A Mixed Methods Study of Maryland's Monetary Incentives to Improve the Quality of Child Care Centers

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Abstract: This research used a sequential explanatory equal status mixed method design to investigate whether Maryland’s child care tiered reimbursement system incentivized child care centers to be rated at least 3 (and receive an incentive payment) on Maryland’s 5-level Quality Rating and Improvement System (QRIS). The first stage of research consisted of multilevel logistic regressions to determine the association between centers’ reliance on child care subsidy payments and whether the center was rated at least level 3. Reliance on subsidy payments was defined as the percentage of licensed slots filled by children receiving a child care subsidy. State administrative data on 1,003 centers that received a subsidy payment in January 2018 was combined with demographic data from the U.S. Census. The second stage of research consisted of 14 interviews with center directors to understand how they made decisions about which QRIS rating to attain and how tiered reimbursements factored into their decisions. Results from the quantitative research showed that a greater subsidy density was associated with a greater likelihood of a center being rated 3 and receiving an incentive payment. However, results from the qualitative research showed that few center directors reported that tiered payments factored into their decision on what QRIS level to reach and none of the directors were singularly motivated by the incentives. Rather, directors reported being intrinsically motivated to improve QRIS ratings or motivated by technical assistance providers. Additionally, directors who did not attain a level 3 rating experienced capacity challenges to reaching level 3. Policy implications are discussed.
Introduction

High-quality early care and education programs, particularly preschool, can improve children’s school readiness, especially for disadvantaged children (Karoly & Auger, 2016; Phillips et al., 2017). However, not all early care and education programs are high-quality, nor are all programs equally effective (Phillips et al., 2017). In fact, low-income children receiving child care subsidies funded by the federal Child Care Development Fund (CCDF) are often served by low-quality providers (Jones-Branch, Torquati, Raikes, & Pope Edwards, 2004; Raikes, Raikes, & Wilcox, 2005). Two ways that states can incentivize child care centers to improve their quality are the supports available through participation in states’ Quality Rating and Improvement Systems (QRIS) and tiered child care subsidy reimbursements. QRIS are state-run rating systems designed to assess, improve, and communicate the quality of early care and education providers. Tiered reimbursement systems are state-run systems that provide higher child care subsidies to higher quality providers, often based on reaching particular rating levels on their state’s QRIS. Across the states, tiered reimbursement rates vary by the age of the child, the type of program, and the program’s rating. Thirty-nine states have at least one QRIS (QRIS Compendium, 2017) and 38 states have a tiered reimbursement system (Schulman & Blank, 2016).

In general, incentive systems are based on the underlying assumption that people are entirely self-interested (Bowles, 2016). Even though the developers of state QRIS and tiered reimbursement systems would likely agree that the child care workforce is, at least partially, intrinsically motivated, aspects of the systems are based in this basic economic theory of self-interest. QRIS assume that child care providers will be incentivized to improve quality, in part, because parents will use the QRIS public ratings to choose higher quality providers. Tiered
reimbursement systems assume that child care center directors will respond to financial incentives by changing their behavior and improving their quality.

To understand whether tiered reimbursement systems work as economic incentive theory predicts, this research used a sequential explanatory equal status mixed method design to answer the question, *Does Maryland’s tiered reimbursement system incentivize child care centers to attain a rating on Maryland’s QRIS that results in a higher reimbursement rate?* Maryland’s QRIS (called Maryland EXCELS) has five levels, and the state provides a higher reimbursement rate to providers that reach the third level in Maryland EXCELS. The first stage of research consisted of multilevel logistic regressions to determine the association between child care centers’ reliance on subsidy payments and whether the center was rated at least level 3 in Maryland EXCELS, which would result in an incentive payment (called an EXCELS payment). To better understand whether, and how, the incentive was a factor in why a center reached EXCELS level 3, in the second stage of my research, I interviewed 14 child care center directors in five counties. Interview topics included their knowledge of the tiered reimbursement system; the EXCELS rating level they would like to meet, how they settled on that goal, and challenges to improving their EXCELS rating; and how tiered reimbursements factored into their decision.

Maryland is a good case study due to its relatively low subsidy rate, its relatively large incentive at level 3 of its QRIS, and its requirement that providers be enrolled in Maryland EXCELS to receive subsidy payments. Historically, Maryland has had relatively low subsidy reimbursement rates: in 2016 it was one of 13 states had rates that were at least 33 percent lower than the 75th percentile of market rate for 4-year-olds served in centers (CCDF guidance is to set rates at the 75th percentile of market rate) (Schulman & Blank, 2016). Specifically, Maryland set its voucher rate at the 9th percentile of market rate prices from June 2016 to June 2018 (i.e., the
rate covers 9 percent of programs; Maryland State Department of Education, 2016). With lower subsidy reimbursement rates than most states, providers in Maryland may be especially in need of the tiered payment. Like only seven other states, Maryland offers its first tiered payment at level 3 of its QRIS, as opposed to level 1 or 2. The EXCELS payments are rather large at level 3: 22 percent on top of the rate for centers serving children under age 2 and an additional 10 percent for centers serving children over age 2 (Maryland State Department of Education, 2013). Finally, Maryland is one of eight states that requires that at least some providers participate in its QRIS in order to serve children receiving child care subsidy (i.e., some of the eight states only require centers and some only require providers receiving large reimbursements participate). In Maryland, as of July 2015, all providers (including family-based providers) that serve children in its Child Care Subsidy Program (CCSP) are required to participate in its QRIS. The requirement to participate in Maryland EXCELS removes selection bias into the QRIS among providers who serve children in the CCSP. The lack of selection bias combined with the sharp incentive at level 3 makes Maryland an ideal case to study whether its tiered reimbursement incentivizes providers participating in the CCSP to reach level 3.

A validation study of Maryland EXCELS examined whether providers with higher EXCELS ratings demonstrated higher quality on a variety of observation tools, including the Classroom Assessment Scoring System (CLASS), Early Childhood Environment Rating Scale-Revised (ECERS-R), and Family Child Care Environment Rating Scale-Revised (FCCERS-R). The study found that the CLASS did not differentiate among Maryland EXCELS levels and fewer than half of the ERS subscales differentiated among Maryland EXCELS levels (Swanson et al., 2017). Maryland’s validation study did not assess the association between rating levels and child outcomes, though validation studies of other states’ QRIS generally found that higher QRIS
ratings were not associated with developmental gains for children (Karoly, 2014; Tout et al., 2017).

I assumed that the goal of the Maryland’s tiered child care reimbursement system is to improve the subsidized quality of care in Maryland as measured by EXCELS rating. That is, whether or not the care in a level 3 provider is demonstrably better than care in a level 2 provider, Maryland’s tiered reimbursement system provides an incentive for a level 2 provider to improve to a level 3. Therefore, my research analyzed whether the incentive encouraged providers to become “higher quality” and attain a rating that resulted in a tiered reimbursement.

**Background**

**Quality Rating and Improvement Systems**

In the late 1990s, states began to incentivize child care programs funded through the CCDF to improve quality through the use of tiered reimbursement payments that typically paid higher rates for accredited programs. States realized how difficult it was for programs to become accredited by national accreditation bodies, and states developed QRIS to help programs improve in manageable steps. In 1997, one state had a QRIS and 16 states had a QRIS 10 year later (National Center on Early Childhood Quality Assurance, 2017).

Low-quality child care programs could remain open for a number of reasons, including well-meaning programs not knowing how to improve their services and parents’ inability to discern a low-quality program from a high-quality program. The former possibility is a challenge to the “supply” of the child care market functioning properly: some child care centers would improve the quality of their child care program if they had assistance to do so. The latter possibility is a challenge to the “demand” of the child care market functioning properly: parents do not have the information necessary to seek and demand high-quality child care. QRIS are
accountability systems designed to improve the quality of child care by defining quality standards, providing incentives and supports for program improvement, and making quality transparent to providers and parents. Zellman and Perlman (2008) developed a logic model that emphasized the market-based aspects of the QRIS system: Inputs and initial outcomes include programs being assessed and developing improvement plans, initial and intermediate outcomes include parents learning about and using ratings, and longer-term outcomes include improving formerly low-quality programs and closing persistently low-quality programs that become undersubscribed. Research on QRIS has found that QRIS improved the quality of care and program quality increased over time. As mentioned above, higher QRIS ratings, generally, were not associated with developmental gains for children (Karoly, 2014; Tout et al., 2017).

Quality of care (e.g., curriculum, learning activities) matters to parents, but parents often do not know how to identify a high-quality program (Cryer and Burchinal, 1997). While QRIS can aid parents in identifying high-quality care, parents also value other factors when making their choice of care (Corcoran & Steinley, 2019; Kim & Fram, 2009; Mamedova & Redford, 2015; Tout et al., 2011). Parents often rely on friends and family as their primary source of information about programs (National Survey of Early Care and Education Project Team, 2014), with only 27 percent of parents reporting that ratings on a website were “very important” when selecting a care arrangement (Corcoran & Steinley, 2019). Recently, Bassok, Dee, & Latham (2017) found that parents were less willing to enroll children with providers that had a lower QRIS rating. In sum, while there is recent research that parents might be using QRIS to make care decisions, it is likely that the “demand” side of the QRIS theory is not functioning as theory predicts, adding urgency to the need to study the “supply” side of QRIS theory, including tiered reimbursement systems.
**Tiered Child Care Reimbursement Systems**

Despite researchers noting the importance of studying the relationship between a state’s tiered reimbursement system and the ratings of the providers caring for children receiving subsidies (e.g., Adams, Snyder, & Tout, 2003; Blau, 2007; Forry, Daneri, & Howarth, 2013; Rigby et al., 2007), there is little published research analyzing this question. Greenberg et al. (2018) examined whether state subsidy payment rates and provider-friendly policies (i.e., those that increased the level and stability of funding and reduced administrative costs) were associated with center’s having a “quality rating.” Two of the policies analyzed were each state’s use of a tiered reimbursement system and the differences between reimbursement rates in the lowest and highest tiers. Quality rating was measured by a question on the 2012 National Survey of Early Care and Education that asked center directors, “Does your organization have an overall quality rating (for example, accreditation, tiered reimbursement or some other quality rating system?” (Office of Planning, Research & Evaluation, 2011). The authors found that a $100 difference between monthly payments in the lowest and highest tiers of a tiered reimbursement system was associated with 63 percent higher likelihood of centers earning a quality rating. Cannon et al. (2017) recommended that states adequately invest in tiered reimbursement systems to ensure that the incremental reimbursement tied to each rating level covers the cost of higher quality care. Given the dearth of research on tiered reimbursement systems, states would also need to invest in evaluations to understand whether their tiered reimbursement system is appropriately funded. If the tiered reimbursements are too small, it may not be cost-effective for most providers to improve quality, as provider high-quality care is costly.

In 2000, before it was common for states to have tiered reimbursement systems, 18 states (not Maryland) offered higher child care subsidy reimbursement rates for child care providers
that were nationally accredited. The rate differential ranged from an additional 5 to 20 percent of the base subsidy rate across states. A study that examined data from child care centers in 10 states that applied for accreditation from the National Association for the Education of Young Children (NAEYC) found mixed results (positive or null) for whether the introduction of the differential reimbursement rates resulted in an increase in the number of centers applying for accreditation. The authors note that many of the states offered workshops and on-site support to help with the accreditation process (Gormley and Lucas, 2000). Another study that included interviews with a small sample of providers indicated that the cost of advancing in a tiered reimbursement system may not be worth the extra payment (Adams et al., 2003).

Incentive Systems

In general, incentive systems have been found to improve the measured performance (Cameron, Banko, & Pierce, 2001; Shaw & Gupta, 2015; Strechter et al., 2010) and to not hurt intrinsic motivation (Cameron, Banko, & Pierce, 2001; Shaw & Gupta, 2015). In addition, Cameron, Banko, and Pierce (2001) found that when rewards are offered for meeting or surpassing a score on a task of high interest, there was a positive effect on task interest. The authors hypothesized that, “one possible explanation for the positive effect of this type of reward contingency is that rewards signify competence, self-efficacy, or ability at the task, and people enjoy doing activities that reflect their competence” (p. 23).

James (2005) produced a principal-agent model that showed that if incentives from the principal to the agent for a given behavior are seen as “controlling,” the agent’s intrinsic motivation could be crowded out by the incentive. James’ model demonstrated two conditions under which an incentive system could be seen as “controlling” and potentially crowd out intrinsic behavior: (1) incentives are large or (2) the intrinsic motivation is also the source of the
incentive (e.g., a child care provider is intrinsically motivated to act in the interest of the state, and the state then introduces incentives). The model also showed that the higher one’s intrinsic motivation, the harder it is for an incentive system to crowd out one’s intrinsic motivation.

Applying James’ theory to Maryland’s tiered reimbursement system, it is unlikely that child care providers are motivated to provide child care because of the state’s interest and the EXCELS payments are not unreasonably large. In fact, a random sample of teachers (not directors) in child care centers in four midwestern states found that they identified with their work as a “personal calling” (Torquati, Raikes, & Huddleston-Casas, 2007, p. 266), indicating that it is unlikely that providers’ intrinsic motivation to provide quality care would be crowded out by the tiered reimbursement system. Further, if directors want to be viewed as competent, highly-skilled child care providers, the tiered reimbursement system gives the opportunity to be viewed as such.

A specific type of performance-based incentive system that has similarities to QRIS is a health care incentive system. A review of 17 studies published through 2005 found that the majority of the studies found partial or positive effects of financial incentives on measures of health care quality (Petersoe et al., 2006). Similarly, a Cochrane Collaboration systematic review found that financial incentives generally improved aspects of care, but there was little evidence for improved patient outcomes (Flodgren et al., 2011). After reviewing the evidence on incentives and describing new incentives under the Affordable Care Act, Doran, Maurer, and Ryan (2017) noted that it is crucial to continue improving the design of incentive programs.

Additionally, there is evidence that consumers choose health plans based on quality ratings without incentives. For example, a study of ratings disseminated by the National Committee for Quality Assurance to employees choosing a health plan found that the ratings had a meaningful influence on employees’ choices, particularly for individuals choosing a plan for a
first time (Jin & Sorensen, 2005). Similarly, a study of HMO report cards in 1999 and 2000 for 40 million Medicare enrollees found that consumers used both the report cards and market-based sources when choosing an HMO (Dafny & Dranove, 2008).

**Key Features of Maryland EXCELS and Maryland’s Tiered Reimbursement System**

Between 2009 and 2011, the Maryland State Department of Education’s (MSDE) Division of Early Childhood Development worked with experts to develop Maryland EXCELS, a QRIS for family child care providers and child care centers. Maryland EXCELS contains standards that cover five core “disciplines”: Licensing and Compliance (3 standards), Staff Qualifications and Professional Development (1 standard), Accreditation and Rating Scales (3 standards), Developmentally Appropriate Learning and Practice (9 standards [only 6 standards for school-age only centers]), and Administrative Policies and Practices (15 standards) (Maryland EXCELS, n.d.). Requirements to meet each standard increase for each of the five EXCELS levels. A provider’s ratings on each of the five disciplines are available to the public on the Maryland EXCELS website, though a program’s overall rating is equal to the lowest of its individual ratings.

Beginning on July 1, 2015, programs needed to be enrolled in Maryland EXCELS in order to receive a CCSP reimbursement for child care services. Maryland EXCELS went “live” on July 1, 2013, and MSDE and its partners had two years to ensure that all providers that received CCSP reimbursements—or who may want to receive them in the future—were enrolled in Maryland EXCELS before the new requirement went into effect on July 1, 2015. Once enrolled in Maryland EXCELS, programs have one year to meet all level 1 standards in each discipline (which requires uploading documents to a secure website) and “publish” their quality rating on the public EXCELS website.
MSDE supports three types of technical assistance to providers to improve the quality of care and meet EXCELS standards: Program Coordinators, Quality Assurance Specialists (QAS), and Technical Assistance Specialists employed by regional Child Care Resource Centers (CCRCs). Program Coordinators help programs navigate the EXCELS website, review all materials submitted to meet a certain standard, verify or ask for additional information, and provide a rating based on submitted material (Maryland State Department of Education, 2017). QAS provide training on how, specifically, programs can meet EXCELS standards. QAS provide this training through monthly workgroups and one-on-one telephone or in-person support. Technical Assistance Specialists employed by the CCRCs provide one-on-one technical assistance to help programs use research-based practices that will improve the quality of child care. QAS and CCRC staff try to coordinate technical assistance to have the CCRC technical assistance providers focus on improving quality and the QAS focus on how to document that quality to meet EXCELS standards.

Another role of a QAS is to conduct scheduled monitoring visits to programs participating in EXCELS to assess whether the provider is meeting EXCELS standards for 10 observable standards. A QAS outside of the provider’s region uses the provider’s uploaded materials and observes whether the policies are being implemented as stated. Monitoring visits do not lower a provider’s rating. Rather, the regional QAS assigned to the program uses the monitoring report to create an improvement plan to increase quality. Monitoring visits started in 2017 with QAS monitoring 25 programs (chosen at random) every other month, increasing to 45 programs per cycle the following year.

MSDE’s marketing and outreach campaign to make parents aware of EXCELS has included staffing information booths at county fairs, preschool fairs, and health expos; partnering
with the Baltimore Orioles and minor league baseball teams; advertising on billboards, buses, and radio; and providing window stickers and yard signs to EXCELS participants.

In each month of fiscal year 2016 Maryland served approximately 18,500 families and 24,600 children through its CCSP, which is how Maryland administers the $88 million in federal funds it received through the CCDF (Office of Child Care, 2018; Office of Child Care, 2016). While the CCDF program encourages states to set vouchers at the 75th percentile of market rate prices, Maryland decided to serve more children with smaller vouchers and its voucher rates were set at the 9th percentile of market rate prices from June 2016 to June 2018 (Maryland State Department of Education, 2016). Beginning in July 2018, Maryland increased its payment rate to, at a minimum per subsidy payment region, the 20th percentile of market rate prices. Additionally, 2018 legislation required that the percentile of subsidy reimbursement, at minimum per subsidy payment region, reach the 30th percentile in 2020, the 45th percentile in 2021, and the 60th percentile in 2022 (Maryland State Department of Education, 2018).

Maryland has offered its tiered reimbursement to providers since 2001. Beginning on July 1, 2013, the tiered reimbursements were based on Maryland EXCELS, with child care centers that are rated level 3, 4, or 5 receiving a certain percentage of additional payment from the state (see Table 1). There are no restrictions on what a provider may do with the additional money, though MSDE encourages providers to put the money back into the program, including by offsetting the cost of child care for families receiving a subsidy, providing salary and benefits enhancements to staff, or making quality improvements to the program (Maryland State Department of Education, 2013).
Despite tiered reimbursement systems existing for two decades, there is very little research on how providers respond to the systems (Adams et al., 2003; Gormley and Lucas, 2000; Greenberg et al., 2018). My research is the first in-depth look at how a tiered reimbursement system functions in a single state and it is an important contribution to the field by determining whether a tiered reimbursement system functions as theory predicts.

**Research Design, Data Sources, and Methods**

In the first stage of my research, I conducted multilevel analyses to determine the association between centers’ reliance on CCSP payments and whether the center had an EXCELS rating of 3 or higher. In the second stage of my research, I interviewed child care center directors in five counties to understand how they made decisions about which EXCELS rating to attain, how tiered reimbursements factored into their decisions, supports they used to improve their EXCELS rating, and challenges to improving their EXCELS rating.

Leech and Onwuegbuzie (2009) define mixed methods research studies as those that collect, analyze, and interpret quantitative and qualitative data in a single study. My research is a sequential explanatory equal status design, in which I analyzed quantitative data, used the results to select the child care center directors for my qualitative data collection, analyzed the qualitative data, and, finally, interpreted all of the data together (Creswell, Plano Clark, Gutman, & Hanson, 2003). My research is an “equal status” design because I did not preference either the quantitative or qualitative stages of my study. Rather, I interpreted all of the data together to answer my research question.

**Quantitative Data and Analysis**

During the first stage of the study, I solicited data from MSDE, identified relevant census-based data, and constructed an analytic strategy for analyzing the data. I specified a
number of relevant statistical models for testing my hypothesis, including a set of models that would allow me to test the robustness of my results to different model specifications. MSDE provided me with administrative data for all centers that were licensed by MSDE’s Division of Early Childhood in January 2018. For all centers, I received data on their address, county, and year first licensed. For all centers, for each of July 2013, January and July 2014, January and July 2015, January and July 2016, January and July 2017, and January 2018, I received licensed capacity (by five age groups), EXCELS participation, overall EXCELS rating, EXCELS rating by domain, number of children using the CCSP (by under 2 and age 2 and over), subsidy payments (dollar value; by under 2 and age 2 and over), and EXCELS payments (dollar value; by under 2 and age 2 and over). Though MSDE provided me with five categories for licensed capacity, in my analyses I combined the first two (6 weeks–17 months and 18–23 months) and last three (2–5 years, 5–15 years, and 16+), to represent the age groups with different EXCELS payments. To create the covariate licensed slots/children under 5, for each zip code I totaled the number of licensed slots in the first three categories (i.e., 6 weeks–5 years, not yet in kindergarten) and divided it by the number of children under age 5 living in the zip code (from the U.S. Census Bureau’s 2016 American Community Survey (ACS)). This variable over-represented the number of slots/child, as the numerator included slots licensed for 5-year-old children still in preschool, but the denominator does not include children aged 5. I created a dummy variable for school-age only providers (i.e., before and afterschool providers), by identifying providers that were only licensed to serve children ages 5–15. I used the 2016 ACS 5-year estimates for zip code-level data on age, poverty, race/ethnicity, females 25 or older with a bachelor’s degree, females ages 20 to 64 in labor force, and unemployment rate. Urbanicity data was from the 2010 Census.
To quantitatively test my hypothesis that tiered reimbursements incentivize providers to reach EXCELS level 3, I conducted two-level logistic regressions, with child care centers (level 1) nested within counties (level 2). It is necessary to nest centers within counties to account for the unobserved county-level characteristics that affect quality outcomes (e.g., counties in Maryland have different MSDE-funded technical assistance contacts and counties have different cost-of-living-adjusted CCSP reimbursement rates). The dependent variable ($\eta_{ij}$ in the estimating equation below) is the probability that center $i$ in county $j$ had an EXCELS rating of level 3 or higher, the independent (continuous) variable ($X_1$) is a center’s subsidy density, and a host of center and location (i.e., demographic characteristics of zip codes) covariates controlled for observed differences between centers. My use of zip codes as a program’s “community” or “service area” was consistent with similar analyses by Bassok and Gaslo (2016) and Hatfield et al. (2015).

The independent variable of interest is the percentage of children a child care center serves that receive a subsidy and my analysis is restricted to programs with subsidy density greater than 0 in January 2018. As child care centers that do not receive CCSP funds are not required to participate in EXCELS, those that chose to participate in EXCELS may be quite different than centers that do not participate in EXCELS, as well as different from centers that serve children in the CCSP. Subsidy density is defined as the percentage of licensed slots filled by children in the CCSP. For most child care centers, this study’s definition of subsidy density is likely lower than if the variable could have been calculated with a denominator of enrollment. For 21 child care centers, my definition of CCSP density is over 1.0 and certainly higher than if the variable could have been calculated with a denominator of enrollment.¹ A provider could

¹ One of the robustness analyses I ran capped subsidy density at 1.0.
enroll more children than its licensed capacity if all children are not attending for five full days each week (e.g., some children may attend on Monday and Wednesday and another group of children may attend on Tuesday and Thursday). I also created subsidy density variables for January 2018 for the two age categories with differing tiered reimbursement rates: younger than 2 years and 2 years and older.

The basic model (1) is a two-level model that nests centers in counties and does not include any covariates. Model (2) includes center covariates (i.e., year first licensed, time enrolled in EXCELS, licensed capacity by age group, and a dummy for a school-age only center; $X_2$). Model (3), the main model, adds zip code covariates (i.e., licensed slots/child, under 5 poverty, race/ethnicity, females with at least a bachelor’s degree, mothers in labor force, unemployment rate, and percent rural; $X_3$) at level 1 (see Table 2). While level 2 of the model is unspecified, it does control for unobserved differences in county characteristics that might influence relationships associated with centers and zip code locations. The estimating equation for model (3) is:

Level 1: $\eta_{ij} = \beta_{0j} + \beta_{1j}X_{1ij}(Density) + \beta_{2j}X_{qij}(Provider\ Characteristics) + \beta_{3j}X_{qij}(Zip\ Code\ Characteristics)$

Level 2: $\beta_{0j} = \gamma_{00} + u_{0j}$

Model (3) addressed whether, on average, serving a higher percentage of children receiving subsidies is associated with a greater likelihood of attaining an EXCELS rating of level 3 or higher. As tiered reimbursements also vary by the age of the children served, in model (4), I replaced the subsidy density variable with variables that represent subsidy density, by the age bands with different reimbursement rates: under 2 years and 2 years and older.
I ran three robustness analyses with different key independent variables. In model (5), I capped subsidy density at 1.0, reducing the subsidy density of 21 centers (maximum of 4.455). While it is possible for a center to have a subsidy density of over 1.0, this capped independent variable will reduce the pull of outliers and may help correct for any data errors. In fact, one of the child care center directors I interviewed worked at a center that was part of a small franchise of three centers. She told me each of two locations had about 50 percent of children participating in the CCSP, but MSDE administrative data showed that one of the centers had zero children participating in the CCSP and the other center had more children in the CCSP than it was licensed to serve. In model (6), I created an average subsidy density variable that averaged subsidy density for those centers that served at least 1 child in the CCSP program in each of July 2015, January and July 2016, January and July 2017, and January 2018. Model (7) caps the average subsidy density variable at 1.0. I chose July 2015 as the earliest month because that was the month that, in order to receive CCSP payments, providers must have been enrolled in EXCELS. The dependent variable remains whether a provider is higher quality in January 2018. The draw-back to models (6) and (7) is that the sample is smaller (n=865) than models (3) and (5) (n=1,003), as only providers that served children receiving CCSP for all six time periods are included in the analyses.

All models were run using the xtlogit command, grouping at the county level, with random effects in STATA 15.1. All models were run with group-mean centered variables.

**Qualitative Data and Analysis**

During the second stage of the study, I developed a semi-structured interview protocol, identified and recruited center directors to interview, and developed an analytic strategy to analyze the interview data. The identification of center directors was informed by the
quantitative analysis I conducted in the first stage of this study. The semi-structured protocols were informed by interviews with MSDE staff and technical assistance providers.

I conducted in-person interviews in five counties in central Maryland. The economic, racial, and ethnic demographics of those counties (and the children who are eligible to be enrolled in the CCSP program) represent Maryland’s diversity. Because my quantitative analyses found that a center’s subsidy density was positively and significantly associated with the likelihood that a child care center would be high-quality, I aimed to conduct more interviews with centers that were on the higher end of the distribution for subsidy density. My original goal was to interview eight directors of centers that were not higher quality, and 10 directors of centers that were higher quality located in zip codes with various poverty levels. Additionally, centers that only served school age children were less likely to be higher quality centers; therefore, I ensured afterschool providers were included in the interview sample.

Of the initial 18 centers, two owners declined to participate and four directors were ultimately unresponsive in scheduling an interview. To replace the two centers that outright declined to participate, I recruited an additional two centers to participate, though I had to contact three centers to find two that would participate. After scheduling an interview with one center director at a franchise location, she suggested I also contact someone at the larger organization, and I ended up interviewing her, as well.

The final sample consisted of 14 interviews with three afterschool providers with multiple locations, one corporate child care provider with multiple locations, and 10 child care center directors. Of the 10 child care center directors, two were directors of individual corporate child care center locations, 4 were directors or owners in small franchises (3 or 4 locations), and 4 were directors or owners of single-location child care centers. Of the 10 child care center
directors, seven operated centers rated EXCELS level 3 or higher and three were rated EXCELS level 1 or 2. The afterschool providers and the corporate provider had individual centers that, collectively, had ratings across the EXCELS continuum, though one afterschool provider did not have any higher quality centers. Almost all of the individual centers had a subsidy density of at least 24 percent, indicating they were in the highest quartile of subsidy density in the state (Q1, 0.030; Q2, 0.083; Q3, 0.243). In contrast, across all afterschool centers, relatively few children received child care subsidy, though a few locations had high percentages of children on subsidy. Across all of the corporate provider’s locations, less than 3 percent of children receive child care subsidy (i.e., most locations were in the first quartile of subsidy density). Compared with interview participants, non-participants tended to have lower EXCELS ratings, with five of the non-participating center directors from centers rated 1 or 2 and two from centers rated 3.

I conducted the focused interviews with a semi-structured protocol and recorded interviews with consent. Four center directors did not consent to be audio recorded and I took notes during the interview and immediately typed up my notes into an electronic version of the interview protocol.

Results

Quantitative Results

Descriptive Results

In January 2018, there were 2,701 licensed child care centers 72 percent of those (1,954 centers) participated in Maryland EXCELS. Of those 1,954 centers, 1,007 centers (52 percent) received a CCSP payment in January 2018. Four of the 1,007 centers that received a CCSP payment were located in zip codes with missing census data and were dropped from further analysis. Of the 1,003 centers included in the regression analyses, 255 (25 percent) were rated
EXCELS level 3 or higher in January 2018. Subsidy density ranged from 0.003 to 4.455, with a median of 0.083.

As shown in Table 3, there are a number of differences between the characteristics of centers that received CCSP payments in January 2018 that were and were not rated EXCELS level 3 or higher. Higher quality centers had higher subsidy density, were older, had participated in EXCELS longer, had higher capacity, and were less likely to be school-age providers. Higher rated centers were located in zip codes that had higher percentages of females with a bachelor’s degree and lower unemployment rates.

**Regression Results**

Model (1) is a two-level model, with centers nested in counties, that only includes the independent variable of interest, subsidy density. Without any center or zip code characteristics, a higher CCSP density was associated with a decreased likelihood of a center being higher quality (OR=0.879) (see Table 4). However, once provider characteristics were included in model (2), a higher CCSP density was associated with a large increased likelihood of a center being rated higher quality (OR=3.488). That is, holding all center characteristics equal within counties, the odds of being a higher quality center for a center with subsidy density of 1.0 (i.e., a center that serves a number of children enrolled in the CCSP equal to the center’s licensed capacity) were about 3.5 times that of center with a subsidy density of just over 0.0 (i.e., a center that serves 1 child enrolled in the CCSP). Model (3) adds zip code characteristics to model (2) and found that a higher CCSP density was associated with an increased likelihood of a center being rated higher quality (OR=4.865). Model (3) is preferred over model (2) because it is based on theory and research that the level of disadvantage in a zip code is associated with the quality of care.
Model (4) extends model (3) by including variables for subsidy density by age band, as the two age bands have different EXCELS payment rates. Model (4) found that the subsidy density of children 2 and older was statistically significant (OR=3.454), while the subsidy density for children under 2 was not statistically significant, though the odds ratio was still greater than 1.0 (OR=1.308). Results from robustness analyses produced similar results, with odds ratios ranging from 4.501 to 6.724 when measuring subsidy density in various ways.²

**Qualitative Results**

While I intentionally interviewed directors of centers that varied by subsidy density and surrounding poverty, responses did not vary based on these characteristics. In the following results, I indicate whether respondents are child care center directors or from larger organizations and, when it seems like helpful context, the EXCELS rating of respondents. Three child care center directors—all from centers with an EXCELS rating of 3—reported their centers served especially vulnerable populations. Two centers served a relatively high number of children in foster care and a third center reached out to shelters and partnered with the county to provide child care to parents who were in training and work programs. The third center also provided almost 50 children with transportation between the child care center and a transit station, understanding that parents could not easily access the child care center. These center directors seemed to especially enjoy serving vulnerable populations, reporting that they provided diapers and winter coats to children and helped parents find food, housing, and electric assistance.

**Parents Search and Choice of Care**

Center directors did not believe EXCELS ratings (or the EXCELS website) factor into parents’ choice of child care. Two directors thought that well-educated parents were aware of

² Results available from the author upon request.
EXCELS ratings even though they did not think the rating was a factor into the decision to choose a center. Rather than using the EXCELS website to learn of centers, center directors over-whelming reported that parents learned of their centers through word-of-mouth. Word-of-mouth and personal relationships also emerged as memorable reasons for why parents chose a center. In addition to recommendations, center directors reported that parents chose their center because the center offered a safe and clean environment; had engaging, caring staff; and/or felt like a community or a home-away-from-home.

**Tiered Reimbursements**

If center directors did not believe that EXCELS ratings factored into parents search for or choice of care, then tiered reimbursement payments are the only incentive for centers to improve their QRIS rating. For EXCELS payments to act as an incentive to improve care, programs must be aware of the payments. In fact, all but one of the interviewed directors was aware of Maryland’s tiered reimbursement program, though one did not learn of it until she was almost through all of the requirements to achieve a level 3. The one center director that was not aware of the EXCELS payment was rated a level 1 in EXCELS and, during her interview, asked me what “was the point of EXCLES” and whether the EXCELS rating matters. As she had waitlists for all of her ages, the EXCELS rating appeared not to matter to her clientele, many of which participated in the CCSP.

Three interviewees reported that EXCELS payments factored into their decision on what EXCELS level to reach or how quickly to reach it, but none of the centers were singularly motivated by the EXCELS payments. One director of a center that opened in 2016 and is in the 3rd quartile of subsidy density learned of the EXCELS payments through a discussion with a QAS who used a monthly CCSP invoice to explain exactly how much additional money the center
could receive. The director remembers thinking, “Hey, let’s try to do that” and reported that the EXCELS payments were a “major motivation” to increase her EXCELS rating and within two-and-a-half years of opening, her center was rated level 3. However, the director also reported that her original goal was to become an accredited center (which would be difficult to do without reaching EXCELS level 3), indicating that the EXCELS payment may have been only part of the motivation for improving in EXCELS. A second center director in the 3rd quartile of subsidy density had recently experienced a decrease in the number of children participating in the CCSP, and she reported that she would like to achieve a level 3 to receive additional money though the EXCELS payments. However, this center has been a level 2 for over two years so it does not appear that the incentive was enough of a motivation to overcome her capacity constraints. Finally, one interviewee in a large corporate chain reported that the EXCELS payments were part of the reason the chain decided on a goal of level 3 for all of its centers, with the other reason being a level 3 was the highest a center could go without working towards accreditation. In contrast, three other interviewees specifically reported that they wanted to reach an EXCELS level 3 (or higher) to “do the right thing for children” or because of “a passion that all kids have a right to good quality child care. They didn’t get to choose what their parents’ income was going to be.”

With the exception of one provider, all directors of centers rated EXCELS level 3 or higher were appreciative of the EXCELS payments. Directors most commonly reported spending their EXCELS payments on supplies, such as toys and books. One director reported spending her EXCELS payments on staff incentives, such as staff dinners or gift cards for holiday door decorating contests. Another director spent her EXCELS payments on enrichment

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3 This one provider was affiliated with a local government, and the additional EXCELS payments were difficult for their finance office to account for.
activities with outside instructors, such as yoga or music, for which most child care centers charge parents extra money. This same director—in the third quartile of subsidy density—expressly noted that she did not use EXCELS payments on staff salaries because the payments were not a reliable source of income.

**Supports and Challenges to Improve EXCELS Rating**

QAS were instrumental in helping directors understand EXCELS standards, decide upon a goal for an EXCELS level, support directors in moving up EXCELS levels, and, ultimately, for providing a positive experience with EXCELS. All of the directors appreciated the work of QAS and their trainings, workshops, and individual support. One interviewee commented that, “The training they provided was excellent. You can read the website and read the materials, but having someone break it down as to how it benefits the associates and how it benefits the centers. Eye-opening—that aha moment—now I get it!” Another director reported that the QAS “wanted us to be successful. ‘I’m going to help you do this’—almost to the point—‘if I have to come sit at your center.’ They were very motivated to get you in.” Another director recalled that a QAS motivated her to reach for an EXCELS level 3 after she so easily and quickly met the level 1 requirements.

The majority of center directors reported that staffing requirements were a barrier to moving beyond a level 3 in EXCELS. While one director noted that her staff loves trainings and credentialing is not a challenge in moving beyond level 3 (her current level and her goal is a 5), three center directors and all three afterschool providers noted a lack of interest or passion among staff to attend trainings and increase their credential level. As one director explained, her staff do not have the same passion she had when she entered the child care field: “It’s a different generation then when I came into child care. When I came in, I had passion for it, I liked it, I said
this was my livelihood so if I had to go on the weekends, I didn't grumble about it, I went. But, this is a different generation coming in. They want their personal time.” Afterschool providers felt their challenges to securing trained staff were even greater than typical child care centers, as school-age child care requires a split shift. None of the afterschool providers expected their sites to be able to advance beyond a level 3 in EXCELS.

Five of the eight child care center directors not affiliated with large child care providers reported that the time required for EXCELS was burdensome, as did one of the center directors that was part of a national chain. The center director that was part of a national chain did not receive any assistance from the corporation for EXCELS, perhaps because her corporate coordinator only oversaw one center in Maryland and was not familiar with EXCELS. In contrast, the corporate provider and the three afterschool providers included in my interview sample all had a staff member in the central office who was responsible for uploading EXCELS documents, such as staff and parent handbooks, into the EXCELS system. For three of the large providers, the central office exclusively worked in the EXCELS system, though in one of the large providers, site directors entered site-specific information, such as staffing, into EXCELS. An owner of three centers was aware of the assistance the large corporations provide, and he noted it was much more difficult for him to find the time for EXCELS: “What I've noticed is these big daycare centers, they have hundreds of centers and they have a special team to help their centers get to a 5. They can afford that. We cannot even finish up the workload that we have here: vouchers, invoices, payments, balance sheets, complaints, child health, teachers calling out.”

Instead of relying on central staff, center directors of small franchises worked with their franchise colleagues to develop EXCELS documents, such as staff and parent handbooks, so the
documents are consistent across sites. One owner of three centers hired an administrator who devoted much of her initial time to EXCELS documentation for the three centers. Another owner of three centers recently contracted with a former credentialing specialist to assist his staff in getting their credentials. A third director who was not technologically-savy relied on a relatively young staff member to help with EXCELS and she acknowledged that if she did not have this staff member to help, she would have had to hire someone else.

**Discussion**

The results from my quantitative analyses show that serving a higher proportion of children in the CCSP was associated with an increased likelihood of reaching EXCELS level 3 and receiving an EXCELS payment. This result indicates Maryland’s tiered reimbursement is working as theory predicts. However, the results of my qualitative research did not provide the same result: few child care center directors reported being motivated by the EXCELS payments. Rather, more directors reported being self-motivated to improve quality or were motivated by QAS. I frame the discussion of these divergent findings around three possible reasons that a tiered reimbursement system may not work as intended: (1) the incentive amount is too small, (2) providers lack capacity to meet the higher quality standards, and (3) providers have intrinsic motivation to meet higher quality standards.

The interviews did not provide support for the first possible reason a tiered reimbursement system would not work. None of the four center directors that were rated EXCELS level 1 or 2 or the central staff of centers with multiple locations stated that the incentives were too small. Two directors of programs rated EXCELS level 3 mentioned the amounts of their EXCELS payments during the course of the interviews. Both indicated that they did not view these amounts as especially generous and neither of these directors reported being
motivated by the EXCELS payments to reach level 3. Both of these center directors, as well as many others, were appreciative of the EXCELS payments and tended to spend the payments on supplies. The limited qualitative data on the size of the incentive indicates that center directors may view the incentives as small, but helpful and worthwhile—indicating alignment with the quantitative findings (i.e., the payment was not too small).

Another way to understand the relative size of an incentive is think about the effort needed to earn the incentive, with a lack of capacity being the second possible reason a tiered incentive system may not function as theory predicts. Five of the eight center directors not affiliated with large child care providers reported that the time required for EXCELS was burdensome, as did one of the center directors that was part of a national chain. There was even less capacity among owners/directors of single centers. Of the three center directors I interviewed that were rated EXCELS level 1 or 2, two were owners/directors of single centers and both experienced capacity challenges. One of the owners was not proficient with computers and relied on a young staff member to help with EXCELS. The owner and her assistant experienced challenges with getting organized and finding time to complete the documents to move from a level 2 to a level 3. Another owner/director of a single center reported that she was motivated by the EXCELS payments to reach level 3. However, she has had a difficult time finding the time to devote to the paperwork and quality self-assessment needed to move to level 3 and she has been a level 2 center for two years.

A final indication that lack of capacity may be a challenge in reaching EXCELS level 3 is that five of the seven non-participating center directors I contacted for interviews were from centers rated 1 or 2. Some refused to participate because they did not have time for an interview. One owner noted that his director just left, and she was the one who dealt with EXCELS. It
seems likely that centers that did not consent to an interview had even less capacity than those whose directors could make time for an interview.

The qualitative findings indicate that directors found it difficult to spend the time on EXCELS that is necessary to reach a level 3. While owners of franchises may have the resources to hire someone to assist with EXCELS, owners/directors of single centers are unlikely to have the resources to hire help. My quantitative models did not control for whether a center was part of a franchise or a national chain. However, larger centers had a statistically significant slightly increased likelihood of being higher quality (OR=1.005 for the continuous variable capacity ages 2 and older). Larger centers may have more office staff to assist with EXCELS documentation. Together, these results suggest that lack of capacity could keep some centers from reaching level 3, regardless of the size of the tiered payment.

With regards to the third possible explanation for why a tiered payment system would not work, the qualitative findings indicate that, instead of being motivated to improve quality to earn an EXCELS payment, center directors had intrinsic motivation to provide the best care they could. For example, three center directors reported that they wanted to reach an EXCELS level 3 (or higher) to “do the right thing for children” or because of “a passion that all kids have a right to good quality child care. They didn’t get to choose what their parents’ income was going to be.” These results indicate that some of the center directors were largely intrinsic motivation, and were not motivated by the EXCELS payments.

The question remains, however, if center directors were intrinsically motivated, and not motivated by the incentive payment, why would providers with higher subsidy densities be more likely to reach EXCELS level 3? As already touched upon, perhaps all providers are similarly internally motivated, but providers that serve few children in the CCSP simply do not have the
capacity to reach level 3. Another possibility could be that providers who are the most internally motivated to provide care to disadvantaged children are also the providers who are the most internally motivated to provide higher quality care. In that case, subsidy density would be a proxy for the intrinsic motivation to make a prosocial difference.

Another possible explanation is that the center directors were, perhaps unconsciously, providing socially desirable answers (Paulhus, 2002). I tried to minimize this possibility by asking directors why they settled on an EXCELS rating, why they are (or, are not) currently working to improve their EXCELS rating, and then asking if the director was aware of the EXCELS payments. The three interviewees that reported that EXCELS payments motivated them to improve in EXCELS mentioned this after I asked about their awareness of EXCELS payments. For some of the other directors, after asking the semi-structured protocol questions, it was natural to ask if EXCELS payments were a motivation to improve their EXCELS rating. When asked outright, all of these directors said that EXCELS payments were not a motivation for improving their EXCELS rating.

Limitations

A key limitation of using administrative data for my quantitative analysis is that I could not determine why the incentives were associated with higher density. For example, the quantitative analysis could not account for whether providers were aware of the incentive payments or how intrinsic motivation may have contributed to the outcomes. A benefit of mixed methods research is that I have qualitative data from child care center directors on these topics. However, a limitation of my focused interviews is that center directors of lower quality providers were less likely to agree to speak with me, and they likely would have had different experiences with EXCELS and the tiered reimbursement system.
**Future Research**

These limitations and my findings make clear that additional research is needed on how tiered reimbursement systems function. Ideally, interviews should be conducted with more directors from lower quality child care centers to better understand why these providers are not reaching EXCELS level 3 and the supports that may result in improvement. To attempt to unpack the processes by which a tiered reimbursement system may improve the quality of child care, future research should survey child care center directors on their understanding of tiered payments (including their amounts), motivation, and capacity. These data, when combined with administrative data, would allow an analysis of how motivation and capacity moderate a center’s quality status.

Additional data that should be collected from providers via survey include enrollment and (for centers) auspice (i.e., for-profit, not-for-profit, or government-run status). Auspice would allow an analysis of whether for-profit status is associated with a larger response to incentives; the three interviewees who reported that EXCELS payments were (somewhat) motivating were all affiliated with for-profit centers. Enrollment data would enable an analysis of the association between a provider’s open capacity (i.e., licensed capacity minus enrollment) and their response to incentives. Enrollment data would also allow for a more accurate “subsidy density” independent variable.

Future research could also examine whether subsidy density is associated with separately reaching EXCELS levels 3, 4, and 5. As the vast majority of higher quality providers in January 2018 were rated at level 3, there were too few providers at levels 4 or 5 to permit a quantitative analysis. As Maryland EXCELS matures, more providers will reach these higher levels.
Maryland is a rather unique state to study in that all providers that receive CCSP payments are required to participate in EXCELS and tiered payments are not earned until a provider reaches level 3. While my research is the first to examine a state-level tiered reimbursement system, future research should examine states with different structures. For example, some states offer small tiered payments at level 1 as an incentive to participate in their entirely voluntary QRIS. The underpinning theory of such a system is quite different from the theory underpinning Maryland EXCELS and its tiered reimbursement system. Finally, the research reported here focuses on child care centers, and more research is needed to understand how family child care providers respond to tiered reimbursement systems.

**Policy Implications**

The findings from my quantitative and qualitative research should give pause to any state that does not currently have a tiered reimbursement system and is considering implementing one. It is important to remember that tiered payments provide additional funds *after* the provider has demonstrated a given level of quality; states need to continue to think about how to support providers in reaching higher quality levels. Before implementing a tiered reimbursement system, a state should conduct focus groups and surveys to better understand why providers are not currently receiving high ratings on their state’s QRIS. If capacity constraints are a concern, the state should consider if funds could be better spent on technical assistance, rather than tiered payments. Recall that some child care center directors reported that the QAS were instrumental in providing support and encouragement to increase EXCELS levels. If staff qualifications are a concern, the state should consider if funds would be better spent on career ladders and supports.

While my quantitative results indicate that the tiered reimbursement system works as theory predicts, most children participating in the CCSP are still being served by lower quality
Additionally, most of the children participating in the CCSP in higher quality providers are in “marginally” higher quality providers. Specifically, 27 percent of child care centers serving children in the CCSP (with a published EXCELS rating) are higher quality (i.e., EXCELS level 3, 4, or 5), and 73 percent of higher quality centers were rated level 3 in January 2018. If a state’s goal is to provide all disadvantaged children with high-quality care, a state must understand that a tiered reimbursement system—and its associated QRIS—cannot be the only avenue by which to improve the quality of child care. As mentioned above, states need to consider, at minimum, providers’ capacity to improve and career ladders to address staffing challenges.

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## Tables

### Table 1
*Maryland’s Tiered Payment Schedule for Child Care Centers*

<table>
<thead>
<tr>
<th>Tiered Payments</th>
<th>Maryland EXCELS Level</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Level 3</td>
</tr>
<tr>
<td>Under 2 years of age</td>
<td>22%</td>
</tr>
<tr>
<td>2 years of age and over</td>
<td>10%</td>
</tr>
</tbody>
</table>


### Table 2
*Independent Variables Included in Models*

<table>
<thead>
<tr>
<th>Independent variables</th>
<th>Model (1)</th>
<th>Model (2)</th>
<th>Model (3)</th>
<th>Model (4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 1 ($\beta_{0j}$)</td>
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<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Subsidy density</td>
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<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Subsidy density, by age band (2 variables)</td>
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<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>High/low subsidy density (dummy) x</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High/low child poverty (dummy)</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Provider covariates</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Year program first licensed</td>
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<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Length of EXCELS participation</td>
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<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Licensed capacity, by age group</td>
<td>X</td>
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<td>X</td>
<td></td>
</tr>
<tr>
<td>School-age provider (dummy variable)</td>
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<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zip-code covariates</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>Licensed slots per child under 5</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Under 5 poverty (%)</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Race/ethnicity (%)</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Females with at least a BA (%)</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mothers in labor force (%)</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unemployment rate</td>
<td>X</td>
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<td></td>
<td></td>
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<tr>
<td>Urban v. rural (%)</td>
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<td></td>
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<tr>
<td>Level 2 ($\gamma_{00}$)</td>
<td>X</td>
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Table 3
*Means of Group-Mean Centered Independent and Dependent Variables, by Centers’ Quality Status*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Lower Quality</th>
<th>Higher Quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Density</td>
<td>-0.018</td>
<td>0.052**</td>
</tr>
<tr>
<td>Year First Licensed</td>
<td>0.384</td>
<td>-1.127**</td>
</tr>
<tr>
<td>School-age provider</td>
<td>0.026</td>
<td>-0.076**</td>
</tr>
<tr>
<td>Length of participation (6-month chunks)</td>
<td>-0.349</td>
<td>1.023**</td>
</tr>
<tr>
<td>Under 2 licensed capacity</td>
<td>-0.492</td>
<td>1.444*</td>
</tr>
<tr>
<td>2+ licensed capacity</td>
<td>-2.538</td>
<td>7.446**</td>
</tr>
<tr>
<td>Licensed slots per child under 5 in Zip Code</td>
<td>-0.002</td>
<td>0.006</td>
</tr>
<tr>
<td>Pct Pov &lt; 5 in Zip Code</td>
<td>0.161</td>
<td>-0.473</td>
</tr>
<tr>
<td>Pct Asian in Zip Code</td>
<td>-0.001</td>
<td>0.002</td>
</tr>
<tr>
<td>Pct Black in Zip Code</td>
<td>0.003</td>
<td>-0.008</td>
</tr>
<tr>
<td>Pct Hispanic in Zip Code</td>
<td>-0.000</td>
<td>0.002</td>
</tr>
<tr>
<td>Pct Female with BA+ in Zip Code</td>
<td>-0.284</td>
<td>0.834**</td>
</tr>
<tr>
<td>Pct Mothers with kids &lt;6 in labor force</td>
<td>-0.055</td>
<td>0.163</td>
</tr>
<tr>
<td>Unemployment rate in Zip Code</td>
<td>0.104</td>
<td>-0.305</td>
</tr>
<tr>
<td>Pct rural</td>
<td>0.104</td>
<td>-0.305**</td>
</tr>
</tbody>
</table>

*Note.* Italicized numbers and asterisks indicate a statistically significant difference between lower quality and higher quality providers. * indicates significance at the 0.05 level and ** indicates significance at the 0.01 level.
<table>
<thead>
<tr>
<th>Independent Variable</th>
<th>Model (1)</th>
<th>Model (2)</th>
<th>Model (3)</th>
<th>Model (4)</th>
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<tbody>
<tr>
<td>Subsidy density</td>
<td>0.879</td>
<td>3.488</td>
<td>4.865</td>
<td>1.308</td>
</tr>
<tr>
<td></td>
<td>(0.274)**</td>
<td>(1.144)**</td>
<td>(1.783)**</td>
<td></td>
</tr>
<tr>
<td>Under 2 subsidy density</td>
<td></td>
<td></td>
<td></td>
<td>3.454</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(1.701)**</td>
</tr>
<tr>
<td>Year program first licensed</td>
<td>0.983</td>
<td>0.986</td>
<td>0.968</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.026)</td>
<td>(0.026)</td>
<td>(0.035)</td>
<td></td>
</tr>
<tr>
<td>Length of EXCELS participation</td>
<td>1.448</td>
<td>1.470</td>
<td>1.334</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.079)**</td>
<td>(0.082)**</td>
<td>(0.093)**</td>
<td></td>
</tr>
<tr>
<td>Under 2 licensed capacity</td>
<td>1.006</td>
<td>1.004</td>
<td>1.004</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.006)</td>
<td>(0.007)</td>
<td>(0.013)</td>
<td></td>
</tr>
<tr>
<td>2+ licensed capacity</td>
<td>1.005</td>
<td>1.005</td>
<td>1.007</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.002)**</td>
<td>(0.002)*</td>
<td>(0.003)*</td>
<td></td>
</tr>
<tr>
<td>School-age provider</td>
<td>0.738</td>
<td>0.692</td>
<td>12.336</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.177)</td>
<td>(0.170)</td>
<td>(22.238)</td>
<td></td>
</tr>
<tr>
<td>Licensed slots per child</td>
<td></td>
<td>0.747</td>
<td>1.086</td>
<td></td>
</tr>
<tr>
<td>under 5</td>
<td></td>
<td>(0.294)</td>
<td>(0.620)</td>
<td></td>
</tr>
<tr>
<td>Under 5 poverty (%)</td>
<td>1.006</td>
<td>1.025</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.014)</td>
<td>(0.019)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian (%)</td>
<td>0.509</td>
<td>474.363</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(1.295)</td>
<td>(1717.699)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black (%)</td>
<td>0.853</td>
<td>1.809</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.548)</td>
<td>(1.500)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hispanic (%)</td>
<td>4.722</td>
<td>2.277</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(6.753)</td>
<td>(4.765)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Females with at least a BA (%)</td>
<td>1.059</td>
<td>1.049</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mothers in labor force (%)</td>
<td>1.007</td>
<td>1.013</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.011)</td>
<td>(0.016)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unemployment rate</td>
<td>0.930</td>
<td>0.884</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.060)</td>
<td>(0.072)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rural (%)</td>
<td>0.807</td>
<td>0.682</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.549)</td>
<td>(0.629)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2-level model | X | X | X | X |

Note. * indicates significance at the 0.05 level, and ** indicates significance at the 0.01 level. Standard errors are in parentheses. n=1003. Rho is statistically significant at the 0.05 level for all models. For model (1) rho=0.102; for model (2) rho=0.139; for model (3) rho=0.151; and for model (4) rho=0.104.