

State regulations and child care choice

SANDRA L. HOFFERTH¹ & DUNCAN D. CHAPLIN²

¹The University of Michigan; ²The Urban Institute, Washington DC, USA

Abstract. While government regulations are designed to safeguard the health and well-being of children, they may also alter the cost and availability of child care, thus affecting parental use of such services. This paper investigates the total effects of regulation on parental choice of child care and the indirect effects of regulation through the price, quality, and availability of care. In our analysis of data from the National Child Care Survey 1990 we find strong evidence that state regulations requiring center-based providers to be trained are associated with a lower probability that parents choose a center, while state inspections are associated with more parental choice of center and home care. We end by discussing the policy implications of our findings.

Key words: Child care, Health safeguard, Government regulations

Introduction

The cost of caring for young children has been found to discourage maternal employment (Blau & Robins 1988; Connelly 1992). Recent child care research has attempted to obtain better measures of the incentive and disincentive effects of public policies on the cost, quality, and availability of child care, and how these ultimately affect parental choice of employment and care arrangements (Hofferth & Wissoker 1992). This paper focuses on the effects of public policy, in particular, government regulation and inspections, on parental choice of child care mode through price, quality, and availability.

One purpose of government regulation is to safeguard the health and well-being of children, and there is evidence that it does so (Phillips et al. 1990). Regulations can prevent parents from choosing low quality care and provide them with valuable information regarding the price, quality, and availability of care. On the other hand, government regulation may have detrimental effects on the price parents have to pay and the availability of programs if these regulations increase provider costs, which are then passed on to consumers, or if they limit the number of providers who can enter or remain in the field (Lowenberg & Tinnin 1992; Rose-Ackerman 1983; Walker 1991). If regulations increase price and reduce availability, parents may use less child care even if quality is higher.

While regulations set standards, frequent inspections are critical to ensure that regulations are enforced. As such, we expect them to affect the price, quality, availability, and use of child care in the same ways and for the same reasons that regulations do. However, inspections do vary independently of regulations. Federal funding for licensing and monitoring has not increased in proportion to the number of facilities (Kisker et al 1991). At the state level, there is evidence that caseloads for state licensing officials greatly exceed recommended levels. For instance, in North Carolina 43 licensing consultants monitor over 6,565 day care and Head Start facilities (Office of the Inspector General 1993). This suggests that some states may not view licensing and monitoring as necessary for regulation.

Research questions. In this paper we address the following questions:

1. In what ways do regulations and inspections affect choice of arrangements? In particular, do regulations and inspections affect choice by influencing the cost, quality, and availability of arrangements?
2. What are the total effects of child care regulations and inspections on parental choice of child care arrangements?

Theoretical model

Our model describes the choice of child care arrangements for youngest child by mothers who are working, training, or in school. The decision to work, train, or attend school is assumed to be independent of the child care decision. A substantial amount of research has examined family and individual factors associated with child care choice (Blau & Robins 1988; Hofferth & Wissoker 1992; Lehrer 1983, 1989; Lehrer & Kawasaki 1985; Leibowitz, Waite & Witsberger 1988; Robins & Spiegelman 1978; Yaeger 1979); only a few studies (Blau & Robins 1988; Hofferth & Wissoker 1992; Yaeger 1979) have included measures of price, quality, or availability. Our approach explicitly models choice as a function of the characteristics of the choices.

Families are assumed to have an expected price, quality, and availability for each child care arrangement they are aware of. Within a mode families face many options. We assume that parents evaluate the utility of each option within a mode and choose the option with the highest utility, determined as the expected price, quality, and availability of the option as well as income, assets, tastes and a purely random component of utility. Parents then choose the mode with the highest utility.

Government regulations are argued to affect choice through their effects on price, quality and availability. It seems less likely that regulations have any direct effects on tastes, income, or assets. However, because tastes, income, and assets may be correlated with regulations and are likely to affect child

care choices, we control for these factors. Lacking complete information on the quality of care we allow for a direct effect of regulations in our empirical specification.

Quality is multidimensional, which makes its measurement particularly difficult. Quality is proxied here by the child/staff ratio of the child care arrangement. While we wished to include other aspects of quality, particularly the training of the provider, the models were not statistically stable and we were unable to do so. The child/staff ratio is a key aspect of the quality of the child's experience in child care, with higher quality implied by a lower ratio of children to staff. Other research has shown that the number of children a provider cares for affects child-provider interactions and child development (Hayes et al. 1990; Phillips & Howes 1987; Travers et al. 1980). In addition, most states regulate this aspect of quality and it is one of the most costly of the regulations (because staff costs constitute 2/3 to 3/4 of the cost of child care (Kisker et al. 1991)). For these reasons we focus our analysis on regulations affecting the ratio of children to staff in child care arrangements.

Besides child/staff ratio regulations, we also include regulations regarding the level of training and education required for child care staff in centers and family day care homes. Training regulations have been shown to affect the utilization of child care. Trained staff may also recognize the value of small child/staff ratios and maintain lower ratios than required by the state. Finally, inspections serve as an important tool of regulatory enforcement. For theoretical reasons and because inspections have been shown in prior research to be strongly associated with child-care use, we examine the effect of required number of annual inspections per provider by state on the price, quality, availability, and use of centers and family day care homes.

The role of government regulation

Effective regulations can reduce the likelihood that children receive low quality child care, thereby improving the welfare of children (Hayes et al. 1990). Regulations are often explained by this concern with child welfare (Hotz & Kilburn 1995). In this section we explain how both a lack of information about low quality care and the failure of parents to realize all the benefits of good quality care can affect parental decisions and the quality of care that is nearby.

A number of studies show that low child care quality is detrimental to the development of children, particularly those 'at risk' (Hayes et al. 1990; Helburn et al. 1995). Thus parents who are concerned about the welfare of their children have reason to avoid low quality care. However, parents may not select the optimal level of quality for their child.

One reason that parents may provide lower quality care than is optimal for them and their children is their inability to monitor the quality of care. Since quality is complex and multifaceted, parents have difficulty assessing the services provided in the child care market (Hofferth et al. 1994). Indeed there are many dangers that parents would not normally think of and whose effects they might never have discovered or attributed to low quality care in the absence of regulations. For instance, probably few parents know the importance of locating child care facilities on the first floor of a building so that children can be easily evacuated in case of a fire. Nevertheless many states include this provision in their regulations. Similarly, parents may not have the means to check on staff credentials or unhealthy conditions such as lead pipes. Even child/staff ratios can be difficult to monitor because groups shift often during a day so that the staff available when a parent is present may not be indicative of normal staffing. Because of these difficulties in monitoring the quality of care, the price paid to providers is not likely to reflect actual quality (Waite et al. 1991; Helburn et al. 1995). This low return to providing quality causes quality to drop both because high quality providers have little incentive to enter the field and because providers may be negligent in maintaining their quality standards (Walker 1991).

A second reason that parents may choose lower quality care for their children than is socially optimal is that many of the benefits of high quality care do not directly affect parents or even their children, but instead affect all of society through children's behavior in school, employment, and the community (Donovan & Watts 1990). For instance, research has found at-risk children who participated in a high quality preschool program to be less likely to be dependent on welfare or involved in criminal activities as young adults than those who did not (Schweinhart et al. 1993). Thus, even in a world of perfect information, parents might provide lower quality care for their children than would be optimal from a societal perspective.

Net welfare effects. The discussion above suggests that there may be failures in the child care market, due to imperfect information about child care quality, and positive externalities on child well-being. These are necessary but not sufficient conditions for government intervention. Indeed some analysts argue that providers, having more political clout than consumers, may push for excessive government regulation. This is because providers may push for increased regulation at least in part to increase their market power and, therefore, their earnings (Lowenberg & Tinnin 1992). However it is not clear that the regulations that providers push for would be so different than those that would benefit society as a whole. Therefore, even if regulations are affected in part by the political clout of providers, they may still be worthwhile.

To properly estimate the overall effect of regulations on society's welfare, we would need to know how much the benefit of the increase in expected quality is worth to each parent, the value of the change in children's outcomes to society (other than the parents), the increased cost to parents, and the costs of enforcing the regulations. These factors depend in part on how much information the government is able to collect over and above what the parents would have had in the absence of government intervention. Gormley (1990) argues that local governments may be better suited than federal or state governments in this regard.

While a complete analysis of the total benefits of child-care regulations is beyond the scope of this paper, important policy implications can be derived based on our analysis of the effects of regulations on the price, quality, availability, and use of child care.

First, no increase in regulations is likely to benefit all parents unless offsetting compensation is provided to those parents who are negatively affected. For instance even if regulations improve the quality of care in the regulated mode they may decrease the quality of care for those children who, as a result of regulations, shift out of the regulated mode and into unregulated care of lower quality. If poor parents are most likely to lose, then subsidizing care for the poor may serve to partially offset some negative effects of regulations. By themselves, however, stricter regulations may exacerbate inequality.

Second, if use of a regulated mode increases with more stringent regulations this implies that at least some parents have gained. The parents who switched into the regulated mode reveal that to them the benefits of the regulation outweigh any increase in costs that they face. Conversely, if use goes down then at least some families have lost.

Finally, similar points can be made regarding the direct effects of price, quality and availability. If price increases or availability falls, then some parents are likely to lose. Conversely, if price falls or availability increases then some parents are likely to gain. For these reasons, an analysis of the effects of regulations on price, quality, availability, and use of care is informative for public policy purposes. In the following section we describe how regulations can affect the price, quality, availability, and use of care.

Effects of regulations. If parents are well-informed and regulations increase actual and expected quality, then they are also likely to increase the price of care and reduce use. However, in the following discussion we show that these conditions need not hold so that no strong predictions can be made concerning the effects of regulations.

Quality. Regulations are intended to reduce the incidence of low quality care in the regulated mode directly by removing low-quality providers from the market and by increasing the incentive to provide quality care for existing providers whose licenses can be suspended or revoked (Shapiro 1986). Regulations may also serve to increase the quality of care indirectly, by affecting parents' decisions. While parents are unlikely to know much about the regulations themselves, information about the quality of child care can spread via friends, social workers and companies that help locate child care for parents (such as resource and referral agencies). Therefore regulations may serve to reduce parents' search costs and their uncertainty about the quality of care they do choose (Lowenberg & Tinnin 1992). This increase in information may, in turn, affect the quality of care provided by increasing the returns to providing high quality care. While we have pointed to several positive effects, it is also possible for regulations to have negative effects if parents rely on their existence too heavily and reduce their own efforts at monitoring care.

Price. Regulations may also increase price both by increasing demand and by reducing supply. However, these effects are not clear. First regulations increase the demand for care only if they increase expected quality. As explained above the effect on expected quality is not clear. In addition, even if regulations increase quality from the regulator's perspective, they may lower quality from the parent's perspective (Hotz & Kilburn 1995). For instance some parents may prefer higher child/staff ratios than are allowed by regulations. For these reasons the net effect of regulations on price via demand is unclear.

While the expected effect on demand is not clear, the expected effect of regulations on price via supply is likely to be positive. Providers are likely to reduce supply to offset the costs associated with regulations. Such costs include hiring additional staff to reduce the number of children per staff member, raising wages to attract staff members with higher educational and training qualifications, providing subsidies to existing staff to meet increased education and training requirements, and paying for facility modifications to meet additional health and safety requirements. Regulations can also reduce supply in the short run by giving producers who remain in the market extra market power (Lowenberg & Tinnin 1992; Svorny 1987). In sum, while regulations are likely to reduce the supply of care (and thereby increase prices) the total effect on price is unclear because demand may fall if expected quality declines (from the parents' perspective).

Availability. The availability of the arrangement may also influence parental decisions (Blau 1991). Child care is quite localized. In our work, availability refers to the parent's perception of the travel time to a provider with an open

slot. It is measured as whether or not the parent perceives a child care provider of a given type to be available within 30 minutes of home. On the one hand, stricter regulations can decrease availability if a provider is unable to remain in business after regulations are increased. As the number of providers falls, the chance of being close to a provider in a fixed area falls. Also, regulations reducing child/staff ratios may cause providers to reduce their enrollment if they cannot hire more staff and this may reduce the availability of licensed slots. On the other hand, regulations could positively affect availability if they cause an increase in expected quality and thereby raise demand causing providers to expand. The overall effect is ambiguous.

Use. The net effect of regulations on whether or not a parent uses care is affected by the change in expected quality, price, and availability. While regulations may increase expected quality, causing an increase in demand, price may also rise and availability fall, offsetting the gain in expected quality. Therefore the net effect of regulations on use of care is ambiguous.

Regulations may be ineffective. The effects discussed above are all contingent on regulations being binding. This need not be the case. If regulations are so lax that almost all providers would have met the standards in their absence, regulations are unlikely to have much effect. Similarly, it is possible that the government may create laws that would be binding if they could be enforced, but which are essentially meaningless because the government regulators do not or cannot enforce them (General Accounting Office 1992). This seems especially likely to be true in the case of family day care, 80 percent of which is either exempt from regulation or illegal (Willer et al. 1991). Finally, regulations may also be ineffective in increasing the expected quality of care for parents if regulators focus on aspects of quality that parents do not care about. Training and child/staff ratios are good examples of this (Hofferth & Chaplin 1994).

Evidence from previous studies

To date, three studies have examined child care consumption at the state level. Lowenberg & Tinnin (1992) examined the relationship between two aspects of state regulation – state requirements for the maximum ratio of children to staff and preservice requirements for center directors – and the number of licensed child care center slots in each state ($n = 40$), controlling for other factors that are likely to influence child care consumption in the state. The authors found a negative relationship between educational requirement and number of slots and a positive relationship between child/staff ratio and number of center slots at the state level. That is, the more restrictive the

licensure requirement, the lower the number of child care slots. The authors argue that this provides evidence that licensure restrictions in the US child care center market do not benefit consumers. This conclusion is hard to justify since the benefits to society in general and the consumers who continue to use the mode of care regulated may greatly outweigh the losses incurred by those who switch to other modes. While this paper is enlightening on some aspects of licensing, it does not include any measure of enforcement.

Rose-Ackerman (1986) examined the proportion of all children under 18 enrolled in day care centers, a measure of consumption. She too found that higher (or more lax) state child/staff ratio maximums were associated with higher enrollment rates. The number of inspections, a measure of enforcement, was not significantly related to consumption of child care centers. While this paper is also interesting, the data were collected in the mid to late 1970s; substantial changes in the day care industry have taken place since then, including greatly increased use and federal funding (Hofferth 1993). Our data from 1989 provide a more up to date picture of current usage patterns.

Gormley (1991) examined the effect of regulation on the number of centers and regulated family day care homes per 1,000 children in each state. His paper examined the influence of different types of regulations, categorized based on their costliness, intrusiveness, and enforceability. According to Gormley, not all regulations are likely to affect the number of child care providers; only those that are costly or intrusive and enforceable. A handwashing requirement may have large psychic costs for providers because it affects day-to-day routines. However, it is probably not enforceable and, therefore, is unlikely to affect the number of providers. In contrast, child/staff ratio and training regulations are both costly and enforceable. Child/staff ratios are costly because staff costs constitute the largest component of program costs (Travers et al. 1980). Training regulations are costly because they generally require staff to have completed a minimum number of hours in special course work related to young children. These training requirements can affect the costs of hiring qualified staff and training under-qualified staff.

Gormley (1991) found that stronger regulations were often associated with fewer centers and family day care providers per child in the state. In particular he found that for centers lax child/staff ratio requirements were associated with a greater number of centers, and that for family day care homes a smaller number of annual required inspections, and less strict liability insurance requirements were associated with a greater number of regulated family day care homes. Training regulations, in contrast, were not found to be associated with a reduced number of centers or family day care homes. While Gormley's work is informative, he used aggregate data while we use individual level data.

In addition, he lacked data on price, quality, and actual use (as opposed to the number of providers), all of which are included in our analysis.

All three previous papers have found some support for a negative effect of strict child/staff ratio regulations on the number of child care slots or on aggregate consumption (proportion of children enrolled). Only the Lowenberg and Tinnin analysis found a negative effect of educational requirements on the number of licensed center slots. None of these papers examined how regulations might affect individual family decisions regarding care.

Hotz & Kilburn (1994) analyzed the effects of regulations on the use of non-parental child care arrangements at the family level. Using data from the fifth follow-up to the National Longitudinal Survey of the High School Class of 1972, the authors examined the effects of child/staff ratio regulations in centers and regulations regarding the training of center staff and family day care providers on the use of nonparental care by working and nonworking mothers about 32 years of age. They did not examine inspections. As did the other studies, the authors found that lax regulations are associated with greater utilization of non-parental child care arrangements. This held for both child/staff ratio regulations and education/training requirements for staff. The only apparent exception was that the greater the education requirement for center staff, the greater the utilization of nonparental care by nonworking mothers. The authors also found a fairly substantial effect of regulation on the amount parents pay for nonparental care; expenditures are significantly lower in states with lax child/staff ratios and education/training standards. Child care expenditures, in turn, have a strong negative effect upon child care utilization by parents.

Our results improve on those of Hotz and Kilburn for several reasons. First, we use four categories of care while Hotz and Kilburn were limited by their data to parent versus non-parent care. Second, we use measures of child/staff ratios in family day care homes and inspections. Third, our sample of employed mothers is nationally representative while that of Hotz and Kilburn was limited to mothers in their early thirties who were high school graduates.

Although little research has explored the effect of state regulations, and only one has examined parental choice of child care arrangements, the effects are relatively consistent across the studies to date. Stricter regulations are generally associated with lower utilization of child care. Stricter regulations are also associated with higher priced care. None of these studies, however, has looked at the direct effects of regulations on the quality of child care, a key factor in determining its effectiveness.

One study (Phillips et al. 1992) examined the relationship between the stringency of state child care regulations and quality of care in five metropolitan

areas. The investigators found centers in states with more stringent regulations to have better staff-child ratios, better-trained staff, and lower staff turnover rates. While suggestive of the effects of regulation, this study is limited in its generalizability.

The present paper is the first to examine the influence of both state regulations and inspections on parents' use of care through their effects on price, quality, and availability. We consider a larger set of possible child care arrangements (center care, family day care, relative care, and father care) than other papers on state regulations, a larger set of regulations, and incorporate parental reports of price and availability for modes of care not used. Nor has the literature controlled for quality in looking at parental choice of arrangements. For all of these reasons our paper represents an advance over previously available evidence concerning the effects of regulations on child care use.

Data

We use two unique data sets in this study – the National Child Care Survey 1990, and a file of contextual data on the counties in which this survey was collected (the Contextual Data File).

National Child Care Survey 1990. The National Child Care Survey 1990 (NCCS) is a nationally representative survey of households with children under age 13 funded by the National Association for the Education of Young Children and the Administration for Children, Youth and Families (Hofferth et al. 1991). This nationally representative survey of households with children under age 13 was fielded by Abt Associates from November 1989 through May 1990. Through random digit-dial techniques, 4,392 households located in 100 counties or county groups in 37 states were interviewed by phone using computer-assisted telephone interviewing methods. The overall response rate to the survey was 57 percent. A variety of data quality checks indicate close agreement between the results of this survey and other national surveys conducted in person and by phone with respect to child care arrangements (Hofferth et al. 1991).

Contextual data file. Using a variety of sources such as the US Bureau of the Census, the National Center for Health Statistics, and the Bureau of Economic Analysis, we obtained data for 62 contextual variables in each of the 144 counties and 37 states in the NCCS. Information was compiled on state regulations regarding staff qualifications, child/staff ratios, and inspections for centers and family day care as well as a number of characteristics not used

in this study from Morgan (1987). Additional information was obtained by calling officials at the state and county levels.

Selection criteria. We focus our analysis on children under 6 whose mothers are working, in training, or in school. This is the group traditionally considered relevant for child care policy. We analyze the primary child care arrangement for the youngest child of those mothers.¹ Cases in which the mother is the primary provider are excluded. We select youngest children because many of the important variables are only available for the youngest child. In addition, the care decision for the youngest child is generally agreed to most affect parental decisions regarding employment and child care (Leibowitz, Klerman & Waite 1992). Finally, we select only cases in which the mother was the respondent. Only 42 cases out of 1,341 are excluded because the father answered the questionnaire. Excluding an additional 93 cases with missing data, the final sample size is 1,206.

Methods

Approach

We analyze the effect of regulations on choice of child care arrangements using both a reduced-form model and a path model. The reduced-form model estimates the total effects of regulations on choice without controlling for price, quality, or availability. The path model estimates the indirect effects of regulations on choice via price, child/staff ratio, and availability, in addition to the direct effects. This is shown in Figure 1. Regulations are hypothesized to affect the price, quality, and availability of care, and through these paths to affect the decisions that parents make.

The first step in laying out the path model is to examine the relationship between regulations and the three attributes of child care – price, quality, and availability. We do this by regressing our measures of price, quality and availability on the appropriate regulations and the controls. The second step is

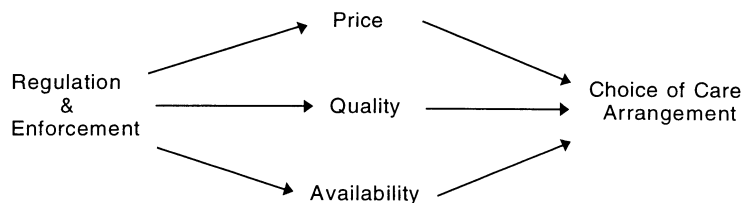


Figure 1. Path diagram for the effect of state regulation on the choice of child care arrangement.

to estimate the direct effects of regulations on choice and the indirect effects that occur through price, quality, and availability. We do this by regressing child care use on the price, quality, and availability variables, in addition to the regulations and controls, using multinomial logit regression. Below are detailed descriptions of our reduced-form and path models.

Statistical models

Reduced-form model. In the reduced-form model we assume that the propensity to make choice n for individual i (V_{in}) is a linear function of the relevant regulations (R_{in}), the control variables (X_i), and a random component (e_{in}),

$$V_{in} = R_{in}'\beta_{Rn} + X_i'\beta_{Xn} + e_{in} \quad (1)$$

where β_{Rn} and β_{Xn} are vectors of parameters. Note that only the relevant regulations affect the propensity for choice n .

The individual will choose the option with the highest propensity. Option j will be chosen if,

$$V_{ij} \geq V_{in}, \quad n = 1 \dots N \quad (2)$$

where N is the total number of child care choices available.

We also assume that the random components (e_{in}) are independent across individuals and modes of care. With this assumption, the probability that mode j is chosen by individual i may be written as,

$$\begin{aligned} p_{ij} &= \text{Prob}(V_{ij} \geq V_{in}, n = 1 \dots N) \\ &= \exp(R_{ij}'\beta_{Rj} + X_i'\beta_{Xj}) / \sum_{n=1}^N [\exp(R_{in}'\beta_{Rn} + X_i'\beta_{Xn})]. \end{aligned} \quad (3)$$

For identification, the center care parameters on the control variables are normalized to 0. The remaining parameters of the model are estimated using maximum likelihood.

Path model. To estimate the path model we first use linear least squares regressions to describe the association between the price, quality, and availability variables (Z_{in}) and the regulations and control variables.

$$Z_{in} = R_{in}'\alpha_{Rn} + X_i'\alpha_{Xn} + W_{in}'\alpha_{Wn} + u_{in} \quad \text{for } n = 1 \dots N \quad (4)$$

where α_{Rn} , α_{Xn} and α_{Wn} are matrices of parameters, W_{in} are variables that affect the price, quality, and availability but not choice of child care, and u_{in} is a vector of unobservables affecting Z_{in} .

Separate regressions are used for each mode of care (center, home, and relative) except father care. For father care we assume the price is zero. The child/staff ratio is the number of children in the family under the age of 6, and availability is determined by the mother's marital status.

We then add the price, availability, and quality variables (z_{in}) to equation 1, which describes the multinomial logit regressions for choice of care. Since we do not observe quality for non-users, we predict it for everyone.

$$V_{in} = z'_{in}\gamma_{Zn} + R'_{in}\gamma_{Rn} + X'_i\gamma_{Xn} + \epsilon_{in} \quad (5)$$

where γ_{Zn} and γ_{Rn} are vectors of parameters and ϵ_{in} is an error term of unobserved factors affecting V_{in} .

We use this path model to estimate both direct and indirect effects of regulations. The indirect effects occur through prices, child/staff ratios, and availability. The direct effects describe the association of regulations with unobserved factors affecting child care choices.

We control for parents' reports of price and availability and for only one aspect of quality – the child/staff ratio. Price and availability may be measured imperfectly. In addition, there are many other aspects of quality that we would like to have measured and we lack controls for parents' uncertainty about the price, quality and availability of child-care arrangements. Finally regulations may be correlated with unmeasured variation in all of these factors. For these reasons we also estimate direct effects of regulations.

Measures of key variables

Child care choice. We distinguish four categories of care: center care, which is care in a day care center or nursery school; home care, which includes care by non-relatives in the home of the provider (family day care) or the home of the child (sitter care); relative care (in the child's or provider's home); and father care. The major distinction among types is based on the relationship between the child and the provider, rather than location or payment status. From a child development perspective, the crucial distinction is whether children are cared for by a relative or by someone unrelated to them (Baydar & Brooks-Gunn 1991). Center and home care are separated because early research found that family factors affect parents' choices between the two. Because fathers are not paid and not everyone has access to a second parent, father care was separated from relative care. In addition, in results not presented here, we found that the effects of factors associated with using care by the father or by another relative differed significantly at the 5 percent level. Center care is regulated in all states; home-based and relative care are not. Ideally, we

would have separated regulated home-based from non-regulated home-based care, but parents were not asked the regulatory status of their provider.

Regulations. We include five state regulations plus two measures of inspections in our models, three related to center care and four related to family day care. For center care, the regulations include whether states require education, training, or experience of teachers, the maximum child/staff ratio allowed for programs with 2-year-olds, and the required number of annual inspections per center. For family day care, the regulations we use include whether care programs are required to be licensed, whether provider training is required, the maximum child/staff ratio for 2-year-olds, and the required number of annual inspections per provider. The descriptive statistics for these regulations are given in the Appendix.

Price. To calculate a price of care for each mode of care, we combined data on *actual* and *expected* prices. Parents reported their *actual* expenditures on child care for each arrangement that they used for the youngest child. These actual expenditures are reported in a variety of units (hourly, daily, weekly, bi-weekly, monthly, and annually) and for all children in the arrangement. We used parents' answers to calculate hourly prices per child. This is straightforward because parents reported the hours per day and days per week that the child was in care. In this paper we use the actual expenditures on the first arrangement. Only about one-quarter of parents have a second arrangement.

Data on the *expected* costs of arrangements not used were also reported in a variety of units. In this case, however, the hours per day and days per week were not reported. Therefore, we had to estimate the expected hourly price for each user that did not report expected price in hourly units. The details of this estimation are discussed in Hofferth et al. (1996).

Finally, an actual or expected price was created based on the actual price for the arrangement the respondent was using and the expected prices for those she was not using. The mean of the actual and expected prices for that arrangement was substituted for a missing value. Early versions of the multinomial logit regression models were run with variables indicating that means were substituted. This did not affect our substantive conclusions.

Quality. The measure of quality used in this analysis is the ratio of children to staff (child/staff ratio) in the child's group; a low ratio has been found to be related to better developmental outcomes for children (Phillips & Howes 1987). In the NCCS, parents reported the number of children in their child's group or class and the number of teachers or providers caring for them. We calculated the ratio of children to staff based on these reports. While we expect a relationship between child/staff ratio regulation and child/staff ratio in the

child's group, there is substantial variation, with many programs exhibiting child/staff ratios considerably higher than required by the state.

We only observe the child/staff ratios for the form of care used. Therefore, we predict child/staff ratios for all the modes of care. Using coefficients from the models for the child/staff ratios (see equation 4 above), we obtained predicted measures of quality of care for each arrangement for each family, whether or not they used the arrangement. Hofferth & Wissoker (1992) used a similar method but corrected their child/staff ratio regressions for selection. Because the correction terms were not statistically significant in their analysis, we did not control for selection in our models.

Identifying variables for child/staff ratios. To identify the effects of child/staff ratio on child care choice, we need variables that are related to child/staff ratio but not directly to choice once the child/staff ratio and other variables are controlled. For all modes of care we use the unemployment rate and average per capita income in the county as identifying variables. For the child/staff ratio of relative care we also use the relation of the child to others under 18 in the home and the education of relatives in the household.

Availability. Availability refers to how long the parents believe it would take to travel to the nearest potential provider of care for their child.⁴ Parents using an arrangement were asked how long it takes to travel to that arrangement from their home. Parents not using an arrangement were asked whether they know of a center, sitter, family day care home, or relative that would be available to care for their child or a program their child could attend. If so, a second question asked them how long it would take to get to that person or program from their home.⁵ Our availability variable is an indicator for whether it takes more or less than 30 minutes to travel to that arrangement. Non-users of a mode of care who said they did not know if it was available were given the value for 30 minutes or more.

Control variables. In all of our regressions we control for a set of factors that may affect price, quality, availability, and demand for child care. Since parents differ in their assets and preferences, we control for the characteristics of the decision maker and the community in which he or she lives. The controls are described in the Appendix.

Previous research has shown that centers and family day care homes set fees based on the age of the child and whether the child is enrolled in school, the income of the family, and the number of children in the arrangement (Kisker et al. 1991). Providers tend to charge less for older preschool children because they need less attention than younger ones. They also charge more for before- and after-school care for each school-age child. Providing care

during these hours may be more costly. In addition, these children occupy slots that might otherwise go to full-day children.

For income we use the mother's wage, other household income, and the average income in the county. Mothers with low wages, education, and other income probably pay less if they choose lower quality arrangements or if providers charge differently according to their perceived ability to pay. The average income of child care users in the area probably affects the availability of care for all individuals living in the area. We control for these considerations.

We also control for number of siblings, the time of day the mother works, her education, race and ethnicity, the county level unemployment rate for women, and the per-capita income in the county. The time of day the mother works affects fees; evening care may cost more than care during the day because it is more burdensome to the provider. Education, race and ethnicity of the mother control for differences in preferences regarding the characteristics of child care purchased. Fees, quality, and availability may vary depending on the county per capita income and unemployment rate, both of which measure prosperity of the area and alternative employment opportunities for providers.

Results

The effects of regulation on choice

Table 1 provides three estimates of the estimated effect of regulations on the percentage of families using center and home care. The first column is based on the raw percentage differences in our sample using center care or home care, by regulation status. The second column is based on the reduced form model, and the third column is based on the path model. The coefficient estimates for all regressions are available upon request from the authors.

The differences in use by regulation status, presented in the first column of Table 1, show that regulating training is associated with 30.3 percent less use of center care and 14.5 percent less use of home care. Lastly, having any regulations is associated with 30 percent less use of home care.⁶ Only one of the three raw percentage differences is statistically significant,⁷ but all three estimates are consistent with the hypothesis that regulations limit parental choice.

In order to control for other factors that affect choice we estimate the multinomial logit regressions discussed above. The reduced form model includes the regulations as well as a number of controls, but excludes price, child/staff ratio, and availability. The results of this regression are used to calculate the estimated total effects reported in the second column of Table 1.

Table 1. The estimated total effects: Percent change in use of mode caused by regulations

Mode	Regulation	Raw difference ^a	Reduced form ^b	Path
Centers				
	Training	-30.3* (12.6)	-37.1** (13.4)	-33.3 (-)
	Inspections	-	17.7** (6.0)	16.7 (-)
	Child/staff ratios	-	1.1 (2.0)	4.0 (-)
Home				
	Training	-14.5 (10.1)	-16.1 (10.8)	-25.0 (-)
	Inspections	-	14.7** (5.6)	18.2 (-)
	Child/staff ratios	-	-4.7 (3.2)	-8.4 (-)
	Any regulation	-30.0 (21.2)	-48.7* (24.4)	-86.7 (-)

^a The raw difference is the mean percent using the mode in states with the regulation minus the mean percent in states without the regulation divided by the sample mean. The standard error is calculated assuming the denominator is fixed. ^b The estimated effects for the reduced form models are the derivatives of the relevant choices with respect to the variable of interest divided by the predicted probabilities. The standard errors account for the variance in the denominator.

* $p < 0.05$; ** $p < 0.01$.

As can be seen, the total effects of training regulations and regulating family day care at all are larger than the percent differences in sample means.

Requiring providers to be trained reduces the use of centers by 37 percent and home care by 16 percent according to our reduced form model estimates (column 2, Table 1). Table 1 also shows that living in a state requiring family day care providers to be regulated at all reduces the use of home care by 49 percent. The estimated effect of a training regulation is statistically significant for centers, but not for family day care, while the estimated effect of having any regulations for family day care is statistically significant. These results strengthen the evidence suggesting that regulations reduce use.

The reduced form model (column 2, Table 1) also shows that inspections are significantly related to use for both center and home care. Surprisingly, requiring more inspections is associated with increased rather than decreased

use. Among the states in our sample, the average number of annual inspections per provider is 1.72. Increasing the average number of inspections per year by one inspection increases center use by 17.7 percent and home care use by 14.7 percent in our reduced form model. The opposite effects would be expected if inspections acted to reinforce the effects of regulation. Rather, the results concerning inspections are consistent with the interpretation that they reduce the probability of low quality care and thereby increase use.

Finally, the estimated effects of the child/staff ratio regulations for centers and for family day care are moderately large but not statistically significant. For center care, the average state child/staff ratio maximum for parents in our sample is 7.4. Increasing the state child/staff ratio maximum by one child increases center use by 1.1 percent in the reduced form model, less than its standard error. For family day care the average maximum state child/staff ratio is 3.8. Increasing the maximum by one child decreases use of home care by 4.7 percent, less than twice its standard error. Because of the large standard errors we can say little about the total effects of regulating child/staff ratios.

In sum, we find strong evidence that requiring center-based providers to be trained lowers the probability that parents will choose a center. In contrast, more frequent inspections are strongly associated with more parent use of both center and home care. The effects of child/staff ratio regulations on use are inconclusive because we estimate relatively large standard errors for both center-based and home-based care.

Explaining the effects of regulation

The estimated total effects of regulations using the path model are presented in the third column of Table 1. While coefficient estimates are rarely significant, the path analysis is still helpful in demonstrating the proportion of variance in the total effects of regulations and inspections that can be explained by indirect effects through price, quality, and availability and that which remains unexplained (the direct effect).

One might expect the total effects estimated using the reduced form and path models to be identical. This does not happen in our models because of sample selection and non-linearities. In a more typical path model the intermediate variables are observed for the entire sample. Sample selection occurs in our analysis because we observe child/staff ratios only for those individuals who use the relevant form of care. The results also differ because we use a non-linear model (the multinomial logit) to describe the choice of child care arrangements.

For center care the estimated total effects from the path model are similar to the total effects estimated using the reduced form model. For home care, the path model estimates are larger in absolute size than the reduced form

estimates, although, based on the standard errors for the reduced form model, the differences are not statistically significant.

We use ordinary least squares to estimate all of the regressions in the first stage of the path model. To calculate the predicted total effect of any regulation we multiply the coefficient estimates on that regulation from the price, child/staff ratio, and availability regressions by the corresponding estimated effects from the child care arrangement choice model, and sum the results. Added to this sum is the direct effect of the relevant regulation from the choice model. These calculations are shown in Table 2.

Center-based care

Training. As shown in Table 2, all of the indirect effects of teacher training regulations on choice of centers are negative. First, a state training regulation increases price, and increased price reduces use of center care. Second, a training regulation lowers the child/staff ratio, but, a lower child/staff ratio decreases use. Third, a state training regulation reduces the availability of center-based care, and lower availability reduces its use. The estimated effects of training on price and price on use are statistically significant at the 0.10 and 0.05 levels, respectively, and in the expected directions. Of the other four estimates, only the estimated effect of perceived availability on use of center care is statistically significant and in the expected (positive) direction. The direct effect of training on use of center care is negative but not statistically significant.

The total effect of training regulations on use of center care calculated from the path model is to reduce the use of center care by one-third (–33.3 percent). Of this, two-thirds (66.1 percent) is due to the ‘direct’ effect and remains unexplained by price, ratio, and availability. Nineteen percent is explained by the effect of training regulations on availability, and 12 percent by the effect of training regulations on price. Only 2 percent is explained by the effect of training regulations on child/staff ratios. These results are consistent with our argument that, because they are costly, training regulations reduce child care use by increasing price and reducing access, but the evidence is weak.

Inspections. In Table 2, we decompose the positive relationship between inspections and the use of center care into its direct and indirect effects. More frequent inspections are weakly associated with lower prices, increased child/staff ratios, and greater availability, all of which are associated with increased use of center care. Inspections also directly increase the use of centers though the estimate of this effect is not statistically significant.

We showed earlier that inspections are associated with an increase of 16.7 percent in the use of centers (Table 1, column 3). Two-thirds (66.4 percent)

Table 2. Decomposing total effect of regulations on use of care

Mode Regulation Path	Estimated effects			Percent of total
	Stage 1	Stage 2	Product	
Center				
Train				
Price	0.227+	-0.175**	-0.040	11.9%
Ratio	-0.421	0.019	-0.008	2.4%
Available	-0.046	1.410***	-0.065	19.5%
Direct	1	-0.220	-0.220	66.1%
Total			-0.333	100.0%
Inspection				
Prices	-0.080	-0.175**	0.014	8.4%
Ratio	0.360+	0.019	0.007	4.1%
Available	0.025	1.410***	0.035	21.1%
Direct	1	0.111	0.111	66.4%
Total			0.167	100.0%
Child/staff ratios				
Price	-0.036+	-0.175**	0.006	15.8%
Ratio	-0.003	0.019	-0.000	-0.1%
Available	0.011*	1.410***	0.016	39.0%
Direct	1	0.018	0.018	45.3%
Total			0.040	100.0%

+ $p < 0.10$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

is due to the direct effect of inspections on use and is therefore not explained by price, child/staff ratio, or availability (Table 2). Twenty-one percent is explained by the effect of inspections on availability, 8 percent by the effect of inspections on price, and the remaining 4 percent by the effect of inspections on child/staff ratios.

We hypothesized that inspections may raise the expected quality of the modes of care parents consider and, through this path, affect their choices. It does not reduce child/staff ratios as hypothesized. Since we do not have a measure of quality other than child/staff ratio in our path model, it is not surprising that most of the effect of inspections is direct.

Child/staff ratio maximum. Surprisingly, we find no statistically significant effect of the state child/staff ratio maximum on the reported child/staff ratio of the child's arrangement, once other factors are controlled (Table 2). Indeed, the estimated effects are unexpectedly negative for both center and home care.

Table 2 (continued)

Mode Regulation Path	Estimated effects			Percent of total
	Stage 1	Stage 2	Product	
Home				
Train				
Price	0.064	-0.072	-0.005	1.8%
Ratio	-0.144	0.338	-0.049	19.5%
Available	0.016	2.089***	0.033	-13.4%
Direct	1	-0.230+	-0.230	92.1%
Total			-0.250	100.0%
Inspections				
Price	-0.062	-0.072	0.004	2.5%
Ratio	-0.034	0.338	-0.011	-6.3%
Available	0.022	2.089***	0.046	25.3%
Direct	1	0.143*	0.143	78.6%
Total			0.182	100.0%
Child/staff ratios				
Price	-0.052+	-0.072	0.004	-4.5%
Ratio	-0.082	0.338	-0.028	33.1%
Available	-0.031***	2.089***	-0.065	77.3%
Direct	1	0.005	0.005	-6.0%
Total			-0.084	100.0%
Any regulations				
Price	-0.440+	-0.072	0.032	-3.7%
Ratio	-0.023	0.338	-0.008	0.9%
Available	-0.135+	2.089***	-0.282	32.5%
Direct	1	-0.609+	-0.609	70.2%
Total			-0.867	100.0%

+ $p < 0.10$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

One possible explanation for this result is that parents are not well aware of the child/staff ratios at their centers. Other evidence (Hofferth et al. 1994) suggests that parent reports of child/staff ratios do not match those the centers report, although parent reports on other characteristics such as price do match (Willer et al. 1991.) Other explanations include misspecification of the model and small sample sizes. It is also possible, however, that state regulations have very little effect on child/staff ratios.

While we did not find the expected effect of child/staff ratio regulations on reported child/staff ratios, we did find positive effects of child/staff ratio regulations on use via price and availability, about which parents are prob-

ably more knowledgeable. A higher child/staff ratio regulation is associated with reduced price, though weakly, and is strongly associated with greater availability of center care. Reduced price and greater availability are, in turn, strongly associated with greater use of center care.

The total effect of increasing the child/staff ratio maximum by one is to increase the use of center care by 4 percent, according to the path model (Table 1). The direct effect of the child/staff ratio maximum on use is not statistically significant but accounts for 45 percent of the total effect (Table 2). Thirty-nine percent is explained by the effect of child/staff ratio on availability and the remainder (16 percent) by the effect of child/staff ratio on price. This evidence suggests that regulations increase the price and reduce the availability of child care.

Home care

Training. For home care, our path model explains little of the total effect of training on child care use. In Table 2 we see that the effects of training regulations on price, child/staff ratios, and availability are all statistically insignificant. The estimated direct effect of training regulations on use from our path model explains almost all of the –25 percent total effect of training regulations and is significant at the 10 percent confidence level. The variables included in the model are not sufficient to understand the effect of training of family day care providers on care use.

Inspections. We find a significant positive association between inspections of family day care homes and parents use of family day care. An increase of one inspection per year per home increases use by 14.7 percent in our reduced form model in Table 1. In Table 2, we see that inspections are not significantly associated with price, child/staff ratios or availability. However, the direct effect in the path model is statistically significant and explains most (78.6) percent of 18.2 percent estimated impact of inspections in the path model.

Child/staff ratio maximum. In Table 2 we see that the estimated effect of higher child/staff ratio regulations on child/staff ratios is unexpectedly negative, as is the effect on availability. In states with a higher child/staff ratio maximum, parents report lower child/staff ratios in their children's programs, though this is not statistically significant. In addition, in states with more liberal ratios, parents report less availability, an estimate that is statistically significant. The estimated effect on price is negative and marginally significant ($p < 0.10$).

The total estimated effect of increasing the maximum child/staff ratio by one is a decline of 8.4 percent in the use of home care based on the path model

(Table 1). This is not the expected sign if higher child/staff ratio regulations facilitate use. As can be seen in Table 2, most of this estimated effect comes through the estimated effect on availability. In sum, the path model provides an unclear picture of how child/staff ratio regulations affect either child/staff ratios or use of child care

Any regulation. There is a positive estimated effect of having any regulation on use of home-based care through price: Regulating family day care significantly reduces price, and reduced price raises use. Having any regulation for family day care is estimated to reduce child/staff ratios and availability, but only the effect on availability approaches significance – at the 10 percent confidence level.

The estimated effect based on the path analysis model, –87 percent, is much larger than the reduced form estimate of –49 percent (Table 1) which is significant. These large estimated effects are not due to the non-linearity of the function. In addition, this result does not appear to be caused by a regional effect because the states without regulations are spread out across the country. While we have strong evidence that family day care regulations affect choice, there is a great deal of uncertainty about the magnitude of the effect.

The direct effect of regulations on use is statistically significant at the 10 percent confidence level and accounts for about 70 percent of the total effect in the path model, while the indirect effect through availability accounts for most of the rest (Table 2). As discussed earlier, the estimated effect of having any regulations on availability is negative and also significant at the 10 percent level. Both of these pieces of evidence support the hypothesis that regulations may serve to decrease use of the mode of care they regulate.

Discussion

The effect of regulations on use of centers and family day care homes is negative, supporting other work suggesting that not all consumers benefit from regulations. To understand why regulations and inspections affect parental choice as they do, we examined the effects of regulations and inspections on the price, quality, and availability of child care, and then looked, in turn, at the effects of price, quality, and availability on parental decisions. We found that observed patterns do not always meet our expectations. Though we believe there is a relationship between regulations and child care use, we do not fully understand how regulations and inspections affect parental use of child care.

Overall, our results support two general principles of the effects of regulations. First, *stricter regulations are weakly associated with increased prices to consumers, and increased prices reduce use*. Four of the five regulations (not including inspections) increase price, and three of these estimates are

significant at the 10 percent level. Higher prices, in turn, are associated with less use, although the estimated effect for home care is not statistically significant. The indirect effect of regulation on use through price is small in spite of the substantial effect of price on use because of the small effect of regulations on price.

Second, *stricter regulations are weakly associated with reduced availability, and reduced availability lowers use*. We find that stricter regulations are associated with reduced availability for three of the five regulations variables, and two of these effects are significant at the 10 percent level. Reduced availability, in turn, is significantly associated with less use of both center and home care. The indirect effect of regulation on use through availability is the largest of the indirect effects because of the large effect of availability on use.

We also find that *inspections facilitate use of care*. Thus, inspections appear to benefit at least some child care consumers. We find evidence that inspections are not costly to parents. For both center and home care, the point estimate of the effect of inspections on price is small and negative ($-\$0.08$ for centers and $-\$0.06$ for homes). Based on the small confidence intervals (not shown), we conclude that adding one inspection per year is very unlikely to add more than two percent to the cost that parents pay for child care. Indeed it would probably reduce parental payments.

Inspections are also associated with increased availability for both center and home care, although neither estimate is significant. Since the path from inspections to availability is not statistically significant, we can draw no strong conclusions about the ways in which inspections increase use. However, the direct effects of inspections on choice are large and positive for both center and home care and significant for home care. This suggests that another intermediate factor, such as quality, may be the path through which inspections affect parents' use of care. In other words, inspections may provide users with better quality care, which increases its use. Unfortunately, our measure of quality was limited. Including other aspects of quality in future research would provide a better test.

We estimate fewer significant results for home care than for center-based care. Neither the training regulation nor the inspections regulation is significantly associated with price, child/staff ratios, or availability, and the significant effect of having any regulation at all on price is negative. This may be because most of the providers in our home-care category are not regulated. Regulations apply only to non-exempt family day care; and 80 to 90 percent of family day care is exempt from regulations or is operating illegally (Willer et al. 1991). Our home care category also includes some sitter care that is not regulated.

Finally, it appears that price and availability explain a greater portion of the variance in the effect of regulations on the use of center care than on the use of home care. The indirect effects through price, child/staff ratio, and availability explain about one-third to one-half of the total effect of regulations and inspections on use of center-based programs while none of the direct effects is statistically significant. The indirect effects explain only a small fraction of the total effects of most regulations for home care while the direct effects are statistically significant for three of the four variables.

Conclusion

This analysis provides evidence that some regulations may reduce parental child care use. Our results regarding child/staff ratio regulations are unclear. However, requiring providers to be trained does appear to reduce parent use of center care while having any regulations appears to reduce use of family day care. These results suggest that regulations do not benefit all consumers. If we wish to use regulations to increase the training of child care providers without reducing use, we must either increase government assistance to pay for this training or educate parents to increase their willingness to pay for it. Otherwise, regulations mandating provider training may cause some parents to switch to nonregulated forms of care.

While training regulations reduce center use and the effect of child/staff ratio regulations is unclear, inspections appear to have large and positive impacts on use for both center and home care. In addition, we find evidence against large positive price effects. This suggests that inspections benefit some consumers. While in this paper we were not able to explain the effects of inspections through child/staff ratio, inspections are likely to affect other aspects of quality that were unmeasured in our analyses. Thus, more frequent inspections may prove to be a useful way to improve quality without increasing the price of care to parents, but more research is needed.

Finally, it appears that regulations may have indirect effects on parental use of child care through availability and price.

Our results, suggesting that training regulations may limit use of care while inspections are likely to increase use, should be of considerable interest to state agencies considering overhauling their regulatory requirements, and to federal agencies working to increase the availability of programs to needy families. This research was, however, limited to certain types of regulations and certain characteristics of child care arrangements. In addition, many of our results were inconclusive. Additional research is needed using larger data sets with more complete information on aspects of regulations and programs that were not addressed here.

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Appendix: Descriptive statistics

Variable	Mean	sd	Description
CEN	0.313	0.464	1 if center care is used, 0 otherwise
HOME	0.257	0.437	1 if home care is used, 0 otherwise
REL	0.223	0.416	1 if relative care is used, 0 otherwise
DAD	0.207	0.406	1 if dad care is used, 0 otherwise
Prices and child/staff ratios (actual and predicted) and availability			
AOEPCEN	1.776	1.294	Price of center care, actual or expected
AOEPHOME	2.107	1.541	Price of home-based care, actual or expected
AOEPREL	0.595	1.088	Price of relative care, actual or expected
RCEN	6.221	3.236	Child/staff ratio of center care, actual
RRCEN	5.636	1.574	Child/staff ratio of center care, predicted
RHOME	2.926	2.141	Child/staff ratio of home-based care, actual
RGRHOME	2.845	0.771	Child/staff ratio of home-based care, predicted
RREL	1.458	2.088	Child/staff ratio of relative care, actual
CSRREL	1.452	0.400	Child/staff ratio of relative care, predicted
CEN30MIN	0.755	0.431	<30 minutes to nearest available center
FDC30MIN ^a	0.590	0.492	<30 minutes to nearest available family day care home
REL30MIN	0.529	0.499	<30 minutes to nearest relative who could provide care
Regulations			
TRAINCEN	0.852	0.355	Training of center teaching staff required in state
TRAINFAM	0.346	0.476	Training of family day care providers required in state
REGULFAM	0.934	0.248	Family day care homes are regulated in state
INSPCCTR ^b	1.720	0.979	Minimum annual inspections of centers
INSPCFDC	0.902	0.893	Minimum annual inspections of family day care homes
CSCEN ^c	7.455	2.885	Max. child/staff ratio for centers with two-year olds
CSFAM ^c	3.767	1.990	Max. child/staff ratio for family day care with kids < two years old

Appendix (continued)

Variable	Mean	sd	Description
Instruments for child/staff ratios			
PRCAPINC	14.21	3.494	Money income per capita in county (in thousands)
UNEMPLRF	6.239	2.167	Female unemployment rate in the county
REL_<18	0.983	3.679	Child's relationship to others under 18 in home
REL_ED.	0.874	3.210	Highest education of nonparental, nonsib relatives in home
Control variables			
NRELS	0.104	0.406	Number of relatives in the household
OTHINC ^d	2.410	1.720	Income of other household members (in ten thousands)
MOMWAGE ^d	1.096	1.274	Mother's hourly wage (in tens of dollars)
NONDAY ^d	1.110	0.282	Mother has a nonday job
EDUCMOM	13.62	2.141	Years of schooling of mother
BLACK	0.114	0.317	Mother is Black
HISP	0.076	0.266	Mother is Hispanic
AGE3T5	0.442	0.497	Child is 3–5 years old
NSIBO5	0.275	0.486	Number of siblings ages 0–5
NSIB612	0.468	0.699	Number of siblings ages 6–12
NSIB1317	0.076	0.301	Number of siblings ages 13–17
RSCHOOL	0.094	0.292	Child is enrolled in kindergarten or first grade
MARSTAT	0.813	0.390	Marital status of mother

^aThe five missing values of FDC30MIN were replaced with the mean of the non-missing values. ^bMissing values of the variables INSPCCTR and INSPCFDC were replaced with predicted values based on regressions of the non-missing values on ONE, SMSA, URBAN, SOUTH, CENTOKID, FDCTOKID, and CTRAINED. The latter three variables are county level variables not used elsewhere in this analysis. ^cCSCEN and CSFAM do not vary with the child's age but are calculated based on state-level regulations which do vary with the age of the children being cared for by the provider. The age categories used to calculate CSCEN and CSFAM were chosen to simplify the calculations. ^dThe regression for missing values of OTHINC used the same variables as the regression for INSPCCTR as well as EDUCMOM, BLACK, HISP, AGE3TS, NSIBO5, NSIB612, NSIB1317, RSCHOOL, and MARSTAT. For MOMWAGE, the variables OTHINC, AGEMOM (mother's age), and WKEXP18 (weeks of work experience since age 18) were added. The regression for NONDAY used the same variables as that for OTHINC, with the addition of OTHINC and MOMWAGE.

Notes

1. The primary arrangement is the nonmaternal arrangement that the child was enrolled in for the most hours. See Eichman & Hofferth (1993) for an analysis of factors associated with choosing multiple modes of child care.
2. While it may be desirable to distinguish between pre-service and in-service training, since only the former is likely to be a barrier to entry to the field, in practice this distinction is not so clear. Few states require any pre-service training of family day care providers. For centers, state requirements are more varied (Phillips et al. 1990; Morgan 1987). Since there are few entry requirements for assistant teachers, most center staff are able to meet education/training criteria by entering as assistant teachers and obtaining experience or

- in-service training (Morgan 1987). The distinction between pre-service and in-service requirements seems small and does not constitute a barrier to employment entry.
3. Hofferth et al. (1994) compared parent reports with those of their family day care and center providers on key characteristics of care including group size and child/staff ratios. The results indicated that parent and provider reports of the child/staff ratio in family day care were similar. The reports for child/staff ratio of center care were less similar, but still significantly associated.
 4. An alternative measure of availability is the number of child care centers and family day care homes per 1000 children in an area. However, we found that this variable was not related to parental behavior.
 5. This question was not asked for sitter care so we used the answer for family day care alone as a proxy for the availability of home care.
 6. All states regulate centers so we cannot estimate an effect of having any regulations for centers.
 7. Throughout this paper 'significant' refers to statistically significant at the 5 percent significance level unless otherwise specified.
 8. We calculated the percent difference between the predicted probabilities with and without the relevant regulations evaluated at the means for the other variables. The percent changes calculated using this simulation method, also based on the reduced form results, are substantively similar to the reduced form estimates reported in Table 1; -40.5 percent for center training, -18.3 percent for home care training and -70.0 percent for any home care regulations. Moreover, using this method we estimate that going from no regulations and no training regulations for home care to having both causes a 90 percent drop in use of home care. Similar estimated effects for all of the regulations are found when per capita income and unemployment are added to the multinomial logit model for child care choice.

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Address for correspondence: Sandra L. Hofferth, Institute for Social Research, The University of Michigan, 426 Thompson Street, Ann Arbor, MI 48106-1248, USA
Phone: (313) 763-5131; Fax: (313) 647-4575; E-mail: hofferth@umich.edu