Results of Multivariate Analysis

As indicated previously, we first estimate models with only the individual-level child and family characteristics that predict patterns of child care use.[31] We find the results from these models to be consistent with other research on child care use (Blau & Hagy, 1998; Brown-Lyons, Robertson & Layzer, 2001; Burstein & Hiller, 1999; Layzer & Collins, 2000; Michalopoulos, Robins & Garfinkel, 1992). The individual-level child and family characteristics are mostly associated with use and ratios in the expected directions, and vary somewhat depending on the type of care and age group of child. The key individual-level predictors in our models are: child's age, number of other children in the household by age, number of non-parental adults in the household, household income, and mother's ethnicity, age and education. In general, these findings remain robust when the state-level variables are added to the models. Our goal is to investigate associations between state variables and child care use patterns after controlling for individual-level demographics. Thus, we focus our discussion on some of the key findings or interesting relationships between state variables and child care use in the 36 models.

What is the extent of this state-level variation, once differences in individual demographic characteristics are controlled?

We estimate a set of preliminary models that include the state-level dichotomous variables in the model with the individual-level predictors.[32] These models test whether there is any state variation in patterns of child care use after differences in individual child and family characteristics among states are controlled. We find significant state differences in patterns of child care use among the 13 states, even after controlling for differences across states in individual-level child and family characteristics. The final set of models investigates the content of some of this variation.[33]

What state-level policy and demographic variables can explain state-level differences in child care use?

Tables 2 to 13 present standardized and unstandardized regression coefficients from models estimating the effect of state contextual variables on patterns of child care use, after controlling for individual child and family characteristics.[34] We present the standardized coefficients as well, in order to compare the magnitude of the effects. In general, the inclusion of the state variables improves the fit of the models, even after controlling for the total number of variables in each model.[35] The following discussions present our findings for each of the four types of care.

Center-Based Care

Tables 2 to 4 present the results of models estimating individual child and family characteristics and state-level predictors of the use of center-based child care, weekly hours in care, and child:adult ratios for center care. Two state-level factors are significantly and positively associated with the increased likelihood of using center care for at least one age group of children. The number of center slots per child and the percentage of employed mothers with young children are both positively related to the use of center care. The relationship with slot availability is the largest for infants. We find small negative relationships with population density on the likelihood of using center care among infants and toddlers, of the degree of residential mobility among preschoolers, child care spending for children of low-income families among toddlers, and federal spending on Head Start among preschoolers.

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[31] Detailed results available upon request.

[32] Detailed results available upon request.

[33] Due to a high degree of co-linearity with the included state variables, we do not include a set of state dummies to capture any remaining unmeasured state differences in child care use in the final models. This inclusion would also be contrary to the general purpose of the models to predict state child care use for other states, taking into account both individual demographics and some key differences between states in demographics and state child care policies and context.

[34] These models do not contain the state-level dichotomous variables, due to problems with co-linearity resulting from the small number of states.

[35] For the models with just the individual variables, the Adjusted-R^2 ranges from .1 to .2. The inclusion of the state variables increases the Pseudo or Adjusted R^2 by one or two percentage points. As a point of comparison, for models with the individual-level variables and state dummies, the R^2 is slightly greater than each of these other sets of models. Thus, as would be expected, we conclude that the state-level variables in our model explain some, but not all, of the differences between states.

Some of these findings deserve further exploration, and some hypotheses are offered about the direction of these effects. It could be that among younger children in states with higher density, more children are in other types of non-center care, such as care by family, friends or neighbors. The negative relationship between federal Head Start spending and preschoolers in center care is in the expected direction, since Head Start is not included in our measure of center care, and thus, more preschoolers might be using Head Start rather than center care when federal spending is greater. The direction of causality concerning the significant relationship between the number of center slots and the likelihood of children in these two age groups being in center care is difficult to determine and beyond the scope of this project, though the association is clear and in the expected direction.

For toddlers and preschoolers, several state-level variables significantly impact the average hours per week spent in center care. Only the 75th percentile market rate for center care is significantly associated with infant hours in center care. The higher the market rate, the fewer hours infants and toddlers spend in center care. In addition, the availability of center slots is positively associated with the hours spent in center care by toddlers and preschoolers. Population density and residential mobility are both negatively associated with center care hours among these same age groups. Finally, the availability of kindergarten is significantly and positively related to the hours that preschoolers spend in center care. While this may seem counterintuitive, we hypothesize that the availability of kindergarten may increase mothers' employment, and thus, parents may use more wrap-around care. An alternative hypothesis is that reducing families' need to spend money for the care of five-year-olds may increase the funds available for more expensive center care for three- and four-year-olds.

In terms of parent-reported center child:adult ratios, we find a positive association between the percentage of employed mothers in a state and the parent-reported child:adult ratios for infants. The licensed maximum ratios in a state are positively and significantly associated with the parent-reported child:adult ratios among toddlers and preschoolers. This finding is consistent with our expectation that state licensing requirements affect practice, and that where standards allow higher child:adult ratios, the average ratios reported by parents will be higher, and where the maximum allowable ratios are lower, the average ratios will be lower as well.

Family Child Care

Tables 5 to 8 present the results of the multivariate models estimating the effects of state-level variables on family child care use, hours and parent-reported ratios. Not unexpectedly, the number of family child care slots per child is significantly related to the percentage of children using this type of care for children in each age group. The degree of residential mobility is positively related to the use of family child care among parents of infants. This finding is consistent with our hypothesis that the more parents move, the less available family, friend and neighbor care may become, and the more parents may rely on other sources of infant care such as family child care, though we found the opposite effect for preschoolers in center care. Finally, the center care market rate (which we expect to be correlated with family child care market rates), and the child care spending per low-income child, are positively associated with toddler and preschooler use of family child care, respectively.

Among infants, the degree of regulation among licensed family child care homes is significantly and negatively associated with hours of use by infants. This finding could be related to an association between regulation and costs of family child care, which we were unable to include in our model. At the state level, the percentage of employed women is significantly and positively related to the number of family child care hours, and the degree of residential mobility is negatively associated with hours spent by preschoolers in family child care.

Among infants, we also find a significant positive relationship between parent-reported child:adult ratios in family child care and the percentage of employed women with young children. This could be due to the fact that a greater percentage of employed women in a state increases demand for child care, and this, in turn, could affect licensing regulations determined to meet this capacity. For all age groups, as expected, the licensing maximum child:adult ratios for family child care are significantly and positively associated with parent-reported child:adult ratios.

Relative Care

Tables 8 to 10 illustrate significant effects on patterns of relative child care use. (We do not predict relative care ratios, as we do not hypothesize that these are a function of state policy or context, but rather individual demographics, such as family size). Among parents of preschoolers, the percentage of employed women in a state significantly increases the likelihood of using relative care. For parents of toddlers, population density is positively associated with the likelihood of using relative care. For infants and preschoolers, use of relative care is negatively associated with residential mobility, as expected. Finally, the market rate for center care is negatively associated with the use of relative care among preschoolers, as is the availability of kindergarten.

In terms of hours in care, the percentage of employed women in a state is negatively associated with hours in relative care among toddlers, and positively associated among preschoolers. The market rate for center care is negatively associated with hours in relative care among preschoolers and toddlers, though the effect is greater for preschoolers. Finally, the degree of residential mobility and the availability of kindergarten are both negatively associated with hours in relative care, as expected.

Other Non-Relative Care

Tables 11 to 13 present results of the individual- and state-level models for patterns of other types of non-relative care, such as care by sitters or nannies. (Once again, we do not include state-level variables in our models for predicting these ratios.) Contrary to the findings for relative care, non-relative care use by preschoolers increases as residential mobility increases. This finding is consistent with the hypothesis that the use of relative care is a function of the availability of relatives, which is reduced by mobility. And, we also find a positive association between the market rate for center care and the use of other types of non-relative care, which is different from the direction of effect we found for preschoolers in relative care. In terms of hours in other types of non-relative care, the percentage of employed women in a state is negatively associated with infant and toddler hours. The market rate for center care is also negatively associated with hours in non-relative care among preschoolers.

In summary, our results suggest that several key policy, demographic and contextual state-level variables explain some of the variation among states in child care use patterns not addressed in previous works. However, given the exploratory nature of these findings, it is difficult to draw conclusions about causation, or to offer precise explanations of some of the unexpected or competing directional effects across some types of care. In many cases, we found effects in the hypothesized direction, or we found significant associations in directions explainable by competing hypotheses. For example, in the case of market rates for center care, one hypothesis is that the higher the price of center care, the less the demand and use of that care, and the greater the demand and use of other types of family, friend, and neighbor care. Conversely, one could argue that the greater the demand for center care and family child care in a state, the greater the market rate, and that this relationship explains the positive association. Our results, frankly, lend support to both sets of hypotheses, depending on the age and type of care.

Conclusion

These models represent a significant advance over previous child care utilization models, due to the ability to measure both the extent and the content of state-level variation in patterns of child care use. We do this by merging the National Survey of American Families (NSAF) data from 13 states with state-level data from a variety of sources into a rich and unique dataset. The results of this project will be used to produce estimates of the size and components of the child care workforce in any of the 50 states, regardless of the availability of data on child care use. Further, we will do this in a way that takes into account differences among states in patterns of child care use. For states where current household survey data about child care use are available, we can simply apply our workforce estimation method directly, as direct estimates already capture the effects of state context on individual behavior, as reflected in parent responses. For other states, we can estimate child care use from demographic variables and selected state contextual variables, and then apply the demand-based method to produce workforce estimates for those states.

Demand-based workforce estimates have the advantage of linking to many other concerns not likely to be addressed by federal occupational statistics at the state level – in particular, the characteristics of children in care, such as age group, disability and limited English proficiency, which are critical elements for policy and planning. Since household demand surveys normally capture much significant information about children and their families, deriving workforce estimates from these surveys allows us to link workforce estimates to child and family characteristics. A major finding from our initial national estimates of the size of the child care workforce, for example, is that almost one-half of the paid child care workforce is caring for toddlers. This finding is significant for designing appropriate requirements and curricula for professional development, as well as for understanding the pressures that workers face. Not all states have utilization data, however, since conducting such surveys requires a large investment of money, time and research effort. We therefore developed the models presented in this report, which capture variations among states in child care use, to enable us to produce workforce estimates both for states that have reliable household surveys and for those that do not.

There are several caveats about our analysis and the results. First, the state-level effects we find are based only on data from 13 states, and therefore the models may not be representative of the nation as a whole. Since state-level representative data are available for only 13 states in the NSAF 1999, however, this limitation is unavoidable. Second, as is clear from some of the models, the direction of causation between the state-level variables and the individual patterns of child care use is sometimes difficult to determine. However, since our purpose is not to model causal relationships but rather to predict usage at the state level, we are more interested in the associations than in causation. Second, we are unable to control for remaining unmeasured state differences, due to problems with multi-colinearity when we include 12 state dummy variables in addition to the state variables. In addition, since the purpose of these models is to predict estimates for other non-NSAF states, we do not want to include indicators of the 13 states in our final models. Finally, we concede that using analysis techniques suitable for multilevel data would have been ideal, but the sample size of the state-level data did not allow for these approaches.

The state-level estimates that can be produced by these methods will need to be validated by comparison with other sources, such as state administrative data for regulated components of the workforce and federal occupational statistics for states. This phase of this research, being conducted by the Human Services Policy Center (HSPC), will produce workforce estimates for several states and compare components of those estimates with the best available state data about those components. To serve as the basis of comparison, HSPC has selected states with and without demand data that have high-quality sources of state data on the child care workforce. In the case of states without utilization data, we will apply the models described in this report to state-level demographic data, in order to obtain the appropriate child care utilization components necessary for the demand-based computational routine.

State Variables Data Tables

Table 1: Range of Variation Among States in Patterns of Child Care Use for Children Ages 0-5, for Three Dependent Variables and Four Types of Care, NSAF 1999

	Minimum-Maximum
Center Care	
Percentage of Children In Care	23 – 38
Average Hours Per Week In Care	21 – 30
Average Number of Children per Adult	5.4 - 6.7
Family Child Care	
Percentage of Children In Care	8 - 28
Average Hours Per Week In Care	20 – 27
Average Number of Children per Adult	1.6 - 3.2
Relative Care	
Percentage of Children In Care	27 – 40
Average Hours Per Week In Care	14 - 22
Average Number of Children per Adult	1.5 - 2.0
Other Non-Relative Care	
Percentage of Children In Care	5 – 13
Average Hours Per Week In Care	8 – 18
Average Number of Children per Adult	2.0 - 2.4

Table 2: Logistic Regression Of State- And Individual-Level Factors On The Likelihood Of Using Center Care By Child's Age Group (Unstandardized (A) And Standardized (B))

	Infants		Toddlers		Preschoolers	
	A	B	A	B	A	B
CHARACTERISTICS OF CHILD AND FAMILY VARIABLES						
Child's Age	0.45**	1.25	0.90***	1.57	0.64***	1.37
Number Of Children Age 0-5 Other Than The Focal Child	-0.00	1.00	-0.19	0.88	-0.29**	0.81
Number Of Children Age 6-17	-0.17	0.86	-0.49***	0.61	-0.26***	0.76
Number Of Adults Other Than Parents	-0.44**	0.72	-0.10	0.94	-0.56***	0.71
Mother Is Single	1.04***	1.49	0.68***	1.31	0.89***	1.45
Household Income	0.02**	2.15	0.02***	2.55	0.02***	2.59
Household Income Squared	-0.01*	0.59	-0.01***	0.59	-0.00*	0.71
Mother Is Hispanic	-0.50	0.80	-0.55**	0.79	-0.29	0.88
Mother Is Black	0.30	1.10	0.43**	1.14	0.31	1.11
Mother Is Asian Pacific	-0.49	0.88	-1.34***	0.75	0.02	1.00
Mother Is Native American	-1.48	0.85	0.18	1.01	-0.53	0.95
Mother Has Bachelor's Degree	0.76***	1.40	0.49***	1.25	0.10	1.04
Mother's Age	-0.00	0.99	0.01	1.09	0.04***	1.27
STATE VARIABLES						
Number Of Center Slots Per Child	2.59**	1.27	1.19	1.12	2.28**	1.24
% Of Employed Women With Children Age 0-5	0.01	1.06	0.03**	1.14	0.04*	1.20
Population Density	-0.00**	0.82	-0.00*	0.90	0.00	1.08
% Of People Who Lived In A Different County A Year Ago	-0.01	0.98	-0.01	0.98	-0.11*	0.87
75th Percentile Market Rate	-0.00	0.87	0.00	1.04	0.00	1.09
Child Care Spending Per Low-Income Child	-0.00	0.96	-0.00*	0.92	-0.00	0.93
Federal Spending On Head Start Per Low-Income Child					-0.00***	0.83
Availability Of Kindergarten					-0.10	0.94

Note: Significance applies to both unstandardized and standardized coefficients; * p < .10; **p < .05; ***p < .01

Table 3: OLS Regression Of State- And Individual-Level Factors On Weekly Center Care Hours By Child's Age Group (Unstandardized (A) And Standardized (B))

	Infants		Toddlers		Preschoolers	
	A	B	A	B	A	B
CHARACTERISTICS OF CHILD AND FAMILY VARIABLES						
Child's Age	-1.87	-0.06	-0.46	-0.01	-1.48	-0.05
Number Of Children Age 0-5 Other Than The Focal Child	0.12	0.01	-3.53***	-0.14	-0.72	-0.35
Number Of Children Age 6-17	-2.21	-0.11	-0.51	-0.02	-1.72***	-0.12
Number Of Adults Other Than Parents	-0.03	-0.00	0.52	0.02	0.38	0.14
Mother Is Single	8.49**	0.25	6.37***	0.17	7.31***	0.22
Household Income	0.23**	0.67	0.11**	0.34	0.07*	0.22
Household Income Squared	-0.10**	-0.56	-0.03	-0.20	-0.03*	-0.20
Mother Is Hispanic	8.70	0.20	5.77***	0.13	2.03	0.05
Mother Is Black	1.37	0.03	6.69***	0.15	7.47***	0.18
Mother Is Asian Pacific	6.96	0.11	-2.84	-0.03	2.79	0.05
Mother Is Native American	17.57***	0.07	-2.62	-0.01	4.00	0.02
Mother Has Bachelor’s Degree	-4.25	-0.15	-3.35**	-0.11	-1.23	-0.04
Mother's Age	0.11	0.04	-0.25**	-0.10	0.06	0.03
STATE VARIABLES						
Number Of Center Slots Per Child	3.81	0.03	13.59*	0.09	30.39***	0.21
% Of Employed Women With Children Age 0-5	-0.13	-0.04	-0.07	-0.02	-0.09	-0.03
Population Density	0.00	0.02	-0.01**	-0.09	-0.01***	-0.18
% Of People Who Lived In A Different County A Year Ago	0.07	0.01	-0.64	-0.06	-1.18***	-0.11
75th Percentile Market Rate	-0.02*	-0.18	-0.03***	-0.21	0.01	0.08
Availability Of Kindergarten					2.91***	0.12

Note: Significance applies to both unstandardized and standardized coefficients; * p < .10; **p < .05; ***p < .01

Table 4: OLS Regression Of State- And Individual-Level Factors On The Number Of Children Per Center Staff By Child's Age Group (Unstandardized (A) And Standardized (B))

	Infants		Toddlers		Preschoolers	
	A	B	A	B	A	B
CHARACTERISTICS OF CHILD AND FAMILY VARIABLES						
Child's Age	0.53**	0.17	0.72***	0.15	0.65***	0.10
Number Of Children Age 0-5 Other Than The Focal Child	0.23	0.11	-0.06	-0.02	-0.04	-0.01
Number Of Children Age 6-17	-0.06	-0.03	0.07	0.02	0.01	0.00
Number Of Adults Other Than Parents	-0.32*	-0.11	-0.16	-0.04	-0.42*	-0.07
Mother Is Single	0.25	0.07	-0.04	-0.01	0.55	0.07
Household Income	0.00	0.10	0.02*	0.33	0.01	0.08
Household Income Squared	-0.00	-0.07	-0.01	-0.27	0.00	0.01
Mother Is Hispanic	0.14	0.03	-0.11	-0.02	0.28	0.03
Mother Is Black	-0.37	-0.09	0.36	0.05	-1.34***	-0.14
Mother Is Asian Pacific	-1.09***	-0.16	1.35***	0.08	1.35	0.10
Mother Is Native American	1.99***	0.08	-0.95	-0.02	-0.45	-0.01
Mother Has Bachelor's Degree	-0.14	-0.05	-0.39	-0.08	-0.08	-0.01
Mother's Age	0.00	0.02	0.01	0.02	0.05**	0.09
STATE VARIABLES						
% Of Employed Women With Children Age 0-5	0.06***	0.21	0.01	0.02	0.02	0.03
Population Density	-0.00	-0.06	-0.00	-0.03	-0.00***	-0.08
Staff To Child Ratio Required For Licensed Centers	-0.01	-0.00	0.12***	0.22	0.10***	0.16

Note: Significance applies to both unstandardized and standardized coefficients; * p < .10; **p < .05; ***p < .01

Table 5: Logistic Regression Of State- And Individual-Level Factors On The Likelihood Of Using Family Child Care By Child's Age Group (Unstandardized (A) And Standardized (B))

	Infants		Toddlers		Preschoolers	
	A	B	A	B	A	B
CHARACTERISTICS OF CHILD AND FAMILY VARIABLES						
Child's Age	0.48***	1.27	-0.22	0.90	0.02	1.01
Number Of Children Age 0-5 Other Than The Focal Child	-0.32**	0.79	-0.31**	0.81	-0.29*	0.81
Number Of Children Age 6-17	-0.13	0.89	0.02	1.02	-0.10	0.90
Number Of Adults Other Than Parents	-0.25	0.84	-0.31**	0.82	-0.26	0.86
Mother Is Single	0.68*	1.30	0.34	1.14	0.40	1.18
Household Income	0.03***	3.18	0.01	1.64	0.01	1.66
Household Income Squared	-0.01**	0.45	-0.01	0.66	-0.01	0.62
Mother Is Hispanic	-0.15	0.94	-0.38	0.85	-0.91**	0.68
Mother Is Black	0.65**	1.22	0.26	1.09	-0.58*	0.83
Mother Is Asian Pacific	-0.52	0.87	0.12	1.03	-1.90***	0.64
Mother Is Native American	1.14	1.13	-0.63	0.96	-1.27	0.89
Mother Has Bachelor's Degree	-0.24	0.90	0.17	1.08	0.12	1.05
Mother's Age	0.03*	1.19	0.02*	1.15	0.02	1.15
STATE VARIABLES						
Number Of FCC Slots Per Child	2.96***	1.22	1.88**	1.14	2.42**	1.18
% Of Employed Women With Children Age 0-5	0.02	1.08	-0.01	0.94	-0.04*	0.83
Population Density	-0.00	0.98	-0.00	0.97	-0.00	0.81
% Of People Who Lived In A Different County A Year Ago	0.16***	1.24	0.05	1.07	0.10	1.14
75th Percentile Market Rate	0.00	1.08	0.00*	1.19	0.00	1.16
Child Care Spending Per Low-Income Child	-0.00	0.94	0.00	1.06	0.00*	1.28
Degree Of Regulation Of Licensed FCCs	-0.04	0.94	-0.04	0.95	-0.04	0.94
Availability Of Kindergarten					0.34	1.21

Note: Significance applies to both unstandardized and standardized coefficients; * p < .10; **p < .05; ***p < .01

Table 6: OLS Regression Of State- And Individual-Level Factors On Weekly Family Child Care Hours By Child's Age Group (Unstandardized (A) And Standardized (B))

	Infants		Toddlers		Preschoolers	
	A	B	A	B	A	B
CHARACTERISTICS OF CHILD AND FAMILY VARIABLES						
Child's Age	1.61	0.05	-4.61**	-0.14	-1.66	-0.05
Number Of Children Age 0-5 Other Than The Focal Child	1.49	0.06	-3.61*	-0.12	-1.65	-0.06
Number Of Children Age 6-17	0.33	0.01	0.45	0.02	-1.17	-0.07
Number Of Adults Other Than Parents	-0.65	-0.02	-1.20	-0.04	-5.21***	-0.17
Mother Is Single	3.76	0.09	10.07***	0.24	7.26***	0.20
Household Income	0.33***	0.82	0.11	0.28	0.06	0.16
Household Income Squared	-0.17***	-0.83	-0.00	-0.00	-0.06*	-0.29
Mother Is Hispanic	-3.50	-0.07	0.51	0.01	4.59	0.10
Mother Is Black	1.24	0.03	2.72	0.05	2.15	0.04
Mother Is Asian Pacific	7.70	0.10	3.68	0.06	6.17	0.05
Mother Is Native American	-16.27***	-0.17	14.28***	0.05	-19.04***	-0.08
Mother Has Bachelor's Degree	-5.51**	-0.16	-2.19	-0.07	1.33	0.04
Mother's Age	-0.35	-0.13	-0.07	-0.02	0.04	0.02
STATE VARIABLES						
Number Of FCC Slots Per Child	-4.77	-0.03	4.68	0.02	12.19	0.07
% Of Employed Women With Children Age 0-5	0.26	0.09	-0.02	-0.01	0.55**	0.20
Population Density	-0.00	-0.02	0.00	0.01	-0.00	-0.08
% Of People Who Lived In A Different County A Year Ago	-0.26	-0.02	0.61	0.05	-1.55**	-0.13
75th Percentile Market Rate	0.01	0.06	-0.00	-0.01	-0.02	-0.14
Degree Of Regulation Of Licensed FCCs	-2.47***	-0.20	-0.58	-0.05	1.77	0.15
Availability Of Kindergarten					2.15	0.08

Note: Significance applies to both unstandardized and standardized coefficients; * p < .10; **p < .05; ***p < .01

Table 7: OLS Regression Of State- And Individual-Level Factors On The Number Of Children Per Family Child Care Provider By Child's Age Group (Unstandardized (A) And Standardized (B))

	Infants		Toddlers		Preschoolers	
	A	B	A	B	A	B
CHARACTERISTICS OF CHILD AND FAMILY VARIABLES						
Child's Age	0.21	0.06	-0.59***	-0.15	0.03	0.01
Number Of Children Age 0-5 Other Than The Focal Child	0.20	0.06	0.52**	0.14	-0.04	-0.01
Number Of Children Age 6-17	-0.26**	-0.10	-0.09	-0.04	-0.27	-0.10
Number Of Adults Other Than Parents	-0.25	-0.08	0.13	0.03	-0.79***	-0.17
Mother Is Single	-0.59	-0.13	-0.28	-0.05	0.63	0.11
Household Income	-0.00	-0.09	0.01	0.20	0.03***	0.55
Household Income Squared	0.00	0.14	-0.00	-0.13	-0.02***	-0.49
Mother Is Hispanic	-0.92***	-0.18	-0.75**	-0.14	0.02	0.00
Mother Is Black	0.28	0.05	-0.35	-0.06	0.25	0.03
Mother Is Asian Pacific	-0.38	-0.04	-1.02**	-0.14	-1.42***	-0.08
Mother Is Native American	-0.25	-0.02	-0.76	-0.02	0.47	0.01
Mother Has Bachelor’s Degree	-0.33	-0.08	-0.04	-0.01	0.50	0.11
Mother's Age	0.01	0.04	0.02	0.05	0.03	0.07
STATE VARIABLES						
% Of Employed Women With Children Age 0-5	0.09***	0.28	0.02	0.06	0.03	0.07
Population Density	0.00	0.05	-0.00	-0.02	-0.00**	-0.09
Staff To Child Ratio Required For Licensed Small FCCs	0.19***	0.17	0.12**	0.08	0.16**	0.11

Note: Significance applies to both unstandardized and standardized coefficients; * p < .10; **p < .05; ***p < .01

Table 8: Logistic Regression Of State- And Individual-Level Factors On The Likelihood Of Using Relative Care By Child's Age Group (Unstandardized (A) And Standardized (B))

	Infants		Toddlers		Preschoolers	
	A	B	A	B	A	B
CHARACTERISTICS OF CHILD AND FAMILY VARIABLES						
Child's Age	0.04	1.02	-0.05	0.98	-0.30**	0.86
Number Of Children Age 0-5 Other Than The Focal Child	-0.30***	0.80	-0.07	0.95	-0.06	0.96
Number Of Children Age 6-17	0.01	1.01	-0.02	0.98	-0.11	0.89
Number Of Adults Other Than Parents	0.05	1.04	0.12	1.08	0.09	1.06
Mother Is Single	0.66***	1.29	0.63***	1.28	0.85***	1.42
Household Income	0.01	1.44	0.02***	2.03	0.02***	1.93
Household Income Squared	-0.01	0.67	-0.01***	0.46	-0.01***	0.59
Mother Is Hispanic	0.10	1.05	0.06	1.03	0.53**	1.25
Mother Is Black	0.03	1.01	0.36**	1.12	-0.06	0.98
Mother Is Asian Pacific	-0.56	0.86	0.12	1.03	0.61	1.16
Mother Is Native American	-0.66	0.93	0.31	1.02	0.47	1.05
Mother Has Bachelor's Degree	-0.13	0.94	-0.03	0.99	-0.22	0.91
Mother's Age	-0.03*	0.84	-0.05***	0.72	-0.06***	0.70
STATE VARIABLES						
% Of Employed Women With Children Age 0-5	0.02	1.10	-0.00	0.98	0.04**	1.20
Population Density	-0.00	0.96	0.00*	1.09	-0.00	0.94
% Of People Who Lived In A Different County A Year Ago	-0.14***	0.83	-0.02	0.98	-0.16***	0.82
75th Percentile Market Rate	-0.00	0.92	-0.00	0.96	-0.00**	0.82
Child Care Spending Per Low-Income Child	0.00*	1.09	0.00	1.06	-0.00	0.90
Availability Of Kindergarten					-0.34*	0.83

Note: Significance applies to both unstandardized and standardized coefficients; * p < .10; **p < .05; ***p < .01

Table 9: OLS Regression Of State- And Individual-Level Factors On Weekly Hours In Relative Care By Child's Age Group (Unstandardized (A) And Standardized (B))

	Infants		Toddlers		Preschoolers	
	A	B	A	B	A	B
CHARACTERISTICS OF CHILD AND FAMILY VARIABLES						
Child's Age	1.59	0.05	-1.04	-0.03	1.52	0.05
Number Of Children Age 0-5 Other Than The Focal Child	-2.96***	-0.12	-0.28	-0.01	-1.50	-0.07
Number Of Children Age 6-17	-0.18	-0.01	-1.14	-0.07	0.38	0.02
Number Of Adults Other Than Parents	-1.80	-0.09	-0.34	-0.02	2.00	0.09
Mother Is Single	5.10*	0.13	5.17**	0.14	6.62***	0.20
Household Income	0.16**	0.35	0.03	0.06	0.17***	0.39
Household Income Squared	-0.06	-0.21	-0.03	-0.09	-0.10***	-0.36
Mother Is Hispanic	8.05***	0.22	7.32***	0.19	4.19**	0.12
Mother Is Black	7.36***	0.15	2.12	0.05	-1.21	-0.03
Mother Is Asian Pacific	10.69***	0.13	0.27	0.00	0.77	0.01
Mother Is Native American	10.59*	0.06	-1.05	-0.00	0.71	0.01
Mother Has Bachelor's Degree	-4.06**	-0.10	0.11	0.00	0.86	0.02
Mother's Age	-0.19	-0.07	-0.01	-0.00	-0.18	-0.07
STATE VARIABLES						
% Of Employed Women With Children Age 0-5	0.06	0.02	-0.29*	-0.08	0.26*	0.08
Population Density	-0.00	-0.03	0.00	0.01	-0.00	-0.01
% Of People Who Lived In A Different County A Year Ago	-0.29	-0.02	-0.48	-0.04	-2.60***	-0.22
75th Percentile Market Rate	0.00	0.04	-0.01*	-0.10	-0.03***	-0.22
Availability Of Kindergarten					-5.21***	-0.20

Note: Significance applies to both unstandardized and standardized coefficients; * p < .10; **p < .05; ***p < .01

Table 10: OLS Regression Of Individual-Level Factors On The Number Of Children Per Adult Relative By Child's Age Group (Unstandardized (A) And Standardized (B))

	Infants		Toddlers		Preschoolers	
	A	B	A	B	A	B
CHARACTERISTICS OF CHILD AND FAMILY VARIABLES						
Child's Age	-0.04	-0.02	0.14	0.06	-0.08	-0.04
Number Of Children Age 0-5 Other Than The Focal Child	0.46***	0.31	0.51***	0.31	0.65***	0.42
Number Of Children Age 6-17	0.33***	0.29	0.25**	0.21	0.35***	0.31
Number Of Adults Other Than Parents	-0.15**	-0.12	0.23*	0.15	0.09	0.06
Mother Is Single	-0.05	-0.02	-0.08	-0.03	0.09	0.04
Household Income	0.00	0.08	0.00	0.11	-0.00	-0.04
Household Income Squared	-0.00	-0.08	-0.00	-0.06	0.00	0.06
Mother Is Hispanic	0.02	0.01	-0.14	-0.05	0.05	0.02
Mother Is Black	0.10	0.03	0.17	0.05	0.25*	0.07
Mother Is Asian Pacific	-0.04	-0.01	0.38	0.07	-0.64**	-0.15
Mother Is Native American	-0.25	-0.02	0.39	0.02	-0.22	-0.02
Mother Has Bachelor’s Degree	-0.02	-0.01	-0.26**	-0.09	0.07	0.03
Mother's Age	-0.02**	-0.14	0.01	0.06	-0.00	-0.01

Note: Significance applies to both unstandardized and standardized coefficients; * p < .10; **p < .05; ***p < .01

Table 11: Logistic Regression Of State- And Individual-Level Factors On The Likelihood Of Using Other Types Of Non-Relative Care By Child's Age Group (Unstandardized (A) And Standardized (B))

	Infants		Toddlers		Preschoolers	
	A	B	A	B	A	B
CHARACTERISTICS OF CHILD AND FAMILY VARIABLES						
Child's Age	1.10***	1.73	-0.10	0.95	0.41**	1.22
Number Of Children Age 0-5 Other Than The Focal Child	0.04	1.03	0.15	1.11	0.07	1.05
Number Of Children Age 6-17	-0.06	0.95	0.04	1.04	-0.03	0.97
Number Of Adults Other Than Parents	-1.43***	0.36	-0.18	0.89	-0.34	0.82
Mother Is Single	1.36***	1.68	0.15	1.06	0.57	1.27
Household Income	0.03***	3.42	-0.01	0.75	-0.00	0.88
Household Income Squared	-0.01	0.63	0.01	1.53	0.01*	1.58
Mother Is Hispanic	0.08	1.04	-0.64*	0.76	-0.61*	0.77
Mother Is Black	0.19	1.06	-1.61***	0.61	-0.22	0.93
Mother Is Asian Pacific	-0.17	0.96	-0.80	0.84	-0.70	0.85
Mother Is Native American			-2.46***	0.84	-0.13	0.99
Mother Has Bachelor's Degree	0.42*	1.20	0.60***	1.31	0.44*	1.22
Mother's Age	0.01	1.08	0.06***	1.41	0.05**	1.33
STATE VARIABLES						
% Of Employed Women With Children Age 0-5	0.02	1.08	0.02	1.09	0.01	1.05
Population Density	0.00	1.09	-0.00	0.92	0.00	1.05
% Of People Who Lived In A Different County A Year Ago	0.13	1.18	0.00	1.00	0.18**	1.26
75th Percentile Market Rate	0.00***	1.44	0.00	1.17	0.00**	1.47
Child Care Spending Per Low-Income Child	-0.00	0.93	-0.00	0.97	0.00	1.15
Availability Of Kindergarten					0.12	1.07

Note: Significance applies to both unstandardized and standardized coefficients; * p < .10; **p < .05; ***p < .01

Table 12: OLS Regression Of State- And Individual-Level Factors On Weekly Hours In Other Types Of Non-Relative Care By Child's Age Group (Unstandardized (A) And Standardized (B))

	Infants		Toddlers		Preschoolers	
	A	B	A	B	A	B
CHARACTERISTICS OF CHILD AND FAMILY VARIABLES						
Child's Age	-4.13*	-0.11	-0.50	-0.02	-2.37	-0.11
Number Of Children Age 0-5 Other Than The Focal Child	-0.24	-0.01	0.54	0.03	-1.69*	-0.11
Number Of Children Age 6-17	-2.69	-0.11	1.34	0.11	0.36	0.03
Number Of Adults Other Than Parents	-0.13	-0.00	-2.39	-0.08	0.47	0.02
Mother Is Single	6.99	0.14	13.28***	0.35	-0.13	-0.00
Household Income	0.11	0.40	0.05	0.26	0.06	0.33
Household Income Squared	0.00	0.03	0.01	0.06	-0.02	-0.29
Mother Is Hispanic	3.65	0.07	3.61	0.09	3.80	0.11
Mother Is Black	9.43**	0.16	-8.40	-0.11	8.25**	0.23
Mother Is Asian Pacific	26.01***	0.43	3.57	0.06	3.47	0.06
Mother Is Native American			14.71***	0.03	1.36	0.01
Mother Has Bachelor's Degree	1.20	0.04	-3.49	-0.14	-4.08**	-0.19
Mother's Age	0.09	0.03	-0.37**	-0.18	-0.14	-0.09
STATE VARIABLES						
% Of Employed Women With Children Age 0-5	-0.44*	-0.14	-0.40**	-0.17	-0.23	-0.11
Population Density	0.00	0.01	-0.00	-0.00	0.00	0.00
75th Percentile Market Rate	-0.53	-0.04	0.40	0.04	-1.16*	-0.15
% Of People Who Lived In A Different County A Year Ago	0.01	0.05	-0.00	-0.03	0.00	0.03
Availability Of Kindergarten					-0.42	-0.02

Note: Significance applies to both unstandardized and standardized coefficients; * p < .10; **p < .05; ***p < .01

Table 13: OLS Regression Of Individual-Level Factors On The Number Of Children In Other Types Of Non-Relative Care By Child's Age Group (Unstandardized (A) And Standardized (B))

	Infants	Toddlers	Preschoolers

	A	B	A	B	A	B
CHARACTERISTICS OF CHILD AND FAMILY VARIABLES						
Child's Age	-0.07	-0.03	0.04	0.02	0.10	0.05
Number Of Children Age 0-5 Other Than The Focal Child	0.72***	0.45	0.75***	0.46	0.58***	0. 44
Number Of Children Age 6-17	0.45***	0.28	0.62***	0.55	0.51***	0.53
Number Of Adults Other Than Parents	-0.20	-0.05	-0.22	-0.08	-0.39*	-0.16
Mother Is Single	-0.66**	-0.22	0.48**	0.14	0.25	0.10
Household Income	-0.01*	-0.56	0.00	0.23	0.01	0.42
Household Income Squared	0.00	0.44	-0.00	-0.26	-0.00	-0.31
Mother Is Hispanic	-0.63***	-0.21	-0.29	-0.08	-0.08	-0.03
Mother Is Black	0.05	0.01	-0.16	-0.02	-0.38	-0.12
Mother Is Asian Pacific	0.27	0.07	0.28	0.05	-0.06	-0.01
Mother Is Native American			-0.67***	-0.01	0.27	0.02
Mother Has Bachelor's Degree	-0.28	-0.13	-0.10	-0.04	-0.27	-0.14
Mother's Age	0.02	0.10	-0.01	-0.03	-0.01	-0.04

Note: Significance applies to both unstandardized and standardized coefficients; * p < .10; **p < .05; ***p < .01

References

Blank, H., Schulman, K. & Ewen, D. (1999). *Seeds of Success: State Prekindergarten Initiatives 1998-1999.* Washington, DC: Children's Defense Fund.

Blau, David M. (2003). Do Child Care Regulations Affect the Child Care and Labor Markets? *Journal of Policy Analysis and Management,* 22(3), 443-465.

Blau, David M. (2001). *The Child Care Problem: An Economic Analysis.* New York: Russell Sage Foundation.

EN.REFLIST Phillips, D. A., Voran, M., Kisker, E., Howes, C. & Whitebook, M. (1994). Child Care for Children in Poverty: Opportunity or Inequity? *Child Development, 65*, 472–92.

Schulman, K. (2000). *The High Cost of Child Care Puts Quality Care Out of Reach for Many Families.* Washington DC: Children's Defense Fund.

Schulman, K., Blank, H. & Ewen, D. (2001). *A Fragile Foundation: State Child Care Assistance Policies.* Washington, DC: Children's Defense Fund.

Sonenstein, F. L., Gates, G. J., Schmidt S. & Bulshon, N. (2002). *Primary Child Care Arrangements of Employee Parents: Findings from the 1999 National Survey of America's Families.* Assessing the New Federalism: National Survey of America's Families. Washington, DC: Urban Institute.

U.S. Census Bureau (1997). Child Care Arrangements for Preschoolers by Family Characteristics and Employment Status of Mother. Washington, DC: US Census Bureau.

U.S. Census Bureau (1999a). Current Population Survey, Employment Status of the Civilian Noninstitutional Population by Sex, Age, Race, and Hispanic Origin, 1999 Annual Averages. Washington, DC: U.S. Census Bureau.

U.S. Census Bureau (1999b). Median Income for 4-Person Families by State. Washington, DC: U.S. Census Bureau.

U.S. Census Bureau (2000a). Census 2000 Supplementary Survey Summary Tables, PO41 & PO62. Washington, DC: U.S. Census Bureau.

U.S. Census Bureau (2000b). Census 2000 Summary File 1 (SF 1) 100-Percent Data, GCT-PH1-R and PCT12. Washington, DC: U.S. Census Bureau.

U.S. Census Bureau (2000c). Census 2000 Summary File 1 (SF 1) 100-Percent Data, GCT-PH1-R. Population, Housing Units, Area, and Density. Washington, DC: U.S. Census Bureau.

Webster, C. J. & White, S. (1995) Child-care Services and the Urban Labour Market. Part 2: Modeling the Relationships between Child-Care Service Accessibility and Labour-Market Participation (1997). *Environment and Planning: A. 29*, 1675-1695.

Willer, B., Hofferth, S., Kisker, E., Divine-Hawkins, P., Farquahar, E. & Glantz, F. (1991). *The Demand and Supply of Child Care in 1990: Joint Findings from the National Child Care Survey 1990, and A Profile of Child Care Settings.* Washington, DC: National Association for the Education of Young Children.