Preschool, Day Care, and After School Care: Who's Minding the Kids?

David Blau

(UNC-Chapel Hill)

Janet Currie

(UCLA and NBER)

June, 2003

Abstract

The majority of children in the U.S. and many other high-income nations are now cared for many hours per week by people who are neither their parents nor their school teachers. The role of such pre-school and out of school care is potentially two-fold: First, child care makes it feasible for both parents or the only parent in a single-parent family to be employed. Second, early intervention programs and after school programs aim to enhance child development, particularly among disadvantaged children. Corresponding to this distinction, there are two branches of literature to be summarized in this chapter. The first focuses on the market for child care and analyzes factors affecting the supply, demand and quality of care. The second focuses on child outcomes, and asks whether certain types of programs can ameliorate the effects of early disadvantage. The primary goal of this review is to bring the two literatures together in order to suggest ways that both may be enhanced. Accordingly, we provide an overview of the number of children being cared for in different sorts of arrangements; describe theory and evidence about the nature of the private child care market; and discuss theory and evidence about government intervention in the market for child care. Our summary suggests that additional research is necessary to highlight the ways that government programs and market provided child care interact with each other.

Keywords: Preschool, Child care, daycare, Early intervention, Head Start, Afterschool programs, Child care subsidies.

JEL codes: I21, I28, I38

We would like to thank Ilya Berger, Stephanie Riegg and Jwahong Min for excellent research assistance, and Jeanne Brooks-Gunn and participants in the Handbook on the Economics of Education Conference of March 2003 for helpful comments.

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1. Introduction:

For good or ill, the majority of children in the U.S. and many other high-income nations are now cared for many hours per week by adults other than their parents and school teachers. The role of such pre-school and out of school care is potentially two-fold: First, child care can make it feasible for both parents or the only parent in a single-parent family to be employed. This role has become increasingly important in an era of welfare reform, in which able bodied mothers are expected to work regardless of the age of their children. Second, early intervention programs and after school programs can enhance child development, particularly among disadvantaged children. Consistent with this distinction, child care is typically provided by the private market, while early intervention programs are generally publicly provided.

Corresponding to this distinction, there are two branches of literature to be summarized in this chapter. The first focuses on the market for child care and analyzes factors affecting the supply, demand and quality of care. The second focuses on child outcomes, and asks whether certain types of programs can ameliorate the effects of early disadvantage. However, child care and early intervention are intrinsically linked: The quality of child care is likely to affect child development, and programs such as Head Start which seek to enhance child development also provide child care. Moreover, National Research Council and Institute of medicine (2003) estimates that in the U.S., one third of the costs of child care for children under age six is paid for by government subsidies. The primary goal of this review is to bring the two literatures together in order to suggest ways that both may be enhanced. Our summary suggests that additional research is necessary to highlight the ways that government programs and market provided child care interact with each other.

Section 2 provides an overview of the number of children being cared for in different sorts of arrangements. Section 3 describes theory and evidence about the nature of the child care market. Section 4 discusses theory and evidence on government intervention in the market for child care, while section 5 discusses direct government provision of services. Section 6 offers conclusions and suggestions for further research. This review follows the literature in focusing on the United States . As Waldfogel (2001) emphasizes, there are dramatic differences between OECD countries in the extent to which child

care policies are publicly supported. Exploring the effects of child care policy in other countries would be an interesting topic for future research.

2. Who is Minding the Kids?

The dramatic increase in female labor force participation is one of the most important developments in the postwar U.S. economy. This increase has been greatest among married women with children. For example, in 1950 11.9% of married women with children under six were in the labor force, compared to 62.8% in 2000. Never married, separated, and divorced mothers also increased their labor force participation dramatically, with the most rapid growth in the last three decades. In 2000, 65.3% of single women with children under 6 were in the work force (U.S. Bureau of Labor Statistics, 2001), and the National Institutes for Child Health and Development (NICHD) Early Child Care Study found that most infants were placed in some sort of non-maternal care by four months of age (NICHD Early Childcare Research Network, 1997). In a recent press release calling attention to the "record" participation rates of women with young children, the Census bureau noted that "The large increase in labor force participation rates by mothers since 1976 is an important reason why child-care issues have been so visible in recent years" (U.S. Census Bureau, October 24, 2000.)

However, child care is also increasingly utilized by families with stay-at-home parents. Tables 1 and 2 present tabulations of the type of child care used by children aged 0-4 and 5-14 in 1999, disaggregated by the mother's employment status. Table 1 shows that almost a third of 0 to 4 year old children with mothers who are not employed are in non-parental child care, compared to three quarters of children of employed mothers (lower panel, first row). The former group spends an average of 16 to 20 hours per week in the primary mode of non-parental care, and 20-27 percent also spend a further 7 to 11 hours in a secondary mode of non-parental care. This is a substantial amount of time, although much less than the 32 to 35 hours per week that children of employed mothers spend in their primary non-parental care arrangement. It is striking that a large fraction of care is not paid for, particularly in families in which the mother is not employed. For the latter group, about half of non-relative and center care is unpaid, compared to 10-20 percent for employed mothers. Families with a non-employed mother are also

more likely to receive government assistance in paying for child care.

Table 1 also shows that there are distinct demographic patterns in the use of child care modes. Relative to white non-Hispanic mothers, black mothers are more likely to use care from relatives, or child care centers, and less likely to use non-relative care. Hispanic mothers are most likely to use relative care, and least likely to use centers, a pattern that has been noted previously (c.f. Fuller et al. 1996; Hofferth et al., 1991). The use of center-based care is distinctly U-shaped with respect to income, with both poor and rich families more likely to use such care than middle income households, and families on public assistance being more likely to use such care than other families. There are also pronounced regional differences, though urban and rural families tend to have fairly similar patterns of mode choice. For example, mothers in the South are more likely to use center-based care than those in the rest of the country.[i] Not surprisingly, younger children are more likely to be cared for by parents than older children, as are children of married mothers.

Table 2 indicates that 63% of school age children of employed mothers regularly spend time in some form of non-school, non-parental care, compared to 31 percent of children of non-employed mothers. Children of employed mothers spend an average of 22 to 30 hours a week in such arrangements. Considering that most children spend about 30 hours a week in school, it is evident that what they do during this non-school care time is likely to be important to their development. In contrast to younger children, school-age children spend relatively little time in non-relative care, and greater amounts of time in organized activities. Two thirds to three quarters of these activities involve a monetary payment, so it is not surprising that white children are more likely to be involved than black and especially Hispanic children, or that poorer children are less likely to have organized activities than richer ones.

The vast increase in maternal employment has generated a large literature on the effects of maternal employment on child outcomes (c.f. Baum, 2002; Belsky and Eggebeen, 1991; Blau and Grossberg, 1992; Desai, Chase-Lansdale and Michael, 1989; Greenstein, 1993; Han, Waldfogel, and

[i]Blau (2001) notes that mothers in the South are substantially more likely to be employed full time than are mothers in other regions.

Brooks-Gunn, 2001; Neidell, 2000; Parcel and Menaghan, 1990, 1994; Ruhm, 2000; Waldfogel et al., 2002). This literature has produced little conclusive evidence of a negative effect of maternal employment on children. Although OLS estimates often shownegative effects of employment in the first year, these effects are not generally robust to attempts to deal with the endogeneity of employment. The small or negligible effects may be because the increased income earned by employed mothers offsets the effect of reduced time spent with their children. However, time use studies indicate that except for very young children, maternal employment has only modest effects on the amount of time mothers spend with their children, and tends to increase the amount of time that fathers spend with their children in two-parent households. Mothers apparently reduce both leisure time and housework in order to maintain their time inputs into child raising (National Research Council and Institute of Medicine, 2003).

The most consistent evidence of negative effects of maternal employment comes from families in which some or all of the following are true: the mother returns to work when the child is less than one year old; young children spend very long hours in care; the mother's employment does not raise family income (as in some households where families have been forced off welfare); there is a single parent with few family members to draw on so that time spent in employment cannot be compensated by drawing on the time of other family members either for child care or for housework; and/or the work itself is very stressful and reduces the resources the mother brings to parenting. Some studies of shift-work, for example, suggest that it may have this effect. Adolescents may also suffer more negative effects of maternal employment than younger children, particularly if they are left unsupervised. (National Research Council and Institute of Medicine, 2003).

Table 3 focuses on trends in the use of child care by employed mothers. Perhaps surprisingly, the percentage of preschool children in organized facilities shows no clear trend between 1985 and 1999, although the number of children reporting relative care as their primary arrangement increases.[ii] The

[ii]A CPS supplement in June 1977 collected data on child care used by children of employed mothers. There were 4.37 million children under age 5 at that time, and their distribution of modes of care was father:14.4%; relative (including grandparent): 30.9%; babysitter in the child's home: 7.0%; family day care home: 22.4%; day care center/preschool: 13.0%; mother while working: 11.4% (Casper, 1997). Thus, the major increase in use of centers occurred between 1977 and 1985.

fraction of families who report paying for child care increased over time, from 33.7% in 1985 to 43% in 1999, although the average amount paid fell in real terms. Since the percentage of income paid for child care increased over the same period, Table 3 suggests that more low-income families are paying for child care.

Table 4 addresses the issue of so-called "latch-key" children, who spend some part of the day without any adult supervision. In 1999, 10.5% of children age 5 to 14 of employed mothers were in unsupervised self-care for part of the day, compared to 3.2% of children of non-employed mothers. Most of these children were in relative care as their primary child care arrangement. This suggests that employed mothers who rely on care from relatives are often unable to schedule activities so that all of the child's time can be supervised. As one might expect, the fraction of children who are unsupervised rises sharply with age: among 9 year old children of employed mothers, 8.1% are sometimes unsupervised (5.2/(5.2+59.1))compared to 18.1% among 11 year olds (11.5/(11.5+51.9)) and 44.9% of 14 year olds (32.3/(32.3+39.7)). The probability of being unsupervised is higher for single parents, and also rises with income. It is also lower for Hispanics and Blacks than for Whites.

There is evidence that unsupervised children are at increased risk of truancy, poor grades, and risk-taking behaviors such as substance abuse (Dwyer et al., 1990). Juvenile crime rates triple in the after school hours between 3 and 6 in the afternoon when children are most likely to be left unattended, and children are most likely to be victims of violent crimes committed by non-family members in these hours (Fox and Neuman, 1997; U.S. Office of Juvenile Justice and Delinquency Prevention, 1996). These facts suggest that lack of supervision is a serious problem, at least for some children—an issue we revisit in Section 6.

In summary, large numbers of children spend many hours each week in some form of non-parental, non-school child care. While children of employed mothers are most likely to be in child care, a significant share of children with non-employed mothers are also in child care. Many children spend time in more than one mode of non-parental care, and routinely spend time unsupervised, suggesting that it is difficult for some parents to patch together enough child care to completely cover the necessary hours.

3. The Market for Child Care

A. Demand for Child Care

1. Theory

A simple one-person static labor supply model augmented with assumptions about child care provides a useful starting point for analyzing demand for child care . The mother is the agent in the model, making decisions about care for her children. Suppose that child care is homogeneous in quality and commands a market price of p dollars per hour of care per child, taken as given by the mother.[iii] There is no informal unpaid care available and the mother cannot care for her children while she works, so paid child care is required for every hour the mother works. By assumption, the mother cares for her children during all hours in which she is not working. There are no fixed costs of work, and the wage rate w is the same for each hour of work. For simplicity, suppose there is only one child who needs care. The mother's budget constraint is $c = y + (w\text{-}p)h$, where c is consumption expenditure other than child care, y is nonwage income, and h is hours of work. The time constraint is $h + l = 1$, where l is hours of leisure, and the utility function is $u(c, l)$. The monetary cost of child care reduces the net wage rate (w-p). A higher price of child care increases the likelihood that the net market wage is below the reservation wage, thereby reducing the likelihood of employment.

Some families have access to care by a relative, including the father or another family member, at no monetary cost. But not all families with access to such care use it, because it has an opportunity cost: the relative sacrifices leisure or earnings in order to provide care. The quality of such care compared to the quality of market care is also likely to influence the use of informal care, but consideration of quality is taken up below and ignored here. If the mother pools income with the relative or has preferences over the relative's leisure hours, then the mother will behave as if unpaid child care has an opportunity cost. To illustrate in the simplest possible setting, take as given that the relative who is the potential unpaid child care provider is not employed.[iv] Let H represent hours of *paid* child care purchased in the market and U

[iii]Homogeneous quality means that we can ignore the effect of child care on child outcomes for now. This assumption will be relaxed below.

[iv]See Blau and Robins (1988) for a model in which the relative's employment status is a choice variable. This extension does not change the qualitative implications of the analysis.

hours of *unpaid* child care. Maintaining the assumption that the mother is the care giver during all hours in which she is not employed, we have $h = H + U$, and $h \geq H$, $U \geq 0$. The budget constraint is $c = y + wh - pH$. The utility function is u(c, l, l_r), where l_r is leisure hours of the relative. The time constraints are $l + h = 1$ for the mother, and $l_r + U = 1$ for the relative. If U and H are both positive, then the shadow price of an hour of relative care is the marginal utility of the relative's leisure. In this case relative care is used for the number of hours U^* for which the marginal rate of substitution between consumption and leisure of the relative equals the market price of care: $u_{lr}/u_c=p$; and paid care is used for the remaining $H^* = h - U^*$ hours for which child care is required.

In order to examine work incentives in this model, classify outcomes as follows:

Outcome	Mother Employed	Unpaid Care Used	Paid Care Used
1	no	no	no
2	yes	yes	no
3	yes	yes	yes
4	yes	no	yes

A higher price of child care increases the cost of using paid care, but does not affect the cost of unpaid relative care, because no money changes hands for such care. A higher price therefore decreases the probability of choosing outcomes 3 and 4, and increases the probability of choosing outcomes 1 and 2. In addition to providing a work disincentive for the mother (outcome 1 is more likely) a higher price also provides an incentive to use unpaid care conditional on working (outcome 2 is more likely).

If the quality of paid child care is variable and if the quality of care affects child outcomes, then the mother will be concerned about the quality of care she purchases. The simplest case to consider is uni-dimensional quality: quality is a single "thing." The price of an hour of child care is $p = \alpha + \beta q$, where q is the quality of care and α and β are parameters determined in the market. This hedonic price function is determined by the market supply of and demand for quality (a linear price function is not essential to the argument). The mother cares about the quality of child care because it affects her child's development outcome, d. Let the child development production function be $d = d(lq_m, hq)$, where q_m is the quality of the care provided by the mother. The effect of purchased child care on development depends on its quantity (h) and quality (q). For simplicity, no distinction is made between the mother's leisure and her

time input to child development, and assume also for simplicity that no unpaid care is available. Relaxing these assumptions does not change the main implications of this model. The utility function is u(c, l, d) and the budget constraint is $c = y + (w - [\alpha + \beta q])h$.

Blau (2003b) demonstrates the following results in this model. A higher price of child care resulting from an increase in either α or β decreases the incentive to be employed. An increase in α has a bigger negative effect on employment than an equivalent increase in β. So, if the goal of a subsidy program is to facilitate employment, this is best accomplished by an "α-subsidy" unconditional on quality. In a quality-quantity model such as this one, the substitution effect of a change in price on the level of quality demanded is ambiguous, and this holds for changes in both α and β. But it can be shown that (1) if the substitution effects $\partial q/\partial \alpha|_{\bar{u}}$ and $\partial q/\partial \beta|_{\bar{u}}$ are both negative, then $\partial q/\partial \beta|_{\bar{u}}$ is larger in absolute value than $\partial q/\partial \alpha|_{\bar{u}}$; and (2) if $\partial q/\partial \alpha|_{\bar{u}} > 0$ then either $\partial q/\partial \beta|_{\bar{u}}$ is positive but smaller than $\partial q/\partial \alpha|_{\bar{u}}$, or $\partial q/\partial \beta|_{\bar{u}} < 0$. Thus an increase in β has a bigger negative effect or a smaller positive effect on the level of quality demanded than an increase in α. So if the goal of a subsidy is to improve the quality of child care, a "β-subsidy" that provides a more generous subsidy for higher-quality care is more effective than an α-subsidy. There is a clear tradeoff in subsidy policy between the goals of increasing employment and improving the quality of child care.

2. Evidence

Table 5 summarizes results from 20 studies that estimated the effect of the price of purchased child care on the employment of mothers.[v] Estimated price elasticities reported in the studies range from .06 to -3.60. The studies differ in the data sources used and in sample composition by marital status, age of children, and income. Sample composition does not explain much of the variation in the elasticity

[v]Reviews of this literature can be found in Anderson and Levine (2000), Blau (2003b), Connelly (1991), and Ross (1998). Chaplin et al. (1999) review the literature on the effect of the price of child care on child care mode choice. Some studies are not included in the table because the elasticity of employment with respect to the price of child care was not estimated or reported. Some of the latter studies estimated an hours of work (or a marginal rate of substitution) equation instead of an employment equation (Averett, Peters, and Waldman, 1997; Heckman, 1974; Michalopolous, Robins, and Garfinkel, 1992). Others did not report enough information to determine the method of estimation or the elasticity (Connelly, 1990; Kimmel, 1995).

estimates; the range of estimates is large within studies using the same sample composition. Differences in the data sources also do not appear to account for much variation in the estimates, since there is substantial variation in estimates from studies using the same source of data. Hence specification and estimation issues most likely play an important role in producing variation in the estimates.

The dozen studies listed in the upper panel of the table use very similar methods. These studies estimate a binomial discrete choice model of employment by probit or logit. The price of child care is measured by the fitted value from an hourly child care expenditure equation estimated by linear regression on the subsample of families in which the mother was employed and paid for child care. The expenditure equation is corrected for selectivity on employment and paying for care using either a standard two stage approach (Heckman, 1979) or a reduced form bivariate probit model of employment and paying for care, following Maddala (1983) and Tunali (1986). For identification, some variables that are included in the child care expenditure equation are excluded from the employment probit in which the fitted value from the expenditure equation appears as a regressor. Also, some variables that are included in the probit selection equations are excluded from the child care price equation in order to help identify the selection effects. A selectivity-corrected wage equation is used to generate a fitted value for the wage rate, which is included in the employment model.[vi]

Blau (2003b) discusses two problems with this approach. First, it does not account for the existence of an unpaid child care option. In the theoretical model described above, the price of child care affects the employment decision through its effect on the utility of the employment-child care options in which paid child care is used, compared to the utility of not being employed and the utility of being employed and using unpaid care only. A multinomial choice model accounts for these various choices, but the standard binomial model used in these studies does not. As a result, the price effect estimated in a

[vi]Exceptions to this general approach among the eleven studies include the following. Baum (2002) specifies the employment equation as a discrete-time monthly hazard model of return to work following birth of a child. Blau and Robins (1991) estimate the employment probit jointly with equations for the presence of a preschool age child and use of non-relative care. Connelly and Kimmel (2000) estimate an ordered probit model for full-time employment, part-time employment, and non-employment. GAO (1994) used weekly child care expenditure. Ribar (1992) estimates the employment equation jointly with equations for hours of paid and unpaid care. Hotz and Kilburn (1997) estimate the binary employment equation jointly with equations for use and hours of paid child care, child care price and the wage rate.

binomial employment model is a biased estimate of the true effect of the price of child care on employment.

The second problem is how to measure the price of child care. The studies listed in the upper panel of Table 5 use the fitted value from a selection-corrected child care expenditure equation estimated on the subsample of employed mothers who use paid care. This approach provides a price measure for all sample cases, not just those who used paid care, and one that is more likely to be exogenous than observed expenditure for mothers who pay for care. The effect of price on employment is identified by exclusion restrictions. Researchers have typically used child care regulations, average wages of child care workers, and other factors that vary across geographic locations as identifying variables, under the assumption that such variables affect household behavior only insofar as they affect the price of child care. Some studies have also used less defensible identifying variables such as the number of children by age.

If the unobserved factors that influence employment and child care behavior are correlated with the unobserved determinants of the price of care, then estimating a reduced form price equation on a sample of mothers who are employed and pay for care yields biased estimates. Most researchers have specified reduced form employment and pay-for-care equations that are used to correct the child care price equation for selection effects in a two-stage estimation. However, if quality of care is a choice variable for the family, then there are no justifiable exclusion restrictions to identify the selection effects: after substituting for quality the price function is a reduced form, so it contains all of the exogenous variables in the model. Hence the only basis for identification of a child care price equation using consumer expenditure data in a manner consistent with economic theory would be functional form or covariance restrictions (i.e., assume that the unobserved factors that influence employment and child care behavior are uncorrelated with the unobserved determinants of the price of care).

The estimated elasticity of employment with respect to the price of child care ranges from .04 to -1.26 in the studies listed in the upper panel of Table 5. Without a detailed examination of specification and estimation differences, it is difficult to explain why these estimates are so varied. Some of this variation may be due to the two problems discussed here: ignoring unpaid child care, and inappropriate

exclusion restrictions to identify the child care price equation. Different identification restrictions are used in each study, possibly leading to different degrees of bias. Different data sources containing different proportions of mothers who use paid care are used in each study, and the bias caused by ignoring unpaid child care is likely to depend on this proportion.

The eight studies listed in the lower panel of Table 5 use variants of the multinomial choice framework discussed above. Of these, three studies—Ribar (1995), Tekin (2002), and Blau and Hagy (1998)—are most consistent with an underlying framework in which informal care is dealt with appropriately. Ribar specifies a structural multinomial choice model. Paid child care is *not* treated as if it was the best option for all mothers: the price of child care influences behavior by affecting the utility of the options in which paid care is used, consistent with the theory described above. Tekin specifies a discrete choice model with outcomes defined by cross-classifying employment status (full-time, part-time, not employed) with indicators for use of paid child care conditional on employment and receipt of a child care subsidy conditional on employment and use of paid care. Like the studies in the upper panel, Ribar and Tekin use consumer expenditure data to measure the price of child care. Blau and Hagy specify a multinomial choice model with categories defined by cross-classifying binary indicators of employment and paying for care with an indicator of type of care, accounting appropriately for unpaid child care. They derive the price of child care from a survey of day care providers.

These three studies produce estimates of the elasticity of employment with respect to the price of child care at the lower end of the range (in absolute value) in Table 5: -.09 in Ribar, -.15 in Tekin, and -.20 in Blau and Hagy. It is risky to generalize from only three studies, but the fact that the studies that accounted for unpaid child care in ways consistent with the existence of an informal care option produced small elasticities suggests that the true elasticity may be small.

. The effect of the price of child care on the intensive labor supply margin is of interest as well. Several of the studies in Table 5 provide estimates of the effect of the price of child care on hours of work by the mother, conditional on employment. Blau and Hagy (1998) estimate the price effect on weekly hours of work separately by the mode of child care used, and find uncompensated elasticities .06, .08, and -.05, respectively for users of centers, family day care, and other non-parental care. Michalopoulos,

Robins, and Garfinkel (1992) and Baum (2002) also find small elasticities, not significantly different from zero. On the other hand, Averett, Peters, and Waldman (1997) report an uncompensated labor supply elasticity with respect to the price of child care of -.78. This large estimate could be a result of Averett et al.'s use of a kinked budget constraint method, which imposes a substitution effect with a sign consistent with economic theory whether or not this is consistent with the data (MaCurdy, Green, and Paarsch, 1990).

One additional response to a child care price change deserves mention although it is not included in Table 5. The price of child care may have an impact on welfare participation. Using the standard approach to measuring price, Connelly and Kimmel (2001) find an elasticity of AFDC participation of .55 with respect to the price of child care from an ordinary probit model, and an elasticity of .28 from a probit model of AFDC participation estimated jointly with an employment probit. Tekin (2001) uses a multinomial model of employment, welfare participation, and payment for child care similar to the approach in Tekin (2002) described above. He estimates the elasticity of TANF enrollment with respect to the price of child care to be just .098.

In summary, the best available estimates suggest that the effects of the price of paid child care on labor force participation, hours of work, and welfare use are small.

B. Supply of Child Care

1. The Quantity of Child Care Supplied

Since nationally representative data on the supply of child care are unavailable, the quantity of child care *labor* typically serves as a proxy for the quantity of child care. Examining trends in child care labor makes sense in this context because child care is a very labor-intensive activity and the technology of providing care is unlikely to have changed much over time. This proxy does not allow us to determine with certainty how much child care is supplied in a given year, but we can be reasonably confident that trends in child care labor supply will track trends in child care supply.[vii]

[vii]Changes over time in the mix of child care by type (center, family day care, etc.) could cause divergence between trends in child care labor supply and child care supply. Day care centers have the highest child-staff ratio and if more care is provided in centers over time, then a given change in the number of child care workers would be associated with a different change in the number of children in care over time.

Consider the following simple conceptual framework developed in Blau (1993, 2001). Assume that during a given period of time, a person can engage in one of the following three activities: (1) work for pay in the child care sector, (2) work for pay in another sector of the labor force, or (3) not work for pay (the "home sector"). She chooses the option that gives her the highest utility, and in sectors (1) and (2) she also chooses the number of hours of work. Utility in sectors 1 and 2 depends on the wage rate in the sector, and on the direct satisfaction she gets from working in the sector, measured by observed covariates and an unobserved disturbance. A multinomial discrete model of the choice among the three sectors and a regression model of hours of work per week for those employed in child care can be derived from this framework. The key explanatory variables of interest in both models are wage rates. The coefficient estimates on the child care wage rate can be used to measure the supply responsiveness of child care labor: the amount by which the quantity of child care labor supplied increases as a result of an increase in the child care wage relative to the wage rate available in other employment. Note also that one must account for selectivity bias in this scenario since the unobserved characteristics that influence a person's choice of sectors also likely affect the wage rate that a person could earn as a child care worker and hours of work in child care.

Blau (2001) uses pooled data from the Current Population Survey (CPS) for the years 1977-1998 to estimate the model described above. He estimates the total elasticity of supply of child care labor to be 1.15, accounting for both new entrants to the sector and increased hours supplied by workers already in the child care sector.

The large increase in demand for child care in recent years should drive up the wages of child care workers. Blau estimates that there was a 24 percent increase in demand for child care during the period 1983-1998 and uses a demand elasticity of -.24. The supply elasticity of 1.15 implies that a 24 percent increase in the demand for child care should have caused the child care wage rate to rise by 17 percent. The actual increase in the average child care wage rate was only 8 percent, so some other factors that affect child care labor supply must account for why the child care wage rate increased by as little as it did. One possibility is that the supply of child care workers increased as a result of increased immigration of low-skilled women for whom child care is a relatively attractive employment option. Another

possibility is that day care centers use less labor per child than home-based arrangements, so the increase over time in the share of child care provided in centers could help explain why child care wages have not grown as much as expected in response to the enormous increase in labor force participation of mothers. This argument suggests that an analysis that does not distinguish the between the center and home-based sectors may be overly simple.

2. The Supply of Quality in Day Care Centers

The quality dimension of child care is arguably as important as the quantity supplied because in many cases the alternative to high quality child care is not home care, but lower quality child care. In this section, we define quality and give some descriptive statistics for measures of quality in U.S. day care centers. We describe findings from the child care quality literature and analyze the relationship between child care price and quality.

Reviews of the literature on child care quality by Hayes, Palmer, and Zaslow (1990), Lamb (1998), and Love, Schochet, and Meckstroth (1996) note that there are two distinct concepts of quality in the literature. The first type is variously referred to as “process” quality, “global” quality, and “dynamic features of care,” while the second is called “structural” quality or “static features of care.” Process quality characterizes the interactions between children and their caregivers, their environment, and other children. A child care arrangement is considered high quality according to this concept when

“caregivers encourage children to be actively engaged in a variety of activities; have frequent, positive interactions with children that include smiling, touching, holding, and speaking at children’s eye level; promptly respond to children’s questions or requests; and encourage children to talk about their experience, feelings, and ideas. Caregivers in high-quality settings also listen attentively, ask open-ended questions and extend children’s actions and verbalizations with more complex ideas or materials, interact with children individually and in small groups instead of exclusively with the group as a whole, use positive guidance techniques, and encourage appropriate independence.” (Love et al., p. 5).

Structural quality refers to characteristics of the child care environment such as the child-staff ratio, group size, teacher education and training, safety, staff turnover, and program administration. A child care arrangement is considered to be of high quality according to the structural definition when it meets standards specified by professional organizations such as the National Association for the Education of Young Children (NAEYC). The NAEYC and other standards specify maximum child-staff ratios and group sizes by age of the children in care; curriculum content; minimum staff qualifications for alternative levels of responsibility; health and safety standards; and standards for other program characteristics (see Hayes et al., 1990 for details of the NAEYC and other standards).

The surveys cited above argue that process quality is more closely related to child development than structural quality. The authors contend that structural features of child care "appear to support and facilitate more optimal interactions" (Hayes et al., p. 84) and "potentiate high-quality interaction and care but do not guarantee it" (Lamb, p. 13). For example, caring for children in a smaller group will only lead to better child development if a smaller group makes it easier for caregivers to provide developmentally appropriate care. But despite the widespread agreement on the importance of process quality, there are no nationally-representative data available on process measures. Researchers must rely on structural measures under the assumption that the two types of quality are related. Complicating matters further, is the failure of the U.S. child care data collection system to collect quality data on a regular basis. The most recent nationally representative data on the structural measures of child care quality are from 1990. Here, we summarize the available information on the quality of child care in the U.S.

Table 6 summarizes characteristics of centers and regulated family day care homes (see Kisker et al. 1991 for more details). Average group size is 16 in centers and 7 in family homes. Group size increases with the age of children in centers, but remains within the range of maximum group size recommended by the National Association for the Education of Young Children (see Hayes et al., 1990, p. 333) for each age group. Average child-staff ratios, on the other hand, generally fall on the high end or outside the NAEYC's recommended range. The average child-staff ratio of 6.2 for one year olds and 7.3 for two year olds exceed the recommended ranges for these age groups, while the average of 9.9 for 3-5 year old children is at the high end of the NAEYC recommended level. The great majority of children in

centers are 3-5 years old, so the majority of classrooms are (barely) within the range recommended by the NAEYC.

Half of the centers in the sample report no staff turnover, and the other half report turnover averaging 50% annually. Thus some centers appear to be quite stable, while others have a significant amount of turnover. From the perspective of a child, however, turnover is not exceptionally high. If a child enrolls in a center on her third birthday and remains in the center for two years, she will be in the center for the same duration as the average teacher (expected duration equals the inverse of the turnover rate).

Teachers in day care centers are well-educated on average, with almost half (47%) having a four-year degree, 39% with some college, 13% with a high school diploma or GED, and virtually no high school dropouts (1%). Operators of regulated family day care homes are much less educated, with only 11% having graduated from college, 44% with some college, 34% with a high school diploma or GED, and 16% high school dropouts. Specialized training in early education, child development, or child care is also more common among center staff than in family day care homes.

As indicated above, there are no nationally representative samples of day care centers with measures of process quality. But two studies with reasonable sample sizes, the Cost, Quality, and Outcomes Study (CQOS) and the National Child Care Staffing Study (NCCSS) (see the Data Appendix for further information), measured process quality in site-specific samples of day care centers using the Early Childhood Environment Rating Scale (ECERS) and its infant-toddler counterpart (ITERS) to assess quality. These instruments rate each observed classroom on 30-35 items using a scale of 1-7 for each item. As a guide to the intended interpretation of the scores, ratings of 1, 3, 5, and 7 are designated by the instrument designers as representing inadequate, minimal, good, and excellent care, respectively (Harms and Clifford ,1980; Harms, Cryer, and Clifford. 1990). Summary scores are obtained by averaging over the items.

Table 7 presents descriptive statistics on quality ratings in day care centers from these two studies, by site, age of children in the classroom, and the type of center (for-profit or non-profit). The overall average rating in both studies is just under 4, or about halfway between minimal and good. The

authors of the CQOS report refer to this level of quality as "mediocre" (Helburn, 1995, p. 1). Quality varies substantially across locations, with the highest-quality sites (California, Connecticut, and Boston) rated almost a full point above the lowest-quality sites (North Carolina, Atlanta, and Seattle). Classrooms with preschool age children are almost always rated to be of higher quality than infant-toddler rooms, by a fairly wide margin in the CQOS data.[viii] With only a few exceptions, non-profit centers receive higher average quality ratings than for-profits.[ix]

Day care centers (the only type of provider with the necessary data on quality) can be thought of as cost-minimizing firms facing a quality production function. Since labor is the most important input to this production function in terms of cost, and little information is available for other inputs such as materials and rent, the price of teacher labor is the primary focus. If providers choose group size and the amounts of the different types of labor to minimize the cost of providing child care of the desired level of quality, given the labor prices and technology the provider faces, the relationship between cost and quality can be characterized by a standard cost function. The quantity of care is assumed to be determined by consumer decisions conditional on the quality and price distributions available in the market. The price per hour of care that a provider can charge depends on the quality of care offered, as determined by the equilibrium price function in its local market.

Given the cost function and the price function in its local market, a provider chooses the quality of care to maximize its utility, where utility of the provider is a function of profit and quality. The relative weight placed on quality versus profit in the utility function may differ across providers (e.g. between for-profit and non-profit providers). With estimates of the parameters of the cost function, the price function, and the relative weight on quality, it is then possible to derive the *quality supply function*: the relationship between price and the level of quality offered by providers.

[viii]The ECERS and ITERS instruments are similar but not identical. It is not clear whether quality differences by age of children in the classroom are real or reflect different scales of the instruments.

[ix]There is little systematic information on process quality in family day care homes. Kontos et al. (1995) studied about 200 family day care homes and relatives providing child care. They concluded that the majority of providers were providing care of adequate quality, about one third were providing inadequate quality care, and only 9% were providing good quality care.

We begin with estimates of the cost function part of the puzzle. Several studies have estimated cost equations for day care centers: Powell and Cosgrove (1992), Preston (1993), Mukerjee and Witte (1993), Mocan (1997), and Blau and Mocan (2002). We focus on results from the latter study because it is most recent, and because it uses data from the large scale Cost, Quality, and Outcomes Study. Blau and Mocan (2002) find that the logarithm of total cost is positively related to quality, with a coefficient estimate of .056 (significantly different from zero at the 5% level). The interpretation of this estimate is that a one unit increase in quality (for example, a change in the ECERS score from 3 to 4, equal to about a one standard deviation increase) would raise cost by 5.6 percent. By this metric, raising the quality of a center from "minimal" (3) to "good" (5) would only raise costs by 11.2 percent. This is a small effect, and it suggests that with the current structure of teacher wages it is not very costly to raise the quality of child care in centers. Cost is positively related to wages of teachers of various education levels, with the wage rate of the least educated workers showing the biggest impact.

The results for the price function in Blau and Mocan (2002) indicate that the market rewards higher-quality care with a significantly higher price in three of the four states examined, with elasticities of .40 in California, .32 in Colorado, .22 in Connecticut, and .13 in North Carolina. Further estimates indicate that the relative weight on quality in the providers' utility function is approximately zero for both for-profit or non-profit centers. This is not a surprising finding for the for-profit centers: they are in business to make a profit, and presumably care about quality only in so far as it affects their profit. The finding that non-profits also put no weight on quality is surprising given evidence that non-profits have higher average quality, but it is very robust.

Having estimated the cost function, the price function, and the relative weight on quality, Blau and Mocan use these to calculate the quality supply function. The simulated quality supply function yields an average price elasticity of .66 among for-profits and .48 among non-profits. These moderately large elasticities result from the fact that cost is estimated to increase only modestly with increases in quality, while the market price can be increased fairly substantially as quality increases. Since the major cost of child care is labor, another policy of interest is a wage subsidy for child care labor. Quality supply appears to be fairly sensitive to the wage rate, with average elasticities of -.77 to -.80, suggesting that

even small wage subsidies have the potential to substantially improve the quality of care. These results suggest a puzzle: If raising the quality of child care is relatively inexpensive and well rewarded, then why is so much privately provided child care of low quality? One possible resolution of this puzzle is discussed below: parents may not be willing to pay even the small additional amount required to cover the cost of improved quality. Tthe increase in market price that is observed with increased quality may be due to public subsidies.

C. The Effects of Child Care Quality

Many studies of the effects of structural inputs on "process quality" and of the effects of childcare inputs and child care quality on child outcomes are reviewed in National Research Council and Institutes of Medicine (2000b, and 2003), Love et al. (1996), and Lamb (1998). The great majority of such studies are relatively uninformative by the standards of economic research. For example, many use small non-randomly selected convenience samples, include few or no measures of family and child characteristics, and lack measures of child development prior to exposure to the child care arrangement being studied. A few of the better studies on child care quality are summarized in Table 8. It is important to note, however, that only a few of these studies consider the possibility that families select child care arrangements on the basis of unobserved aspects of the home environment, or unobserved characteristics of the child, which limits the inferences that can be drawn.

The National Day Care Study (Ruopp et al. 1979) is remarkable for using random assignment of children within centers to classrooms with different staff-child ratios and teachers with different training levels. Other studies listed in Table 8, use the CQOS and the NICHD Study of Early Child Care data, which are large-scale observational studies. These data are described in more detail in the Appendix. An important limitation of these observational studies is that it is difficult to control for non-random selection of children into centers.

Some studies using these data simply compare the developmental outcomes of children according to whether their child care arrangement is classified as low-quality or high-quality based on inputs. These studies typically find that high quality care has a positive and statistically significant association with

child cognitive development (Peisner-Feinberg et al. 2001, Early Child Care Research Network (ECCRN) and Duncan 2002, ECCRN 2000c), behavior (ECCRN 1998b), and peer interactions (ECCRN 2000b). However, this approach does not provide estimates of the impact of varying each input separately, which would be useful for policy analysis.

Other studies examine the effects of inputs separately. Ruopp et al. (1979) report that both low staff-child ratios and higher teacher training were associated with better child outcomes. Similarly, Mocan et al. (1995) use data from the CQOS to examine the effect of structural inputs such as staff-child ratios, wage rates, teacher training, teacher turnover, and group size, and find that all but group size have an effect on "process"measures of the quality of care. Their study is notable for including a large number of control variables, relative to other studies. However, Blau (2000) shows using the same data that when center fixed effects are included in the model, only teacher training has an effect on child care quality. This finding replicates his earlier analysis of data from the National Child Care Staffing Survey (Blau, 1997). The center fixed effects may be viewed as an attempt to control for fixed characteristics of centers (such as location) that might attract families of a particular type.

The Florida Child Care Quality Study was designed to exploit changes in Florida's child care regulations that mandated higher staff-child ratios, and more training for staff in day care centers. A sample of 150 child care centers was selected, and Center directors and children were interviewed before and after the changes. The study found that the regulations did appear to affect the regulated inputs (for example, staff-teacher ratios increased), but had no significant impact on measures of process quality. There were some significant improvements in children's psychological well-being as measured by their attachment security. However, there was no comparison group in this study.

The results from the NICHD Study of Early Child Care (SECC) are potentially more credible that those of many other studies because of the longitudinal design of the SECC, the inclusion of children in all types of child care, and the availability of extensive information on non-child care factors. The recent analysis of these data by ECCRN and Duncan (2002) takes advantage of the richness of the data by controlling for more home and child characteristics than the other SECC studies, and by also examining changes in outcomes. The results indicate that a two standard deviation (SD) improvement in child care

quality in early childhood is associated with a one-sixth to one-seventh of a SD increase in cognitive functioning in a model that controls for cognitive functioning at age 24 months as well as extensive controls.

Blau (1999) uses data from the National Longitudinal Survey of Youth (NLSY), which is a large general purpose study which includes women who were 14 to 21 in 1978, and follow-ups of their children (see the Appendix for further information). He examines the effects of maternally reported group size, staff-child ratios, and teacher training, as well as of type of care, cost of care, hours per week, and month per year spent in the arrangement on a series of cognitive and test scores as well as a behavioral problems index. The models control for a large number of background variables, including measures of the quality of the home environment. Some models also include family fixed effects, and/or lagged measures of child development. Blau finds that the effects of child care quality are generally insignificant, and sometimes wrong-signed. In contrast, measures of the home environment are all statistically significant and have relatively large effects. It is possible that maternal reports are measured with error, which biases the estimated effects towards zero.

The overall message of this section is that there is little convincing evidence that structural child care inputs affect child outcomes, while there is more evidence that "process quality" has a positive effect on child development. These findings are rather similar to those in the school quality literature, in which many studies find that structural inputs such as class size, teacher education and experience, and teacher pay have little impact on student outcomes, while more intangible teacher characteristics (captured by teacher fixed effects) are strongly associated with student outcomes (Hanushek, 1992; Hanushek, this volume). It is interesting to note that French preschool programs, which are generally thought to be of high quality, employ a different input mix than American programs, with small staff-child ratios, more highly trained staff, and centrally planned curricula (Boocock, 1995). It may be that part of the difficulty in making a strong connection between inputs and outputs is that there are different ways to produce care of a given quality level, so that focusing on levels of a few inputs in isolation yields a misleading picture.

4. Government Intervention in the Child Care Market

A: Rationale

To this point, we have mostly ignored the role of the government in the child care market. The government does in fact play an important role, and an economic case for government intervention in the child care market can be made on several grounds. First, the government may be concerned with equity; second, the government may want to encourage parents to work; and third, there may be market failures, such as liquidity constraints, information failures, and externalities.

The first argument in favor of government intervention in the child care market is on the grounds of equity, just as the case is sometimes made for government involvement in the public school system. For example, Bergmann (1996, page 131) argues that high quality child care can be thought of as a "merit good, something that in our ethical judgement everybody should have, whether or not they are willing or able to buy it." Bergmann argues that the usual economic considerations in favor of cash transfers over in-kind subsidies do not apply to merit goods. The main arguments she advances are that children have little or no say in how parents spend a cash grant; that society has a responsibility to ensure that children are well-cared for while the parents work; and that high-quality child care has benefits to children that parents may not fully account for in their spending decisions. Economic actors who start out with very unequal endowments (in terms of ability, environment, or opportunities) are likely to end up with very unequal allocations, even if the outcome is efficient (Inman, 1986). Meyers et al. (2002) discuss inequalities in access to quality early childhood educational experiences.

A government that is concerned with equity can compensate for differences in final outcomes, attempt to equalize initial endowments, or both. In principal, spending on programs of each type can be increased until the marginal benefit associated with an additional dollar of spending is equalized. However, to the extent that it is possible, equalizing endowments through intervention in the child care market may be a superior approach to the problem of unequal allocations than providing compensation for unequal outcomes later in life, both because it avoids many of the moral hazard problems that arise when society attempts to compensate those with poor outcomes, and because it may be more cost-effective.

For example, Furstenberg, Brooks-Gunn, and Morgan (1987) present evidence that it is important for children to get "off on the right foot" in school, and that children who started school with disadvantaged families had worse average performance than other children even if their parents' situation improved subsequently. To the extent that initiatives such as after-school programs can prevent high school dropout and juvenile crime, they may be very cost effective approaches to such societal problems. Earlier intervention is also attractive because of the sheer difficulty of overcoming poor endowments later in life. Public sector efforts to train low-skilled adult workers have generally found very small returns. Lalonde's (1995) survey of the training literature points out that most training programs for adult males and youths have been ineffective (the exception for youths being the costly Job Corps program). And among poor adult women, the evidence shows rapidly diminishing returns to training investments, suggesting that it may not be possible to raise earnings much with this kind of intervention.

A quite different rationale for government intervention in the child care market is to encourage parents—particularly low income women—to work. There are two main reasons for this type of policy. First, it may be less costly to taxpayers to require low income women to work and to provide child care subsidies than it is to support the same women via the welfare system. That is, child care subsidies may be able to help low-income families be economically self-sufficient. Self-sufficient in this context means employed and not enrolled in cash-assistance welfare programs. Self-sufficiency may be a desirable goal for non-economic reasons, but also may be considered desirable if it increases future self-sufficiency by inculcating a work ethic and generating human capital, thereby saving the government money in the long run (Robins, 1991). Child care and other subsidies paid to employed low-income parents may cost the government more today than would cash assistance through TANF. But if the dynamic links suggested above are important, then these employment-related subsidies could result in increased future wages and hours worked and lower lifetime subsidies than the alternative of cash assistance both today and in the future. There is little evidence either for or against the existence of strong enough dynamic links to make means-tested, employment-conditioned, child care subsidies cost-effective for government.[x]

[x]There is substantial evidence of positive serial correlation in employment. Whether this is due to "state dependence" (working today changes preferences or constraints in such a way as to make working in the future more attractive) or unobserved heterogeneity (working today does not affect the attractiveness of future work; some

Second, there may be positive externalities associated with employment of low-income mothers. For example, younger women may be more likely to stay in school and less likely to get pregnant if they see that work is always required of recipients of public assistance. The children of women who move into the workforce may gain a positive role model. Third, liquidity constraints could prevent some women from paying for the child care that they need in order to enhance their own human capital through on-the-job training. Walker (1996) has argued, however, that difficulties in attaining economic self-sufficiency are caused by imperfections in the credit market, not the child care market. If the dynamic links suggested above are important, then a family could borrow against its future earnings in a perfect credit market to finance the child care needed in order to be employed today and gain the higher future earnings that result from employment today. Imperfection in the credit market caused by moral hazard and adverse selection prevent this, but the remedy according to Walker lies in government intervention in the credit market, not the child care market.

These potentially positive effects of encouraging maternal employment will be undermined if sending women to work results in children being cared for in a way that harms their development. For example, tax payers could end up spending more rather than less, if neglected children are more likely to engage in future crime. Thus, there is a potential conflict between these two goals of government intervention in the child care market. Policies that enhance child development will not always encourage maternal employment, and vice versa.

A third broad justification for government intervention in the child care market is that there is a market failure that the government can address. Indeed, several market failures are potentially relevant in this case, including liquidity constraints, information failures, and externalities. Liquidity constraints may prevent parents from making optimal investments in the human capital of their children. But the existence of iquidity constraints alone would only justify financial assistance to certain parents, not direct

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people find work more attractive than others in every period) is unclear. See Heckman (1981) for an early discussion and Hyslop (1999) for recent evidence. Gladden and Taber (2000) analyze the effect of work experience on wage growth for less-skilled workers. Card and Hyslop (2002) discuss evidence from a Canadian welfare to work program which suggests that the program increased employment, but that there was little growth in earnings over time.

government intervention in the provision of child care services. However, information failures are also likely to be important. There is increasing evidence that parents find it difficult to evaluate the quality of child care centers and that some parents pay for care of such low quality that it may be harmful to their children (Cryer and Burchinal, 1995; Helburn and Howes, 1995; U.S. Department of Health and Human Services, 1998).

Information failures provide a possible explanation for the poor average quality of child care available in the United States.[xi] There is imperfect information in the child care market because consumers are not perfectly informed about the identity of all potential suppliers, and because the quality of care offered by any particular supplier identified by a consumer is not fully known. A potential remedy for this problem is government subsidies to Resource and Referral (R&R) agencies to maintain comprehensive and accurate lists of suppliers. This may not solve the problem in practice because of very high turnover and unwillingness to reveal their identity among informal child care providers. The second information problem is that consumers know less about product quality than does the provider, and monitoring is costly. This can lead to moral hazard and/or adverse selection. Moral hazard is a plausible outcome in day care centers (e.g., changing diapers just before pick-up time). Adverse selection of providers is plausible in the more informal family day care sector: family day care is a very low-wage occupation, so women with high wage offers in other occupations are less likely to choose to be care providers. If the outside wage offer is positively correlated with the quality of care provided, then adverse selection would result. Regulations are often suggested as a solution to the information problem, but Walker (1991) notes that the monitoring required to enforce regulations may be costlier for the government than for consumers. He also points out that the conditions under which regulations are beneficial to consumers may not be satisfied in the child care market.[xii] We address this issue in more detail below.

[xi] See Walker (1991), Council of Economic Advisors (1997), Magenheim (1995), Robins (1991), and U.S. Department of Health and Human Services (2001).

[xii] See Walker (1991, pp. 68-69), which is based on applying Leland's (1979) model of regulations to the child care market. The conditions are low price elasticity of demand, quality matters to consumers, the marginal cost of quality is low, and consumers place a low value on low-quality care.

Some evidence suggests that parents do not obtain much information about the child care market before making a choice. Walker (1991) reports that 60-80 percent of child care arrangements made by low-income parents are located through referrals from friends and relatives or from direct acquaintance with the provider. A referral may not be a good signal of the developmental appropriateness of child care if parents are not good judges of the quality of care. Cryer and Burchinal (1995) report a direct comparison of parent ratings of various aspects of the developmental appropriateness of their child's day care center classroom with trained observer ratings of the same aspects, using data from the Cost, Quality, and Outcomes study. The results show that parents give higher average ratings on every item than do trained observers, by about one standard deviation on average for preschool age classrooms and by about two standard deviations on average for infant-toddler rooms. The instrument containing these items is of demonstrated reliability when administered by trained observers, so this suggests that parents are not well-informed about the quality of care in the arrangements used by their children.[xiii]

Similarly, Mocan (2001) finds that parents use less information than trained observers when making quality assessments. He finds that parents tend to incorrectly associate some characteristics of centers (such as clean reception areas) with quality and fail to use other more relevant signals. Parents who are more educated, and married parents, assess quality in a way more similar to the trained observers. Mocan finds that the vast majority of parents claimed that they valued the quality attributes measured by the process-oriented scales, suggesting that parents are not choosing centers on the basis of some entirely different criteria (such as location). These findings suggest that government may be able to improve outcomes by developing and publicizing standards, but there is little evidence available about the efficacy of this type of market intervention. Finally, even altruistic parents may not take full account of the consequences of the effects of their child raising decisions on those outside the family. For example, a

[xiii]The instrument is the Early Childhood Environment Rating Scale (ECERS) and its counterpart for infants and toddlers, the Infant-Toddler Environment Rating Scale (ITERS). See Harms and Clifford (1980) and Harms, Cryer, and Clifford (1990) for discussion of the instruments. Helburn (1995) discusses their reliability in the Cost, Quality, and Outcomes study. The correlation between parent and observer scores was .21 for infant-toddler rooms and .29 for preschool rooms (Cryer and Burchinal, 1995, p. 206). Thus parents do appear to have some ability to distinguish among programs of different quality. However, from a child development perspective it is the absolute level of quality that matters, not relative quality.

child who becomes a welfare mother imposes a tax burden on other citizens, a cost which may not be considered by the parents when they decide on investments in the child's human capital.

The evidence about whether parents are willing to pay for better quality (and how much) is conflicting. On the one hand, Blau and Mocan (2002) find that the price centers can charge rises appreciably with quality. On the other hand, Blau (2001) reports a small correlation between family income and quality, and a generally flat price-quality gradient. In their study of consumer-demand functions for child care quality inputs, Blau and Hagy (1998) also find that parents do not seem to be willing to pay more for regulated aspects of care such as lower staff-child ratios.

Externalities provide perhaps the strongest theoretical justification for direct government involvement in the provision of quality child care. However, even the best justifications in terms of equity or market failures are moot if it is not actually possible to improve child outcomes through intervention. Hence, we will return to this question in the next section. In the remainder of this section we examine two types of government interventions in the private child care market: subsidies and regulation.

B. Subsidies

Table 9, which is based on Blau (2003b) shows the history, goals, and main provisions of the major child care subsidy programs in the U.S.[xiv] The oldest program is the Dependent Care Tax Credit, which, since it is not refundable, does not benefit low income families without tax liabilities. The Exclusion of Employer-Provided Dependent Care Expenses (EEPDCE) allows expenses paid or incurred by an employer for dependent care assistance provided to an employee to be excluded from the employee's gross taxable earnings. This subsidy is also of little benefit to low-income families.

The 1988 Family Support Act (FSA) and the Omnibus Budget Reconciliation Act (OBRA) of

[xiv] One significant program not included in Table 9 is military child care. Government expenditure on military child care was estimated to be $352 million in 2000 (Campbell et al., 2000). This program is not discussed here because it is not available to civilians. The military child care system was drastically reformed in the 1990s, and the current military child care system is often taken as a model of how a publicly-run child care program should be organized. See Campbell et al. (2000), U.S. General Accounting Office (1999b), and Lucas (2001) for information on military child care.

1990 instituted four different means-tested child care subsidy programs, with different target populations, eligibility requirements, and subsidy rates. This resulted in a fragmented system in which families had to switch from one program to another as a result of changes in employment or welfare status which may have depressed takeup below already low levels (c.f. U.S. Advisory Commission on Intergovernmental Relations, 1994; U.S. General Accounting Office, 1995; Ross, 1996; Long et al., 1998). The 1996 Personal Responsibility and Work Opportunity Reconciliation Act (PRWORA) consolidated the programs created by FSA and OBRA into a single block grant called the Child Care and Development Fund (CCDF). Under the new system, states can allow families that move from welfare to work to remain in the same subsidy program. Rules governing the types of child care that can be subsidized are determined by the states, and hence vary widely across states. States have substantial flexibility in designing their CCDF programs, as shown in Table 10.

The data in Table 10 show that only nine states set income eligibility at the maximum allowed by law, 85 percent of State Median Income (SMI). Ten states set the income eligibility limit at less than 50 percent of SMI. States are permitted to waive fees (co-payments) for families with income below the poverty line, and the fourth column of Table 10 shows that there is substantial variation across states in use of this provision. Fees are determined in many different ways, including flat rates, percent of cost, percent of income, and combinations of these. States are required to have sliding scale fee structures, with fees that rise with family income. The minimum fee shown in the fifth column of the table is the co-payment required of the lowest-income families, and the maximum fee shown in the sixth column is the co-payment for the highest-income eligible families. The reimbursement rates listed in the last two columns represent the amount of the subsidy exclusive of the family co-payment. States that provide relatively generous reimbursement also tend to have higher income eligibility limits: the correlation between the figures in columns 2 and 8 is .51, and between the figures in columns 3 and 8 is .25. Federal guidelines for implementation of the CCDF law require that the subsidy rate be set at the 75th percentile of the price distribution from a recent local market rate survey. In practice many states use out-of-date market rate surveys or set the subsidy rate lower than the 75th percentile of the price distribution (Adams, Schulman, and Ebb, 1998).

Table 11 summarizes federal and state expenditures on child care subsidies in recent years, and the numbers of children served by the subsidy programs. A rough figure for total expenditure on child care subsidies in Fiscal Year 1999 is $13 billion. A meaningful total for the number of children cannot be computed, because the DCTC lists only the number of families served, and data are not available for TXX. The CCDF is the biggest program in terms of expenditure, at about $9 billion. Much of the CCDF funding was transferred from TANF; the CCDF appropriation for 1999 was $5.285 billion.[xv]

Table 12 shows data on the incidence of child care subsidy receipt and characteristics of recipients in 1999, tabulated from the SIPP. The respondents who used non-parental child care were asked if they received any assistance from a government agency in paying their child care expenses. Overall, only 2.1% of respondents reported receiving a subsidy. This seems quite low. It is likely that tax-based subsidies were not reported, and subsidies paid directly to child care providers may have been under-reported. The highest incidence of subsidy receipt by income, 5.3%, was reported by respondents with annual income of $5-10,000, and the incidence generally declines with income. Recipients of public assistance (TANF, Food Stamps, General Assistance) reported a subsidy receipt rate of 11.2%. Among households with income less than $25,000, subsidy recipients were much more likely to use center care than non-recipients, and were more likely to pay some out-of-pocket expenses than non-recipients. The maternal employment rate was much higher among recipients than non-recipients, no doubt reflecting the fact that most child care subsidies require employment or employment-related activities such as education and training. On the other hand, average hours worked and wage rates conditional on employment are similar for recipients and non-recipients. Subsidy recipients have higher education, a lower marriage rate (among non-recipients of public assistance), fewer adults in the household other than the mother and father, and more young children than non-recipients.

If we assume for the moment that all child care is of the same quality, and that the mother must purchase one hour of child care for every hour that she works, then we can use the simple model outlined in Section 3 to examine the effects of subsidized child care on maternal employment. A linear child care

[xv]Expenditure on other programs such as Head Start, Title I, and the Child Care Food Program are discussed below.

subsidy of *s* dollars per hour changes the budget constraint by raising the wage net of child care costs, and hence increases the probability that the mother works a positive number of hours. The effect on hours of work is ambiguous, given that there is both an income and a substitution effect. However, most subsidy programs are highly nonlinear. As Table 11 shows, most states structure CCDF subsidies so that they decline as income rises, up to some maximum level at which the family is no longer eligible. This is also true of TXX child care subsidies and the DCTC. This type of structure results in a "notch" in the budget constraint at the point when the subsidy drops to zero, as shown in Figure 1. Like a linear subsidy, a nonlinear subsidy creates an incentive to work. But it is even more difficult to determine effects on hours of work given that women now have incentives to locate on particular portions of the budget constraint.

By making paid care relatively cheaper, a subsidy will increase the probability that the mother is employed and that paid care is used. But subsidies for paid child care will also have effects on the use of unpaid care. Some women who would have worked and used unpaid care will switch to paid care. Thus, a subsidy to paid care "crowds out" unpaid care. Moreover, a child care subsidy will have income effects on the purchases of all goods, so that the additional expenditures on child care will be less than the amount of the subsidy. However, even given these crowd out effects, Blau (2003b) shows that a child care subsidy is usually a less expensive way to increase labor supply than a wage subsidy. The intuition is that the wage subsidy provides benefits to all working mothers, including the many mothers who use unpaid care, while the child care subsidy provides benefits only to mothers who use paid care.

We can go one step further, by relaxing the assumption that all care is of the same quality, and assuming that higher quality care costs more; that is, $p = \alpha + \beta q$, where q is child care quality, as in the model in section 3. Most existing child care subsidies affect α but not β, because they are independent of quality. Others, such as the CCDF, can only be used in child care arrangements that satisfy state licensing standards or are legally exempt from such standards. These subsidies can be thought of as being subject to a quality threshold, but they are independent of quality once that threshold is crossed. Thus, they do not alter the marginal price of quality (ignoring general equilibrium effects). As discussed in Section 3, a subsidy that is independent of quality (which we can call an α-subsidy) has a bigger positive effect on employment than a quality specific or β-subsidy. On the other hand, a β-subsidy has a bigger effect on

the quality of care that is chosen. Hence, there is a direct policy tradeoff between those subsidy policies that are most effective in supporting maternal employment and those that are most effective in improving child care quality.

In the remainder of this section we describe evidence on how child care subsidies affect maternal employment and child care quality. The evidence discussed is from two types of studies: evaluations of experimental demonstration projects and evaluations of actual child care subsidy programs. Note also that the literature reviewed above on the effect of the price of child care on employment is relevant as well. One of the motivations for that literature is to infer how child care price subsidies would affect employment decisions. Whether inferences about the effects of subsidies drawn from this literature are useful depends on several factors. If there are substantial costs to taking up a subsidy, either in the form of time costs required to negotiate the subsidy bureaucracy or psychic costs ("stigma") of participating in a means-tested program, then price effects on employment may not be a reliable guide to subsidy effects. Also, the price effects estimated in this literature are generally assumed to be linear, while most subsidies are nonlinear. Nonlinearity of a subsidy does not affect the qualitative result that a child care price subsidy increases the incentive to be employed, but it could affect the magnitude of the employment effect. Thus estimates of linear price effects could be an unreliable guide to the effects of typical nonlinear subsidies.

1. Evidence on Subsidies

Several demonstration programs designed to help low-income families achieve economic independence included child care subsidies along with other benefits and services. These programs were evaluated using randomized assignment methods, so the average effects of the programs on outcomes of interest are estimated without bias by simple comparisons of treatment and control group averages. However, in each case the child care subsidy was only one of several services provided as part of the program, so it is not possible to determine how much of the program impacts were due to the child care subsidy.[xvi] We discuss one example of a demonstration program in order to illustrate the nature of the

[xvi] A 1989 randomized experiment in Mecklenberg County, North Carolina offered a treatment group of 300 AFDC mothers guaranteed access to subsidized child care for up to one year within two weeks of taking a full-time job, while a control group of 302 AFDC mothers had access to subsidized child care only through a long waiting list

evidence from such programs.

New Hope was a program intended to reduce poverty among the low-income population in Milwaukee (Bos et al., 1999). It operated from 1994 through 1998 with broad eligibility rules that made virtually anyone with low income eligible to enroll, regardless of employment and family status. The program was voluntary and provided an earnings supplement, affordable health insurance, a child care subsidy, and a full-time community service job if no other employment was available. The program required full-time employment (30 hours per week) and provided benefits for up to three years. Participants made their own child care arrangements and were reimbursed for most of the expenses, with a co-payment that increased with family income. 39% of participants with children used child care at an average subsidy of $2,376 over two years. An early evaluation based on two years of data from the program found that among individuals who were not employed at entry to the program, participation in the program increased employment by seven percentage points, boosted earnings by about $700 per year (13%), raised income by 12%, and had no impact on welfare participation. The program had no statistically significant effects on employment and earnings for those who were employed for at least 30 hours per week at entry, although the sample size was small (the point estimate of the earnings impact was -$571 per year), but reduced AFDC and Food Stamp participation by 7-10% in year two. The program increased use of formal child care by 7.4% for boys and 12.5% for girls, and resulted in improved academic performance, study skills, social competence, and behavior among boys but not girls.[xvii]

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with an average wait of 6-10 months. However, the offer was made by mail with no telephone or personal contacts, and the take up rate was very low: only 1/6 of the treatment group applied for and received a subsidy. The treatment had no significant impact on welfare participation or expenditure. See Bowen and Neenan (1993) for details.

[xvii]Other demonstrations and experiments that included child care subsidies were the Teenage Parent Demonstration (Kisker et al., 1998), New Chance (Quint, Bos, and Polit, 1997), GAIN in California (Riccio et al., 1994), the National Evaluation of Welfare-to-Work Strategies, formerly known as the JOBS program (Hamilton et al., 1997), the Minnesota Family Investment Program (Miller et al., 1997), the Florida Family Transition Program (Bloom et al., 1999), and the Gary, Seattle, and Denver Income Maintenance Experiments. The GAIN demonstration excluded children under age 6. Granger and Cytron (1999) report that the effects of the Teenage Parent Demonstration and New Chance (which was also targeted at teenage mothers) on use of center-based child care were smaller than in New Hope and often statistically insignificant. Robins and Spiegelman (1978) estimate that eligibility for a SIME-DIME child care subsidy increased use of market child care by 18 percentage points in Seattle and 14 percentage points in Denver. Results for child care use in the other demonstrations are not available. See Hamilton et al. (2000) for a summary of the effects of all of the recent demonstration programs.

Turning now to studies that examine the effect of child care subsidies more directly, we discuss four studies that have estimated the impact of actual child care subsidies on employment. The studies are summarized in Table 13. In each of these studies the subsidy recipients are self-selected, and the studies recognize and attempt to deal with the possibility of selectivity bias.

Two of these studies evaluate means-tested state subsidies for low-income families funded by Federal programs prior to the 1996 welfare reform (Berger and Black 1992; Meyers, Heintze, and Wolf 2002). Berger and Black compare the employment of mothers with subsidies to those on a wait list and find that subsidies increase employment by 8.4 to 25.3 percentage points depending on the assumptions made about unobservables in the model. Meyers, Heintze, and Wolf use the mother's knowledge of subsidy programs to identify the effects of child care subsidies on employment. They find much larger effects of subsidies—on the order of 52 percentage points increase—but the lack of a convincing comparison group weakens their results.

A third study by Gelbach (2002) evaluates the labor supply effects of the implicit child care subsidy provided by free Kindergarten for five year old children in public school. To identify the effect of the subsidy, Gelbach exploits variation in quarter of birth of children and the fact that all states impose a date-of-birth requirement for entry to kindergarten. His instrumental variable estimates indicate that access to free public school increased the employment probability of single mothers whose youngest child was age five by five percentage points at the interview date and by four percentage points during calendar year 1979. Gelbach's approach is creative and provides credible evidence of the impact of a child care subsidy on employment of mothers whose youngest child is five years old. However, it is unclear whether his results can be generalized to children younger than five.

The fourth study evaluates the impact of subsidies in the post-PRWORA era, using data from the 1999 National Survey of America's Families. Blau and Tekin (2003) identify the employment effect of subsidy receipt using county-level dummies as instruments for subsidy receipt. Two stage least squares (2SLS) estimates show an effect of 32.5 percentage points on employment, a result that is significantly different from zero. The identification strategy may be problematic if, after controlling for 21 county

characteristics, county-level differences in subsidy receipt are not exogenous. Moreover, as in the Meyers, Heintze, and Wolf study, there is no natural comparison or control group.

These results indicate that there are at least some positive effects of subsidies on employment. But it is also interesting to note that there is a low rate of take-up of child care subsidies. Meyers and Heintze (1999) asked mothers why they did not receive subsidies from the programs for which they appeared to be eligible, and the majority response for every type of subsidy program was that they were not aware of the program. The acceptance rate for mothers who applied averaged 72% across all programs. Similarly, Fuller et al. (1999) estimate a model of child care subsidy take-up for TANF mothers using data from San Francisco, San Jose, and Tampa in 1998. Of the women using any non-maternal child care, only 37 to 44 percent received a subsidy.

C. Regulations

In addition to providing price subsidies, the government intervenes in the child care market by imposing regulations on providers. As with many other consumer products and services, the goal of these regulations is to reduce the risk of harm to children. Potential risks include harm from injury as well as from disease and developmental impairment (Morgan and Azer, 1997). Regulations stipulate such things as the educational requirements for child care providers, the maximum number of children per child care staff member, and the frequency with which facilities are inspected.

Three aspects of regulations are especially important. First, they are determined by state governments, not the federal government. The federal government can impose standards that child care providers must meet in order to be eligible for federal subsidies, but the federal government is not authorized to regulate child care.[xviii] Child care regulations therefore differ across states, sometimes substantially. Second, child care regulations impose minimum standards but do not define or attempt to enforce "optimal" standards, such as those specified by the National Association for the Education of

[xviii] Federal Interagency Day Care Requirements (FIDCR) were developed in the 1960s to standardize the requirements for receiving federal funding for child care services. These requirements were eliminated in 1981. Head Start imposes uniform federal standards that providers must meet in order to qualify for funding, and Title IA also uses the Head Start standards. Hayes, Palmer, and Zaslow (1990, Appendix B) describe the FIDCR. Head Start program standards are listed at http://www2.acf.dhhs.gov/programs/hsb/regs/regs/rg_index.htm.

Young Children (Morgan and Azer, 1997). Thus it is possible for a child care provider to comply with all state regulations but nevertheless receive a low score on quality rating scales. Third, regulations differ for day care centers and family day care homes, and in most states some providers are legally exempt from regulation. For example, many states exempt day care centers affiliated with a church or family day care homes that provide care for only a few children. This means that such providers are not required to register or obtain a license, though they must comply with some health and safety standards.

Table 14 summarizes a few of the many child care regulations by state. The regulations are typically very detailed. For example, in most states the maximum group size (GS) and child-staff ratio (CSR) standards differ by single year of child age, and staff training requirements differ by type of position. The regulations shown in the table are a small excerpt from the regulatory structure of each state, but comparisons across states on the basis of the examples shown in the table are a reasonable guide to the overall relative standards of different states. The maximum CSR for infants younger than one year old in day care centers ranges from 3:1 in Kansas, Maryland, and Massachusetts to 6:1 in eight states. Maximum group size for infants ranges from 6 to 20, and is not regulated at all in 19 of the states. The maximum CSR for four-year old children in centers ranges from 10:1 in 17 states to 20:1 in 4 states, and the maximum group size for four year olds ranges from 16 in Mississippi to 36 in Georgia. Thirty two states have no pre-service child care experience or early education/training requirement for teachers in day care centers. In these states it is legal to employ a teacher with no education, training, or experience in child care or early education, though many of these states do impose a non-child-care-specific education requirement such as a high school diploma. In the other states, pre-service requirements range from Georgia's mandate of ten clock hours of training in child care within the year following the date of hire, to Hawaii's requirements of a Bachelor's degree in any field, 12 credits in early childhood education, and six months experience.

States inspect child care providers and give them information on how to comply with regulations. Table 14 includes a summary measure of state enforcement: the average annual number of inspections per day care center. This varies from a low of 0.5 (every other year) in four states to a high of four per year in Florida and Tennessee and three or 3.5 in eight other states. Interestingly, most of the states with three or

more annual inspections have no pre-service training requirement for staff, suggesting that frequent inspections might be viewed as a substitute for a minimum training standard.

The last two columns of Table 14 show the maximum allowed CSR in family day care homes and the minimum number of children in a family day care home for which a license is required. In many states the maximum CSR varies by age; the table shows the maximum for preschool age children. This ranges from a low of three in Kansas to a high of 12 in four states. About half the states require all family day care homes to be licensed or registered, while four states exempt those caring for fewer than six children and four others exempt those caring for fewer than five children.

An important question is whether child care regulations have any effect on the well-being of children. In principle, imposing more stringent minimum standards on child care arrangements should improve child well-being. But this conclusion presumes that: (1) the standards are binding on the existing practices in child care settings; (2) regulations are enforced; and (3) parents do not "avoid" the regulations by the child care arrangements they choose. Whether or not the regulations are circumvented will depend in part on how costly they are to implement and enforce. To the extent that higher quality and safer child care arrangements are costly to produce, binding child care regulations are likely to increase the price of child care, causing some parents to be "priced out" of regulated care. As a result of this "crowd-out" effect, it is unclear whether imposing more stringent standards on regulated child care will actually increase the quality of care to which children are exposed on average.

Table 15 summarizes the literature about crowd-out in child care markets. Using data from a national sample of child care centers, Chipty and Witte (1997) find that a lower required child/staff ratio for preschool children reduces the probability that child care centers care for preschool rather than school age children, and vice-versa.[xix] Blau (2003) uses data from the SIPP and considers a more comprehensive set of child care regulations. He finds that child care regulation affects the type of child care that is chosen (though he finds no impact on child care expenditures or hours in care). Currie and Hotz (2001) use data from the NLSY and find that tougher child care regulations are associated with lower

[xix] See also Fuller, Raudenbush, Wei, and Holloway (1993), Gormley (1991); Lowenberg and Tinnin (1992); Queralt and Witte (1997); and Rose-Ackerman 1983).

probabilities of using regulated child care services. However, Currie and Hotz also show that regulating the education of care givers improves the safety of children at these centers. Evidence from some household surveys indicates that stricter child-staff ratio and training regulations are associated with lower rates of use of non-parental child care and lower hours of care per week among users (Hotz and Kilburn, 1997; Hofferth and Chaplin, 1998). However, Ribar (1992) finds no impact of a stricter child-staff ratio on hours of child care used, and Chipty (1995) finds mixed results on the effects of regulations on use of child care.

Evidence on the effects of child care regulations on labor force participation of mothers shows small negative effects, often insignificantly different from zero (Hotz and Kilburn, 1997; Blau, 1993; Ribar, 1992). Hotz and Kilburn (1997) and Hofferth and Chaplin (1998) find that tougher regulations are associated with higher family expenditure per hour of child care among families paying for care. Chipty (1995) finds that a stricter group size regulation in both family day care and centers raises family expenditure per hour in both settings, but a stricter child-staff ratio regulation reduces expenditure in both settings. Imposing a training requirement in a given sector is associated with lower family expenditure in that sector.

As discussed above, parents may be uncertain about the quality of care their children will receive from a particular child care provider. For example, parents may not know exactly how attentive a provider is to their child or how safe a particular setting is. Informational deficiencies among consumers with respect to quality are a common concern in markets for many goods and services and the potential for adverse selection in such markets is well-known. Imposing minimum quality standards, via regulation, represents one mechanism for solving the informational problems faced by consumers.[xx] For example, Klein and Leffler (1981) argue that the maintenance of licensure systems that impose minimum quality standards on service providers may have beneficial welfare effects in markets for goods and services in which product quality is difficult to monitor. Imposing standards in such markets can "assure" consumers

[xx] Also see Leland (1979) for more on the role of licensing and imposing minimum quality standards in markets for goods and services with hard-to-monitor quality attributes. See Lowenstein and Tinnin (1992), Chipty and Witte (1997) and Hotz and Kilburn (1997, 2000) for more on the application of such arguments to the market for child care services.

of the quality of the goods and services they receive to the extent that a provider's investment in meeting such standards either generates a higher stream of earnings or results in higher costs (fines) to the provider if these minimum standards are violated.

Regulations may change the production function for child quality, making it easier to avoid unintentional injury with a given level of parental effort. As a result, such regulations may increase both the actual quality of care in the regulated sector and the amount that parents are willing to pay for it. Chipty and Witte (1997) find, using individual-level data from the National Child Care Survey, that increasing the number of mandatory inspections increases both the price of child care and the number of hours that children spend in care. This finding is consistent with the idea that minimum quality standards may encourage consumers to purchase more child care.

On the other hand, Blau (2003a) finds that a substantial portion of day care centers fail to comply with regulations, which limits the usefulness of regulation as a means of providing quality assurance. The weak association between those structural aspects of quality that can be regulated, such as staff-pupil ratios and more global measures of quality suggest that it would be very difficult to substantially increase the quality of child care centers through regulation alone. For example, the estimates presented in Mocan et al (1995) suggest that to increase the quality of a child care center from average to good through reductions in staff-pupil ratios would require a reduction in staff-pupil ratios from 5.4 children per staff member to 1.6.

Thus, it may be unrealistic to expect regulation to do much more than to weed out centers with unacceptably low levels of quality. There is evidence from the Head Start program that detailed government oversight of observable aspects of quality can eliminate poor quality programs. Head Start centers have consistently been found to be of higher quality on average than other preschool programs (Resnick and Zill, undated), because in contrast to the private child care market, there are few very low-quality Head Start programs.[xxi]

[xxi]However, the quality of Head Start should not be regarded as uniform, either. Zigler and Styfco (1994) argue that funds are insufficient to allow for proper enforcement of Head Start program standards, which may be one reason for the variation in quality. Still, it is interesting that the sheer existence of these standards, even with little enforcement, seems to be associated with a minimum level of quality higher than the minimum observed in the private sector.

An interesting alternative approach to the regulation of child care quality, would be to encourage the use of credentialing services, as suggested by Shapiro's (1986) model. Xiao (2002) studies a voluntary quality certification mechanism for child care centers. She presents evidence that relatively few child care centers bother to get certification although it is inexpensive to do so. She argues that certification conveys information to parents, but most parents have already gleaned the same information from other sources. Hence, certification has little effect on demand for child care centers, which explains why few centers obtain the certification.

In summary, regulating the child care market by imposing minimum standards on some segments of the market can be a two-edged sword. While children in child care settings subject to binding regulation may receive higher quality care, regulation is also likely to drive some children out of the regulated sector. Thus, the overall effect of regulation is ambiguous, with the potential crowd out effect balanced against the quality assurance effect. Estimating the magnitudes of these separate effects is difficult, requiring the imposition of considerable structure on the parental child care choice process and child quality production functions in order to separately identify these effects. The utility of regulation is also limited by failure to comply and by the fact that only the most obvious (and not necessarily most important) aspects of quality can be regulated.

5. Publicly provided child care

As discussed above, most child care subsidy programs do not attempt to influence the quality of care, and regulatory policy must balance potential crowd out with quality assurance. In contrast, publicly provided care is usually explicitly intended to improve the quality of care that children receive in order to enhance their development. This section provides an overview of the literature on early intervention, and of the emerging literature on after school programs.

A. Model Early Intervention Programs

A recent National Research Council (2000a) report on early childhood education and intervention divides skill development into three areas: cognitive skills, school readiness, and social and

emotional development. Until very recently, the economics literature on this topic has focused primarily on the development of cognitive skills as measured by test scores, and especially on IQ. The gains in test scores associated with early intervention are often short-lived, which has cast doubt on the effectiveness of these programs. However, there is increasing evidence that the absence of obvious behavior problems and the development of skills such as self-control may be at least as important to future success in life as formal cognitive skills (Lee et al., 1990; Heckman, Hsse and Rubinstein, 2000). Non-cognitive attributes -- even in a form as basic as the ability to sit still and pay attention -- may even be necessary for the full development of formal cognitive skills. Thus, the focus in the early intervention literature has recently shifted towards trying to measure outcomes such as success in school (i.e. reductions in remedial education placements and grade repetition) and the earnings of children who participated in early intervention programs.

The excellent literature reviews of early childhood education programs in Barnett (1995) and Karoly (1998) list 16 studies of model programs. Table 16 shows the results of the seven such studies that followed a randomized methodology. These programs were typically funded at higher levels and run by more highly trained staff than large-scale, publicly-funded programs. The sample sizes for treatment and control groups in these model studies are small, often less than 100 children. However, evidence from these studies can be used to shed light on the issue of whether it is possible to use early intervention to improve child outcomes. In a randomized trial, children are randomly assigned to treatment and control groups. The importance of random assignment is that researchers can be reasonably certain that there are no pre-existing, unobserved, and uncontrolled differences between the treatments and controls on average. In contrast, when comparison groups are created by some method other than random assignment, one can never be certain that the differences between the treatments and controls reflect the effects of the experimental intervention rather than the effects of some other unobserved difference between the groups. However, even in a randomized trial, problems can arise: Some of the more serious problems mentioned in Heckman and Smith (1995) include differential attrition from treatment and control groups, the fact that people randomized to the control group may seek "treatment" outside the experiment, and the fact

that it is often difficult to generalize the results of experiments to differing settings

For example, the Institute for Developmental Studies program summarized in Table 16 (Deutsch et al., 1983) started with 503 participants but was able to conduct long-term follow-up at grade 7 on only 97 of them. The 97 who were followed may not be very representative of the initial sample since they are likely to be from more stable families. Unless attrition is random, it is difficult to draw any inferences about the long-term outcomes of the whole group from this small subset. Four studies from Table 16 stand out because they used random assignment, are relatively free of attrition, and follow children at least into middle school. They are the Early Training Project, the Carolina Abecedarian Project, the Perry Preschool Project, and the Milwaukee Project. (The Infant Health and Development Project also used a randomized design and had low attrition, but followed children only to age 8. A long-term followup is currently in the field.) [xxii]

The first conclusion that can be drawn from these studies was alluded to above: Only the Milwaukee Project found any long-term effect on IQ. However, the Early Training, Carolina Abecedarian, and Perry Preschool Projects all found positive effects on measures of scholastic success, which strongly suggests that boosting IQ is not the only way to affect this important outcome.

The Early Training Project was the least intensive intervention of this group. It served four and five year-olds, and involved weekly home visits during the year in addition to a ten-week part-day preschool for either two or three summers. It showed dramatic reductions in use of special education by age 12: 5 percent of the treatment group compared to 29 percent of the controls. Although there were no statistically significant differences between treatments and controls in achievement test scores, grade retention, or high school graduation, differences in the latter two outcomes were in the right direction. For example, 68 percent of the treatment group graduated compared to only 52 percent of the controls. The lack of statistical significance is likely to be due to the small sample size: 44 treatments and 21 controls.

[xxii] The IHDP data has been extensively analyzed. In addition to the positive effects on IQ and other outcomes at age 8, analysts have shown using propensity score analysis that the largest effects were for the children who would otherwise have been least likely to have been in center based care (Hill et al. 2002), and that the largest effects were for children of the least educated mothers.

The Carolina Abecedarian Project involved a somewhat larger group of 57 treatments and 54 controls. At birth, children were randomized into a treatment group that received enriched center-based child care services emphasizing language development for eight hours per day, five days a week, 50 weeks per year, from birth to age five, and a control group that did not receive these services. The teacher/student ratio ranged from 1:3 to 1:6 depending on the child's age. At school entry, the children were again randomized into two groups. One received no further intervention, and the other had a "Home-School Resource Teacher" who provided additional instruction, a liaison between parents and school, and served as a community resource person for the family (Campbell and Ramey, 1994, 1995).

At age 15, the Carolina Abecedarian Project found that the children who had received the preschool intervention had higher scores on achievement tests (especially reading) and reductions in the incidence of grade retention and special education, regardless of whether or not they had been assigned a Home-School Resource Teacher once they entered school. Retention in grade and being placed in the special education "track" are viewed by educators as predictors of dropping out of school. They also create additional costs to society that must be weighed against the costs of providing the early intervention. In contrast, the effects of the Home-School Resource Teacher were generally either small or statistically insignificant. The investigators have now completed a follow-up assessment of the Abecedarian children at age 21.[xxiii] Of the original 111 infants, 104 were assessed. At age 21, the children who received the preschool intervention had higher average tests scores and were twice as likely to still be in school or to have ever attended a four-year college.

A recent cost benefit analysis based on follow-ups through age 21 suggested that each dollar spent on Abecedarian saved tax payers four dollars (Masse and Barnett, 2002). Both the study children and their mothers had higher earnings, and costs for special education and health care were reduced in the treatment group relative to the controls.

The most famous of these interventions is the Perry Preschool Project, which involved 58 children in the treatment group and 65 controls. The intervention involved a half-day preschool every

[xxiii]The following discussion is taken from the Executive Summary of the Carolina Abecedarian Project which is available at http://www.fpg.unc.edu/verity.

week day plus a weekly 90 minute home visit for eight months of the year, for two years. Teacher/student ratios were 1 to 6, and all teachers had masters degrees and training in child development (Schweinhart et al., 1993). The intervention had positive effects on achievement test scores, grades, high school graduation rates, and earnings, as well as negative effects on crime rates and welfare use (as of age 27). It is estimated that each dollar spent on this program saved up to seven dollars in social costs (see Karoly et al. 1998 for a more detailed discussion).

Studies of model early intervention programs do not show universally positive results. In particular, studies with non-randomized designs frequently find insignificant or even wrong-signed effects. However, well-designed studies of intensive educational interventions show that it is possible for intervention to make a positive difference in children's lives.

B. Head Start

There is a large gap between the model programs for early childhood education and the large-scale publicly funded interventions that are currently in place. The largest and best known public program is Head Start, a preschool program for disadvantaged children which aims to improve their skills so that they can begin schooling on an equal footing with their more advantaged peers. Begun in 1965 as part of President Johnson's "War on Poverty", Head Start now serves almost 800,000 children in predominantly part-day programs, about 60% of eligible 3 and 4 year old poor children (U.S. Administration on Children Youth and Families, 1999). Over time, federal funding has increased from $96 million in 1965 to $6.2 billion in FY2001.

These numbers can be compared to those in Table 1, which shows that 21% of three year olds and 36% of 4 year olds had some sort of center based care as their primary arrangement in 1999. This figure should include Head Start cases, since Head Start is classified as center care in Table 1. However, it is likely that this number excludes many children who are in Head Start. The Census Bureau currently asks the SIPP child care questions between April and July, when many part-year Head Start centers are closed. The 1999 SIPP yields less than 200,000 children in Head Start, far lower than the number indicated by administrative records. Still, we conclude that the fraction of children served by Head Start is quite large

relative to the total number of children of this age range in any sort of center-based care.

Head Start is run at the local level, but local operators are subject to federal quality guidelines. These guidelines specify that Head Start is to provide a wide range of services in addition to providing a nurturing learning environment. For example, Head Start is required to facilitate and monitor utilization of preventive medical care by participants, as well as to provide nutritious meals and snacks. This multi-dimensional aspect of the program has generated controversy, since some observers feel that Head Start should focus more narrowly on "education". The program is not an entitlement, but is funded by appropriation, which means that when funds run out, eligible children cannot be served.

Head Start provides child care services that are of much better quality than those commonly available to low income parents, though they are not usually full-day programs.[xxiv] However, the most recent available estimates suggest that as of 1995, 28 percent of Head Start parents were employed full time, and 17 percent were employed part-time (Smith, 2000). These percentages may have become much higher in recent years due to welfare reform. Head Start parents typically combine Head Start with relative care, in order to obtain the required number of child care hours.

The successful model programs discussed in the previous section were funded at higher levels than a typical publicly funded program. For example, in 1998 it cost $5,021 to keep a child in a part-day Head Start program for 34 weeks a year, implying that it would cost approximately $10,000 to send a child for two years. The part-day Perry Preschool intervention cost $12,884 per child (in 1999 dollars) for a program that lasted eight months a year over two years. Since 20 percent of the children participated only for one year, the figures imply that the cost per child was approximately $7,000 per year, so that Head Start costs approximately 71 percent of what Perry Preschool cost (Karoly et al., 1998).

The Administration for Children, Youth, and Families estimates that it would cost $2,394 to extend the Head Start program to full-year care, and an additional $1,615 to extend it to full-day/full-year care. Taking these figures together, it would cost approximately $9000 per child per year to have a child

[xxiv]Tabulations from the CQOS show that among families using for-profit day care centers, 40% of the lowest income quartile used care with ECERS quality less than or equal to 3, compared to only 9% of the top income quartile. The distribution of quality by income was much more even among users of non-profit child care.

in a full-year, full-day Head Start program (Bourdette, 1999). The preschool component of the Carolina Abecedarian intervention (which was full-day) cost about $15,000 per child, per year and this part of the intervention lasted five years. Children entered the preschool component of the program between 1972 and 1983.[xxv] Fewell and Scott (1997) report that the IHDP program also cost about $15,000 per year per child, though 20 percent of the costs were in the form of transportation expenses. These figures suggest that a full-year, full-day Head Start program would cost roughly 60 percent of what these model programs cost.

Since the model programs offered more intensive services with smaller group sizes and more highly trained personnel, it is reasonable to expect that they would have larger effects than Head Start or similar public programs. The reviews of early childhood education studies in Barnett (1995) and Karoly (1998) list 22 studies of the effects of Head Start programs, as well as similar programs funded under Title 1 of the Federal Elementary and Secondary Education Act of 1965. (Title 1 provides about $8 billion per year to school districts with disadvantaged students, but makes few stipulations regarding how the funds can be spent. It is estimated that in FY1999 about $2 billion was spent on services for preschool age children (U.S. General Accounting Office, 1999a, p. 6)).

It is surprising that there has never been a large-scale, randomized trial of a typical Head Start program.[xxvi] Moreover, few existing studies have attempted to follow children past the elementary grades.

[xxv]Ramey, Campbell and Blair (1998) state that on average the preschool component of the program cost about $6,000 per year in 1978 dollars, which is approximately $15,000 in 1999 dollars. It is not completely clear that the CPI is the right deflator to use in making this adjustment, however, since the bulk of child care costs are for labor and wages of less skilled workers fell over this period. A cost-benefit analysis of the Abecedarian program by Masse and Barnett (2002) estimates that using a discount rate of 5%, the PDV of the program costs was $34,600, and the PDV of the benefits was $76,000. The benefits included in the calculation were the treatment-control differences in participant earnings, earnings of future generations, earnings of the participant's mother, savings in K-12 education costs, savings in smoking-related health expenditure, differences in higher education costs (a "negative" benefit, since the treatments attended college at a higher rate than the controls), and savings in welfare expenditure.

[xxvi]The Advisory Committee on Head Start Research and Evaluation recently recommended that the Department of Health and Human Services conduct an evaluation that relies on random assignment of children in sites in which funds are insufficient to serve all eligible children; that is, if some children are to be denied access to services in any case, the committee recommends that this be done randomly so that the effects of Head Start can be assessed. This proposed random-assignment evaluation of Head Start was recently initiated, but results will not be available for some time. See http://www.acf.hhs.gov/programs/core/ongoing_research/hs/impact_intro.html. The evaluations are to focus on the intermediate outcome of school readiness. Longer-term followup of treated children would be very useful, but raises many practical problems to do with tracking substantial numbers of individuals over long periods

The most recent federally-sponsored study of Head Start is FACES which stands for Family and Child Experiences Survey (Zill, Resnick and McKey, undated). Unfortunately this study took a short-term perspective and had no control group. The study focused on documenting improvements in the skills of Head Start children over the course of a year in the program. The children showed gains in social skills over the course of a year in Head Start. However, these gains could not be compared to any national norms, so it is unclear what to make of the finding; after all, surely one would expect all preschool children to improve their social skills over the course of a year. The cognitive gains of the Head Start children were assessed by comparing the Head Start children to national norms. These findings were consistent with those of many other studies that have documented short-term gains to some cognitive skills, particularly to verbal skills.

Table 17 provides an overview of selected studies of large-scale publicly funded early childhood intervention programs, focusing on those which are most recent and prominent and on those which have made especially careful attempts to control for other factors that might affect outcomes.[xxvii] The Educational Testing Service's Longitudinal Study of Head Start, began by conducting a spring canvas of all the children in a neighborhood who would be eligible to enter Head Start in the fall (Lee et al., 1990). The children who actually attended Head Start had lower scores on average than those who did not, although much of the difference could be accounted for by family characteristics. The children were followed into second grade, and it was found that Head Start attendance had positive effects on both verbal test scores and measures of social adjustment such as impulse control. Unfortunately, it was not possible to follow the children further to see whether these effects were sustained.

The Chicago Child-Parent Centers is an early intervention that began with an enriched preschool program, and followed up with an enriched curriculum for school-aged children up to age nine. This intervention is similar to providing a Head Start-like preschool program and then improving the school

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of time.

[xxvii] Mckey *et al*. (1985) offers a meta-analysis of many of these Head start studies. They argue that while the effects generally do not reach statistical significance in individual studies, the studies taken together suggest positive effects on schooling attainment, school attendance, health care utilization, and social development. Here, we take a different approach by focusing on those studies that we judge to be most methodologically sound.

subsequently attended by the Head Start children. Reynolds (1998) followed a sample of children who had all participated in the preschool and kindergarten components of the program through 7th grade. Some participated after kindergarten (the treatments) and some did not (the controls). In addition, some attended schools in which the extended program was offered for two years, while some attended schools in which it was offered for three years. Reynolds finds significant reductions in the rates of grade retention, special education, and delinquency in the treatment group, as well as higher reading scores. He uses several different statistical methods to control for the possibly unobserved characteristics of the (non-randomly assigned) treatment and control children.[xxviii] His results are robust to the use of different methodologies.

In other studies of the Chicago Child-Parent Center population, Temple et al. (2000) follow the children to the end of high school and find that the program reduced the high school dropout rate by 24 percent, and that the size of the effect grows with the time that children spent in the program. Reynolds et al. (2000) look at several additional outcomes including delinquency, crime, and a skills test and find beneficial effects of the program on all of the outcomes they examine. They include a simple cost-benefit analysis which suggests that a dollar spent on the program saved $3.69 in future costs to government.

The National Longitudinal Survey of Youth, which has followed a nationally representative group of people who were between the ages of 14 and 21 in 1978, began following the children born to women in NLSY in 1986. Currie and Thomas (1995) use these data to evaluate Head Start. They attempt to control for unobserved characteristics of children by comparing siblings who participated in Head Start to those who did not. The idea is that by using siblings as the controls, any shared characteristics of family background will be controlled. As discussed above, unobserved characteristics such as the parents' views on the importance of education are likely to contaminate estimates of program effects if they are

[xxviii] Reynolds (1998) uses three different methods. First, he conducts an analysis of the initial differences in test scores between the two groups, and finds that most of it can be explained by observable characteristics; that is, there do not appear to be large pre-existing unobservable differences between the treatments and the controls. Second, he estimates a model in which selection into the treatment group is controlled for by including the inverse Mill's ratio from a first-stage selection equation. In this model, it is assumed that the characteristics of each school site affected selection into the treatment group without having additional direct effects on child outcomes. A third approach is to compare children in schools which offered the treatment for two years to those in schools that offered it for three.

not accounted for.

The Currie and Thomas (1995) evaluation is one of very few to have included significant samples of the 60 percent of Head Start children who are not African-American. The estimates of gains for African-American children parallel those of studies in which subjects were randomly assigned, which lends them additional credibility: initial gains in vocabulary and reading test scores "faded out" while the children were still in elementary grades. For white children, in contrast, there were persistent gains in test scores, as well as reductions in grade repetition. It is worth emphasizing that the initial gains in test scores were the same for whites and blacks -- thus, the real difference was not in the initial impact of the Head Start program but in what happened to the children after they left.

In conjunction with results from Reynolds' work on the Chicago Parent-Child program and with evidence that Head Start children often go on to attend poor schools (Lee and Loeb, 1995) these results suggest that the fade out of Head Start gains among African-American children may be due not to deficiencies in the Head Start program but to problems of subsequent school quality. Currie and Thomas (2000) find that black children who attended Head Start go on to attend schools of lower quality than other black children. However, the same is not true among whites. Moreover, when they stratify by an indicator of school quality, gaps in test scores between Head Start and other children are very similar for blacks and whites. Hence, the effects of Head Start may fade out more rapidly among black students at least in part because black Head Start children are more likely to subsequently attend inferior schools.

Only two published studies have attempted to follow Head Start children into adulthood. Oden, Schweinhard, and Weikart (2000) report on an attempt to follow up a group of young adults who participated in Head Start between 1970 and 1971 in both urban and rural areas in Colorado and Florida. These children were compared to a group of children who had never participated in any form of early childhood education program. In order to construct the comparison group, researchers found young adults who had lived on the same streets, or in the same census tracts as the Head Start children, and who had initially enrolled in the same elementary school. They recognize that this method of constructing a comparison group is imperfect, and note that in the final sample, the Head Start children were likely to be from more disadvantaged backgrounds along a number of dimensions. A statistical analysis of

differences in many different outcomes between the Head Start and no intervention children is presented, but none of the differences are statistically significant at conventional levels of significance.

In contrast, Garces, Thomas, and Currie (2002) find that Head Start generates long-term improvements in important outcomes such as schooling attainment, earnings, and crime reduction. The data for this study come from the Panel Study of Income Dynamics (PSID) which began in 1968 with a survey of 4,802 households containing 18,000 individuals. In 1995, adults in the PSID who were age 30 or younger were asked whether they had ever been enrolled in Head Start or any other preschool or daycare program. These adults have been followed since childhood, and also answered questions about labor force participation, earnings, schooling, and criminal activity. There are roughly 4,000 respondents in the survey for whom both information about preschool and information about these adult outcomes is available.[xxix] They find that disadvantaged whites who had been enrolled in Head Start were more likely to graduate from high school and to have attended college than siblings who did not, while African-Americans who attended Head Start were significantly less likely to have been booked or charged with a crime compared to siblings who did not participate in Head Start.

The existing evidence from both model programs and Head Start studies suggests that the benefits of early intervention may be greater for more disadvantaged children than for other children, though again, this needs to be more rigorously demonstrated. For example, in the Carolina Abecedarian project, researchers found positive effects that were twice as large for children from the poorest and least educated families as they were for the other children. The Infant Health and Development Project listed in Table 14 found positive effects on math scores only for a group of relatively high birthweight children within their low birthweight sample. But within this group, the children of the poorest and least educated mothers gained the most. Currie and Thomas (1999) find that in a sample of Hispanic children in Head Start, the largest gains in test scores were among children of mothers who had been interviewed in Spanish, suggesting that at least some of the positive effect of the program is due to increased preschool

[xxix] A possible problem is that the Head Start questions refer to events that took place many years ago. Aware that survey participants might have problems remembering preschool attendance, the authors compare self-reported PSID Head Start enrollment rates and the racial composition of enrollments in the PSID with those reported by the Head Start Bureau. They find no evidence that poor memories contaminate their results.

exposure to "mainstream" language.

In summary, the evidence in support of favorable long-term effects of public programs is less conclusive than the evidence showing positive effects of model programs, mostly because there have been very few well-designed studies of longer-term effects. Thus, the jury is still out on whether Head Start is cost effective, although Currie (2001) calculates that the short and medium-term benefits of Head Start (in terms of reducing ills such as grade repetition) pay back 40 to 60% of the cost of the program. Thus, if Head Start has long-term benefits even a quarter as large as those of some of the model programs, then the intervention pays for itself.

C. Early Head Start

The Early Head Start (EHS) program was created in 1994 as part of a Congressional mandate to address the needs of infants and toddlers within the existing Head Start framework. The 1994 legislation set aside three percent of the 1995 Head Start budget for the creation of EHS. The proportion of funding designated for EHS has grown steadily since then, reaching ten percent in 2002 (Raikes and Love, 2002). In response, EHS has grown from 68 programs in 1995 to 664 programs serving over 55,000 families in 2002. EHS is organized and evaluated according to the same performance standards as the Head Start Program. However, programs are allowed considerable flexibility and can offer several options, including: a home-based program with weekly home visits and at least two group socializations per month for each family; a center-based program which also provides a minimum of two home visits per year; or a mixed approach. EHS can also contract out child care services to existing providers in the community. Paulsell et al. (2002) and Buell et al. (2002) find evidence that the involvement of EHS enhances the quality of child care at these locations.

Perhaps because of controversy regarding the wisdom of encouraging mothers to place infants in child care, an evaluation component was built into EHS. Seventeen sites have been chosen to be part of the national evaluation. At each site, randomly assigned treatments and controls are being tracked. It is interesting to note that in the relatively short time since the program's inception, the 17 sites in the national evaluation have all but abandoned the home-based approach in favor of center-based care.

The results to date of the national evaluation are reported in Table 17. As of age three, the effects appear to be very positive. The EHS children have significantly higher scores on several tests of cognitive development, exhibit less aggressive behavior, and less negative behavior towards parents during play, and are also better able to devote sustained attention to an object during play. Given the results suggesting some "fade out" in effects of Head Start, at least for some children, it will be very important to see how well these gains are maintained over time.

D. *State Programs*

Head Start has served as a model for state preschools targeted to low-income children in states such as California (U.S. General Accounting Office, 1995), and also for new (voluntary) universal preschool programs in Georgia, Oklahoma,and New York.[xxx] In many states, the state program has a contractual arrangement with local Head Start agencies, but may also operate through the public schools. It is common for state programs to use the Head Start Performance Standards as guidelines for their program. It is also common for these programs to emphasize the "comprehensive services" mandated by Head Start—that is parent involvement, health referrals, case workers, and home visits in addition to educational services.

Table 18 shows state spending on preschool education at three points in time, by program. Most states have shown significant growth in their expenditures on these programs between 1987 and 1999. The Children's Defense Fund (1999) reports that as of the 1998-99 school year, 724,610 children were participating in state-funded enriched preschool programs. A recent NCES report (2003) finds that in 2000-2001, 822,000 children were served by prekindergarten classes operated by public schools. One impetus for this growth is the federal Individuals with Disabilities Education Act (IDEA), which provides funding to states to support educational services for children with disabilities. In 1999-2000 five percent of U.S. preschoolers (588,300) received some IDEA services at a cost of $374 million. In order to be

[xxx] Georgia established a universal voluntary program for 4-year olds in 1995. New York followed in 1997, and Oklahoma expanded an existing program serving disadvantaged kids into a universal 4-year old program in 1998. In New York, only 200 out of 700 school districts were participating in 2002, and the continued existence of the program is in jeopardy due to budget crises.

eligible for these funds, states must make free appropriate public education available to all three to five year old children with disabilities. The NCES report indicates that 51% of public elementary schools that provided prekindergarten classes used funds from federal or local programs for children with disabilities. Twenty five percent reported using Title 1 funds, and 13 percent used Head Start funds (nationally, about 13 percent of Head Start centers are operated by public schools). These figures indicate that while there is considerable overlap between different types of public programs serving preschool children, the number of children in state-funded early education initiatives is roughly equal to the 800,000 participants in Head Start. However, we know very little about the effectiveness of these programs, a problem that has become more urgent given current federal proposals to allow states to opt out of Head Start and receive block grants instead.[xxxi]

The best available summary of research on these programs is a meta-analysis by Gilliam and Zigler (2001). They note that by 1998, only 13 of 33 state funded preschool programs providing classroom-based educational services had completed any formal evaluation of the program's impact on children. Of these 13, three did not include any comparison group. The remaining 10 generally chose comparison groups from either eligible non-attendees or randomly chosen classmates who may or may not have been eligible. The evaluation of the New York program selected a control group from the waiting list for the program, which is perhaps the best non-experimental design of the group. However, this evaluation is extremely dated (1977).

The evaluations of these programs yielded results quite similar to those of the non-experimental evaluations of Head Start discussed above. There generally seem to be positive short-term effects on measures of social-emotional, cognitive, motor, language, academic and literacy skills, which are sustained through Kindergarten. Most evaluations followed children only into first grade, but noted some positive effects in academic and literacy domains. The few studies that followed children beyond first grade found no positive effects, and an evaluation in Kentucky found negative effects when children from

[xxxi] **Error! Main Document Only.**The Head Start reauthorization bill introduced by Representatives Castle and Boehner on May 22, 2003 proposes to allow states to opt out of Head Start and receive a block grant. State programs would not be subject to the same performance standards as Head Start.

the state program were compared to random classmates.

In contrast, evaluations that looked beyond test scores, sometimes reported positive effects. For example, a Florida evaluation that examined actual reported incidents of corporal punishment, suspensions and expulsions found significant effects as late as fourth grade: eligible nonattendees without preschool experience were significantly more likely to have been disciplined than participants. Similarly, most states that examined attendance found significant impacts that persisted beyond school entry. For example, New York found statistically significant impacts at the fifth and sixth grade when comparing state preschool attendees to non-attendees drawn from the waiting list for the program, and Maryland found positive effects at tenth grade when participating children were compared to random classmates. Several studies also reported that participants had higher scores on school-administered academic achievement tests, although the effect sizes were small. The Maryland and New York evaluations found statistically significant positive effects at grades 5, 8, 9, and 10, and in grade 6, respectively. Finally, every state that evaluated retention in grade found that program participants were significantly less likely to have been retained than controls.

In sum, like Head Start, state preschool programs have not been adequately evaluated. However, the limited available information suggests that while effects on cognitive tests scores may fade out, there may well be longer-term effects on actual achievement. Sstate preschool programs generally bear a striking resemblance to Head Start, so that even if money diverted from the federal Head Start program into block grants for states was spent entirely on preschool programming (rather than for example, on increases in child care subsidies), it is unlikely that this would have a major impact on the type of programs available to low income children.

E: Programs for School Aged Children

Data from the National Survey of America's Families suggests that in 1997, about seven percent of children 6-12 were enrolled in some sort of after school programming. Concern about the plight of "latch key" children has led to increasing interest in after school (and before school) programs for

children of school age. Between 1997 and 2002, the U.S. Department of Education increased funding for 21st Century Community Learning Centers, which are school-based after school programs, from $40 million to $1 billion. In 2001, 1.2 million elementary and middle school students participated in this program in 3,600 schools. State governments have also increased their spending on these initiatives. California recently passed Proposition 49, which increased state funding for before and after school programs up to $455 million dollars, beginning in 2004. Proponents of the measure argued that up to a million California children under the age of 15 were left unsupervised after school, and that after school programs could reduce crime rates by 40 percent or more (California Secretary of State, 2002).

There are many studies examining correlates of self-care in children (c.f. Belle, 1997; Vandell and Posner, 1999). Some of the more recent studies are summarized in Table 19. With the exception of Aizer (2003), none of the studies attempt to deal with heterogeneity between students who take care of themselves after school and other students. There are many reasons to expect selection bias in simple comparisons of children who are and are not in self care: If parents are less likely to leave children with problems alone, then the estimated effects of self-care could be under-estimated. On the other hand, self-care could be correlated with other characteristics of families that cause negative outcomes.

Many of these observational studies report behavior problems in children left in self care (Galambos and Maggs, 1989; Marshall et al. 1997; McHale et al, 2001; Pettit et al. (1997, 1999), Rodman et al. (1985)). Pettit et al. (1997) also report negative correlations between self care and the test scores of children in self care in grade 1, though they find no significant effect on grade 2 test scores. On the other hand, Vandell and Ramanan find that among 3rd to 5th grade children, children in self care are significantly more likely to be "headstrong" and hyperactive, but have test scores similar to other children, and are equally likely to report peer conflicts.

Looking at 8th grade children, Richardson (1989) reports that self-care children are significantly more likely to use cigarettes, alcohol and marijuana than other children. Using data from the National Longitudinal Survey of Youth, Aizer examines children 10 to 14, and attempts to control for unobserved family background characteristics using family fixed effects. Her estimates indicate that children in self-

care are significantly more likely to report that they skip school, use alcohol or drugs, have stolen, or have hurt someone. Thus, these studies offer some support for the view that self-care can be harmful.

However, it is considerably more difficult to demonstrate, on the basis of the available evidence, that formal after school programs are the solution to this problem. The first problem facing the researcher, is that there is little consensus in the literature about the definition of an after-school program. Seppanen et al. (1993) offer a coherent definition as well as the first national overview of such programs. Following them, we define an after school program as one offering "formally organized services for five to thirteen year olds that occur before and/or after school during the academic year and all day when school is closed and parents are at work." We further narrow our attention to school or center-based programs that operate at least one hour per day and at least three days per week. As Seppanen et al. (page 6) explain, "Such programs augment the school day, and typically also the school calendar, creating a second tier of services that provide supervision, enrichment, recreation, tutoring, and other opportunities for school-age youth."

Seppanen et al. report several surprising findings. First, they find that before and after school programs are underutilized nationally–enrollments were at an average of only 59 percent of the capacity of licensed programs, and only one-third of programs were operating at 75 percent or more of capacity. Thus, the widespread perception that after school programs are unavailable seems to be incorrect, though it is of course possible that existing programs are "too expensive". In the 2000 competition for the 21st Century Community Learning Centers, 2,252 communities applied for funds that were sufficient to fund only 310 grantees (National Research Council and Institutes of Medicine, 2003).

Seppanen et al. also report that 90 percent of the before school enrollments, and 83 percent of the after-school enrollments are of children in prekindergarten through grade three. Thus, it would appear that these programs are used primarily as child care for children deemed by their parents to be too young to be on their own, but that the programs are not used very much for the older children who are apparently most at risk of negative effects of self care. Moreover, the largest drop off in enrollments occurs between Kindergarten and grade one. It may be that the generally somewhat longer school day for children in

grade school allows parents to find alternative child care arrangements more easily than they can for Kindergartners.

According to Seppanen et al. most after school programs offer the following low-cost, easy to organize activities: socializing, free time, games and puzzles, reading independently or in small groups, time for homework, unstructured play time, and construction or building (with sand, Legos, etc.). Less that 75 percent of programs offered activities such as dramatic play or dressing up, music, storytelling, or theater. Fewer than half of all programs offered creative writing, sports, field trips, or science activities at least once a week or more. There was also a great deal of heterogeneity in structural measures of program quality. The education of care-givers ranges from less than high school through graduate degrees. Staff turnover averaged 60 percent, although some programs reported no turnover. Child-staff ratios ranged from four to one to 25 to one.

The existing evaluations of after school programs, summarized in Table 20, tend to focus on special after school programs rather than on the more typical programs surveyed in Seppanen et al.[xxxii] Two other limitations of the existing studies are almost immediately apparent from Table 20. First, very few studies have used a randomized treatment and control design. Second, while proponents of after school programs generally focus on keeping older kids out of trouble, many of the "model" after-school programs that have been evaluated focus on improving the scholastic outcomes of younger children.

Two of the better studies of this type are the Howard Street Tutoring Program and the Memphis City Schools Extended Day Tutoring program. Both used a design in which students with poor reading test scores were randomly assigned to a treatment group which received tutoring or a control group. In their evaluation of the Howard Street program, Morris et al. (1990) report significant gains in basal passage reading, timed word recognition, basal word recognition, and spelling in their sample of second and third grade children. Ross et al. (1996) also report significant gains in reading scores in the Memphis City Schools program. However, rather than simply comparing treatments and controls, Ross et al.

[xxxii] Note that some of the studies summarized in Table 19 essentially compare self-care to care in some sort of after-school program. These include Vandell and Corasoniti 1988; Posner and Vandell, 1994; Marshall et al. 1997; and

conduct comparisons which add treatment children who did not attend the program more than a threshold amount of the time to the control group. Even with this modification to a standard experimental design, they find significant effects only for third graders, and not for either second graders or fourth graders.

One of the after school programs which has received most attention (and is the subject of three of the evaluations in Table 20) is LA's Best. This program offers comprehensive after-school tutoring, cultural enrichment, recreation, computer, and nutrition services to Kindergarten and elementary school children in 19 of Los Angeles' poorest schools, and is probably what proponents of California's proposition 49 had in mind. Brooks et al. (1995) conducted a study of 146 LA's Best children over academic years 1992/93 and 1993/94. Children in the program were compared to a non-randomly selected group of control students whose parents had agreed to let them participate in the study. The control group started with significantly higher grades, and also showed differences in family background characteristics and ethnic composition when compared to the treatments.

Brooks et al. report that at the end of two years in the program, the LA's Best children had higher GPAs in reading and science than the control children, as well as reporting generally more positive attitudes towards school, higher aspirations, etc. Perhaps notably, treatment children were also more likely than controls to report that they felt safe after school. However, the estimates discussed by Brooks et al. and cited in other analyses of after school programs are based on an analysis that deletes "outliers" from the comparison. From the pattern of results, it appears that the effect of deleting these outliers was to raise the mean scores of the LA's Best kids relative to the controls. Alternative estimates reported in the appendix to Brooks et al. show treatment children with lower GPAs than control children, although "gains" in GPAs in social studies and in science were still significantly larger for the LA's Best children than for the other children. These are the estimates that we have reported in Table 20.

Huang et al. (2000) offers a much larger study of almost 20,000 children in LA's Best schools. The study compares children who participated in the program with schoolmates who did not, and controls for gender, ethnicity, income, and English proficiency. Relative to non-participants, the LA's Best

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Pettit et al. 1997. We have not repeated these studies in Table 20.

students were more likely to have been redesignated into the English proficient group, had fewer absences, had better attitudes and were more likely to be in the "high" group on standardized tests rather than the "low" group. However, no effort was made in this study to control for non-random selection into the program. Huang et al. (2001) reports increases in the Stanford 9 test scores of children in the LA's Best children, but does not compare them to Stanford 9 test scores of other children. This is a potentially important omission as test scores in the Los Angeles Unified School District have shown overall increases in recent years. For example, the mean percentile on the Stanford 9 reading, language, and mathematics tests increased from 27 to 38, 29 to 40, and 36 to 44 for Grade 2 LA Unified School District students between 1998-99 and 2000-01 (Los Angeles Unified School District, 2001).

The only study which addresses public concern about keeping older children in school and out of trouble, is Hahn, Leavitt and Aaron (1994), which evaluates the Quantum Opportunities program. This program randomly selected ninth grade students with families on public assistance, who were then randomly assigned to control or treatment status. The program involved after-school educational activities and community service activities each year for four years. Students received monetary rewards for completing each portion of the program. Participants in this program were more likely to graduate from high school or to obtain a GED than controls, and they were more likely to go on to post-secondary education. They also had significantly fewer children and reported being more hopeful about the future than other teens. There was no significant difference in the probability that participants had been "in trouble with police" in the past year, which is interesting in view of the focus of after-school proponents on crime.

There are many programs that do not fit our definition of after school programs, but are sometimes mentioned in this context. Table 21 summarizes some of the more notable of these "positive youth development" programs, which in contrast to the programs in Table 20, are largely privately funded. The Tierney, Grossman and Resch (1995) survey of Big Brothers/Big Sisters is notable both for its rigorous design and for the positive effects, which range from reductions in the probability of hitting people or initiating drug use, to improved schooling attendance. Kahne and Bailey's (1999) study of the

"I Have a Dream" program reports very large increases in the probability of high school graduation in participating schools after the implementation of the program. Other programs demonstrate positive effects in terms of reduced probability of teen pregnancy, and reductions in alcohol and tobacco use.

Taken together, the evidence reviewed in these tables suggests that concern for latch-key children is well-founded, and that model after school programs and other programs that focus on improving outcomes for youth can be effective in improving child outcomes. However, it is a leap to argue that the average available after school program has any effect on child outcomes, since the model programs appear to be significantly better than the typical program. Moreover, despite the focus on reducing crime among advocates of after-school programs, few evaluations include any measure of violence or criminal activity among older children. Finally, more attention should be paid to uncovering the reasons that parents of older children are not using the available after school programs.

6. Unanswered questions

Rather than summarize the preceding survey, we end this chapter with some unanswered research questions. First, the preceding discussion highlights the need for additional, rigorous research on the effects of all types of child care and early intervention programs on children. Existing analyses are often limited by a weak design (e.g. no control group, or a poorly chosen control group), small sample sizes, limited followup, and/or attrition. Another major problem is the lack of comprehensive data on child care quality. Analysts are often in the position of the proverbial three scientists trying to analyze an elephant, where one has only an ear, the second a tail, and the third a tusk. As states become increasingly active in the child care market, this problem is likely to become more acute, as it is difficult to collect comparable data from disparate state systems.

Second, there has been little research documenting the interactions between the private and the public sectors of the child care market. For example, there has been no analysis of the extent to which programs like Head Start "crowd out" private sector provision of child care to low income children, or of

the effects of such crowdout on the care provided to children. Moreover, little is known about the extent to which child care subsidies are passed through to child care prices. There has also been little systematic analysis of the takeup of public programs such as child care subsidies, and of the reasons why eligible families choose alternative child care modes. As a result of these gaps in our knowledge, there is currently little basis for evaluating the tradeoffs between different types of interventions in the child care market, such as different types of subsidy programs, regulation, and direct provision of care.

Finally, there is a pressing need for more information about the child care arrangements of older children, given increasing public expenditures in this area and the large numbers of children in care.

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Appendix: Child Care Data Sources

1. Cost, Quality, and Outcomes (CQOS; Helburn, 1995) collected data from a sample of 400 day care centers in four states in 1993. Observational measures of quality were recorded, along with rich data on inputs and costs. Children who were expected to spend another full year at one of the sampled centers and then enroll in Kindergarten in Fall 1994 were selected to be given developmental assessments. They were reassessed in Kindergarten and second grade. The sample included 828 children, of whom 757 provided useable data.

National Child Care Staffing Survey (NCCSS) was conducted in 227 centers in 5 cities in 1988. Approximately 45 centers were randomly selected from the licensed programs in each city. In each center, an infant, toddler, and preschool classroom was randomly selected and two teachers from each of these classrooms were interviewed about their training, education, wages, experience, and background. In total, 1309 teachers were interviewed. Classrooms were also rated on the ECERS scale, as well as the ITERS and the Arnett scale of teacher sensitivity.

The National Day Care Study (NDCS; Ruopp et al., 1979) closely monitored a sample of 64 day care centers and approximately 1,600 of the children they served for about nine months. The children were given baseline developmental assessments and were assessed again at the end of the nine month period during which classroom activities and inputs were monitored. The study design included two experiments in which some children were randomly assigned to classrooms with different staff-child ratios and teachers with different levels of training.

NICHD Study of Early Childhood Care (SECC; U.S. Department of Health and Human Services, 1998) has followed a sample of over 1,300 children from their birth in 1991 through the present, closely monitoring their home and child care environments and their development. The study used hospital birth records in ten sites in the U.S. during 1991 to select a sample of healthy births to English-speaking mothers over age 18 who planned to remain in the site during the next year. Families were visited periodically for assessments of the home environment, and children who were in non-maternal child care arrangements were visited in their child care arrangement. The quality of the arrangement was measured using a variety of assessment instruments, and data on child care inputs were recorded by direct observation. A novel feature of the study was the inclusion and assessment of all types of non-maternal child care arrangements, not just centers and family day care homes. Child development was assessed at regular intervals and extensive psycho-social data on the mother and data on the home environment were collected as well. As children changed child care arrangements, the new arrangements were visited and observed.

National Longitudinal Survey of Youth (NLSY) began with a sample of 12,652 individuals age 14-21 in 1979. Data was collected annually through 1994 and biannually thereafter. Beginning in 1986, the children of the women in the sample were given developmental assessments every other year. In addition, mothers are asked a series of questions about the home environment and home inputs to child development. And extensive data on child care is collected from the mothers as well. The main disadvantages of the NLSY are that the child care questions are not consistent across survey waves or children (e.g. some questions are asked only for the youngest child, or for infants), there are no data on child care quality (because this would require visits to thousands of child care arrangements), and the child care input data are reported by the mother instead of being recorded by trained observers in visits to the arrangement. The advantages are the very large random sample of children, the availability of extensive measures of the home environment and inputs, and the availability of repeated measures of the

inputs and developmental outcomes. Unlike most other studies (with the exception of the NICHD SECC), the sample is not limited to children in a single mode of child care

The Profile of Child Care Settings (PCS; Kisker et al., 1991) collected information on structural classroom characteristics from a nationally representative sample of 2,089 day care centers and 583 regulated family day care homes by telephone survey in 1990. Regulated family day care homes are unlikely to be representative of unregulated day care homes, and the latter are thought to be far more numerous than the former.

The National Child Care Survey (NCCS; Hofferth et al., 1991) collected information on child care from a nationally representative sample of 4,392 families with children aged 0-12 in 1990. The 100 primary sampling units in the NCCS were the same as in the PCS, so the two surveys together provide consumer and provider information about the same child care markets. Extensive data on child care arrangements were collected for all children.

Survey of Income and Program Participation (SIPP) The SIPP consists of a series of national panels that are interviewed at frequent intervals for a period of 2 ½ to 4 years (depending on the panel) with sample sizes ranging from 14,000 to 36,700 households. Each panel of the SIPP is interviewed every 4 months to collect data on the "core content" - labor force status, program participation and income information. In addition, there are topical modules administered at least once to each panel on a variety of topics like assets and liabilities, health and disability, education and work history, child care, etc. Information from these topical modules can be merged to the core data.

The topical module on child care contains information on all child care arrangements for all children under age 15 in the household for the last reference month prior to the interview. Information is collected on mode of care, weekly number of hours of care, location of care and cost of child care. There are specific questions on whether a relative or non-relative provided care, whether the child took care of herself or whether the child was in school. If the child care arrangement is a facility outside the child's home, parents are asked if the facility is licensed and who is in charge of transporting the child to the facility. Parents are also asked to provide information on whether child care problems adversely affected them at school or at work. Information is available for the following Panels(waves): 1984(5), 1985(6), 1986(3,6), 1987(3,6), 1988(3,6), 1989(3), 1990(3), 1991(3), 1992(6,9), 1993(3,6,9), 1996(4,10), 2001(4).

National Survey of America's Families (NSAF; Urban Institute) was conducted by the Urban Institute in two rounds in 1997 and 1999, with two different samples. It was designed to analyze the consequences of devolution of responsibility for social programs from the federal government to the states. The survey was conducted by telephone on a sample derived primarily from random-digit dialing. Residents of 13 states were over-sampled in order to allow detailed within-state analysis, and low-income households (income less than twice the federal poverty level) were over-sampled as well. The full 1999 NSAF sample includes 42,360 households, and the 1997 sample includes 44,361 households. There are extensive questions on child care and other topics.

Table 1. Characteristics of Households with Children Age 0-4 by Type of Child Care Arrangement, and Distribution of Households Across Child Care Arrangements

	Primary Child Care Arrangement							
	Mother Employed				Mother Not Employed			
	Parent	Relative	Non-relative	Center	Parent	Relative	Non-relative	Center
Hours/week in primary arrang.	22	32.4	34.4	34.7		16.7	17.3	20.2
% Paid cash	0	23.5	90.1	78.9		10.6	54.5	52.2
Amount paid/week	0	47.6	70.7	79.7		27.6	59	42.6
% of income paid	0	6.3	6.9	6.9		5.9	9.4	5.7
% receive govt. subsidy	0.8	1.3	4.6	7.1		2.7	12.7	8.3
Mother's hours of work/week	29.2	35.1	37.7	36.2				
% with a sec. arr.	33.1	28.5	30	37.1		20.5	19.9	27.2
Type of sec. Arr.:								
Parent	69.2	84	87.9	76.4		82.1	83.2	76.5
Relative	16.3	6.6	7.1	12.5		11.3	16.2	11.8
Non-relative	8.8	3.5	0.9	3.8		4.2	0	8.5
Center	5.6	5.8	4	7.3		2.5	0.6	3.2
Hours in sec. arrang.	11.4	14.6	16	16.7		6.7	10.5	8.8
total # of arrang.:	1.26	1.38	1.44	1.52		1.25	1.24	1.33
total hours of care	25.2	37.3	40.4	42.2		18.2	19.6	22.9
	Distribution of Children Across Types of Primary Arrangements							
All	24.9	28.9	20.8	25.4	68.4	14.5	5.5	11.6
Age 0	33.4	31.2	19.3	16.1	78.7	14.7	4.8	1.8
Age 1	25	30.5	26.1	18.4	74.3	15.1	7	3.6
Age 2	26.4	28.7	21.8	23	71.4	16.9	6.4	5.3
Age 3	24	31.7	18.9	25.5	63.6	16.2	5	15.1
Age 4	18.7	23.6	18	39.8	56	9.4	3.8	30.8
Married	29.1	24.1	21.7	25.1	73.1	11	4.7	11.2
Wid., div., sep.	15.8	35.4	20.3	28.5	49.7	25.1	7.1	18
never married	13.4	44.6	17.6	24.4	55.6	25.5	8.3	10.6
White (non-Hisp.)	26.5	23.7	23.4	26.3	70	12.5	5.7	11.7
Black (non-Hisp.)	16.7	36.2	13.4	33.6	46.7	25.4	10.7	17.2
Hispanic	26.2	38.4	20	15.3	76.2	14	1.9	7.9
Annual income<18(000)	21.1	36.1	19.2	23.6	64.4	18.8	5.7	11.1
18-35.999	27.6	36.6	16.4	19.4	75.2	12.8	2.5	9.5
36-53.999	28.1	24.6	21.4	25.9	69.6	15.6	6.1	8.7
54+	22.8	24.2	23.8	29.2	65.7	10.2	7.6	16.5
Income<poverty line	22.7	36	17.7	23.6	64.8	17.9	5.8	11.6
Income 1-2 times poverty line	28.4	38	15.9	17.6	72	15.4	3.1	9.6
Income 2+ times poverty line	24.1	24.5	23.1	28.3	68.7	11.7	6.8	12.8
Income>=poverty line	25.2	27.9	21.3	25.6	70	13.1	5.4	11.6
Northeast	30.2	27.3	18.2	24.3	67.4	10.7	9.4	12.5
Midwest	27.9	24.2	24.9	23	70.2	15.8	3.9	10.1
West	26.2	33	21.4	19.4	70.1	15.4	5.2	9.3
South	19.2	30.1	19	31.6	66.7	15.2	4.3	13.8
Non-south	27.9	28.3	21.7	22.1	69.2	14.2	6.1	10.5
Metro	25.8	28.9	19.8	25.5	68.5	13.5	6	12
Non-metro	19.8	28.9	26.7	24.6	68	20.4	2.7	8.9
Receives pub. asst.	14	42	16.5	27.5	58.4	19.3	7.4	14.9
No public asst.	25.8	27.8	21.2	25.2	70.4	13.6	5.1	10.9
Mother works full time	17.5	30.1	24.1	28.3				
Part time	38.2	26.9	15.7	19.2				

Source: Tabulations from wave 10 of the 1996 panel of the Survey of Income and Program Participation (Spring 1999).

Notes: Parent includes the mother while working, the father, and cases in which no regular child care arrangement is used. Most of the parent care cases for children of non-employed mothers report no regular arrangement, and in these cases information on hours of care etc. is not available. Relative includes grandparents, siblings, and other relatives. Non-relative includes family day care, nannies, and babysitters. Center includes day care centers, preschools, and Head Start. Public assistance includes TANF, other cash assistance, and Food Stamps. Figures are weighted by the child's sample weight.

Table 2. Characteristics of Households with Children Age 5-14 by Type of Child Care Arrangement (excluding school), and Distribution of Households Across Child Care Arrangements

	Primary Child Care Arrangement							
	Mother Employed				Mother Not Employed			
	Parent	Relative	Non-relative	Organized Activity	Parent	Relative	Non-relative	Organized Activity
Hours/week in primary arrang.	12.1	16.4	20.4	15.9		10.7	11.2	7.3
% Paid cash	0	8.1	72.1	73.4		1.7	47.8	67.9
Amount paid/week	0	40.1	48.6	44.1		27.8	37.1	19.8
% of income paid	0	4.8	13.6	5.4		9.1	7	2.9
% receive govt. subsidy	0.5	1.2	3.1	5		1.2	8.6	3
Mother's hours of work/week	33.5	37	38.1	36.5				
% with a sec. arr.	47.5	87.7	77.5	79.9		82	66.2	82.3
Type of sec. Arr.:								
Parent	67.9	66.6	60.2	52.9		72.6	66.3	51.7
Relative	12	12.2	9.1	18.2		14.6	22.4	13.6
Non-relative	1.8	1.3	0.7	2		0.6	0	5.4
Center	18.3	19.9	30	26.9		12.1	11.4	29.2
Hours in sec. arrang.	14.2	12.2	14.5	9.7		8.8	8.3	5.1
total # of arrang.:	1.18	1.63	1.82	2		1.41	1.62	1.81
total hours of care	17.9	22.5	29.5	23.2		13.6	15	10.5
	Distribution of Children AcrossTypes of Primary Arrangements							
All	37	36.3	9.6	17.1	68.7	18.6	2	10.6
Age 5	29.9	24.5	18.5	27.1	67.4	16	4.4	12.2
Age 6	35.9	27.4	16.2	20.5	71	14.9	1.5	12.6
Age 7	36.5	31.9	11.8	19.8	76.8	11.9	1.7	9.6
Age 8	38.6	31.8	12	17.6	69.9	13.6	2	14.6
Age 9	37.8	33.4	13.5	15.3	74.7	14	1.3	9.9
Age 10	40.7	32.3	9.1	17.9	68.7	17.6	1.9	11.8
Age 11	37.6	37.8	7.9	16.8	67.7	19.6	2.1	10.6
Age 12	38.1	44.5	4.6	12.8	64.6	23.8	2.5	9.1
Age 13	38.7	47.7	2.3	11.4	61.4	30.7	1.1	6.7
Age 14	35.6	49.6	1.8	13	59.7	32.6	1	6.7
Married	42.5	31.5	9.1	16.9	70.9	15.4	1.6	12.1
Wid., div., sep.	24.3	47.6	10.2	17.9	61.6	29.5	3.5	5.4
never married	22.6	49.4	11.9	16.1	62.3	27.8	3.3	6.6
White (non-Hisp.)	39	33.4	9.3	18.3	66.5	18.2	1.6	13.7
Black (non-Hisp.)	31.6	43.1	8.3	17	63.8	26.5	2.4	7.3
Hispanic	33.6	41.4	12.6	12.4	77.5	14.3	2.9	5.3
Annual income<18(000)	34.3	42.1	10.1	13.4	69.7	22	2.6	5.8
18-35.999	36.6	39.9	9.7	13.8	73.1	16.4	2.4	8.2
36-53.999	40.9	34.9	8.8	15.5	69.9	17.7	0.7	11.8
54+	36.1	33.3	9.8	20.8	62.7	17.1	2	18.2
Income<poverty line	37.3	41.6	8.8	12.3	69.8	21.6	2.5	6.1
Income 1-2 times poverty line	38	39	9.7	13.3	72.5	18	2.4	7.1
Income 2+ times poverty line	36.6	34.5	9.7	19.2	65.4	16.5	1.5	16.7
Income>=poverty	37	35.7	9.7	17.6	68.2	17.1	1.9	12.9
Northeast	42.2	32.4	9.8	15.7	65.9	16.1	3.5	14.5
Midwest	38.5	35.2	11.5	14.8	63.3	21.6	1.2	13.9
West	36.3	37.5	9.9	16.3	69.8	19.5	1.9	8.8
South	33.8	38.4	8	19.8	72.7	17.3	1.9	8.2
Non-south	38.7	35.2	10.5	15.7	66.7	19.3	1.9	11.8
Metro	37.1	35.8	9.7	17.4	69.7	16.9	2	11.3
Non-metro	36.5	38.6	9.3	15.6	63.2	27.8	2	7.1
Receives pub. asst.	25.4	50.8	10.9	12.8	65.5	25.5	3	6.1
No public asst.	37.9	35.3	9.5	17.4	69.5	17	1.8	11.7
Mother works full time	32.3	39	10.7	17.9				
Part time	48.3	30	7.6	14.2				

Notes: See Table 1. Organized activity includes centers and institutional before-school and after-school programs.

Table 3. Trends in Child Care Arrangements and Expenditures

A. Primary Child Care Arrangement Used by Employed Mothers of Children Age 0-4

	Parent	Relative	Non-relative	Organized facility
Winter 1985	23.9	24.1	28.2	23.9
Fall 1988	22.8	21.1	28.9	27.3
Fall 1990	22.9	23.1	25.1	28.7
Fall 1991	28.7	23.5	23.3	24.7
Fall 1993	22.1	26	21.6	31
Fall 1995	24.3	21.4	28.4	25.7
Spring 1997	28.4	25.8	22.1	23.7
Spring 1999	24.9	28.9	20.8	25.4

B. Total Family Expenditure on Child Care, Employed Mothers with Children Age 0-14

	% paying anything	Weekly expense (1999$), if pay	% of income
Winter 1985	33.7	90.6	NA
Fall 1987	33.3	94.7	6.6
Fall 1988	39.9	97.2	6.8
Fall 1990	38	87.6	6.9
Fall 1991	34.5	86.4	7.1
Fall 1993	35.5	85.1	7.3
Fall 1995	40.5	92.9	7.4
Spring 1997	44.1	74.7	7.4
Spring 1999	43	75.6	7.5

Source: Smith (2000, 2002) and tabulations from wave 10 of the1996 Survey of Income and Program Participation (Spring 1999).

Notes: Parent includes the mother while working, and the father. Relative include grandparents, siblings, and other relatives. Nonrelative includes family day care, nannies, and babysitters. Organized facility includes day care centers, preschools, and Head Start. Beginning in 1995, the SIPP child care module was changed to allow “no regular arrangement” as a response. These cases are classified here as parent care. In 1997 they were 6% of all cases. Figures are weighted by the child’s sample weight.

Table 4: Distribution of children ages 5-14 by use of self care and mother's employment status, 1999

	Uses any self care		Does not use any self-care	
	Mother employed	Mother not employed	Mother employed	Mother not employed
Percent in each primary care arrangement				
Parent	11.1	0.9	42.1	75.3
Relative	76.9	89.2	28.4	11.8
Non-relative	3	1	10.9	2.1
Organized Activity	9	8.8	18.6	10.8
Total	100	100	100	100
	Distribution of children across any self care and mother's employment			
All	10.5	3.2	53.4	32.9
Age 5	0.7	0.3	56.5	42.6
Age 6	1.3	0.6	58.2	40
Age 7	1.4	1.1	60.2	37.3
Age 8	2.8	1.2	58.8	37.2
Age 9	5.2	1.5	59.1	34.1
Age 10	8.3	2.4	57.7	31.5
Age 11	11.5	4.4	51.9	32.2
Age 12	19.6	5.5	47.3	27.6
Age 13	25	7.5	42.4	25.1
Age 14	32.3	8	39.7	20
Married	10	3.2	52.4	34.4
Wid., div., sep.	14.3	3	56.5	26.1
never married	7.6	3.1	55.7	33.6
White	12.3	3.6	53.6	30.5
Black	9	2.8	59.2	29
Hispanic	5.3	2	47.3	45.4
Annual income<18(000)	5.4	4.3	35.9	54.4
18-35.999	9.2	2.6	55.2	33
36-53.999	11.5	3	56	29.5
54+	13.6	3	60.5	22.8
Income <poverty line	4.3	4.5	33.1	58.1
Income ≥ poverty	12	2.9	58.3	26.9
Northeast	8.9	2.3	56.9	31.9
Midwest	14.6	4.6	52.1	28.7
West	9.7	3.5	49.1	37.6
South	9.1	2.5	55.6	32.9
Metro	10	2.9	53.1	34
Non-metro	12.8	4.5	55	27.7
Receives pub. asst.	4.7	5.7	33.5	56.1
No public asst.	11.2	2.9	55.9	30

Source: Tabulations from wave 10 of the 1996 panel of the Survey of Income and Program Participation (Spring 1999).

Notes: Parent includes the mother while working, the father, and cases in which no regular child care arrangement is used.

Relative include grandparents, siblings, and other relatives. Non-relative includes family day care, nannies, and babysitters.

Non-relative includes family day care, nannies, and babysitters.

Organized activity includes before and after school programs, lessons, clubs, sports, and day care centers.

Public assistance includes TANF, other cash assistance, and Food Stamps.

Figures are weighted by the child's sample weight.

Table 5. Studies of the Effect of the Price of Child Care on Employment of Mothers

Study	Data	Population	Employment	Price	Method	Elasticity
Anderson and Levine (2000)	SIPP 1990-93	child < 13	binary: LFP	total c.c. expenses per mother's hours worked	Probit; standard	Married,<13:-.30 Single, <13: -.47 Married, <6: -.46 Single, <6: -.58
Baum (2002)	NLSY 1988-94	Women who gave birth 1988-94	Month of return to work following birth	total cc. expenditure per hour worked	Discrete time logit hazard	low income: -.59 Others: -.02* (one year after birth)
Blau and Robins (1991)	NLSY 1982-86	child < 6	binary: employed in last 4 weeks	total c.c. expenses per hour of care	Probit; standard	.04*
Connelly (1992)	SIPP 1984	Married, child<13	binary: LFP	total c.c. expenses per mother's hours worked	Probit; standard	-0.2
Connelly and Kimmel (2000)	SIPP 1992-3 (data for 1994)	child < 6	FT, PT, OLF	expenditure per hour on primary arrangement of youngest child	Ordered probit on FT, PT, OLF	Married: FT:-.71, PT: -.08 Single: FT:-1.22, PT: -.37
Connelly and Kimmel (2003)	SIPP 1992-3 (data for 1994)	Single, child < 6	Binary: LFP	exp. per hour on primary arr. of youngest child	Probit; standard	-1.03
U.S. GAO (1994b)	NCCS 1990	child<13	binary: LFP	total weekly c.c. expenses	Probit; standard	Poor: -.50 Near poor: -.34 Not poor: -.19
Han and Waldfogel (2001)	CPS 1991-94	child < 6	binary: employed	total c.c. expenses per mother's hours worked (from SIPP)	Probit; standard	Married: -.30 Single: -.50
Hotz and Kilburn (1994)	NLS72, 1986	child < 6	binary: employed	total c.c. expenses per hour of care	probit	-1.26
Kimmel (1998)	SIPP 1987	child < 13	binary: worked last month	total c.c. expenses per mother's hours worked	Probit; standard	Married: -.92 Single: -.22
Powell (1997)	Canadian NCCS	married; child < 6	binary: employed	total family work-related expenditure per mother's hours	Probit; standard	-0.38
Ribar (1992)	SIPP 1984	child < 15	employed	total c.c. expenses per hour of care	probit	-0.74

Blau and Hagy (1998)	NCCS 1990	child < 6	employed	quality-adjusted location-specific price from provider survey	Multinomial logit	-0.2
Blau and Robins (1988)	EOPP 1980	married, child < 14	employed	average location-specific weekly c.c. expenditure	Multinomial logit	-0.34
Fronstin and Wissoker (1995)	NCCS 1990	child < 6	employed	average location-specific price from c.c. provider survey	binary logit	Low-income area: -.45 High-income area: .06*
Michalopoulos and Robins (2000)	Canadian and U.S. NCCS	married, child < 5	FT, PT, OLF	expenditure per hour of child care	Multinomial logit	-0.156
Michalopoulos and Robins (2002)	Canadian and U.S. NCCS	single, child<5	FT, PT, OLF	expenditure per hour of child care	Multinomial logit	-0.259
Powell (2002)	Canadian NCCS	married; child < 6	employed	expenditure on primary arr. of youngest child per hour of care	Multinomial logit	Center user: -1.40 Non-relative user: -3.60 Relative user: -.80
Ribar (1995)	SIPP 1984	married, child < 15	employed FT, employed PT	total c.c. expenses per hour of care	structural multinom-ial	-0.09
Tekin (2002)	NSAF 1997	single, child<13	employed FT, employed PT	total c.c. expenses per hour of care	multinomial logit	full time:-.15 part time: -.07

Notes: Standard = A binomial employment model estimated by probit or logit. The price of child care is usually measured using the fitted value from a model of child care expenditures per hour estimated on the sample of families with an employed mother who pays for care. These child care price equations are usually corrected for selection. SIPP = Survey of Income and Program Participation. NLSY = National Longitudinal Survey of Youth. NCCS = National Child Care Survey. CPS = Current Population Survey. NLS72 = National Longitudinal Survey of the Class of 1972. EOPP = Employment Opportunity Pilot Projects. NSAF = National Survey of America's Families. FT = Full-time, PT = Part-time,

* Underlying coefficient estimate on the price of care was *insignificantly* different from zero at the 10% level.

Table 6. Characteristics of Day Care Centers and Regulated Family Day Care Homes, 1990

	Day Care Centers	Regulated Family Day Care Homes
Average group size[a]	16	7
infants only	7	7
1 year-olds only	10	7
2-year olds only	12	7
3-5 year olds only	17	8
Average Child-Staff Ratio[a]	9	6
infants only	4	5.9
1 year-olds only	6.2	6.2
2-year olds only	7.3	6.2
3-5 year olds only	9.9	6.5
Annual Rate of Teacher Turnover	25	
Percent of centers with any turnover	50	
Turnover rate in centers with turnover	50	
Average Percentage of teachers with:		
At least a BA/BS	47	11
Some College	39	44
High school degree or GED	13	34
No degree or GED	1	11
Percentage of teachers who have had:		
CDA Training	25	6
Teacher Training	35	
Other education training	40	
Child care workshops or courses	54	43
Child development or psychology courses	36	28
Nurse or health training	26	
Training by a R&R or govt. agency	5	5
Social Service training	4	2
Other training	6	

Source: Kisker et al. (1991).

Notes:

a. Excluding programs that serve primarily handicapped children.

b. The training information for center refers only to private, non-religious-sponsored centers.

Table 7. The Distribution of Child Care Quality in Day Care Centers as Measured by the Early Childhood and Infant Toddler Environment Rating

	Mean (and Standard Deviation)				
		For-Profit		Non-Profit	
	All Centers	Preschool	Infant-Toddler	Preschool	Infant-Toddler
Cost, Quality, and Outcomes Study (1993)					
All Sites	3.99 (1.07)	4.07 (0.99)	3.33 (1.02)	4.41 (0.96)	3.57 (1.07)
California	4.36 (0.96)	4.27 (0.88)	3.86 (0.70)	4.66 (0.97)	3.60 (1.07)
Colorado	3.94 (0.95)	4.09 (0.85)	3.40 (0.89)	4.25 (0.89)	3.66 (1.04)
Connecticut	4.24 (1.05)	4.46 (1.02)	4.00 (1.07)	4.33 (0.99)	3.85 (1.13)
North Carolina	3.44 (1.08)	3.28 (0.83)	2.54 (0.60)	4.31 (0.95)	3.29 (1.02)
National Child Care Staffing Study (1989)					
All Sites	3.92 (0.99)	3.59 (0.90)	3.43 (0.98)	4.39 (0.97)	4.09 (1.07)
Atlanta	3.57 (0.96)	3.32 (0.84)	3.04 (0.86)	4.30 (0.87)	3.89 (1.05)
Boston	4.44 (0.72)	3.66 (0.86)	3.16 (0.57)	4.72 (0.61)	4.51 (0.72)
Detroit	3.96 (1.24)	4.23 (1.04)	3.86 (1.37)	4.14 (1.40)	3.69 (1.45)
Phoenix	4.09 (0.90)	3.74 (0.75)	3.84 (0.83)	4.79 (0.89)	4.48 (0.97)
Seattle	3.62 (0.84)	3.30 (0.86)	3.37 (1.06)	3.99 (0.73)	3.63 (0.96)

Source: Tabulations from the Cost, Quality, and Outcomes Study (CQOS) and the National Child Care Staffing Study (NCCSS).

Notes: See Cryer et al. (1995) for description of the CQOS, and Whitebook et al. (1990) for description of the NCCSS. Sample size is 731 classrooms in 401 centers for the CQOS and 665 classrooms in 227 centers for the NCCSS. The public release data set from the NCCSS does not include the scores on the individual ECERS and ITERS items or the average score. Rather, it includes two summary measures derived from factor analysis of the underlying items. The figures presented here are the unweighted average of the two summary measures. This has the same scale as the ECERS and ITERS scores from the CQO but was derived differently, so comparisons between the CQO and NCCSS should be made with caution.

Table 8. Studies of the Effects of Child Care Inputs on Quality and on Child Outcomes

Data	Author	Design	Age of Participation	Sample Size	Outcomes
National Day Care Study (NDCS)	Ruopp et al. 1979	Children given baseline developmental assessments and evaluated again after nine months. Random assignment of children to classrooms with diff. staff-child ratios and teachers with diff. levels of training, but day care centers not randomly chosen.	Age 1-5	64 Centers 1,600 Children T_1= low staff-child ratio T_2= high teacher training Low-income urban.	Language receptivity: all T >C (age 3-5) General knowledge: all T>C (age 3-5) Cooperative behavior: all T>C (age 3-5) Child development: T_1>C (age 1-2), T_1=C (age3-5) Larger group sizes associated with poorer outcomes, but group size not randomly assigned.
Cost , Quality, and Outcomes Study (CQOS)	Helburn 1995	Observational data on measures of quality, inputs, and costs of centers in four states. Children who spent at least one full year at the sampled centers were given developmental assessments in Kindergarten and 2nd grade.		400 Centers Initial: 828 Children Final: 757 Children T= high quality centers	
	Peisner-Feinberg et al. 2001	Controls for maternal education, child gender, ethnicity, and relationship with teacher, but does not control for home environment or a baseline assessment.		Same as above.	Mental development: T>C Math achievement: T>C Behavior: T>C
	Mocan et al. 1995	Estimates a model of classroom quality as a function of child care inputs. Includes many controls.		Same as above.	Inputs with significant effects on process quality: Staff-child ratio Wage rates for teachers with low education Proportion of staff with college degree Lead teacher turnover Inputs which do not effect quality: Group size
	Blau 2000	Uses center fixed effects approach to compare diff. classrooms in the same centers as Mocan et al. 1995.	Age 0-5	Same as above.	Inputs with significant effects on process quality: Workshop training Inputs which do not affect quality: Staff-child ratio Wage rates for teachers with low education Proportion of staff with college degree Lead teacher turnover Group size
National Child Care Staffing Survey (NCCS)	Blau 1997	Uses center fixed effects approach to compare diff. classrooms in the same centers.	infants to children of age 5+	204 centers, 567 classrooms, 1,094 teachers.	Similar to Blau (2000) results.
Florida Child Care Quality Improvement Study	Howes et al. 1998	Evaluates changes in regulation of staff-child ratio & training in Florida. Center directors and teachers in three classrooms were interviewed. Two children		150 centers in 4 Florida counties	Significant changes in inputs 1992-1994: Staff-child ratios up Teacher detachment down Complexity of peer and object play up Attatchment security up

		from each class were randomly selected for developmental assessments. Process conducted before regulations changed in 1992 and again in 1994 and 1996. No comparison group and no way to isolate changes resulting from regulations. Different children assessed in each wave.			Inputs which did not change 1992-94: Teacher sensitivity Teacher harshness Overall classroom quality Behavior problems Cognitive development Significant changes in inputs 1994-1996: Teacher responsiveness up Teacher detatchment up Attatchment security up Inputs which did not change 1994-96: Overall classroom quality Behavior problems Cognitive development
NICHD Study of Early Child Care (SECC)	U.S. Department of Health and Human Services 1998	Monitors children from birth in 1991 until present. Selected healthy births to English-speaking mothers over age 18 who planned to remain in the state for one year. Families and child care facilities of every type were visited periodically. The effects of child care quality on child development analysed in many studies by the NICHD Early Child Care Research Network (ECCRN). See below.		1,300 Children English-speaking	
	Early Child Care Research Network 2000c	Regression model of cognitive development. Controls for five family and child characteristics and site dummies in addition to the type, quantity, and quality of child care.	Age 15, 24, 36 months	Same as above. T=high quality care Children in non-maternal child care at time of assessment.	Cognitive development: T>C
	Early Child Care Research Network 1998	Models behavior problems. Controls for family income, psychological adjustment of the mother, gender, child temperament, quality of home environment, character of mother-child interactions, and child's security of attachment to mother.	Age 24, 36 months	Same as above. T1=high quality care T2=stable care arrangement Children in non-maternal child care at 24 or 36 months.	Caregiver-reported behavior problems: T1<C (age 24 mo.) Mother-reported behavior problems: T1=C (age 24 mo.) Non-compliance of children in care: T2<C (age 24 mo.) Problem behavior: T1<C (age 36 mo.)
	Early Child Care Research Network 2000b	Controls for several family characteristics as well as child's cognitive development, temperament, and mother's sensitivity when analyzing peer interactions.		Same as above. T=high quality care	Peer interactions: T>C

	Early Child Care Research Network 2000a	Models the effects of child care inputs on child care quality. Regression controls for site, but not child, family, or center characteristics. Only characteristics of room, teacher, and type of child care.	Age 15, 24, 36 months	Same as above.	Inputs with significant effects on quality: Group size (age 15, 24 mo.) Staff-child ratio (age 15, 24 mo.) Caregiver education (age 24, 36 mo.) Caregiver specialized training (age 15 mo.) Caregiver experience (age 24, 36 mo.)
	Early Child Care Research Network and Duncan 2002	Controls for many home and child characteristics and estimates change score models.	Age 54 months	Same as above. T=high quality care	Cognitive functioning: T>C
National Longitudinal Survey of Youth 1979 (NLSY79)		Began with sample of 12,652 individuals age 14-21 in 1979. Data collected annually until the present. Beginning in 1986, children of sample women were given developmental assessments every other year.			
	Blau 1999	Analyzes the effect of child care inputs on child development. Controls for type of care, payment, time spent in care, and family and child characteristics. Models with and w/o family fixed effects.	variable, depends on outcome	N=2,503 to 4,031 depending on outcome	Inputs with significant effects on development: Group size (wrong sign) Generally, inputs small and not sig. Home environment large and sig.

Table 9. Summary of the History, Goals, and Provisions of Major Federal Child Care Programs

Program	**Dependent Care Tax Credit**	**Exclusion of Employer-Provided Dependent Care Expenses**	**Aid to Families with Dependent Children Child Care**	**Transitional Child Care**	**At-Risk Child Care**	**Child Care & Development Block Grant**	**Title XX Social Services Block Grant**
Acronym	DCTC	EEPDCE	AFDC-CC	TCC	ARCC	CCDBG	TXX-CC
Year Began	1954	1981	1988[c]	1988	1990	1990	1975[a]
Goal	Subsidize employment-related dependent care expenses	Subsidize employment-related dependent care expenses	Facilitate participation in the JOBS program	Help families who recently left AFDC for work maintain self-sufficiency	Help families who need child care in order to work and are at-risk of going on AFDC if child care is not provided.	Provide child care services for low-income families, and improve the overall supply and quality of child care.	Help low-income families achieve self-sufficiency; prevent child neglect.
Original Form	Tax deduction	Amounts paid or incurred by an employer for dependent care assistance provided to an employee are excluded from the employee's gross taxable earnings	Open-ended entitlement. Vouchers, contracts, or reimbursement of expenses. No fee for recipients	Same as AFDC-CC; limited to 1 year. Sliding fee for recipients.	Capped entitlement. State match required. Sliding fee for recipients. Income limits set by states.	Block grant to states. No state match. 75% of funds for direct subsidies (income<75% of SMI); 25% for quality improvement and consumer education.	Capped entitlement; population-based distribution to states.
Major Changes	1976: credit replaced deduction. 1982: subsidy rate and maximum allowable expenses raised. 1983: added to short form 1040A. 1988: Required SSN of provider.	None	1996: PRWORA consolidated AFDC-CC, TCC, ARCC, and CCDBG into a single program: the Child Care and Development Fund (CCDF).				1981: converted to block grant. 1996: States allowed to transfer up to 10% of TANF funds to TXX.
Current Form	Non-refundable Tax Credit	Same as original	Combination discretionary and entitlement block grant. States must meet maintenance of effort and matching requirements for some of the entitlement funds. States may transfer up to 30% of their Temporary Assistance for Needy Families (TANF) block grant funds into the CCDF. States may also use TANF funds directly for child care, without transferring them to CCDF.				Block grant to states that can be used for many social services; 15% of funds on average used for child care.

Current Provisions	30% tax credit on expenses up to $4,800 for 2 children for AGI ≤10K; subsidy rate falls to 20% for AGI>28K. Effective 2003, 35% credit on expenses up to $6,000 for 2 children for AGI≤15K	Up to $5000 per year excludable. Expenses excluded from gross income are not eligible for the DCTC.	Sliding fee scale, but states may waive fees for families below the poverty line. At least 4% of funds must be spent on quality-improvement and consumer education. Child care must meet state licensing and regulatory standards. Contracts or vouchers. Relative care eligible if provider lives in a separate residence.	Child care must meet state regulatory and licensing standards
Current Eligibility Criteria	Both parents (or only parent) employed.	None, other than being employed by a firm that offers this benefit.	Family income no more than 85% of SMI, but states can (and most do) impose a lower income eligibility limit. Children < 13. Parents must be in work-related activities.	States choose income eligibility. Employment required.

Source: Committee on Ways and Means (1998, 2000); Blau (2001, 2003b).

Notes:

a. Earlier provisions of the Social Security Act provided federal matching funds to the states for social services.

b. Less than two percent of the funds in the food program go to adult care centers.

c. Before explicit child care subsidies were added to the AFDC program in 1988, states could choose to disregard from earnings up to $200/month in child care expenses incurred by employed AFDC recipients in determining AFDC eligibility and benefit amounts.

Table 10. Characteristics of State Child Care and Development Fund Plans

State	Monthly Income Eligibility Level	Income Eligibility as a percent of State Median Income	Are families at or Below Poverty required to Pay a Fee?	Minimum Fee (full-time rate)	Maximum Family Fee (full-time rate)	Reimbursement Rate for Preschool Age Child[a]	Implied weekly reimbursement rate[b]
Alabama	$1,504	45%	Some	$2.00 /week	$85/week	$94/week	$94.00
Alaska	$3,694	85%	Some	3% of cost	100% of cost	$800/month	$185.00
Arizona	$1,909	58%	Some	$1.00/day + $.50 additional c.	$10/day + $5 additional c.	$20/day	$100.00
Arkansas	$1,533	60%	None	0	100% of fee	$14.40/day	$72.00
California	$2,821	75%	None	$0	$10.10 /day	$35.90/day	$287.20
Colorado	$2,139	52%	Some	$6/month	$237/month + $15 each additional c.	$18.18 /day	$90.90
Connecticut[c]	$3,264	75%	Some	No fee	$326.3 /month	$115/week	$115.00
District of Columbia	$2,326	62%	Some	$0		$23.55/day	$117.75
Delaware	$1,764	44%	None	1% of cost	46% of cost	$81.40/week	$81.40
Florida	$1,706	54%	All	$.80 /day + $.40 each additional c.	$9.60/day + $4.80 each additional c.	$102/week	$102.00
Georgia	$2,817	85%	Some	$5/week + $3 each additional c.	$52/week + $26 each additional c.	$75/week	$75.00
Hawaii	$2,874	75%	None	0	$75/month	$375/month	$86.54
Idaho	$1,706	54%	Some	1% of cost	100% of cost	$434/month	$100.15
Illinois	$1,818	45%	All	$4.33 (1 c.) $8.67/month (2 c.)	$134.32 (1 c.) $233.98/month (2 c.)	$23.75 /day	118.75
Indiana	$2,161	58%	None	$0	10% of gross income	$30/day	$150.00
Iowa	$1,793	49%	None	$0	$6/half-day	$9.50/half-day	$95.00
Kansas	$3,114	85%	Some	$0	$243 /month	$2.28/hour	91.2
Kentucky	$1,851	57%	Some	$0	$11.50 (1 c.) $12.75/day (2+ c.)	$15/day	$75.00
Louisiana	$2,420	75%	None	0	100% of cost	$15 /day	$75.00
Maine	$3,957	85%	Some	2% of income	10% of income	$130/week	$130.00
Maryland	$1,870	40%	Some	$4/month + $4 per additional c.	$161/month + $122 each additional c.	$407 /month	$93.92
Massachusetts	$3,869	85%	Some	$.20/day	$22.80/day	$29/day	$145.00
Michigan	$2,172	55%	Some	$.125/hour	$1.75/hour	$2.50 /hour	$100.00
Minnesota	$3,181	75%	Some	$0	$636/month	$44/day	$220.00
Mississippi	$2,333	85%	Some	$10.00 (1 c.) $20/ month (2 c.)	$155 (1 c.) $165/month (2 c.)	$70/week	$70.00
Missouri	$1,482	45%	Some	$1per year	$4.00 /day	$10/day	$50.00
Montana	$1,735	57%	Some	$5	$243	$16.50 /day	$82.50
Nebraska	$2,105	66%	Some	$0	$187 (1 c.) $334 /month (2 c.)	$16/day	$80.00
Nevada	$2,798	75%	Some	10% of cost of care	100% of cost of care	$100/week	$100.00
New Hampshire[c]	$1,784	49%	Some	$0	$.50/week per c. + 34% of daily cost of care	$16.70 /day	$83.50
New Jersey	$1,735	37%	All	$9.10/month + $6.80, 2nd c.	$294.90/month +$156.85, 2nd c.	$21.76/day	$108.80

New Mexico	$2,313	83%	Some	$11	$191	$346.50/month	$79.96
New York	$2,338	60%	Some	$1/week	$90/week	$30/day	$150.00
North Carolina	$2,719	75%	Some	9% of countable monthly income	9% of countable monthly income	$368/month	$84.92
North Dakota	$2,445	85%	Some	10% of cost of care	80% of cost of care	$100/week	$100.00
Ohio	$2,105	58%	All	$0	$172/month	$100/week	$100.00
Oklahoma	$1,936	62%	Some	0	100% of cost of care	$12/day	60
Oregon	$2,088	55%	Some	$25	$612	$372/month	$85.85
Pennsylvania	$2,139	57%	Some	$5.00	$65	$22.70/day	$113.50
Puerto Rico	$1,279	85%	None	$5.00 /month	$48/month	$160/month	$36.92
Rhode Island	$2,603	72%	None	0	$48	$100/week	$100.00
South Carolina	$1,446	42%	All	$3/week	$11/week	$74/week	$74.00
South Dakota	$2,140	65%	None	$10/month	20% copayment	$2.00/hour	$80.00
Tennessee	$2,027	60%	Some	$5 (1c.) $9/week (2 c.)	$35 (1 c.) $61 /week (two c.)	$77/week	$77.00
Texas	$1,735	52%	Some	9% (1 c.) 11% (2+ c.) of gross monthly income	9% (1 c.) 11% (2+ c.) of gross monthly income	$20.09/day	$100.45
Utah	$1,794	56%	Some	$10 (1 c.) $15 (2 c.)	$255 (1 c.) $281 (2 c.)	$17.19/day	$85.95
Vermont	$2,586	83%	None	$0	$17.03/day	$18.92 /day	$94.60
Virginia	$3,394	85%	Some	10% of gross monthly income	10% of gross monthly income	$42.69/day	$213.45
Washington	$2,024	54%	Some	$10.00	$407	$23.41/day	$117.05
West Virginia	$1,735	60%	Some	$0	$3.75 (1 c.) $4.50 (2 c.)	$17 /day	$85.00
Wisconsin	$1,909		All	$5 (1 c.) $9/week (2 c.)	$63 (1 c.) $78 /week (2 c.)	$5.10 /hour	$204.00
Wyoming	$1,539	45%	All	$.05 per hour per c.	$.50 per hour per c.	$2.14/hour	$85.60

Notes: c. stands for “child” or “children.”

a. In most states reimbursement rates vary by location. b. Figures in the last column are calculated from figures in the next-to-last column, assuming 8 hours of care per day, 5 days per week, and 4 and 1/3 weeks per month.

c. Connecticut and new Hampshire did not report information, so figures for these states are from an earlier report. Source: Administration for Children and Families (2001b).

Table 11. Federal and State Expenditures and Children Served by Major Child Care Subsidy Programs

	DCTC	EEPDCE	TXX-CC	CCDF
	Federal + State Expenditures (billions of current dollars)			
FY1999	2.675	0.995	0.285	9.132
FY1998	2.649	0.91		6.399
FY1997	2.464	0.862	0.37	4.369
FY1996	2.663	0.823	0.352	
FY1995	2.518	0.792	0.414	3.1
	Children Served (millions)			
FY1999	6.182			1.76
FY1998	6.12			1.515
FY1997	5.796			1.248
FY1996	6.003			
FY1995	5.964			1.445

Notes: See Table 9 for definition of the program acronyms. Expenditures are given in current dollars to facilitate checking with the original sources. To convert expenditures to 2001 dollars using the Consumer Price Index, multiply dollar figures for 1995-2000 by 1.162, 1.129, 1.103, 1.0865, 1.063, and 1.028, respectively.

Sources:

Dependent Care Tax Credit (DCTC): Committee on Ways and Means (2000, p. 816), except 1999: Internal Revenue Service (2001). Figures in the lower panel are number of returns filed claiming the credit, not the number of children.

EEPDCE : Office of Management and Budget, Budget of the United States Government Fiscal Year 1997. These figures are for the calendar year. The method used to compute them is unclear, and in budget statements for subsequent years they are different. They are also different in the Joint Committee on Taxation, JCS-13-99. These are probably the least reliable figures in the table.

Title XX Child Care (TXX-CC): Committee on Ways and Means (2000, p. 600, 634): 15% of $1.9 billion for 1999;13% of $1.775 billion for 2000; Committee on Ways and Means (1998, pp. 714, 720): 14.8 percent of $2.800, $2.381, $2.500 for FY95, 96, 97.

Child Care and Development Fund (CCDF): Expenditure:1997-1999: We computed expenditure figures by summing all federal and state expenditures on the CCDF, either directly or through transfers to TANF, using data from the Annual TANF Reports to Congress (U.S. Department of Health and Human Services, various years) and reports from the Administration for Children and Families (various years). The latter source provides allocations to the CCDF for FY2000 and 2001, but there are no data available on transfers from TANF for these years. Transfers to TANF constituted about half of CCDF spending in FY1999. 1995: U.S. General Accounting Office (1998, p. 4): total funding for the four programs later consolidated in to the CCDF: AFDC-CC, TCC, ARCC, CCDBG. Children served: 1999: Administration for Children and Families (2000); 1998: Administration for Children and Families (2001a); 1997: Administration for Children and Families (1998); 1995: Administration for Children and Families (1995).

Table 12. Incidence of Child Care Subsidy Receipt and Characteristics of Recipients, 1999

A. Incidence

Annual Household Income ($000)	Proportion with Subsidy
All	0.021
0-4.999	0.04
5.0-9.999	0.053
10-14.999	0.042
15-19.999	0.029
20-24.999	0.033
25-29.999	0.025
30-34.999	0.029
35-39.999	0.013
40+	0.009
Public assistance status	
Receives PA	0.112
does not receive PA	0.022
Sample size	15,747

B. Characteristics of Households with Annual Income < 25,000

	Receives public assistance		Does not receive public assistance	
	Subsidy	No subsidy	Subsidy	No Subsidy
Center	0.45	0.05	0.41	0.05
Nonrelative	0.44	0.1	0.33	0.11
Other Nonparent	0.1	0.31	0.2	0.3
Pay for care	0.42	0.1	0.46	0.14
Cost/hour	2.55	1.76	2.81	3.07
Mother employed	0.61	0.28	0.79	0.49
Hours worked if >0	39	33	37	37
Wage rate	6.62	6.58	6.71	7.1
Annual earnings if >0	10,760	7,575	11,053	11,953
Educ.>12	0.45	0.18	0.52	0.32
Married, spouse present	0.12	0.12	0.35	0.51
Other adults in household	0.09	0.28	0.17	0.21
# Kids < 5	1.09	0.72	0.84	0.68
Black	0.34	0.4	0.28	0.21
Hispanic	0.23	0.29	0.17	0.24
White	0.43	0.25	0.52	0.5
	89	762	88	3,875

Source: Tabulations from the Survey of Income and Program Participation, Spring 1999.

Notes: Unit of analysis is a child. Figures are weighted by the child's sample weight. A child is coded as receiving a subsidy if the mother reports that a government agency helps pay for child care, or one of the child's arrangements is Head Start. Public assistance includes cash (TANF, General Assistance, and SSI) and food stamps. Center care includes nursery, preschool, and Head Start. Nonrelative care includes family day care homes, nannies, babysitters, and other nonrelatives except centers.

Table 13. Studies of the Effect of Child Care Subsidies on Employment

Study	Data	Population	Subsidy	Method	Identification	Effect of subsidy receipt on employment
Berger and Black (1992)	survey of single mothers in Kentucky; CPS, May 1988	single, child mean age 3.6	Title XX centers only	probit for employment before and after subsidy receipt/waitlist	Before-after sub./waitlist comparison	8.4 to 25.3 pp increase, depending on whether "waitlist effect" is included.
Blau and Tekin (2003)	NSAF, 1999	single, child<13	assistance with child care expenses from govt. agency	Two stage Least Squares Linear probability model	county dummies	32 pp increase
Gelbach (2002)	1980 U.S. Census	single, youngest child age 5	Kindergarten	2SLS LPM	eligibility for Kindergarten (quarter of birth dummies)	4-5 pp increase for both single and married mothers
Meyers, Heintze, and Wolf (2002)	Survey of California AFDC recipients in 4 counties, 1995	single, child<14	assistance with child care expenses from govt. agency under several subsidy programs	Probits for non-parental child care use & subsidy receipt. Predicted value included in probit for employment.	knowledge of child care subsidy system excluded from employment probit.	increase in prob. of subsidy receipt from 0.0 to 0.5: 52 pp increase

Table 14. Selected State Child Care Regulations

State	Day Care Centers						Family Day Care Homes	
	Infants		Four year olds		Pre-Service Education, Experience, and Training Requirement for Teachers	Number of Annual Inspections		Minimum Size for Licensing
	CSR	GS	CSR	GS			CSR	
AL	6	6	20	20		1	6	1
AK	5		10			NA	8	4
AZ	5		15			1.3	5	1
AR	6		15			3	10	6
CA	4		12		12 sem. hours ECE or rel. field	1	6	1
CO	5	10	12	24		0.5	6	2
CT	4	8	10	20		0.5	6	1
DE	4	8	15		60 hours training in ECE and 1 year experience	2	6	1
DC	4	8	10	20	9 credit hours in ECE and 1 year experience	2	5	1
FL	4		20		30 clock hours training in ECE	4	10	1
GA	6	12	18	36	10 clock hours training within 1 year after hire	2	4	3
HI	4	6	16		Bachelor's degree; 12 credits in ECE; 6 months experience.	2	6	1
ID	6		12			0.5	6	1
IL	4	12	10	20	6 credits in ECE	1.3	12	4
IN	4	8	12			1.5	12	6
IA	4		12			3	6	1
KS	3	9	12	24	12 credits ECE & 6 mo. exper.	1	3	1
KY	5	10	14	28		2	10	4
LA	6		16			2	6	1
ME	4	12	10	30		1	8	3
MD	3	6	10	20	6 semester hours in ECE	1	8	1
MA	3	7	10	20	HS voc. program in child care	1.5	6	1
MI	4		12			1.5	6	1
MN	4	8	10	20	24 college credits in ECE & 2 years experience	1	10	1
MS	5	10	16	16		3	5	6
MO	4	8	10			2.5	10	5
MT	4		10		8 hours ECE training in first year of empl.	2.3	6	3
NE	4		12			2	8	4
NV	6		13		3 hrs. ECE training in first 6 mo.	3	6	5
NH	4	12	12	24	72 hours of workshops	1.3	9	1
NJ	4	20	15	20	15 child-related college credits	1.3	5	1
NM	6		12			3	6	5
NY	4	8	8	16		1.5	6	3
NC	5	10	20	25		1	5	3
ND	4		10			3	7	4
OH	5	12	12	28		2.5	6	1
OK	4	8	15	30		3.5	7	1
OR	4	8	10	20		2	10	4
PA	4	8	10	20		2	6	4
RI	4	8	10	20	Bachelor's degree & meet standards for RI ECC	2	4	4
SC	6		18			2.5	6	1
SD	5	20	10	20		2	12	1
TN	5	10	15	20		4	7	5
TX	4	10	20	35	8 hours ECE training	1	6	1
UT	4	8	15	25		3	6	4
VT	4	8	10	20	30 hour ECE course in first 6 mo.	2	6	2
VA	4		16			2	8	6
WA	4	8	10	20		1.3	12	1
WV	4		12			0.5	6	4
WI	4	8	13	24	80 hours ECE training	2.5	8	4
WY	5		15			2	6	3

Sources: The Center for Career Development in Early Care and Education at Wheelock College, 1998; U.S. General Accounting Office (2000a); www.nccic.org/statepro.html; Joseph Hotz and Rebecca Kilburn.

Notes: Blank cell indicates no regulation. ECE = Early Childhood Education. ECC = Early Childhood Certification.. GS = Group Size. CSR = Child Staff Ratio. NA indicates the information is not available.

Table 15. Studies on the Effect of Regulations on Child Care Use

Author	Data	Design	Sample Size	Outcomes
Chipty and Witte (1997)	1990 Profile of Child Care Setting (PCS)	PCS data merged to 1990 Census and state and local regulations. Random effect probit estimation to account for unobserved market specific heterogeneity	945 market-oriented centers	Lower required child:staff ratios for preschool children reduce the probability that child care centers care for preschool children rather than school age children, and vice-versa.
Blau (2003c)	Survey of Income and Program Participation (SIPP) and Current Population Survey (CPS)	Data from SIPP merged to state-level data on child care regulation. Estimates include state fixed effects.	17,370 families with at least one preschool age child	Child care regulations are associated with lower probabilities of using regulated child care services, although no impact on price or quality of care was found.
Currie and Hotz (2001)	NLSY	NLSY data merged to state-level data on child care regulations. Multinomial logit estimation of choice of child care on state child care regulations.	44,369 quarters of child life, from 3,394 mothers and 6,290 children.	Regulations are associated with lower probabilities of using regulated child care services. Regulating education of caregivers improves child safety.
Hotz and Kilburn (1997)	National Longitudinal Survey of the High School Class of 1972 (NLS72)	NLS72 data merged to state-level data on child care regulations.		Stricter child:staff ratio and training regulations are associated with lower rates of use of non-parental child care and lower hours of care per week among users. Effects of child care regulations on labor force participation of mothers shows small negative effects, often insignificantly different from zero Tougher regulations are associated with higher family expenditure per hour of child care among families paying for care.
Hofferth and Chaplin (1998)	1990 National Child Care Survey (NCCS)	NCSS data merged to data on county and state level demographics and regulatory requirements.	1,206 children under 6 whose mothers are working, in training or in school.	Stricter child:staff ratio and training regulations are associated with lower rates of use of non-parental child care and lower hours of care per week among users. tougher regulations are associated with higher family expenditure per hour of child care among families paying for care.
Ribar (1992)	Survey of Income and Program Participation (SIPP)	SIPP data merged to data on state-level regulations.	3,738 married families with at least one child under the age of 15	no impact of a stricter child-staff ratio on hours of child care used

Chipty (1995)	1990 National Child Care Survey (NCCS)	NCSS data merged to data on county-level demographics and state-level regulatory requirements. OLS estimation of reduced forms on equilibrium price, hours and staff/child ratio for family day care and day-care centers.	family day care : 67 day-care centers: n.a.	mixed results on the effects of regulations on use of child care. stricter group size regulation in both family day care and centers raises family expenditure per hour in both settings, but a stricter child-staff ratio regulation reduces expenditure in both settings. Imposing a training requirement in a given sector is associated with lower family
Blau (1993)	Current Population Survey (CPS), March Public Use Tape for 1977-87	CPS data merged to data on state and federal child care subsidy parameters and regulations.	15,195 women between the ages of 18 and 64, consisting of 4,305 child care workers, 7,180 other workers and 3,710 nonworkers.	effects of child care regulations on labor force participation of mothers shows small negative effects, often insignificantly different from zero

Table 16. Model Early Childhood Programs with Randomized Designs[a]

Program Name[b]	Program Description	Age of Participation	Sample Size[c]	Outcomes[d]
Carolina Abecedarian (Campbell & Ramey (1994)) (Campbell et al (unpublished))	Preschoolers: full-day child care School age: parent program	Entry 6 weeks to 3 months Exit: 5 to 8 years	Initial: T=57, C=54 Age 8: T=48, C=42 Age 15: T=48, C=44 Age 21: T=53, C=51	IQ: T>C at age 12, T=C at age 15 Achievement tests: T>C at ages 8, 15, 21 Special education: T<C at age 15 Grade retention: T<C at age 15 School dropout: T<C at age 21 College attendance: T>C at age 21 Employment status: T=C at age 21 Average age first child born: T>C at age 21
Houston Parent Child Development Center (Johnson and Walker (1991))[e]	Home visits Full-day child care Center-based program for parents	Entry: 1 to 3 years Exit: 3 to 5 years	Initial: T=97, C=119 Grades 2 to 5: T=50, C=(	Achievement tests: T=C Grades: T=C Bilingual education: T<C Special education: T=C Grade retention: T=C
Infant Health and Development Project (McCarton et al (1997))[f] (Hill, Brooks-Gunn and Waldfogel (2002, in press)	Home visits Full-day child care	Entry: birth (home visits) 1 year (care) Exit: 3 years	Initial: T=377, C=608 Age 8: T=336, C=538	IQ: T>C ages 3,5,8 Behavioral problems: T<C ages 3,5; T=C age 8 Math achievement: T>C age 8 Grade retention: T=C age 8 Special education: T=C age 8 General health: T=C age 8
Milwaukee Project (Garber (1988))	Full-day child care Job and academic training for mothers	Entry: 3 to 6 months Exit: 5 years	Initial: T=20, C=20 Grade 4,8: T=17, C=18	IQ: T>C at grade 8 Achievement tests: T=C Grades: T=C Special education:T=C Grade retention: T=C
Early Training Project (Gray et al (1983))	Home visits Summer part-day preschool program	Entry: 4 to 5 years Exit: 6 years	Initial: T=44, C=21 Post High School: T=36, C=16	IQ: T=C at age 17 Achievement tests: T=C Special education:T<C, grade 12 Grade retention: T=C High school graduation: T=C
High/Scope Perry Preschool Project (Schweinhart et al (1993))[f]	Home visits Preschool program	Entry: 3 to 4 years Exit: 5 years	Initial: T=58, C=65 Age 27: T=58, C=63	IQ: T>C at ages 5,7; T=C at ages 8,14 Achievement tests: T>C at ages 9,14 High school GPA: T>C Special education:T=C, grade 12 Grade retention: T=C, grade 12 High school graduation: T>C Postsecondary education: T=C age 27 Arrests: T<C at age 27 Employment: T>C age 19, T=C age 27 Monthly earnings: T>C at age 27 Receive public assistance: T<C age 27 Teen pregnancies: T=C at age 19

Institute for Developmental Studies (Deutsch et al (1983))	Home visits Part-day preschool program Parent center school (K-3)	Entry: 4 years Exit: 9 years	Initial: T=312, C=191 Grade 7: T=63, C=34	Special education:T=C Grade retention: T=C

Notes

[a]See Barnett and Karoly et al for more detailed information about studies described in this table.

[b]Programs are grouped such that those enrolling children younger than three years old appear first, followed by those enrolling children after age three.

[c]Throughout the table, 'T' refers to treatment group and 'C' refers to control or comparison group.

[d]Outcomes listed as T>C or C>T were statistically significant at the 5% level.

[e]Most recent published document. See Barnett for description of other studies

[f]See Karoly et al. for description of earlier studies.

Table 17. Selected Studies of Large-Scale Public Early Childhood Programs

Program Name	Study Design	Age of Participation	Sample Size	Outcomes
Chicago Child-Parent Center and Expansion Program (Fuerst & Fuerst (1993))	Compared former CPC children with non-CPC children from same feeder schools	Entry: 3 to 4 years Exit: 9 years	Initial: T=684, C=304 Post High School: T=513, C=244	Achievement tests: T>C grade 2, T=C grade 8 High school graduation: T>C
Chicago Child-Parent Center and Expansion Program (Reynolds et al (2000)) (Temple et al (2000))	Compared former CPC children with similarly poor children eligible for CPC but it was not offered in neighborhood	Entry: 3 to 4 years Exit: 9 years	T=837, C=444	School dropout: T<C at age 20 High school completion: T>C at age 20 Delinquency and crime: T<C at age 17 Grade retention: T<C at age 15 Special education: T<C at age 18 Proficiency skills test: T>C at ages 14/15
ETS Longitudinal Study of Head Start (Lee et al (1990))a	Compared attenders with children who attended other or no preschools at grade 3	Entry: 4 years Exit: 5 years	T=333, C=313	Achievement tests: T>C grade 1; T=C in grades 2,3
Head Start Family and Child Experiences Survey (Zill et al (1998))	Studied gains made by Head Start children at age 4 or older	Entry: 3 to 4 years Exit: 4 to 5 years	T=1580, no control	Achievement tests: T>C Other gains cannot be compared to any control
Florida and Colorado Head Start (Oden et al (2000))	Compared attenders (at age 22 in 1988) with those who did not attend any early childhood education program and lived in the same census tract	Entry: 3 to 4 years Exit: 4 to 5 years	T=290, C=332	Achievement tests: T=C (T<C in Colorado) Elementary GPA: T=C (T>C in Florida) Middle and high school GPA: T=C Special education: T=C High school graduation: T=C (T>C for females) Postsecondary education: T=C Employed/enrolled at interview: T=C Teen parent status: T=C Use of public assistance: T=C Arrests: T=C (T<C for females) Convictions: T=C
NLSCM Head Start (Currie & Thomas (1995, 1999))	Compared difference between attended and nonattended siblings with difference between preschool and nonpreschool siblings at various grades	Entry: 3 to 5 years Exit: 5 to 6 years	T=896, C=911 Hispanic study: T=182, C=568	Achievement tests: T>C (whites only) Grade retention: T>C (whites only) Immunization rates: T>C Child height-for-age: T=C Achievement tests: T>C (hispanics only) Grade retention: T>C (hispanics only)
PSID Head Start (Garces et al (2002))	Compared Head Start participants to non participants between ages 18 and 31.	Entry: 3 to 4 years	T=583, C=3502	Grade retention: T=C High school graduation: T=C Teen pregnancy T=C Welfare T=C Arrests T<C College T>C
National Evaluation of Early Head Start (Administration on Children, Youth and Families (2002))	17 EHS sites selected to reflect program approaches and demographic characteristics of all EHS programs funded in 1995-96. Random assignment conducted within each site to compare	Entry: 0 to 1 year Exit: Age 3	Initial: T=1513, C=1488	Mental Development Index: T>C age 2, 3 Low Mental Development Index: T<C age 2, T=C age 3 Vocabulary production score: T>C age 2 Sentence complexity score: T>C age 2 Percentage combining words: T=C age 2 Vocabulary: T>C age 3

	participants with eligible non-participants.	Aggressive behavior: T<C age 2, 3 Emotional Regulation: T=C age 2, 3 Orientation/engagement: T=C age 2, 3 Engagement of parent during play: T=C age 2, T>C age 3 Negativity w/ parent during play: T=C age 2, T<C age 3 Attention to objects during play: T=C age 2, T>C age 3 Child frustration during parent-child task: T=C age 3 Engagement of parent during task: T=C age 3 Persistence during parent-child task: T=C age 3 Low vocabulary score: T<C age 3

Notes: See Barnett and Karoly et al. for more information about the studies described in this table. None of these evaluations were randomized.
T' refers to the treatment, and 'C' refers to the control or comparison group. T>C means that the difference was significant at the 5% level.
[a]Most recent published document. See Barnett for description of other studies

Table 18: State Spending on PreK Initiatives

State	Program	State Spending 1987-88	State Spending 1991-92	State Spending 1998-99
Alabama	Preschool Collaboration Project	—	—	$690,000
Alaska	Comprehensive Preschool	$197,000	—	—
	Alaska Head Start Program (State-Funded Head Start Model)	$2,700,000	$5,728,174	$5,489,951
	total	$2,897,000	$5,728,174	$5,489,951
Arizona	Early Childhood State Block Grant (PreK component)	—	$1,500,000	$10,013,423
Arkansas	Arkansas Better Chance	—	$5,000,000	$10,000,000
California*	State Preschool Program	$35,500,000	$83,335,000	$127,000,000
Colorado	Colorado Preschool Program		$3,204,000	$21,640,000
Connecticut	School Readiness and Child Care Initiative	—	—	$39,000,000
	State-Funded Head Start Model	$400,000	$400,000	$5,100,000
	total	$400,000	$400,000	$44,100,000
Delaware	Early Childhood Assistance Program (State-Funded Head Start Model)	$189,000	—	$3,600,000
District of Columbia	Public School Preschool Program	$12,200,000	$11,483,850	$14,591,000
	District-Funded Head Start Model	$1,100,000	$1,556,241	$2,570,000
	total	$13,300,000	$13,040,091	$17,161,000
Florida	PreK Early Intervention Program	$1,600,000	$69,000,000	$97,000,000
	State Migrant PreK Program	$2,900,000	$3,064,540	$3,295,172
	State-Funded Head Start Model	—	$6,000,000	—
	total	$4,500,000	$78,064,540	$100,295,172
Georgia	PreK Program for Four-Year-Olds	—	—	$217,000,000
Hawaii	Preschool Open Doors	—	n/a	$2,700,000
	State-Funded Head Start Model	$291,790	$529,700	$3,087,387
	total	$291,790	$529,700	$5,787,387
Illinois	Early Childhood Block Grant (PreK component)	$12,700,000	$71,500,000	$136,000,000
	State-Funded Head Start Model	—	$500,000	—
	total	$12,700,000	$72,000,000	$136,000,000
Iowa	Comprehensive Child Development Program ("Shared Visions")	—	$4,958,315	$7,633,087
Kansas	Four-Year-Old At-Risk Children Preschool Program	—	—	$3,000,000
	State-Funded Head Start Model	—	—	$2,500,000
	total			$5,500,000
Kentucky	Kentucky Preschool Program	$232,123	$30,595,270	$39,700,000
Louisiana	Preschool Block Grant	$1,800,000	$3,501,500	$6,650,000
Maine	Two-Year Kindergarten	$27,730	n/a	$1,300,000
	State-Funded Head Start Model	$1,900,000	$2,407,393	$2,329,000
	Early Childhood Demonstration Grants	—	$150,000	—
	total	$1,927,730	$2,557,393	$3,629,000
Maryland	Extended Elementary Education Programs (EEEP)	$3,300,000	$8,948,914	$19,263,000
Massachusetts	Community Parnerships for Children	$10,300,000	$7,500,000	$78,500,000
	State-Funded Head Start Model	$4,500,000	$6,000,000	$6,900,000
	total	$14,800,000	$13,500,000	$85,400,000
Michigan	Michigan School Readiness Program	$2,300,000	$32,917,700	$67,083,000
Minnesota	Learning Readiness	—	—	$10,300,000
	State-Funded Head Start Model	$2,000,000	$6,500,000	$18,400,000
	total	$2,000,000	$6,500,000	$28,700,000
Missouri*	Missouri Preschool Project			—
Nebraska	Early Childhood Projects	—	—	$500,000
New Hampshire	NH Head Start-State Collaboration (State-Funded Head Start Model)	—	$201,000	$230,000
New Jersey	Early Childhood Program Aid (PreK component)	$7,900,000	—	$70,000,000
	State Equalization Aid for Four-Year-Old Kindergarten	—	$9,500,000	—

	Urban PreK Pilot Program/Good Starts		—	$2,500,000	—
	State-Funded Head Start Model		—	$1,300,000	$1,400,000
		total	$7,900,000	$13,300,000	$1,400,000
New Mexico	Child Development Program		—	$145,106	$1,300,000
	State-Funded Head Start Model		—	—	$5,000,000
		total		$145,106	$6,300,000
New York	Universal PreK		—	—	$67,000,000
	Experimental PreK		$27,000,000	$47,000,000	$50,200,000
		total	$27,000,000	$47,000,000	$117,200,000
North Carolina*	Smart Start		—	—	
Ohio	Public School Preschool		$18,000	$13,386,236	$17,900,000
	State-Funded Head Start Model		—	$19,878,559	$92,562,977
		total	$18,000	$33,264,795	$110,462,977
Oklahoma	Early Childhood Four-Year-Old Program		$832,275	$2,132,120	$36,500,708
	Head Start State-Appropriated Funds (State-Funded Head Start Model)		—	—	$3,316,918
		total		$2,132,120	$39,817,626
Oregon	Oregon Head Start PreK (State-Funded Head Start Model)		$1,100,000	$8,200,000	$16,272,167
Pennsylvania*	Education Aid for Kindergarten for Four-Year-Olds		$1,700,000	n/a	$5,700,000
Rhode Island*	State-Funded Head Start Model		$365,000	$1,958,558	$1,965,000
	Early Childhood Investment Fund		—	—	—
	Legislative Allocations for Special Projects		—	$200,000	—
		total	$365,000	$2,158,558	$1,965,000
South Carolina	Early Childhood Program (Half-Day Child Development Program)		$10,900,000	$15,163,447	$22,356,688
Tennessee	Tennessee Early Childhood Education Pilot Program		—	—	$3,100,000
Texas	Public School PreK		$46,200,000	$181,000,000	$235,000,000
Vermont	Early Education Initiative		$500,000	$1,414,000	$1,315,000
Virginia	Virginia Preschool Initiative		—	—	$23,500,000
Washington	Early Childhood Education & Assistance Program		$4,700,000	$17,190,000	$28,897,592
	Head Start State Match Program (State-Funded Head Start Model)		$660,000	$530,763	$470,000
		total	$5,360,000	$17,720,763	$29,367,592
West Virginia	Public School Early Childhood Education		$258,574	$1,035,006	$6,232,702
Wisconsin	Four-Year-Old Kindergarten		$4,300,000	$5,800,000	$19,800,000
	State-Funded Head Start Model		—	$2,250,000	$4,950,000
		total	$4,300,000	$8,050,000	$24,750,000
All States		**total**	**$202,600,000**	**$697,065,392**	**$1,675,455,100**

Source: 1987-88 data from Marx and Seligson (1988).
1991-92 and 1998-99 from Children's Defense Fund (1999).

Notes: California: The data presented here is for 1997-98.

Missouri: The Missouri Preschool Project was introduced in 1998-99, but the first year of funding (estimated to be $9.2 mill.) was 1999-00.

North Carolina: Total state funding for Smart Start was $140 mill. but the program supports a range of services and it cannot be determined how much of the total was spend on preK.

Pennsylvania: The data presented for the Education Aid for Kindergarten for Four-Year Olds is for 1997-98.

Rhode Island: The Early Childhood Investment Fund provided $5.3 mill. of funding for a range early childhood-related programs including preK, but no funds were used for this purpose.

Table 19. Studies of the Effects of Self-Care on Child Outcomes

Report	Study Design	Definition of Self-Care	Age of Participation	Sample Size[a]	Outcomes[b]
Aizer (2003)	Uses OLS, family fixed effects, and IV estimation to look at self-care in the the NLSY79 Child-Mother file through 1998.	Child responds that there is not usually an adult present when they return from school.	Age 10-14	Final: 5,838 T=1,518 (self-care) C=4,320 (supervised)	Skipping school: T>C Using alcohol or drugs: T>C Stealing: T>C Hurting Someone: T>C
Galambos & Maggs (1989)[c]	No random assignment. Students answered a questionnaire to determine what category of care they were in. No discussion of methodology.	Same definition as Steinberg (1986)	6th Grade	Final: 112 T1= Unsup at friends T2= Unsup at home T3= Unsup "hanging out" C= Supervised (by parent or ASP)	Peer involvement: all T>C Problem behavior:T2, T3> T1, C (girls only) Impulse control: T2, T3< T1, C (girls only) Ability to cope: T2, T3< T1, C (girls only)
Marshall et al. (1997)	Grade 1 through 4 children recruited from 30 Boston public schools and 8 parochial schools. Data collected through face-to-face interviews and questionnaires with the parent and through observations at the child's after-school setting. OLS regression of the child's behavioral problems on the types of care.	any time spent alone or only with siblings and no adult.	1st-4th grade	Final: 181	self care negative effects for poor children
McHale et al. (2001)	a short-term longitudinal study with 2 year interval for famlilies who responded to a recruiting letter. Children's behavior evaluated and reported by the parent through home interviews. Children's time use reported by the children and collected through telephone interviews.	Time alone, or with unsupervised peers	10 and 12	Final: 198 T1=time alone T2=w peers	depression: T1>C behavior problems: T2>C
Pettit et al. (1997)	A longitudinal study of children (and families) recruited at the time of kindergarten preregistration and observed through grade 7. Data collected through telephone interviews with children (on after-school time use), mother interview (on parental monitoring) and teacher rating (on children's behavior)	time spent alone or with siblings	6th grade	Initial: 585 T1=self care in grade 1 or 3 T2=self care in grade 5	grades T1<C, T2=C achievement test scores T1<C, T2=C significant interactions T1 and poverty, behavior problems in Kindergarten.
Pettit et al. (1999)	same as Pettit et al. (1997)	Time spent unsupervised in 6th grade	7th grade	Final: 342 T1=w peers T2=alone T3=w siblings	externalizing problems T1>C, greatest effects for students with low parental monitoring and unsafe neighborhoods, T2=C, T3=C
Richardson (1989)	Eighth grade students in 169 classrooms in LA and 67 classes in San Diego filled out a survey on their supervision and substance abuse. Calculated relative risks of substance abuse for those with more than 11hrs of self care vs. those with 0 hrs of self-care (calculated the ratio of the propotion of kids in each group who abused also stratified by covariates).	More than 11 hours of self-care per week.	8th Grade	Final: 4,932 T=1,411 (self-care) C=3,521	Cigarette use: T>C Alcohol use: T>C Marijuana use: T>C

Rodman et al. (1985)	Matched kids in self-care with those in adult care by age, sex, race, family composition, and father's occupation. Well-matched on these characteristics. Only difference between groups is mother's employment and no difference in parental permission to participate. No random assign. Used child interviews, tests, and teacher surveys. T-tests for differences in means.	Children who report that they usually go home after school and either no one or only a younger sibling at is at home. Adult care children were those who reported an adult was at home.	4th & 7th Grade	Final: 96 4th Grade: T=26, C=26 7th Grade: T=22, C=22	Self-esteem inventory: T=C, 4th & 7th Personal reaction (self-control): T=C, 4th & 7th Behavior problems: T=C, 4th & 7th
Steinberg (1986)	Uses existing data set on Madison, WI school district. ANOVA and ANCOVA (controlling for age, SES, famiy structure, and mother's employment). Survey includes hypothetical peer pressure situations.	Categorization based on child's response to "where you usually go after school" and "are there adults present."	5th-9th Grade	Final: 768 T_1=177 Unsup at home T_2=85 Unsup at friend's T_3=57 Unsup "hanging out" C_1=243 Sup at home C_2=48 Sup at neighbor or relative's C_3=93 Sup at friend's C_4=82 Sup at school	Susceptibily to peer pressure: T_1=C_1 [d] all T>all C (girls) all T=all C (boys) T_1<T_2, T_3
Vandell & Corasaniti (1988)	Parents of 349 third-graders in a suburban Dallas school district filled out surveys describing type of care. Of these, 150 white students were deliberately chosen for study. Most day-care centers were proprietary. Teacher, parent, peer, and self ratings as well as standardized test scores and grades analysed with ANOVA, MANOVA, and Duncan post-hoc. Controls for parents' education and marital status.	Parents filled out survey with the 4 choices of after-school care listed along with "other." Those who reported a combination of types of care under "other" were categorized in the type of care used for the majority of days/week.	3rd Grade	Final: 150 T_1=54 (self-care) C_1=26 (center) C_2=42 (mother care) C_3=25 (other adult) White suburban.	Peer ratings: T1=C_2 Grades: T1=C_2 Standardized test scores:T1=C_2, C_1<all T & C Conduct grades: T1=C_2 Self-perception: T1=C_2 Parent ratings: T1=C_2 Teacher ratings: T1=C_2 Negative peer ratings: C_1>T_1, C_2 Academic grades: C_1<all T & C
Vandell & Ramanan (1991)	Used the NLSY79 with data from home visits of NLSY staff. ANOVA then Duncan's post hoc analyses.	Parents report "primary" after school care arrangement.	3rd-5th Grade	Final: 390 T=28 (self-care) C_1=114 (other adult) C_2=248 (mother care) Overrepresentative of single-parent and low-income.	Headstrong: T>all C (but T=C w/ family controls) Hyperactive: T> all C (but T=C w/ family controls) Anxious: T= all C Peer conflicts: T= all C Antisocial: T= all C Dependent: T= all C Harter self-rating, Cognitive: T= all C Harter self-rating, General: T= all C Digit span: T= all C Peabody Picture Vocab. Test: T= all C Peabody Indiv. Achievement Test: T= all C

[a] Throughout the table, 'T' refers to treatment group and 'C' refers to control or comparison group.

[b] Outcomes listed as T>C or C>T were statistically significant at the 5% level unless otherwise noted.

[c] In Galambos and Maggs (1991).

[d] Steinberg et al. also break the unsupervised group into children whose parents know their whereabouts and those who do not. They find some evidence that those children whose parents know their whereabouts (no matter where they go after school) are less susceptible to peer pressure.

Table 19. Studies of the Effects of Self-Care on Child Outcomes

Report	Study Design	Definition of Self-Care	Age of Participation	Sample Size[a]	Outcomes[b]
Aizer (2003)	Uses OLS, family fixed effects, and IV estimation to look at self-care in the the NLSY79 Child-Mother file through 1998.	Child responds that there is not usually an adult present when they return from school.	Age 10-14	Final: 5,838 T=1,518 (self-care) C=4,320 (supervised)	Skipping school: T>C Using alcohol or drugs: T>C Stealing: T>C Hurting Someone: T>C
Galambos & Maggs (1989)[c]	No random assignment. Students answered a questionnaire to determine what category of care they were in. No discussion of methodology.	Same definition as Steinberg (1986)	6th Grade	Final: 112 T1= Unsup at friends T2= Unsup at home T3= Unsup "hanging out" C= Supervised (by parent or ASP)	Peer involvement: all T>C Problem behavior:T2, T3> T1, C (girls only) Impulse control: T2, T3< T1, C (girls only) Ability to cope: T2, T3< T1, C (girls only)
Marshall et al. (1997)	Grade 1 through 4 children recruited from 30 Boston public schools and 8 parochial schools. Data collected through face-to-face interviews and questionnaires with the parent and through observations at the child's after-school setting. OLS regression of the child's behavioral problems on the types of care.	any time spent alone or only with siblings and no adult.	1st-4th grade	Final: 181	self care negative effects for poor children
McHale et al. (2001)	a short-term longitudinal study with 2 year interval for famlilies who responded to a recruiting letter. Children's behavior evaluated and reported by the parent through home interviews. Children's time use reported by the children and collected through telephone interviews.	Time alone, or with unsupervised peers	10 and 12	Final: 198 T1=time alone T2=w peers	depression: T1>C behavior problems: T2>C
Pettit et al. (1997)	A longitudinal study of children (and families) recruited at the time of kindergarten preregistration and observed through grade 7. Data collected through telephone interviews with children (on after-school time use), mother interview (on parental monitoring) and teacher rating (on children's behavior)	time spent alone or with siblings	6th grade	Initial: 585 T1=self care in grade 1 or 3 T2=self care in grade 5	grades T1<C, T2=C achievement test scores T1<C, T2=C significant interactions T1 and poverty, behavior problems in Kindergarten.
Pettit et al. (1999)	same as Pettit et al. (1997)	Time spent unsupervised in 6th grade	7th grade	Final: 342 T1=w peers T2=alone T3=w siblings	externalizing problems T1>C, greatest effects for students with low parental monitoring and unsafe neighborhoods, T2=C, T3=C
Richardson (1989)	Eighth grade students in 169 classrooms in LA and 67 classes in San Diego filled out a survey on their supervision and substance abuse. Calculated relative risks of substance abuse for those with more than 11hrs of self care vs. those with 0 hrs of self-care (calculated the ratio of the propotion of kids in each group who abused also stratified by covariates).	More than 11 hours of self-care per week.	8th Grade	Final: 4,932 T=1,411 (self-care) C=3,521	Cigarette use: T>C Alcohol use: T>C Marijuana use: T>C

Rodman et al. (1985)	Matched kids in self-care with those in adult care by age, sex, race, family composition, and father's occupation. Well-matched on these characteristics. Only difference between groups is mother's employment and no difference in parental permission to participate. No random assign. Used child interviews, tests, and teacher surveys. T-tests for differences in means.	Children who report that they usually go home after school and either no one or only a younger sibling at is at home. Adult care children were those who reported an adult was at home.	4th & 7th Grade	Final: 96 4th Grade: T=26, C=26 7th Grade: T=22, C=22	Self-esteem inventory: T=C, 4th & 7th Personal reaction (self-control): T=C, 4th & 7th Behavior problems: T=C, 4th & 7th
Steinberg (1986)	Uses existing data set on Madison, WI school district. ANOVA and ANCOVA (controlling for age, SES, famiy structure, and mother's employment). Survey includes hypothetical peer pressure situations.	Categorization based on child's response to "where you usually go after school" and "are there adults present."	5th-9th Grade	Final: 768 T_1=177 Unsup at home T_2=85 Unsup at friend's T_3=57 Unsup "hanging out" C_1=243 Sup at home C_2=48 Sup at neighbor or relative's C_3=93 Sup at friend's C_4=82 Sup at school	Susceptibily to peer pressure: T_1=C_1 [d] all T>all C (girls) all T=all C (boys) T_1<T_2, T_3
Vandell & Corasaniti (1988)	Parents of 349 third-graders in a suburban Dallas school district filled out surveys describing type of care. Of these, 150 white students were deliberately chosen for study. Most day-care centers were proprietary. Teacher, parent, peer, and self ratings as well as standardized test scores and grades analysed with ANOVA, MANOVA, and Duncan post-hoc. Controls for parents' education and marital status.	Parents filled out survey with the 4 choices of after-school care listed along with "other." Those who reported a combination of types of care under "other" were categorized in the type of care used for the majority of days/week.	3rd Grade	Final: 150 T_1=54 (self-care) C_1=26 (center) C_2=42 (mother care) C_3=25 (other adult) White suburban.	Peer ratings: T1=C_2 Grades: T1=C_2 Standardized test scores:T1=C_2, C_1<all T & C Conduct grades: T1=C_2 Self-perception: T1=C_2 Parent ratings: T1=C_2 Teacher ratings: T1=C_2 Negative peer ratings: C_1>T_1, C_2 Academic grades: C_1<all T & C
Vandell & Ramanan (1991)	Used the NLSY79 with data from home visits of NLSY staff. ANOVA then Duncan's post hoc analyses.	Parents report "primary" after school care arrangement.	3rd-5th Grade	Final: 390 T=28 (self-care) C_1=114 (other adult) C_2=248 (mother care) Overrepresentative of single-parent and low-income.	Headstrong: T>all C (but T=C w/ family controls) Hyperactive: T> all C (but T=C w/ family controls) Anxious: T= all C Peer conflicts: T= all C Antisocial: T= all C Dependent: T= all C Harter self-rating, Cognitive: T= all C Harter self-rating, General: T= all C Digit span: T= all C Peabody Picture Vocab. Test: T= all C Peabody Indiv. Achievement Test: T= all C

[a] Throughout the table, 'T' refers to treatment group and 'C' refers to control or comparison group.

[b] Outcomes listed as T>C or C>T were statistically significant at the 5% level unless otherwise noted.

[c] In Galambos and Maggs (1991).

[d] Steinberg et al. also break the unsupervised group into children whose parents know their whereabouts and those who do not. They find some evidence that those children whose parents know their whereabouts (no matter where they go after school) are less susceptible to peer pressure.

Table 20. Studies of the Effects of After-School Programs on Child Outcomes

Program Name	Program Description	Study Design	Age of Participation	Sample Size[a]	Outcomes[b]
Random					
Gevirtz Homework Project (Cosden et al. 2001)	Homework assistance with a credentialed teacher after school 3 to 4 days per week (no drop-in)	stratified random assignment of 4th graders to treatment and control groups, students followed from 4th-6th grades	4th-6th grade	Final: 90 T=36 C=54	No difference between treatment and control. Dosage correlated with achievement.
Howard Street Tutoring Program (Morris et al. 1990)	One-on-one adult reading tutors work with 20 low reading ability second and third graders at a public school. Operates afterschool 4 days/wk from October-May, but students attend only 2 days/wk for 50 hrs. of total tutoring over the year.	Teachers identify the lowest 50 readers in second and third grade. Then kids are ranked according to 3 reading and spelling tests. The 2 lowest scoring are paired, then the next two, etc. and one of each pair is randomly assigned to participate in the program. Study compares students in program to the control group in each of two years using the same 3 tests that were administered prior to the program. No sig differences between control and treatment group on tests at pretest. Compared mean gains for T and C using t-tests.	2nd-3rd Grade	Final: 60 T=30, C=30 Low SES urban school.	Word recognition: T=C Basal word recognition: T>C Basal passages: T>C Spelling (correct score): T>C Spelling (qualitative score): T>C
Memphis City Schools Extended-Day Tutoring Program (Ross et al. 1996)	Goal to improve students' reading in grades 1-4 with group tutoring in the after-school hours. Focus on reading, with occassional writing, computer, and test-taking skills. One hour a day, 3 days/wk.	Matched students on the basis of standardized test scores, then attitude and behavior. One student from each pair assigned to participate (supposedly randomly, although 2 outlier schools may have assigned students first, then found a match. These 2 (out of 13) had different mean test scores for T and C and were left out of the analysis. Study uses standardized test scores to evaluate students. ANCOVA and matched-pairs	Program: 1st-4th Grade Study: 2nd-4th Grade	Final: 656 T=328, C=328 Title I students	Reading test score: T>C grade 3, T=C grades 2, 4
Quantum Opportunities (Hahn, Leavitt & Aaron 1994)	After-school educational activities (250 hrs), development activities such as mentoring & peer tut. (250 hrs), community svc. activities (250 hrs) each year for 4 years. Students recieve hourly bonuses and stipends for completing each part of program.	Entering 9th gr. students whose families were on public assistance randomly selected from schools near program sites. Then randomly assigned to control or intervention. Those assigned to the program were then called and encouraged to join. Suveys conducted before and throughout the 4-year program. Final evaluation in autumn after completion.	9th-12th Grade	Initial: 250 T=125, C=125 Final: 170 T=88, C=82 All students from families receiving public assistance.	High school graduation or GED: T>C Post-secondary attendance: T>C Honors/awards: T>C Attending high school: T=C Dropout of High School: T<C Have Children: T=C (T<C at 10% level) No. of children: T<C In trouble with police in past year: T=C (T<C at 10% level) On welfare, AFDC, food stamps: T=C Do community service in past 6 mo: T>C Volunteer mentor/tutor in past 6 mo: T>C Start business or self-employed: T=C Family life is happy: T=C Hopeful about future: T>C Depressed about life: T=C

					Bothered about things: T=C Lonely: T=C Life has been a success: T>C Have future plans: T=C Need reading/math skill improvements: T=C Need training for a good job: T=C Need help finding a job: T=C Need help with alcohol/drug problem: T<C
Non-random					
The ADEPT Project (Ross et al. 1992)	Comprehensive afterschool program focusing on building positive self-esteem and providing homework assist. and activities for social and emotional growth. Kids participated in 2 hr. sessions with free play, creative dramatics, and hmwk assist. throughout the school year.	Teachers and social workers chose 60 kids at each school site who they considered to be latchkey. Families were invited to an orientation and teachers then selected 20 to participate based on "need." Those youths whose parents were not interested became the control group. Quasi-experimental. Use data from parents, teachers, and school records. ANOVA with gain scores used.	K-6th Grade	Initial: 836 T=540, C=296 T_2=self-esteem building curriculum Final: 667 T=443, C=224 Mostly low-income African-American	Self-esteem: all T<C Depression: all T=C Risk-taking: all T=C Impulsivity: all T=C Sulking: all T=C Egotism: all T<C Learning: all T=C Shyness: all T=C Acting: all T=C Pressure: T=C, T_2<C Motivation: T=C, T_2>C Frustration: T=C, T_2<C Peer interaction: T=C Standardized test scores: T=C, T_2>C
Boston After School Study (Marshall et al. 1999)	Regular afterschool programs at public and parochial schools in Boston	Grade 1 through 4 children recruited from 30 Boston public schools and 8 parochial schools. Data collected through face-to-face interviews and questionnaires with the parent and through observations at the child's after-school setting. OLS regression of the child's behavioral problems on the types of care.	1st-4th grade	Final: 181	Behavior Problems, T<C for "regular attenders"
Extended Services School Initiative (Grossman et al. 2002)	Comprehensive afterschool program seeking to promote the well being and positive development of young people in their out of school hours.	Teachers identify the lowest 50 readers	2nd-3rd Grade	Final: 60 T=regular attenders	Word recognition: T=C; skip school: T<C
Kindergarten After-School Program (Howes et al. 1987)	After-school program designed to provide a service to working parents by providing extended day care beyond the morning-only kindergarten class. Also aims to enhance socio-emotional development. Located on school grounds. Operates 5 days/wk. Children may stay until 3 or 5:30pm.	Sociometric interviews and classroom observations used to asses differences in social adjustment between participants in the after-school program and non-participants at the end of one school year. Non-random, but T and C groups had similar demographic composition. Chi-square and F tests of means.	Kindergarten	Final: 100 T=30, C=70 School admissions reflect ethnic diversity of U.S.	Identified as "friend" by peers: T>C Teacher talk to child, spontaneous: T=C Teacher talk to child, responsive: T>C Teacher talk to child, social: T=C Teacher talk to child, information: T=C Teacher talk to child, directions: T=C Teacher talk to child, praise: T=C Teacher talk to child, reprimands: T=C Child talk to teacher, spontaneous: T>C Child talk to teacher, responsive: T=C Child talk to teacher, social: T=C Child talk to teacher, information: T>C Child talk to teacher, demands: T=C

					Teacher responsiveness to child, positive: T>C Teacher responsiveness to child, negative: T=C Teacher responsiveness to child, unaware: T=C
LA's BEST (Brooks et al. 1995)	Comprehensive after-school program intended to combat obstacles to educational acheivement. Academic tutoring and instruction, cultural enrichment, recreation, computer activities, and nutrition for K-6th graders after-school until 6pm M-F in 19 of LA's poorest schools.	2-year longitudinal study of some participants in the 10 longest-running LA's BEST sites. These participants had attended program for at least 2 yrs, had complete school records, and parental permission. No random assignment. Comparison group formed from kids in same school whose parents agreed to participate. Comparison group sig. different in grades (higher), family characteristics, and ethnicity. Data collected for 1992-93 and 1993-94 school years. Compared the improvement in scores of treatment and controls.	Program: K-6th Grade Study: 5th-8th Grade	Initial: 146 T=80, C=66 Final: 123 T=69, C=58	The following outcomes did not have significance tests: GPA math: T=C Reported effort in math: T=C GPA reading: T=C Reported effort in reading: T=C GPA composition: T=C Reported effort in composition: T=C GPA social studies: T>C Reported effort in social studies: T>C GPA science: T>C Reported effort in science: T>C The following outcomes were reported as significant (or not) at the 5% level: Feel that grown-ups in afterschool life care: T=C Feel that grown-ups in afterschool life expect you to do well: T=C Feel that grown-ups in afterschool life are easy to talk to: T=C Feel that grown-ups in afterschool life are helpful: T>C Include teachers to help with a problem: T>C Include student aides for help with a problem: T>C Positive attitude toward school: T>C Felt safe during afterschool hours: T>C Educational expectations (how far you will go in school) : T>C [c]
LA's BEST (Huang et al. 2000)	Same as above.	Compares participants to schoolmates who did not participate. Followed students for five years. Broke down participants into those who attended 75% of days (high), 25-74% (med), and less than 25% (low). Control for gender, ethnic, income, and language status (English profic). Not random assignment.	2nd-5th Grade	Initial: T=4312 C=15010	Language redesignation (English profic): T>C (grades 4, 6, 8), T=C (grades 5, 7) School absence: T<C (grade 6, 7), T=C (grades 8, 9) Math acheivement test scores: T=C (but started with T<C) Felt safe after school: T>C Like school: T>C Engagement in school: T>C Educational expectations: T>C Standardized math tests: High>Low Standardized reading tests: High>Low Standardized language arts tests: High>Low School attendance: High>Low
LA's BEST (Huang et al. 2001)	Same as above.	Surveys 74 of the 76 LA's BEST sites in June 2001. Participants whose parents gave permission (27% of all participants). No control group. Students tested in	2nd-5th Grade	Initial: 3,717	Reading SAT-9: Proportion of LA's BEST students scoring above 50th National Percentile Rank (NPR) rose by 1 percentage pt.

		1998-99 and again in 1999-00.			Math SAT-9: Proportion of LA's BEST students scoring above 50th NPR rose by 3 percentage pts. Language arts SAT-9: Proportion of LA's BEST students scoring above 50th NPR rose by 5 percentage pts.
Milwaukee Public School District (Posner & Vandell 1994)	Formal ASP participants were in 8 different programs at 5 elementary schools. 21 kids attended the same on-site ASP sponsored by the district that offered academic, recreational, and remedial activities at the end of the school day. The other prgms. attended typically had a recreational focus with some optional assisted homework time. Participants in all categories had to spend at least 3 days per week in these arrangements.	Parents volunteered for the study and 216 children were selected if they participated in one of the arrangements for 3 days a week or more. Children evaluated with teacher and parent reports of behavior, the child's grades, and a standardized reading test. Not random. Chi-sq tests for selection on categorical variables lead them to control for race, mother's education, and family income. Use ANCOVA and MANCOVA. Then Fisher tests for differences between T and all C.	3rd Grade	Initial: 216 T=34 Formal ASP C_1=121 Maternal care C_2=45 Informal adult supervision C_3=15 Self-care Low income	GPA math: T>C_1, C_2 GPA reading: T>C_1, C_2 GPA other subjects: T> all C GPA conduct: T> C_1, C_2 Wisconsin 3rd grade reading test: T= all C Antisocial: T<C_2, C_3 Work habits: T> all C Peer relations: T> all C Emotional adjustment: T>C_1, C_2 Adult relations: T= all C Anxious: T= all C Dependent: T= all C Hyperactive: T= all C Time engaged in academic activities: T> all C Time engaged in enrichment: T> all C Time watching TV: T< all C Time in outdoor unorganized activities: T< all C Time in transit: T= all C Time eating: T= all C Time in indoor unorganized activities: T= all C Time with adults present: T> all C Time with peers present: T> all C Actively engaged with peers: T> all C Actively engaged with adults: T> all C Actively engaged with siblings: T< all C Academic activities with adults: T> all C
Milwaukee Public School District (Posner & Vandell 1999)	Same as above.	Followed the same children as above for 2.5 yrs. Used t-tests to contrast the outcomes of kids in formal programs with others.	3rd-5th Grade	Initial: Same as above. Final: 194 no diff. attrition T=26 Formal ASP C1=121 Maternal care C2=30 Informal adult supervision C3=17 Self-care Low income	Time on academics: T> all C (grades 3, 4), T= all C (grade 5) Time on non-sport extracurriculars: T> all C (grades 3, 4, 5) Time in outdoor unorganized activities: T< all C (grades 3, 4, 5) Time in coached sports: T= all C (grades 3, 4), T> all C (grade 5) Time in indoor structured activities: T= all C (grades 3, 4), T> all C (grade 5) Time watching TV: T< all C (grades 3, 4, 5) Time socializing: T= all C (grades 3, 4), T< all C (grade 5) Time doing chores: T< all C (grades 3, 4, 5) Time in transit: T= all C (grades 3, 4, 5) [d]

The Afterschool Corporation (TSAC) (Welsh et al. 2002)	Community-based organizations (CBOs) and other nonprofit organizations are funded by The After-School Corporation (TASC) to operate in-school after-school programs from 3:00 p.m. to 6:00 p.m. Monday through Friday throughout the public school year. TASC programs include educational enrichment through activities in language arts, science, mathematics, fine and performing arts and sports.	Compares the actual changes in academi indicators (performance on standardized tests and school attendance) of TASC participants over a three year period to projected changes for nonparticipants, derived from OLS regressions controlling for factors including prior year's test scores, and demographic and educational background. Data were collected from TASC sites.	K-8th grade	T=25,909 C=39,780	gains in math: T>C, especially for students from disadvantaged circumstances. increase in attendance T>C

[a] Throughout the table, 'T' refers to treatment group and 'C' refers to control or comparison group.

[b] Outcomes listed as T>C or C>T were statistically significant at the 5% level unless otherwise noted.

[c] All outcomes reported are based on Brooks et al.'s "method 1" which compares improvements in test scores of the treatment and control groups (as described above). "Method 2" finds stronger evidence of positive effects of LA's BEST as cited in other meta-analyses. However, method 2 simply excludes low-scoring students from the treatment group, thereby biasing the results.

[d] Posner and Vanell also report the effects that these activities had on GPA, emotional adjustment, work habits, and behavior problems in 5th grade. They find that time spent on unorganized outdoor activities is associated with worse outcomes for whites. Considering this finding in conjunction with the list of results above, suggests that formal afterschool programs may have some positive effects. On the other hand, time in non-sport extracurriculars lowers emotional adjustment among blacks, so to the extent that afterschool programs increase time spent in these types of activities, they may have detrimental effects on student outcomes.

Table 21. Studies of the Effects of Positive Youth Development Programs on Child Outcomes

Program Name	Program Description	Study Design	Age of Participation	Sample Size[a]	Outcomes[b]
Across Ages[c,d] (LoSciuto, Rajala, Townsend & Taylor 1996)	Mentoring by adults over age 55 at least 2 hours/wk, community service 1 hr/wk, 26 sessions of social problem solving, wrkshps for parents.	Random assignment of sixth grade classes in three schools to either program or control group. Used ANCOVA.	6th Grade	Initial: 729 Final: 562 no diff.	Increased positive attitudes: T>C Inc. knowledge of older people: T>C Likely to have negative reaction to drug use: T>C More community service: T>C School attendance: T>C
Big Brothers/Big Sisters (Tierney, Grossman & Resch 1995)	Mentors from the community are matched with eligible youth (typically those with only one adult involved in life). Mentors are usually required to interact with youth 9-12 hours per month for the first year.	Randomly assigned eligible youth to treatment or wait list at eight sites with large case loads across the country. Surveys were administered to parents and youth at the time of assignment and 18 months later (note: those assigned to wait list remained on it for all 18 months). Case managers also completed data collection forms throughout the study. Interestingly, 22% of youth in the treatment group were never matched, usually because the youth became ineligible or no longer wished to be matched. This is typical for the program. The treatment group represents the opportunity to be matched. Outcomes were usually based on several survey questions and established scales of peer relationships, scholastic competence, etc. Used OLS w/ covariates controlling for age, race, gender, abuse, home environment, and site. Used logit for dichotomous outcomes.	Program: Age 5-18 Study: Age 10-16	Initial: 1138 T=572, C=567 Final: 959 T=487, C=472 From single-parent households.	Likelihood of initiating drug use: T<C Likelihood of initiating alcohol use: T=C (T<C at 10%) No. of times hit someone: T<C No. of times stole something: T=C No. of times damaged property: T=C Perceived ability to complete schoolwork: T>C GPA: T=C (T>C at 10%) No. times skipped class: T<C No. of times skipped day of school: T<C Weekly hours of homework: T=C Weekly hours spent reading: T=C School value scale: T=C Overall positive parental relationship: T>C Improved parental relationships (trust): T>C Improved communication wth parent: T=C Anger/alienation in parental relationship: T=C Number of times lied to parents: T<C [e]
I Have a Dream (Kahne & Bailey 1999)	A sponsor adopts a sixth grade class and offers long-term financial, academic, and social support including afterschool programs, tutoring, summer programs, and college scholarships.	Natural experiment where participants are compared to the sixth graders of the previous year (in the same school). Study focuses on two IHAD programs in Chicago.	6th-12th Grade	Final: T=92, C=89	High school graduation: T=70.6%, C=35.5% College enrollment: T=64.7%, C=18.9% (approx) No significance tests reported.
Teen Outreach[c,d] (Allen, Philliber, Herrling & Kuperminc 1996)	45 hrs of volunteer svc. And weekly small class discussions of values, decision making, parenting, life options. Can be in-school or after.	25 schools nationwide randomly assigned to treatment or control from 1991 to 1995, but students in those schools elected to participate. Sites with more interested students than could participate held lotteries. Immediate posttests after 1-year of participation.	9th-12th Grade	Initial: T=342, C=353 Final: T=324, C=323	School failure: T<C School suspension: T<C Teen pregnancy: T<C
Woodrock Youth	Weekly classes (skills for	Classes in 4 Philadelphia schools were	Age: 6-14	Initial: 453	Self-esteem: T=C (age 6-9, age 10-14)

Development Project (LoSciuto, Freeman, Altman & Lanphear 1997)[c]	human relations), daily mentoring, peer tutoring, homework assistance, extracurricular activities, and some home visits. Also, out-of-school special events. In-school classes once a wk and an after-school prgrm.	randomly assigned to treatment or control. Different pre- and posttests given to younger children (age 6-9) and older children (age 10-14). ANCOVA to compare outcomes.	T=161, C=292 Final: 367 T=130, C=237 Age 6-9: n=170 Age 10-14: n=197 Atrit diffs in age (older attrited more) and more from T group among older and more from C for younger.	Relationship w/ and perception of students of other races: T>C (age 6-9), T=C (age 10-14) Alcohol, tobacco, or drug use in last year: T<C (age 6-9), T=C (age10-14) Alcohol, tobacco, or drug use in last month: T<C (age 6-9, age 10-14) Negative attitude toward alcohol, tobacco, and drug use: T=C (age 6-9), T<C (age10-14) (Note that paradoxically, among the older group, T had a less negative attitude toward drugs.)

[a] Throughout the table, 'T' refers to treatment group and 'C' refers to control or comparison group.

[b] Outcomes listed as T>C or C>T were statistically significant at the 5% level unless otherwise noted.

[c] in Catalano et al. (1999)

[d] in Roth et al. (1998)

[e] Other social and behavioral outcomes were also reported, such as self-confidence, social acceptance, conflict with peers, and time spent in cultural activities, but none were significantly different for the treatment and comparison groups.