Abstract Title Page
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Title: Child care subsidy use and child development: Potential causal mechanisms

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Abstract Body

Limit 5 pages single spaced.

Background / Context:

Child care subsidies help pay for child care for low-income parents who are employed or are engaged in training or other activities to foster future employment. Over 1.1 million children under age 6 use child care subsidies each year through the Child Care Development Fund (CCDF) program, costing several billion dollars annually (Committee on Ways and Means, 2008). Child care subsidies are intended to facilitate parent workforce participation by ensuring that parents can obtain child care that meets their needs, so there are few restrictions on the type of care parents may choose when using these subsidies. Indeed, the primary goal of child care subsidy programs is to improve parent workforce participation and economic stability, in contrast to other public early childhood education programs, such as Head Start and state prekindergarten, that focus primarily on child development (Adams & Rohacek, 2002; Blau, 2000). However, it is important that child care subsidies not harm children.

Furthermore, child care subsidies are used primarily by families with low income, often with a history of welfare receipt (Committee on Ways and Means, 2008; Shlay, Weinraub, Harmon, & Tran, 2004). Children in poor families are at risk of poor readiness for school and poor academic achievement in school (Duncan, Brooks-Gunn, & Klebanov, 1994; Duncan & Magnuson, 2005), so interventions such as child care subsidies that affect these children should ideally have positive effects on child development. Yet recent research on child care subsidies and child development has found a worrisome negative association between subsidy use during preschool and child development.

Herbst and Tekin (2010) used the Early Childhood Longitudinal Study – Kindergarten cohort (ECLS-K) data to study the effect of child care subsidy receipt during preschool on school readiness at kindergarten entry, and found a negative association with children's early math (d = .26) and early reading (d = .30) skills that persists until the end of kindergarten. They controlled for a number of family characteristics and included instrumental variables to account for state and local rationing of subsidies to particular family types. The authors suggest child care quality as a potential causal mechanism, but were unable to test it with the ECLS-K. Research is needed to determine whether the negative relationship between subsidies and child development is replicated in a different sample, and research is needed on the potential causal mechanisms.

Purpose / Objective / Research Question / Focus of Study:

Research using an experimental design is needed to provide firm causal evidence on the impacts of child care subsidy use on child development, and on underlying causal mechanisms since subsidies can affect child development only indirectly via changes they cause in children's early experiences. However, before costly experimental research is undertaken, it is important to identify potential causal mechanisms to include in such research. The purpose of this study is to test potential causal mechanisms to explain the negative relationship between child care subsidy use and cognitive development found in previous research (Herbst & Tekin, 2010).

This study tests the direct relationship between child care subsidy use during preschool and child developmental outcomes at kindergarten entry, and it also tests two plausible causal mechanisms that may explain the relationship between child care subsidy use during preschool and children's cognitive development at kindergarten entry. The proposed mechanisms are child care quality and the home environment, illustrated in Exhibit 1, the theoretical model for this research. In this model, child care subsidies are expected to affect family choices, including both

non-parental care arrangements and parent work and economic status. Non parental care choices have implications for children's experiences in nonparental care, or the quality of care, which can then affect child development, particularly cognitive skills at school entry. Parent work and economic status has implications for the family environment, which can also affect child development. The research base for the proposed relationships in this model is described below.

Child care subsidies are designed to affect child care choices by reducing the cost of care to families while maximizing parental choice of child care arrangements, so using a subsidy may be related to the quality of care children receive (Adams & Rohacek, 2002). Quality of care, including the educational environment in the care setting and the supportiveness of children's interactions with teachers, is important because a large body of literature finds that child care quality predicts children's cognitive and social-emotional outcomes (Belsky et al., 2007; Bryant et al., 1994; Burchinal et al., 2000; Howes et al., 1995; Howes et al., 2008; Love et al., 1996; Mashburn et al., 2008; NICHD ECCRN, 1999; NICHD ECCRN, 2002; Peisner-Feinberg et al., 2001; Phillipsen, Burchinal, Howes, & Cryer, 1997; Ruopp, Travers, Glantz, & Coelen, 1979; Shonkoff & Phillips, 2001). Several empirical studies of child care arrangements in various states have found a negative relationship between subsidy acceptance or density (percentage of children in the program who pay with subsidies) and the quality of the educational environment and teacher-child interactions (Antle, Frey, Barbee, Frey, Grisham-Brown, & Cox, 2008; Jones-Branch, Torquati, Raikes, & Edwards, 2004; Mocan, 2007; Raikes, Raikes, & Wilcox, 2005).

Child care subsidy use may affect the home environment of recipients (Huston, 2002), possibly mediating the relationship between subsidy use and child development. The home environment, including educational resources and maternal sensitivity (i.e. positivity and supportiveness of interactions with the child), plays a major role in shaping children's cognitive and social-emotional development (Belsky et al., 2007; Bradley, Corwyn, Burchinal, McAdoo, & Coll, 2001; Chase-Lansdale & Pittman, 2002; Hungerford & Cox, 2006; McLloyd, 1998; NICHD ECCRN, 2002; Raver, Gershoff, & Aber, 2007; Yeung, Linver, & Brooks-Gunn, 2002). Research on child care subsidy use has not studied any direct effect on parenting or children's experiences within the family. However, child care subsidies are linked to increased parent employment (Blau, 2000; Brooks et al., 2002; Ficano et al., 2006; Joo, 2008; Lemke et al., 2000; Schaefer et al., 2006; Tekin, 2007), potentially influencing many dimensions of the home environment such as parent stress, sensitivity with the child, and home educational resources.

Research Questions

1. What is the relationship between child care subsidy use during preschool and children's cognitive skills at kindergarten entry?
2. What is the relationship between child care subsidy use and child care quality?
3. Does child care quality mediate the negative relationship between child care subsidy use during preschool and children's cognitive skills at kindergarten entry?
4. What is the relationship between child care subsidy use and the home environment?
5. Does the home environment mediate the negative relationship between child care subsidy use during preschool and children's cognitive skills at kindergarten entry?

Setting:

This paper involves secondary data analysis of the Early Childhood Longitudinal Study – Birth cohort (ECLS-B), a nationally representative survey of early childhood experiences and outcomes that is collected and made available by the U.S. Department of Education, National Center for Education Statistics (NCES).

Population / Participants / Subjects:

The ECLS-B is a longitudinal study that collects data on child characteristics, experiences, and development from birth to school entry. The ECLS-B randomly selected 14,000 children born in 2001 in the United States, producing a nationally representative sample. The sample was drawn from birth certificates using stratification to ensure adequate sample sizes of children from different racial and ethnic backgrounds, and also of twins and children with low birth weights. The sample includes children from diverse socio-economic backgrounds.
The ECLS-B study includes four rounds of data collection, at roughly 9 months of age (2001-2002), 2 years of age (2003-2004), preschool age (about age 4, 2005-2006), and in kindergarten (at about age 5, either in 2006 or in 2007), plus information from the child's birth certificate. Of the 14,000 children randomly selected for study participation, approximately 10,700[2] participated in the first round of data collection at 9 months, forming the baseline sample. Budget constraints restricted the kindergarten wave to an 85% subsample of preschool respondents, resulting in a kindergarten wave sample of approximately 7,000 children.

Intervention / Program / Practice:

Child care subsidies help defray the costs of child care for low-income, employed parents by providing payments for non-parental care arrangements selected by the family. Child care subsidy programs are operated by states through the federal Child Care Development Fund (CCDF) program, and regulations such as income eligibility and generosity of the subsidy amount vary by state in compliance with federal law. States may offer subsidies to families earning up to 85 percent of the state median income, but most states set income eligibility rates lower (NCCIC, 2006). Child care subsidies are not an entitlement for eligible families, so access to subsidies is dependent on the availability of funds and eligible applicants may be denied. Subsidies typically are delivered as vouchers that parents can use to purchase early care and education arrangements of their choice, but they are sometimes provided as cash or through direct payments to providers (Committee on Ways and Means, 2008).

Federal law does not impose any requirements for safety provisions, caregiver qualifications, or other provider characteristics, and prohibits states from imposing quality standards that would be stringent enough to inhibit freedom of provider choice for subsidy recipients. As a result, quality standards for CCDF providers are minimal in most states. Parents may use child care subsidies for a wide range of child care types, including formal center-based programs, semi-formal family child care providers, and informal care by relatives or babysitters.

Child care subsidies may be used for child care or after-school care for children from birth up to age 13, but approximately two-thirds of subsidies are used for preschool-aged children (Committee on Ways and Means, 2008). This study focuses on subsidy use just before school entry, when children are approximately age 4.

Research Design:

This study involves secondary data analysis using the ECLS-B, a restricted-use data set made available by NCES to licensed researchers. The study uses methods that control for various forms of bias found in correlational research, described in the analysis and discussion sections.

[2] Due to ECLS-B data security requirements, all information about numbers of children must be rounded to the nearest 50. This number and all others reported in this abstract will be rounded up or down accordingly.

Data Collection and Analysis:

The ECLS-B data collection was conducted by NCES. The extensive information collected about children in the ECLS-B is categorized into direct child assessments, observations of parent-child interactions, primary parent (usually mother) interview data, resident and/or non-resident father interview data, early care and education provider interview data, direct observations of early care and education quality, and kindergarten teacher interview data. The study used trained assessors to collect child assessment data, and primary parent interview data were collected in person in the child's home during all study waves. Trained interviewers conducted telephone interviews with early care and education providers during the age 2 and preschool waves, and a subset of providers were visited in person by trained observers for the quality observation data. Fathers and kindergarten teachers completed self-administered surveys.

The ECLS-B is an ideal data set for this analysis because of the large amount of detailed data it collects on early childhood experiences and development. The outcome measures at kindergarten entry are IRT scale scores of children's early reading and math skills, constructed by NCES using items from several widely used cognitive assessment tools. We measure child care subsidy use as an affirmative response to a parent survey question on whether they get help paying for child care from a social service agency or welfare office. Child care subsidy use was measured using very similar questions in other large-scale surveys (such as the Early Childhood Longitudinal Study – Kindergarten cohort and the Survey of Income and Program Participation), and other researchers have used this question as an indicator of subsidy receipt (Blau and Tekin, 2007; Herbst, 2008; Herbst & Tekin, 2010; Tekin, 2007). Child care quality and the home environment are both measured through direct observation and survey questions. The data set also includes extensive information on child and family characteristics, and has measures of child development prior to the preschool year in which subsidy use is measured for this study.

Analysis for research question 1 have been conducted to test the direct relationship between child care subsidy use during preschool (approximately age 4) and children's cognitive skills at kindergarten entry (see Griffen, Hawkinson, Maynard, & Dong, 2010; Hawkinson, Griffen, Maynard, & Dong, manuscript in preparation), using two methods to reduce selection bias due to the non-experimental research design: regression with controls for pretest scores and child and family characteristics, and propensity score analysis. Analysis of potential causal mechanisms includes regression controlling for pretest scores for research questions 2 and 4, and mediation analysis with structural equation modeling (SEM) for research questions 3 and 5.

Findings / Results:

The preliminary research for this study tested the relationship between child care subsidy use during preschool (approximately age 4) and children's early reading and math skills at kindergarten entry. For these analyses, the sample was restricted to families under 185% poverty, since that roughly corresponds with the population of children who are eligible for child care subsidies. There was no significant difference between pretest scores of children in this group who did and did not receive a child care subsidy during preschool. Controlling for children's cognitive scores prior to preschool as well as demographic and socioeconomic characteristics, there is a statistically significant *negative* relationship between child care subsidy use and children's math scores ($d = .14$) and reading scores ($d = .16$) at kindergarten entry (Hawkinson et al., manuscript in preparation). Effect sizes of this magnitude are moderate in the context of research on early childhood interventions (Camilli, Vargas, Ryan, & Barnett, 2010). Although

they are smaller than the Herbst and Tekin (2010) findings perhaps due to methodological differences, they are also in a negative direction, and sizeable enough to be worrisome.

Analyses are now underway testing the potential causal mechanisms that may explain the negative associations between child care subsidy use and child development, and will be completed this winter.

Conclusions:

Child care subsidies serve an important purpose for low income families, facilitating workforce participation by offsetting the cost of child care – a major barrier to work for low-income families. Furthermore, a sizeable body of empirical research finds that use of child care subsidies has positive effects on parent workforce participation and on family economic outcomes, both by increasing income and by offsetting the cost of child care (Blau, 2000; Brooks, Risler, Hamilton, & Nackerud, 2002; Crawford, 2006; Ficano, Gennetian, & Morris, 2006; Forry, 2009; Joo, 2008; Lemke, Witte, Queralt, & Witt, 2000; Schaefer, Kreader, & Collins, 2006; Tekin, 2007). Child care subsidies are a critical support for moving poor parents into the workforce, so research suggesting a negative effect of subsidy use on child development does not mean that child care subsidies are wholly bad or should be abandoned. Rather, research on the pathways through which subsidy use may affect children can help policymakers identify ways in which they might adapt child care subsidy policy to continue fostering workforce participation while also meeting the developmental needs of children. For example, if the educational environment of the child care setting proves to be an important link between subsidy use and cognitive outcomes, it may be that providers who accept child care subsidies need more guidance on incorporating educational experiences into child care. More specific recommendations will be possible when analysis of the mechanisms is completed.

This secondary data analysis study is subject to internal validity limitations, particularly concerns about selection bias. Although the comparison groups in this research are assumed to be non-equivalent because random assignment was not used, the equivalence on the pretest measure of child cognitive scores that is included in the regression analyses substantially reduces the threat of selection bias in analysis of the kindergarten cognitive scores, as well as other threats to validity such as maturation and testing bias (Cambell & Stanley, 1963; Shadish, Cook, & Campbell, 2002), and may also reduce selection bias in combination with controls for child and family characteristics in analyses of the relationship between subsidy use and child care quality and the home environment. Structural equation modeling allows testing of a causal mediation model, but in the case of a non-experimental research design (such as that used here), the internal validity of SEM is subject to specification error threats, especially omitted relevant variables (Shadish et al., 2002). This study attempts to minimize this threat by using a carefully constructed theoretical model based on rigorous research on the model components. Still, firm causal evidence on the impacts of child care subsidies on child development, and on the underlying causal mechanisms, can only be provided by a randomized controlled trial, the "gold standard" of research designs for causal inference.

Appendices

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Appendix A. References

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Appendix B. Tables and Figures

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Exhibit 1. Theoretical Model