Insights into the Black Box of Child Care Supply: Predictors of Provider Participation in the Child Care Subsidy System

A Dissertation Proposal Presented to
The Faculty of the Heller School for Social Policy and Management
Brandeis University, Waltham, MA

Presented by: Kate Giapponi, MBA, MA

August 21, 2014

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# Insights into the Black Box of Child Care Supply:
## Predictors of Provider Participation in the Child Care Subsidy System

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Insights into the Black Box of Child Care Supply: Predictors of Provider Participation in the Child Care Subsidy System

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High quality child care providers that accept subsidies are the linchpin to supporting parental employment (Herbst & Barnow, 2008) and the child development needs of low-income families (Barnett and Ackerman, 2006; Shonkoff, 2009; Vandell & Wolfe, 2000). Without the voluntary participation of private providers in child care subsidy systems, families may not be able to realize these critical benefits. However, little is known about which providers agree to participate and what factors may influence their participation (Adams & Rohacek, 2012; Adams, Rohacek & Snyder, 2008; Bradburn, 2012; Rohacek, 2012). To help fill this void in the literature on child care subsidies, this dissertation will seek to identify and model predictors of provider participation in the Massachusetts child care subsidy system. Predictors to be examined in this multi-method study include providers’ legal structure (for- or non-profit), organizational characteristics and types of services offered, local child care market factors, and regional subsidy policies/practices, as well as other factors that are not as easily quantifiable or readily available such as the influence of provider mission statements, use of private donations/grants and perceptions of responsibility to the local community.

This three-paper dissertation will draw largely on economic theory and strategic management research in developing a multi-method approach to model and test predictors of provider participation in the subsidy system. Specifically, the quantitative portion of the research will utilize administrative data and U.S. Census data to test three empirical models that examine factors associated with provider decisions about 1) whether or not to participate in the subsidy system (Paper 1), 2) how many subsidy recipients to serve (Paper 2), and 3) whether to accept vouchers and/or contract with the state for subsidized child care slots (Paper 2). The qualitative portion of the study (Paper 3) includes interviews with center-based directors to explore pathways to subsidy participation and identify additional factors not examined in the quantitative models that affect providers’ subsidy decisions.

Results from this dissertation will not only make a significant contribution toward closing the current gap in the child care supply literature, but will also provide subsidy policy-makers and administrators with a better understanding of 1) the characteristics of child care providers participating in the subsidy system compared to those that do not, 2) the potential sources of motivation for and barriers to participation, and 3) the way in which differential participation may contribute to inequitable access to a full range of care options for subsidy recipients. Lessons will also be drawn regarding how different policy levers can facilitate greater participation and how targeted recruitment activities may improve participation and reduce inequities in access to care.
Dissertation Committee: Marji Erickson Warfield, PhD, Chairperson
Pamela Joshi, PhD
Dominic Hodgkin, PhD
Yoonsook Ha, PhD, Boston University

Proposal Hearing: August 21, 2014
10:00 AM – 12:00 PM
The Heller School, Room 147
I. Introduction and Literature Review

A. Introduction and Approach

Demand for non-parental child care in the United States (U.S.) has steadily increased over the past several decades primarily due to 1) the rise in maternal employment and 2) the promotion of research suggesting that quality child care can support healthy child development (Barnett and Ackerman, 2006; Shonkoff, 2009; Vandell & Wolfe, 2000). As a result, today, approximately 12.5 million children under the age of five (61%) are cared for regularly in a non-parental child care arrangement each week in the U.S. (Laughlin, 2013). However, the cost of child care has also risen, making care unaffordable or difficult to obtain for many families across the country. Low-income families have been especially impacted. According to a national report, low-income families spend approximately 30% of their monthly incomes on care, while higher income families tend to spend only 8% (Laughlin, 2013). The Child Care and Development Fund (CCDF), established in 1996 under the Personal Responsibility and Work Opportunity Reconciliation Act (PRWORA), provides funding for child care subsidies to make child care more affordable and accessible for low-income families.

The purpose of CCDF, as specified in the U.S. Code of Federal Regulations, is “to increase the availability, affordability and quality of child care services” in the U.S. (45 CFR 98.1 (b)). The regulations further stipulate that the funds are provided to states in order to “maximize parental choice” in care selection, “include in their programs a broad range of child care providers,” “provide quality care” and “design flexible programs that provide for the changing needs of recipient families” (45 CFR 98.1 (b)). Essential to achieving these goals is ensuring that a wide range of high quality child care providers are willing to participate in the subsidy system. If child care providers are not willing to accept subsidies as a form of payment,
low-income families will face an unaffordable care market, which, in turn, may have detrimental impacts not only on parental choice and the quality of care arrangements but also on parental employment and child development. In effect, provider participation in the subsidy system is a lynchpin to CCDF’s expected long-term outcomes of “1) improved employment and self-sufficiency outcomes for parents and 2) increased availability of high-quality child care for low-income working families” (U.S. Office of Planning, Research and Evaluation [OPRE], 2014, p.2). However, little is known about which providers agree to participate in subsidy systems and what factors may influence their participation (Adams & Rohacek, 2012; Adams, Rohacek & Snyder, 2008; Adams, Snyder & Tout, 2003; Bradburn, 2012; Rohacek, 2012). As was noted in a presentation at the 2012 Annual Meeting of the Child Care Policy Research Consortium, what we know about child care providers, within the context of the subsidy system, is essentially a black box (Bradburn, 2012).

This three paper dissertation will use quantitative and qualitative data to conduct exploratory research on provider participation in the child care subsidy system. The core aim of the dissertation is to break new ground and shed some light into the black box of what is known about the child care supply in the context of the U.S. subsidy system. As is demonstrated in Figure 1, the dissertation will explore three different dimensions of provider participation. First, using quantitative analysis, Paper 1 will explore what factors contribute to a provider’s decision to participate or not in the child care subsidy system.

![Figure 1. Provider Decision-Making Regarding Participation in Subsidized Child Care](image-url)
Second, of the providers that do participate, Paper 2 will quantitatively explore what factors influence the degree to which they participate (number of subsidy recipients they serve). Third, of the providers that do participate, Paper 2 will quantitatively examine what factors influence the type of subsidy mechanism through which they participate (vouchers and/or contracts with the state for subsidized slots). With the approval of the Massachusetts Department of Early Education and Care (EEC) (see Appendix A), Papers 1 and 2 will utilize the state’s administrative data to run quantitative models of the determinants of these three dimensions of provider participation in subsidized care.

Given the limited empirical research on providers, Paper 3 of this dissertation will employ qualitative interviews with child care providers to identify factors impacting provider decision-making regarding the three aforementioned dimensions of provider participation in subsidized care. Paper 3 will not only triangulate findings between these qualitative analyses and the quantitative analyses conducted in Papers 1 and 2, but will also seek to identify any additional factors associated with participation that are not as easily quantifiable or readily available. This multi-method approach will allow for the identification of a comprehensive set of predictors of different aspects of provider participation.

This dissertation will address the core goals of CCDF and the market-based approach that the policy takes in helping low-income families access high quality child care. The results of the study will be of particular interest not only to child care researchers, but also national, state and local child care policy-makers and administrators seeking to better understand 1) the range of different types of child care providers participating in the subsidy system compared to those that do not, 2) potential sources of motivation for and barriers to provider participation, 3) how differential participation may contribute to inequitable access to a full range of care options for
subsidy recipients, and 4) how different policy levers and/or targeted recruitment activities may improve participation and reduce inequities in access to child care.

**B. Previous Literature**

Since the enactment of CCDF, a large body of literature has focused on the demand side of the child care market, specifically the take up of subsidies and the impact on families. Researchers have found evidence to suggest that subsidies effectively reduce child care expenses for low-income families (Forry, 2009; Gennetian, Crosby, Huston & Lowe, 2004) and increase maternal employment (Blau & Tekin, 2007; Tekin, 2005, 2007). However, without the voluntary participation of child care providers in the subsidy system, families would not have access to an adequate supply of providers and be able to realize these benefits. As a policy tool, child care subsidies rely on voluntary participation from child care providers in the market. However, few studies have explored what types of providers participate in the subsidy system compared to those that do not, the degree to which providers participate, the subsidy mechanisms through which providers participate and what factors may influence participation (Adams & Rohacek, 2012; Adams, Rohacek & Snyder, 2008; Adams, Snyder & Tout, 2003; Bradburn, 2012; Rohacek, 2012). While there are no studies that specifically address these questions, as is described in the following sections, there is some limited, largely qualitative and descriptive research on state subsidy policies and practices, state and local child care markets, and provider characteristics and types of services offered that provide some insight into provider participation.

1. **State Child Care Subsidy Policies & Practices**

Administered by states, CCDF was designed to be a highly flexible funding stream, with few federal regulations that would restrict states in administering subsidies. The fundamental requirements for subsidies are that they can be given to families 1) with a child under the age of
13 (or older, if the child has special needs), 2) with incomes that do not exceed 85% of the state median income (SMI), and 3) in which the parents either work or are engaged in a work-related activity (e.g. school, job search or job training program) (45 CFR 98.2). However, states can define what constitutes work (i.e. number of hours per week) and work-related activities (e.g. high school attendance, college attendance, job search program participation). They can establish their own parent copayment amounts. In addition, with regard to providers, states can:

1) decide on their own subsidy reimbursement rates for providers,

2) restrict providers from charging parents the difference between subsidy reimbursement rates and private pay prices,

3) restrict the use of subsidies to only particular types of child care providers (e.g. licensed care),

4) choose to provide subsidies through contracted child care slots at prescribed providers and/or through vouchers that can be used at providers willing to accept vouchers as a form of payment, and

5) determine the processes through which subsidies are administered and providers are paid (e.g. paperwork and technology involved).

As such, there is significant variation in state subsidy policies and practices (Adams, Rohacek & Snyder, 2008; Minton, Durhan, Huber & Giannarelli, 2013). As is demonstrated in the following sections, these individual state child care subsidy policies and practices may differentially influence providers’ decisions to participate in the subsidy system, the degree to which they participate and, the mechanism(s) through which they participate.

**State Reimbursement Rates:** A reimbursement rate is the amount that a state will pay providers

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1 States that utilize both contracted slots and vouchers operate what has been called a “dual mechanism” subsidy system
for services delivered to a subsidized child. Reimbursement rates often vary by geographic region, age of the subsidized child served (e.g. infant vs. toddler), the type of care provided (e.g. center-based vs. family child care) and other factors (e.g. quality ratings). Reimbursement rates are ceilings, in that providers are paid at 1) the reimbursement rate if their private pay rates are equal to or higher than the reimbursement rate or 2) the provider’s private pay rate if it is below the reimbursement rate. However, today, with the average annual cost of center-based care for infants now exceeding the average annual cost of public university tuition in the majority of states (Child Care Aware, 2013a), no state child care agencies are able to provide reimbursement rates for subsidized providers at market value. Instead, the Administration for Children and Families (ACF) suggests that states should establish rates “at least at the 75th percentile of the market” (1998, p.39959). This benchmark “would be regarded as providing equal access” to child care services for families receiving subsidies (ACF, 1998, p.39959). However, according to a recent report by the National Women’s Law Center (NWLC), only three states (New York, North Dakota and South Dakota) set subsidy rates that are at or above 75% of average market prices (2013). The vast majority of states offer reimbursement rates to providers that are significantly below market value. Therefore, most providers would have to accept a significant loss in revenue in participating in the subsidy system.

Some limited descriptive research suggests that the reimbursement rate amount influences providers’ willingness to participate in the subsidy system (Adams, Rohacek & Snyder, 2008; Miller & Hu, 1999). A survey conducted in Washington State indicated that nearly half of the providers statewide unwilling to accept subsidies did so because the subsidy rate fell below their prices (Miller & Hu, 1999). Similarly, a qualitative study conducted within

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2 These states set rates that are at or above 75% of 2011 market prices (NWLC, 2013). It is unclear whether their rates are at or above 75% of current 2014 market prices.

3 In 2012, only one state (New York) was able to set subsidy rates at or above 75% of market prices (NWLC, 2012).
five U.S. counties from 2003 to 2004 found that one aspect of subsidy systems that was seen as challenging to providers was that reimbursements rates fell below the amount needed to provide quality care (Adams, Rohacek & Snyder, 2008). However, these descriptive findings did not control for provider characteristics or community or market-based factors. Additionally, these studies were conducted more than a decade ago and, therefore, may not reflect the current environment. More research is needed to assess whether reimbursement rate amounts, especially in comparison to private pay prices, affect provider participation (Adams & Rohacek, 2012).

**Provider Payment Restrictions:** Another factor that may affect provider participation is whether a state restricts providers’ ability to charge subsidy recipient families the difference between private pay prices and subsidy reimbursement rates. According to a recent NWLC report (2013), as of February 2013, 11 states did not allow providers to charge subsidy recipients the difference between their private pay prices and subsidy reimbursement rates. In states without these restrictions, providers may be more likely to participate in the subsidy system and/or serve more subsidy recipients because they can still receive their total private pay revenue by charging subsidy recipient families the difference between their private pay prices and the reimbursement rate.

**Licensing Restrictions:** Another factor that may affect provider participation is state restrictions on the types of providers that can legally be paid through child care subsidies. According to a review of FY2010-2011 CCDF State Plans, as of July 2009, 22 states required that all center-based providers receiving CCDF-funded subsidies be licensed, 19 states required that family child care be licensed and 2 states required that all in-home child care providers be licensed (National Child Care Information and Technical Assistance Center [NCCIC], 2010). These

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4 The federal government defers to the states to determine whether subsidized providers have to be formally licensed. In accordance with CFR 98.2, a provider receiving subsidies must be “licensed, regulated, or registered under applicable State or local law”, in accordance with the state or local health and safety requirements.
restrictions preclude unlicensed providers from participating in some state subsidy systems.

**Subsidy Mechanisms:** Another factor that may impact participation in subsidy systems is the subsidy mechanism used by state child care agencies. The most commonly used mechanisms are child care vouchers and contracts with providers for a prescribed number of subsidized slots. As of 2012, 46 states used CCDF-funded vouchers, 13 of which also used CCDF-funded contracts for subsidized slots, one state (Utah) only used CCDF-funded contracts, and three states used only CCDF-funded cash assistance\(^5\) (U.S. Office of Child Care [OCC], 2014). Massachusetts is an example of a state that uses both CCDF-funded vouchers and contracts.

From the provider perspective, there are potential costs and benefits of participating in either contracted slots or vouchers\(^6\). A significant benefit of contracts is that they provide consistent and reliable funding. For example, in Massachusetts, contracts for child care services are typically for a period of 3 to 5 years (EEC, 2009) and contracted slots vacated by children can be quickly filled by a waitlist of approximately 51,792 children (NWLC, 2013). However, a downside of contracts is that they often require that providers follow additional guidelines and offer additional services. For example, contracted providers\(^7\) in Massachusetts must provide referrals to additional child and family services (e.g. Early Intervention, special education, mental health services, WIC, SNAP, etc.), conduct child care subsidy eligibility determinations and redeterminations, and use child development assessment tools\(^8\) (EEC, 2012a). Likewise, providers seeking contracts with the state must commit staff time and resources to applying for contracts. In contrast, vouchers offer a different set of potential costs and benefits for providers.

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\(^5\) These are payments issued to parents to purchase child care.

\(^6\) Providers that participate in both vouchers and contracts incur the costs and the benefits of both subsidy mechanisms.

\(^7\) This includes providers that only contract with the state for subsidized slots and providers that both contract with the state for subsidized slots and accept vouchers. Providers that only accept vouchers do not have to conduct these activities.

\(^8\) Examples of child development tools include the Ages & Stages Questionnaire, Picture Vocabulary Test (PVT), Expressive Vocabulary Test (EVT), Social and Emotional Screening, and Woodcock-Johnson Test.
Vouchers do not offer providers financial stability given they ‘follow the child’ (West, 1997). This means that parents receiving vouchers may change their selected child care provider at any time and take their vouchers with them to new providers (who are willing to accept them), leaving their initial providers with an unfunded open slot. However, providers accepting only vouchers are not required to follow the additional guidelines and services outlined in direct contracts. Additionally, providers can limit and change the number of vouchers they are willing to accept depending on their financial position throughout the year. As such, while vouchers do not provide funding stability, they do provide funding flexibility.

Little research has been conducted examining differences between the two mechanisms and their impact on provider participation. As Holod and colleagues (2012) suggest, this may be largely due to limitations in state administrative data systems that track contracts and vouchers separately. Holod and colleagues’ (2012) study utilized New York City’s unique single administrative database on contracts and vouchers in combination with survey data to assess the impact of subsidy mechanisms on stability of subsidy receipt. They found no association between a child’s stability of care and the subsidy mechanism utilized, but suggest this may be due to the study’s small analytic sample\(^9\) (Holod, Johnson, Martin, Gardner & Brooks-Gunn, 2012). The researchers hypothesized that contracts would be associated with greater subsidy stability because, among other reasons, contracts would offer providers more stable and consistent funding than vouchers, allowing them to better plan for future staffing and financial health. More research on the impact of different subsidy mechanisms on provider involvement in subsidy systems is needed (Adams & Rohacek, 2012).

**State Administrative Practices:** State child care administrative practices may also influence

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\(^9\) Holod and colleagues (2012) merged administrative data with data from a phone survey of a small subsample of subsidy recipients who were receiving Transitional Assistance for Needy Families (TANF) cash assistance in New York City (weighted \(n = 9,087\); unweighted \(n = 311\)).
providers’ decisions to participate or the degree to which they are willing to participate in child care subsidy systems. In order to receive reimbursement for subsidized children, providers must work through a state’s billing and payment processing procedures. A qualitative study conducted within five U.S. counties located in four states\(^\text{10}\) found that aspects of subsidy systems that were seen as challenging to providers included the timing and inconsistency of reimbursement payments, administrative burdens, and problems working with subsidy recipients (Adams, Rohacek & Snyder, 2008). Likewise, in a survey of 30 child care centers participating in the voucher system in 2004 in the greater Boston area, researchers found that voucher administration processes (including the collection of parent copayments and the translation of voucher administration materials for non-English speaking families) were time intensive and that late reimbursement payments from the state were an issue (Washington, Marshall, Robinson & Modigliani, 2006; Washington & Reed, 2008). However, both of these studies are limited in that they assess small samples of providers that were serving subsidy recipients at one point in time.

Another factor that may play a role in providers’ decisions to participate in the subsidy system is the entity charged with provider recruitment into the subsidy system. No research could be found regarding variation in provider recruitment practices in any states. However, the parties responsible for recruitment may have different tactics in forging relationships with providers and recruiting them to participate in the subsidy system. For example, in Massachusetts, Child Care Resource and Referral (CCR&R) agencies are charged with provider recruitment.

2. State & Local Child Care Markets

Provider participation in child care subsidy systems varies significantly by state. A study

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\(^{10}\) The counties studied were Jefferson County, Alabama; San Diego County, California; Monterey County, California; Hudson County, New Jersey; and King County, Washington (Adams, et al., 2008).
using administrative data in 4 states from 2000 found that while approximately 80% of child care providers participated in the Missouri subsidy system, only 44% participated in Kansas, 45% participated in Iowa and 54% participated in Nebraska (Raikes, et al., 2003). Similarly, in a 2003-2004 study, Adams, Rohacek and Synder (2008) found that while approximately 80% of child care centers in Alabama’s Jefferson County, New Jersey’s Hudson County and Washington’s King County were currently participating or had recently participated in the voucher system, only 60% of child care centers in California’s San Diego and Monterey Counties had or were currently participating. Although these studies identify differences in participation rates, they do not address how variation in local child care markets may contribute to these differences.

Parents typically choose child care close to their homes or workplaces. Therefore, researchers have suggested that child care markets should be defined locally, by community (Grobe, Weber, Davis, Kreader & Pratt, 2008). Local child care markets within states can vary significantly due to both demand-side factors such as consumer demographics (including household income and cultural preferences) as well as supply-side factors such as level of market competition and area rental costs. For example, research suggests that the supply of licensed care is often limited in low-income (Gordon & Chase-Landsale, 2001; Queralt & White, 1998) and non-metropolitan areas (Gordon & Chase-Landsale, 2001), which may suggest that the availability of subsidized slots may be lower in these areas.

3. Provider Characteristics & Types of Services Offered

Finally, provider characteristics and the types of services offered may influence providers’ participation, the degree of their participation and the mechanism through which providers participate in the subsidy system. Non-parental child care in the U.S. primarily
consists of three sources of care: private market-based center and family child care,\(^{11}\) free public care (e.g., public pre-school or Head Start) and informal paid and unpaid care (e.g., aides, friends and relatives).\(^{12}\) Within private market-based care, the focus of this study, providers vary significantly in terms of size/capacity (number of children they can serve), legal structure (non-profit 501(c) organizations and for-profit sole proprietors, partnerships, corporations and limited liability companies), the price of care and the types of services offered, including child age ranges served, hours of operation, staff-to-child ratios, accreditation status, and languages offered. According to Child Care Aware (2013b), as of early 2013, there were approximately 113,000 child care centers and 178,000 family child care homes legally operating in the U.S. However, it is unclear how many of these providers participate in the subsidy system, how their organizational characteristics vary and whether these characteristics impact participation.

Unfortunately, there are no national datasets currently available that provide descriptive information about licensed child care providers that accept child care subsidies compared to those that do not and the characteristics of each. The National Survey of Early Care and Education, conducted by the National Opinion Research Center, is expected to provide some of the data on these variables, including for-/non-profit status, accreditation, age of children served, etc., when data are released (Guzman et al., 2013). However, statistics from the U.S Department of Labor offer some insight into the potential distribution of for- and non-profit providers by subsidy participation. According to the U.S. Bureau of Labor Statistics (2007), on average, in 2007, 64% of total revenue for non-profit and government child care providers came from government sources (e.g., Head Start, Early Head Start, child care subsidies), while 36% came

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\(^{11}\) States vary in their definitions of what is considered family child care. This study uses Massachusetts’ definition of family child care which is “early education and care delivered in a provider's home” for “a maximum of six children or ten children (with an additional assistant)” (EEC, 2011).

\(^{12}\) This type of care is also referred to as kith and kin care.
from private payers. Conversely, 29% of total revenue for for-profit child care providers came from government sources, while 71% came from private paying parents. This suggests that nationally, non-profit child care providers may be more likely to accept subsidies than for-profit providers. The next generation of research needs to establish whether there is a statistically significant relationship between providers’ legal structure and subsidy participation.

Research on parents’ subsidy utilization highlights the potential distribution of providers that serve subsidy recipients. It also offers some insight into parental choice of different types of subsidized care. For example, research has found that low-income families that utilize subsidies, compared to low-income families that do not, are more likely to engage in center-based care rather than home-based care (from aides and relatives and/or family child care) (Brooks, 2002; Crosby, Gennetian & Huston, 2005; Tekin, 2005; Weinraub, Shaly, Harmon & Tran, 2005) and are more likely to select licensed rather than unlicensed care (Weinraub, et al., 2005). However, there is no research about whether low-income parents are more likely to use subsidies for their children at non-profit compared to for-profit child care centers.

Similarly, some limited research has been conducted to assess the differences in the quality of subsidized compared to non-subsidized care using 1) samples of providers participating and not participating in the subsidy system (Jones-Branch, Torquati, Raikes, & Pope Edwards, 2004; Raikes, et al., 2003) and 2) samples of subsidized and unsubsidized low-income children (Johnson, Rigby, & Brooks-Gunn, 2011; Johnson, Ryan, & Brooks-Gunn, 2012; Maher, Frestedt & Grace, 2008; Weinraub et al., 2005). While studies using samples of providers participating and not participating in the subsidy system provide evidence to suggest that participating providers have lower levels of quality on average compared to non-participating providers (Jones-Branch et al., 2004; Raikes, et al., 2003), results using samples of
subsidized and unsubsidized children show mixed findings. Some research using the Early Childhood Longitudinal Study (ECLS-B) and the Fragile Families and Child Well-Being Study suggest that subsidy recipient children receive care from providers that have higher quality ratings compared to low-income non-subsidy recipients, excluding children using Head Start or public pre-kindergarten programs (Johnson et al., 2011; Johnson et al., 2012). Likewise, research using a phone survey of families in Illinois, Mississippi, Ohio, South Carolina and Washington found that parent-reported child-to-adult ratios (an indicator of quality) were higher on average for subsidized infants and preschoolers compared to unsubsidized infants and preschoolers, after controlling for household income and maternal employment (Maher et al., 2008). However, the study also found no association between child-to-adult ratios experienced by subsidized and unsubsidized toddlers (Maher et al., 2008). Similarly, other research using samples of low-income African American 4-year old subsidy recipient and non-recipient children found no statistical differences between the quality of care they received (Weinraub et al., 2005). More research is necessary to identify differences in care quality by providers that participate in the subsidy system compared to providers that do not.

4. Child Care in Massachusetts

Massachusetts has been ranked as one of the top six least affordable states for infant and preschool care in the U.S. for the past 3 years (Child Care Aware, 2011, 2012, 2013a). According to Child Care Aware (2013a), the average annual cost of center-based care in Massachusetts is $16,430 for an infant and $12,176 for a four-year old. A family of three living at the federal poverty level would have to pay, on average, 86% of their annual income to obtain full-time center-based infant care and 64% of their annual income to access full-time center-based care for a four year old (Child Care Aware, 2013a). Along with a high-priced market, the
state is also faced with high demand for child care assistance. As of early 2013, the state maintained a subsidy waitlist of approximately 51,792 children (NWLC, 2013). With a limited budget, like many other states, Massachusetts subsidy administrators have had to decide whether to implement higher reimbursement rates but serve fewer children or implement lower reimbursement rates and serve more children. To supply as much subsidized care as possible to meet such a high demand, Massachusetts has never offered reimbursement rates at or above the federally recommended level of 75% of market prices (ACF, 1998). As is the case in many states, in Massachusetts, reimbursement rates are set by provider type (center-based care, family child care and after/before school care), child age (e.g. infant, toddler, preschooler), and geographic region. Specifically, there are six established geographic reimbursement rate regions in the state. Currently, on average, maximum reimbursement rates fall between only 3% and 31% of center-based provider prices and between 3% and 43% of family child care provider prices across the state (EEC, 2012a). In other words, there is a significant gap between reimbursement rates and the majority of providers’ private pay prices. Additionally, Massachusetts does not allow providers to charge subsidy recipient families the difference between their private pay prices and the subsidy reimbursement rate. With reimbursement rates substantially below market prices, it is not surprising that according to Massachusetts’ FY2014-2015 CCDF State Plan, the state estimates that only 55-60% of all private licensed center-based child care providers accept subsidies as a form of payment (EEC, 2013a). As such, Massachusetts faces significant challenges in ensuring that families receiving subsidies have equitable access to a broad range of private providers.

Massachusetts’ child care subsidy system is also an example of a dual mechanism subsidy system. Specifically, in 2012, Massachusetts provided approximately 40% of CCDF-
funded subsidized care through contracts and 60% through vouchers (OCC, 2014). The system is also unique in that it contracts with CCR&R agencies to, among other responsibilities, recruit providers into the subsidy system (EEC, 2010a, 2012b). Each CCR&R is charged with a geographical region from which to recruit. Currently, seven CCR&R vendors have been contracted to perform these services. However, the state does not have standardized procedures or regulations governing the recruitment of providers. The state also does not offer CCR&Rs any additional financial incentives for recruitment or set recruitment quotas. CCR&Rs are paid based on a prescribed flat fee. Therefore, there may be regional variation in recruitment efforts and tactics, which may affect providers’ decisions to participate in the subsidy system.

II. Theoretical Approach and Conceptual Model

Although there has been a significant amount of modeling and theoretical analysis of child care decision-making from the parent or family perspective (see Forry, Tout, Rothenberg, Sandstrom & Vesely, 2013), little research has explored subsidy system participation decision-making from the provider perspective. This dissertation will utilize a conceptual model of predictors of provider participation in subsidy systems that is based on the economic theory of the firm and non-profit strategic decision-making research established in the field of business and non-profit management.

The economic theory of the firm suggests that firms are created to maximize profits (Aspromourgos, 1986). Therefore, firms will make strategic decisions to maximize profits and minimize costs subject to external constraints. Constraints include such factors as government regulations and policies, consumer demand for the firms’ products/services and the number of

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13 CCR&Rs are contractually required to conduct a number of activities, including, but not limited to subsidy management services (such as subsidy eligibility determinations/re-determinations and payment processing) and child care information and referral for families (EEC, 2010a, 2012b). In state fiscal year 2010, the state reduced funding to the CCR&Rs without reducing any required activities (EEC, 2010b). This may have impacted the CCR&Rs’ resources and, therefore, their capacity to conduct all required activities, including provider recruitment.
competing firms in the market. Historically, the theory of the firm has been applied to for-profit organizations. In contrast, currently, there is no one generally accepted economic theory of the non-profit firm (Hortwitz & Nichols, 2007; Malani, Philipson & David, 2003) and those theories that do exist assess only particular types of firm behavior (e.g. decisions regarding the quality and quantity of goods/services produced) largely in the healthcare industry and have undergone limited empirical testing (Hortwitz & Nichols, 2007). For example, Newhouse (1970) suggests that non-profit hospitals maximize utility over quantity and quality of care rather than profits.

Non-profit organizations operate under different legal and financial restrictions compared to for-profit organizations that impact decision-making. First, non-profit organizations are guided by their mission statements (Brinkerhoff, 2009; Drucker, 1989). In fact, if non-profit providers obtain too much income from non-mission related activities, they risk losing their tax-exempt status under section 501(c) of the Internal Revenue Code (Brinkerhoff, 2009). As such, non-profit organizations must earn revenue related to their missions. Beyond the legal constraints, as Brinkerhoff (2009) suggests, a non-profit’s mission can also serve as a “strategic and tactical touchstone” in decision-making (p.52). As Drucker (1989) further describes, a non-profit’s mission “focuses the organization on action” and “defines the specific strategies needed to attain crucial goals” (p. 89). In other words, a non-profit will make decisions based on whether a particular strategic initiative will lead to mission fulfillment.

Second, non-profit organizations are legally bound by what Hansmann (1980, p. 835) coined “a nondistribution constraint.” Non-profit organizations cannot distribute their profits (revenue earned beyond what is needed to cover expenses) to any individuals who exercise control over the organization, including board members, trustees, and executive staff (Hansmann, 1980). Instead, residual earnings can only be used to finance the production of additional or
future goods or services. In other words, all profits must be reinvested directly into the firm’s operations.

Based on these legal requirements, it can be suggested that while for-profit firms will make strategic decisions that seek to maximize profits subject to constraints, non-profit firms will make strategic decisions that seek to 1) fulfill their missions and 2) enable the firm to remain financially stable (budget neutral), subject to constraints. Therefore, as is demonstrated in the study’s conceptual model (Figure 2), in considering child care subsidy system participation, this study assumes that for-profit providers will determine whether, to what degree and through which subsidy mechanism(s) they will maximize their profits. In contrast, non-profit providers will determine whether, to what degree and through which subsidy mechanism(s) they will be able to fulfill their mission and remain financially stable. Given these different goals, a firm’s legal structure may impact decisions regarding participation in the subsidy system.

Figure 2, also highlights the regional subsidy policies and practices that may constrain providers’ decisions about whether, to what degree and through which subsidy mechanisms they decide to participate in the child care subsidy system. In particular, the size of the regional reimbursement rate may influence whether and to what degree providers may experience a loss in revenue by accepting subsidy payments below the market rate. Likewise, a provider’s assigned CCR&R’s recruitment tactics may have an impact on providers’ decisions about whether, to what degree, and through which subsidy mechanism to participate. For example, particular CCR&Rs may spend more time and effort than others making providers aware of the option to participate in the subsidy system and the different subsidy mechanisms through which they could participate. Additionally, some CCR&Rs may spend more time targeting particular types of providers for recruitment. For example, they may try to appeal to non-profit providers
by describing how subsidy participation may contribute to their missions.

Figure 2 also demonstrates how local child care market forces of supply and demand may influence providers’ private pay prices, which in turn may impact subsidy participation. For example, in markets where demand for child care is high, holding supply of care constant, providers will be able to command higher private pay prices. With the goal of profit maximization, for-profit providers may be less likely to participate in the subsidy system or serve fewer subsidized children and opt for private pay instead. In contrast, non-profit providers may choose to cover or pass on to private pay families, through higher prices, the cost of lost revenue from subsidies and, therefore, may be more likely to participate in the subsidy system or serve more subsidized children. This
process is often referred to as ‘cost shifting’ in literature on hospital financing. Hospitals have long been known to engage in cost shifting, whereby private payers are charged more due to shortfalls in public payments from Medicare or Medicaid (Frakt, 2011). Child care providers may engage in similar practices in serving subsidy recipients.

In a high demand market, where providers can command higher private pay prices from more consumers, 1) for-profit providers participating in the subsidy system may be more likely to take advantage of the flexible voucher system, opting to achieve higher profits by not getting locked into a low reimbursement rate through contracts, and 2) non-profit providers participating in the subsidy system may be more likely to participate in the contracts system, enjoying the financial stability that contracts provide while also covering any losses in revenue from subsidy acceptance with private pay revenue.

Further, as is suggested in Figure 2, individual organizational characteristics and the types of services providers offer may act as constraints on providers’ participation decisions in that they may affect a provider’s physical and financial capacity to accept subsidy recipients as well as the quantity and subsidy mechanism they accept. For example, providers that are members of larger networks of providers or umbrella agencies may have alternative sources of revenue and resources to cover potential financial losses from subsidy receipt (including reimbursement rate deficiencies and staff time spent conducting subsidy billing processes) and, therefore, may be more likely to accept subsidy recipients or accept a larger number of subsidy recipients. Likewise, these providers may have more capacity (e.g. experience, administrative staff and resources) to manage the additional service requirements and procurement processes involved in securing and maintaining contracted slots with the state and, therefore, may be more likely to participate in the contracts system.
Finally, an individual provider’s cost structure may influence their decision-making regarding provider participation. All child care providers incur fixed and variable costs. Fixed costs are those that are independent of output. In other words, regardless of the number of children a provider serves, it must still pay for such expenses as rent, phone/internet, insurance and a program director’s/primary caregiver’s salary. Variable costs are those that vary with output. In other words, depending on the number of children served, a provider’s expenses related to staffing, utilities and supplies/materials will vary. In deciding whether or not to accept subsidies or the number of subsidized children to accept, a provider may analyze how subsidy reimbursement payments will cover its variable and fixed costs. In particular, providers may conduct a contribution analysis. In a contribution analysis, an organization recognizes that certain fixed costs are unavoidable and evaluates a business decision (e.g. acceptance of subsidy recipients) based on whether the particular activity/proposal will produce enough revenue to cover variable costs and any new fixed costs directly related to the activity/proposal (McGuigan, Moyer & Harris, 2011). In the case of subsidy acceptance, providers may be more willing to accept subsidized children or a greater quantity of subsidized children if the subsidy reimbursement payment covers the average variable cost per child.

III. Research Plan

A. Research Questions & Hypothesized Results

This dissertation will be presented as three papers suitable for submission to peer reviewed academic journals. Paper 1 will quantitatively assess Research Question 1 by examining factors associated with provider decisions about whether or not to participate in the subsidy system. Paper 2 will quantitatively assess Research Questions 2 and 3 by examining factors associated with provider decisions about 1) how many subsidy recipients to serve and 2)
whether to accept vouchers and/or contract with the state for subsidized child care slots. Paper 3 will assess all three research questions by qualitatively exploring pathways to subsidy participation and identifying additional factors affecting provider participation not examined in Papers 1 and 2.

Given the lack of rigorous studies of provider participation in subsidy systems, there is limited directly-comparable research upon which to hypothesize the direction of the effects of regional child care policies and practices, local child care market factors, and provider organizational characteristics and types of services offered on provider participation. Based on the extant literature and the proposed conceptual model, below are research questions and general hypotheses for this exploratory study.

**Research Question 1: What are the determinants of provider participation in the child care subsidy system?**

**Hypotheses:** Regional child care policies and practices, local child care market factors, and provider characteristics and types of services offered are associated with providers’ decisions about whether to participate in the child care subsidy system. In particular, given that reimbursement rates fall far below private pay rates in Massachusetts, non-profit providers will be more likely to participate in the subsidy system than for-profit providers and for-profit providers will be more likely to participate if their private pay rates are equal to or below reimbursement rates for subsidies.

**Research Question 2: Among participating providers, what are the determinants of the degree to which providers participate in the subsidy system (the number of subsidy recipients that providers serve)?**

**Hypotheses:** Regional child care policies and practices, local child care market factors, and provider characteristics and types of services offered are associated with participating providers’ decisions about how many subsidy recipients to serve. In particular, given the limited profit
margins associated with subsidies, non-profit providers will be more likely to serve a larger proportion of subsidized children within their caseload compared to for-profit providers, and for-profit providers will be more likely to serve a larger proportion of subsidized children if their private pay rates are equal to or below reimbursement rates, controlling for the regional supply of subsidies.

Research Question 3: What are the determinants of the subsidy mechanism(s) selected by participating providers?

Hypotheses: Regional child care policies and practices, local child care market factors, and provider characteristics and types of services offered are associated with providers’ decisions about their participation in contracts with the state for subsidized slots, vouchers, or both.

Note that in addition to the factors specified in Figure 2, this exploratory study will seek to identify other determinants of provider participation for each research question above through Paper 3’s qualitative data collection methods.

B. Papers 1 & 2 Research Plan

1. Data & Study Sample

Papers 1 and 2 will require the construction of an analysis database by merging data from five Massachusetts’ administrative data systems and the U.S. Census Bureau’s American Community Survey (ACS) to test the study’s conceptual model (Figure 2). Specifically, the dissertation will use administrative data extracts from Massachusetts’ Child Care Information Management System (CCIMS) and Electronic Child Care Information Management System (eCCIMS), licensing database, NACCRRAware system and Quality Rating and Improvement System (QRIS). CCIMS and eCCIMS are subsidy payment processing systems used by the Commonwealth to track child enrollment and related subsidy payments made to providers. CCIMS tracks enrollment and payments for vouchers, while eCCIMS tracks enrollment and
payments for contracted slots. Data from eCCIMS and CCIMS will be used to construct the three measures of provider participation examined in this dissertation.

Massachusetts’ licensing database tracks provider licensing and basic program data, including address, affiliation with an umbrella agency or system of providers, program type (center-based versus family child care), capacity, and licensure status. In Massachusetts, all center and family child care providers are required to be licensed with very few exceptions\(^{14}\) (606 CMR 7). Providers are required to renew their licenses every 2 years and inspections conducted by EEC staff occur throughout the licensure period (606 CMR 7). As such, licensing data is expected to be reasonably accurate and up-to-date.

Massachusetts’ NACCRRAware system houses data on other provider characteristics and types of services offered, such as for- or non-profit status, private pay prices, staff-to-child ratios, language offerings, hours of operation, etc. for all licensed providers. The CCR&Rs are required to track information on all center and family care providers in the state in the NACCRRAware system in order to assist parents in their search for care (EEC, 2010a, 2012b). At minimum, CCR&Rs are required to update information on providers annually (EEC, 2010a, 2012b). Given the NACCRRAware system does not maintain longitudinal data, this study will utilize NACCRRAware data for all licensed providers in the state as of June 2014\(^{15}\).

Massachusetts’ QRIS system will be utilized as the final source of administrative data. A QRIS is a system that collects, houses, and analyzes data on the quality of child care providers. Massachusetts began developing its QRIS in 2008. The system was fully implemented in 2011 (Schilder, Young, Anastasopoulos, Kimura & Rivera, 2011) and is now being validated

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\(^{14}\) See the following webpages for information on licensing exemptions: [http://www.eec.state.ma.us/docs1/regs_policies/group_schoolage_policies/exemption_from_licensing.pdf](http://www.eec.state.ma.us/docs1/regs_policies/group_schoolage_policies/exemption_from_licensing.pdf).

\(^{15}\) Due to these data limitations, the analytic database to be developed for this study will contain NACCRRAware data on providers as of June 2014 that will be linked to licensing data that may be one to two years old for some providers.
The system currently has four\(^{16}\) levels of quality (level 1 being the lowest and level 4 being the highest) that are based on a set of criteria using an array of early learning and curriculum standards, environmental assessments, workforce qualifications and assessments of family and community engagement (Schilder, Young, Anastasopoulos, Kimura & Rivera, 2011; EEC 2013b). For the purposes of this study, the QRIS will provide data on each provider’s accreditation status (NAEYC, NAFCC or COA accreditation) and QRIS rating. However, because the QRIS is in the process of being validated, I will consult with EEC staff regarding validation findings prior to incorporating QRIS ratings into the study’s econometric models\(^{17}\). Although there is some debate over whether accreditation status is a valid measure of child care quality (Zan, 2005; Whitebook, 1996) and the Massachusetts’ QRIS ratings are still being validated (University of Massachusetts Donahue Institute, 2014), these are the best data available for the study.

Finally, I will use available data through the U.S. Census Bureau’s American Community Survey (ACS) 2008-2012 5-year sample and Massachusetts’ licensing database to construct measures of local licensed child care market supply and demand variables. The ACS is an annual nationwide survey of approximately 3.5 million households that collects information previously obtained through the decennial census’ long form, including data on household demographics such as age, gender, family and relationships, income, and employment (U.S. Census Bureau, 2013). This study will utilize ACS household demographic data to develop 1) a measure of child care demand and 2) a measure of the average market consumer’s ability to pay for child care. The study will use licensing data and market boundaries established by the U.S.

\(^{16}\) EEC plans to add a fifth quality rating level that “links high quality education and care with positive developmental and educational outcomes for children and youth” (EEC, 2013b).

\(^{17}\) Given the QRIS is in the process of being validated, at present, EEC is not comfortable releasing any of the raw data behind the QRIS ratings.
Census Bureau to develop a measure of child care supply. Refer to section 2. *Measures* for more information regarding the construction of these measures.

The transfer of administrative data from EEC to Brandeis University was completed on August 6, 2014. Based on licensing data from May 2013, the total sample size of providers for each of the three research questions is expected to be sizeable. The study sample for Paper 1 (Research Question 1) includes any licensed center or family child care provider in Massachusetts open and legally operating from May 2013 to April 2014\(^\text{18}\). According to May 2013 licensing data, 9,092 licensed family and center-based providers were legally operating across Massachusetts; approximately 73% of which were family child care providers and 27% were center-based providers. The study population for Paper 2 (Research Questions 2 and 3) includes any licensed center or family care provider in Massachusetts that served at least one subsidized child from May 2013 to April 2014. According to eCCIMS/CCIMS data, during May 2013 approximately 4,012 providers (44% of all licensed providers) participated in the subsidy system.

Once all data have been cleaned and compiled into an analytic database, power analyses will be conducted for each research question. I will use a power level of .80, conventionally sought in social science research, and an alpha of .05 to assess how small of an effect size I will be able to detect within each paper’s econometric models (see 3. *Data Analysis Plan*) and ensure that the chances of making a Type II error are low. However, with a sample of over 9,000 providers, of which 4,000 accept subsidies, it can be suggested that the study will have sufficient power to detect, at minimum, moderate effect sizes.

2. *Measures*

Using Massachusetts’ administrative data and U.S. Census’ ACS data, I will construct the

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\(^{18}\) This time period is the most recent year of data available for analysis.
dependent and independent variable measures identified in Figure 5. These measures correspond to the factors hypothesized to influence provider participation in the study’s conceptual model. Specifically, I will eCCIMS and CCIMS, to construct the following three dependent variables: 1) any participation (service to at least one subsidized child within the study period, May 2013-April 2014, versus no participation); 2) degree of participation (average monthly percentage of a provider’s caseload that is subsidized over the study period); and 3) participation by subsidy mechanism (service to voucher recipients only vs. contracted slot recipients only vs. both over the study period). Drawing on Massachusetts’ licensing, NACCRRAware, and QRIS data, I will construct 13 measures of provider characteristics and types of services offered including key variables of interest such as for- and non-profit status. One limitation of this data is that licensed capacity is the only capacity measure available. A provider’s total licensed capacity is not necessarily the same as the total number of slots a provider has available. Licensed capacity is the total number of children that the provider can serve in their building at any point in time. However, if the provider offers part-day slots to families, the provider may serve one child in the morning and another in the afternoon. Therefore, the total licensed capacity may not reflect the total number of unique children served by a provider. However, the licensed capacity is the best data available for this dissertation.

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19 Service to voucher recipients only will be defined as service to at least one voucher recipient over the study period, but no service to any contracted slot recipients. Service to contracted slot recipients only will be defined as service to at least one contracted slot recipient over the study period, but no service to any voucher recipients. Service to both will be defined as service to at least one voucher recipient and one contracted slot recipient over the study period.
The U.S. Census Bureau’s American Community Survey (ACS) 2008-2012 5-year sample will be used to construct three local market measures. First, I will construct a variable
that will serve as a proxy for the local market demand for child care services. Specifically, I will use the number of children under age 6 with their single-parent working or both parents working as a percentage of the total number of children under age 6\textsuperscript{20} by zip code tabulation area (ZCTA).\textsuperscript{21} Created by the U.S. Census Bureau, ZCTAs are “generalized area representations of U.S. Postal Service (USPS) ZIP Code service areas,” which are based on the aggregation of residential addresses within census blocks (U.S. Census Bureau, 2012).\textsuperscript{22} In order to assign child care demand to individual providers located within a ZCTA, I will geocode and link the data using the geographic information system ArcGIS.\textsuperscript{23} Second, I will construct a proxy for families’ ability to pay based on the median household income per ZCTA\textsuperscript{24}. Third, I will construct a proxy for the local child care supply (the level of provider competition). Specifically, I will use the U.S. Census Bureau’s Tiger/Line shape files (which identify the number of square miles per ZCTA) in combination with EEC licensing data on providers to construct a variable for the average monthly number of licensed providers per square mile per ZCTA over the study period (April 2013- March 2014).

Four regional subsidy policy and practice variables will be created and assigned to providers. First, I will calculate providers’ expected loss in revenue from subsidy participation, which is the difference between providers’ published private pay rates and the regional subsidy reimbursement rates determined by EEC. Construction of this variable will involve: 1) calculating the difference between each provider’s private pay rate and the regional

\textsuperscript{20} Data are not available to construct a child care demand variable based on the number of children under age 13, the federally implied age under which child care is needed (45 CFR 98.2).

\textsuperscript{21} This data is available through table ACS Table B2300.

\textsuperscript{22} Child care market boundaries are difficult to define (Grobe, Weber, Davis, Kreader & Pratt, 2008). This study will use ZCTAs as proxies for zip code areas, which researchers like Emlen (1992) have used in market price surveys.

\textsuperscript{23} I will first use ArcGIS geo-coding services to assign longitude and latitude measurements to provider addresses identified in the EEC licensing data. I will then use the U.S. Census Bureau’s Tiger/Line shape files to spatially join the census data with the geocoded provider data.

\textsuperscript{24} This data is available through table ACS Table B23008.
reimbursement rate for each age group that the provider serves (e.g. infant, toddler, preschooler, and school age) and 2) calculating the average difference across all age groups served by each provider. This average difference in rates will serve as a measure of the loss in revenue from the acceptance of subsidies\(^\text{25}\). Second, I will use EEC’s CCR&R crosswalk (which contains a listing of Massachusetts towns by CCR&R service region) and provider addresses (included in the licensing data) to create a variable that contains the CCR&R assigned to each provider. Third, using eCCIMS/CCIMS data, I will construct a control variable for the average monthly number of subsidies issued per EEC reimbursement rate region\(^\text{26}\). Fourth, using the subsidy reimbursement rate region crosswalk, I will construct a control variable for the EEC rate region that is assigned to each provider.

Finally, I will construct one interaction term using STATA (a statistical software package) that interacts organizational structure (for- vs. non-profit status) with potential loss in revenue from acceptance of the subsidy reimbursement rate. This interaction term will allow me to test two key hypotheses:

- For-profit providers will be more likely to participate if their private pay rates are equal to or below reimbursement rates.
- For-profit providers will be more likely to serve a larger proportion of subsidized children if their private pay rates are equal to or below reimbursement rates.

3. Data Analysis Plan

Data analysis will begin with construction of my analytic database (using the data sources

\(^{25}\) Note that providers can receive subsidy reimbursement only up to their private pay rates. In other words, if a provider’s private pay rate is below the subsidy reimbursement rate, Massachusetts will reimburse the provider at its private pay rate. Therefore, the loss in revenue from subsidy acceptance variable will be coded as zero for any providers whose private pay rate is below the subsidy reimbursement rate.

\(^{26}\) This includes all subsidized children, regardless of their source of eligibility. EEC provides subsidies for 1) children who are eligible based on their parents’ income and work/training/education activities, 2) children who have an active case with the state’s child welfare system, and 3) children whose parents receive Temporary Assistance for Needy Families (TANF) and/or are transitioning off of TANF and are eligible to receive subsidies.
identified in *Data & Study Sample* and data cleaning. In using administrative data, it is anticipated that some data may contain data entry errors or may be missing. Univariate and bivariate analyses will be conducted in order to identify any outliers or missing data and trends in outliers and missing data. Where possible, I will seek to correct data entry errors by consulting with EEC. Depending on the degree to which data are missing, I will consider either dropping providers from the analysis or imputing missing values using a multiple imputation (MI) technique (Rubin, 1976, 1996). MI is a simulation-based approach to imputing missing data that replaces missing values with multiple sets of simulated values and adjusts parameter estimates for missing data uncertainty (Wayman, 2003). Unlike other imputation procedures, MI will not underestimate the variance of estimates (Rubin, 1996). These and all other analytic procedures will be conducted using the STATA statistical software package.

After the analytic database has been cleaned and all measures (identified in Figure 5) have been constructed, I will run univariate and bivariate analyses to produce descriptive statistics for each of the three research questions. These univariate statistics will assess the central tendency and dispersion of the dependent and independent variables. Specifically, the central tendency will be assessed by the mean and median statistics and dispersion will be assessed by the minimum, maximum, variance and standard deviation statistics. Bivariate tests (including correlation analysis, t-tests and ANOVAs) will also be conducted to provide insight into potential sources of multicollinearity.

The study’s hypotheses, developed through the conceptual model, will then be tested using the following econometric models. The model for Paper 1 will include the pool of all licensed center and family child care providers in the state that are open throughout the study
period\textsuperscript{27}. The models for Paper 2 will include a subsample of licensed center and family child care providers participating in subsidized care at any point during the study period. All econometric models will be run using the standard multiple regression approach of entering all independent variables into the regression equation at the same time\textsuperscript{28}. Likewise, I plan to present regression statistics on all variables, including those that are statistically significant and insignificant\textsuperscript{29}.

**Model 1. Participation (Paper 1):** The first model will assess how provider characteristics and types of services offered, local child care market forces and regional subsidy policies/practices are associated with the probability that a provider served at least one subsidized child during the study period:

\[
Serves \ a \ Subsidy \ Recipient = \beta_0 + \beta_1(Provider \ Characteristics) + \beta_2(Types \ of \ Provider \ Services \ Offered) + \beta_3(Local \ Child \ Care \ Market \ Factors) + \beta_4(Regional \ Factors) + e
\]

where the terms in parentheses represent the sets of variables identified in Figure 5 and \(e\) represents the error term. The model will be run using multivariate logistic regression, which is appropriate for models with a dichotomous dependent variable. For ease of analysis and interpretation of results, I will convert logit coefficients into odds ratios.

**Model 2. Degree of Participation (Paper 2):** The second model will explore how provider characteristics and types of services offered, local child care market forces and regional subsidy policy/practices are associated with the relative percentage of a provider’s caseload that is subsidized (number of subsidized children/total licensed capacity\textsuperscript{30}). This model will be run on only those providers that have served at least one subsidy recipient over the study period. As

\textsuperscript{27} Providers that open or close during the study period will not be included in the analysis.

\textsuperscript{28} Stepwise regression techniques will not be employed.

\textsuperscript{29} No insignificant variables will be removed from the model to maximize R-squared.

\textsuperscript{30} This measure will be defined as the average monthly total number of subsidized children served as a proportion of a program’s total licensed capacity over the study period.
such, the dependent variable will range from over 0% to 100%.

\[
\text{Percent of Caseload Subsidized} = \beta_0 + \beta_1(\text{Provider Characteristics}) + \beta_2(\text{Types of Provider Services Offered}) + \beta_3(\text{Local Child Care Market Factors}) + \beta_4(\text{Regional Factors}) + e
\]

Because the dependent variable in this model is a proportion, bounded by 0 and 1, the effect of explanatory variables will tend to be non-linear and the variance will tend to decrease when the mean gets closer to one of the boundaries (Kieschnick & McCullough, 2003). As a result, linear estimation techniques such as ordinary least squares (OLS) regression, are not appropriate. Instead, as suggested by Kieschnick and McCullough (2003) and Johnson, Kotz and Balakrishnan (1995), a beta regression model will be estimated. This model, while as not well known in the social sciences, is commonly used in the physical sciences (Johnson et al., 1995) and, more recently, in economics (Hviid & Villadsen, 1995) and studies in political economy (Prather, 2013). This model assumes that the dependent variable is beta distributed, which is known to be more flexible for modeling proportions given “its density can have different shapes depending on the values of the two parameters that index the distribution” (Ferrari & Crivari-Neto, 2004, p.2).

However, because beta regression essentially ignores all observations at 0 and 1, I will first assess the distribution of my dependent variable. If I find that no providers serve only subsidy recipients (100% participation) over the study period, I will utilize beta regression to analyze my model. If I find that there are some providers that only serve subsidy recipients over the study period, I will consider using a zero-one inflated beta regression model. A zero-one inflated beta model is appropriate to use in situations where the decisions for proportions of 0 and/or 1 may be different from all of the other proportions. In this case, it’s reasonable to assume that providers that decide to only accept subsidies (100% participation) and not private pay clients have made this decision based on different factors than those that only participate to a
certain degree. A zero-one inflated beta model consists of three parts: 1) a logistic regression model for whether or not the proportion equals 0, 2) a logistic regression model for whether or not the proportion equals 1 and 3) a beta model for the proportions between 0 and 1. In this case, because the model will be run on only providers that have participated in the subsidy system over the course of the study period, the first logistic regression for whether or not the proportion equals 0 would not be analyzed. Further, for ease of analysis and interpretation of results, I will convert the model coefficients to marginal effects.

An alternative approach to assessing this research question is to evaluate the distribution of the dependent variable to determine whether there are any natural groupings of providers into categories of participation (e.g. low, moderate and high participation or low and high participation). Depending on the number of categories identified, I will run either a logit or ordinal logit to determine how provider characteristics and types of services offered, local child care market forces and regional subsidy policy/practices are associated with different degrees of participation in the subsidy system:

\[
\text{Category of Participation (H, L or H, M, L) = } \beta_0 + \beta_1(\text{Provider Characteristics}) + \beta_2(\text{Types of Provider Services Offered}) + \beta_3(\text{Local Child Care Market Factors}) + \beta_4(\text{Regional Factors}) + e
\]

For ease of analysis and interpretation of results, I will convert the model coefficients to marginal effects.

**Model 3. Participation by Subsidy Mechanism (Paper 2):** The third model will assess how provider characteristics and types of services offered, local child care market forces and regional subsidy policies/practices are associated with the probability that a provider will participate in the voucher system only vs. the contracts system only vs. both systems:
Type of Participation = $\beta_0 + \beta_1(\text{Provider Characteristics}) + \beta_2(\text{Types of Provider Services Offered}) + \beta_3(\text{Local Child Care Market Factors}) + \beta_4(\text{Regional Factors}) + e$

Given the dependent variable is comprised of three categories of subsidy participation the model will be run using multinomial logistic regression. For ease of analysis and interpretation of results, I will convert regression coefficients into relative risk ratios. One limitation of the multinomial logit model is that it assumes that the error terms are independent across alternatives for a provider. In other words, it assumes that the various types of subsidy participation (vouchers only, contracts only and both) are completely independent of each other. I will conduct standard specification tests, including the Small-Hsiao test, to ensure that the model assumptions are not violated. If a violation is identified, further exploration will be conducted by testing alternative categories of provider participation. For example, I may use logistic regression to assess how the independent variables are associated with participation in vouchers only vs. contracts only (excluding all providers that participate in both mechanisms from the model). I may then use logistic regression to assess how the independent variables are associated with participation in only one type of subsidy mechanism (vouchers only or contracts only) compared to participation in both mechanisms (vouchers and contracts).

**All Econometric Models:** In order to test the conceptual model and hypotheses related to providers’ legal structure, I will run all of the models above first on the entire sample of providers (all licensed center and family child care providers for Model 1 and all licensed center and family child care providers participating in the subsidy system for Models 2 and 3) and then separately on for- and non-profit providers. The key interaction term proposed in this dissertation (organizational structure*loss from regional subsidy reimbursement rate) will only be included in econometric models run on the full samples of providers (not in the models run...
separately on for-and non-profit providers). It should be noted that care will be taken in interpreting and testing the interaction term. If the dummy variable for organizational structure is coded as 1 for non-profit providers and 0 for for-profit providers, by including the interaction term in an econometric model, the coefficient for organizational structure will show the effect of loss in revenue from the regional subsidy rate for for-profits on subsidy system participation. The coefficient for loss in revenue from the subsidy reimbursement rate will show the difference in effect between for- and non-profits when the loss is zero. These coefficients will provide key information in testing whether for-profits whose private pay rates are equal to or below the reimbursement rates are more likely to 1) participate in the subsidy system and/or 2) serve a larger proportion of subsidized children.

I will also test for multicollinearity among the independent variables in each of the models above by using the tolerance and variance inflation factor (VIF). Tolerance is a measure of how much collinearity a regression model can tolerate and the VIF is an indicator of how much of the inflation of the standard error may be the result of collinearity (Kennedy, 1992). A high VIF and a low tolerance measure (that approaches zero) are indicative of a multicollinearity problem. Using Kennedy’s (1992) suggested VIF cut-off, I will consider any VIF greater than 10 as an indicator of multicollinearity. If the multicollinearity stems from the inclusion of the interaction term (organizational structure*loss from regional subsidy reimbursement rate), I will consider centering the variable in question (transform the variable into the variable less its mean) and creating a new interaction term with this newly centered variable (i.e. organizational structure*centered loss from regional subsidy rate). Alternatively, I will consider removing variables that are causing the multicollinearity. Finally, post estimation

31 Note that the loss in revenue from subsidy acceptance variable will be coded as zero for any providers whose private pay rate is below the subsidy reimbursement rate.
32 I will use the STATA program ‘collin’ to produce the tolerance and VIF indicators.
tests will also be conducted to assess the validity of each econometric model including Wald, Hosmer-Lemeshow and Likelihood Ratio tests.

It should also be noted that I will consider using multi-level modeling (MLM) techniques for each of the models described above. An MLM model is appropriate where data are nested and violate the assumption of independent errors of standard regression analysis (Garson, 2013). Specifically, in this study, depending on the model, providers in the same EEC reimbursement rate regions may act similarly because they are facing the same reimbursement rate constraint. Ignoring this type of nesting can lead to incorrectly estimated standard errors, incorrect levels of statistical significance and, therefore, biased estimates of the relationship among variables. Therefore, I will test for the need for the use of MLM using an intra-class correlation coefficient (ICC). Using Lee’s (2000) suggested ICC baseline, I will consider an ICC value of less than 10% as the decision rule to reject the estimation of a MLM model.

C. Paper 3 Research Plan

1. Data & Study Sample

Paper 3 will examine the study’s three research questions through the collection of qualitative data through semi-structured interviews with a sample of approximately 20 center-based child care provider directors/staff responsible for deciding whether, to what degree, and how to participate in the Massachusetts subsidy system. This qualitative approach adds a different perspective that focuses on why providers operate the way they do relative to participation. The study sample will include directors/decision-makers from licensed center-based providers that currently do and do not participate in the subsidy system in two CCR&R service regions: the Boston and Worcester regions.

These regions have been selected based on two criteria. First, these regions contain
different levels of provider participation. Boston contains the highest level of participation in the state with approximately 65% of providers participating, while Worcester has low participation at only 34%\(^33\). Second, these regions appear to contain contrasting provider preferences for subsidy mechanisms. As is demonstrated in Figure 3, while providers in Boston participate the most in vouchers and contracts and the least in contracts only, providers in Worcester participate the most in contracts only and the least in both vouchers and contracts. Given the regional differences in outcomes in terms of the level and mechanism(s) of participation in the subsidy system, do the determinants identified in the conceptual model help explain provider decision-making or are there other factors that explain provider participation? These two regions will provide good contrasting cases from which to study provider participation.

**Figure 3. Subsidy Mechanisms Used in the Boston & Worcester Service Regions**

<table>
<thead>
<tr>
<th>CCR&amp;R Service Region</th>
<th>Vouchers &amp; Contracts</th>
<th>Vouchers Only</th>
<th>Contracts Only</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boston</td>
<td>45%</td>
<td>39%</td>
<td>16%</td>
<td>100%</td>
</tr>
<tr>
<td>Worcester</td>
<td>28%</td>
<td>31%</td>
<td>41%</td>
<td>100%</td>
</tr>
</tbody>
</table>

Approximately 8 to 10 child care providers will be purposively sampled from each of these service regions. Further, the study will employ a stratified purposive sampling technique, often applied in mixed methods research (Teddlie & Yu, 2007) to better facilitate contrasts and comparisons across sub-populations (Patton, 2002). Using this technique, I will divide the list of all licensed center-based child care providers from each of these two regions of the state into 4 separate sampling pools based on the following strata: 1) participation in the subsidy system and 2) for- and non-profit status. As suggested by the conceptual model, there are fundamental differences in the mission and purpose of non-profit versus for-profit organizations that might impact provider participation decision-making, with non-profit organizations being mission

\(^33\) These statistics are based on January 2012 EEC administrative data. The Worcester region has the second lowest participation rate in the state. The Greenfield Region (in western Massachusetts) has the lowest at 29%.
driven and for-profit organizations driven by profit maximization. As is demonstrated in Figure 4, two to three centers will be randomly selected from each set of strata for each region. The goal will be to get a mix of participating and non-participating providers with different ownership structures in order to best explore the study’s research questions and hypotheses.

The recruitment of sampled child care center directors/decision-makers will take place first via email and then via phone using EEC’s licensing database of provider email addresses and phone numbers. The recruitment email and phone script will ask directors whether they make decisions regarding subsidy system participation and if they do not, who at their organization would make these decisions. For directors who do not respond, an additional follow-up email and phone call will be placed. If there is no subsequent response, I will randomly select a new center from the appropriate sampling pool. Recruitment will continue using this approach until approximately 20 directors agree to participate in the study. Given Massachusetts has a long history of conducting child care research studies involving provider phone surveys and interviews, providers in the state are accustomed to being contacted by research organizations. However, in order to bolster response rates for this study, I will seek the advice of the Worcester and Boston CCR&R agency directors to identify the most advantageous recruitment strategies (e.g. best times of day to call providers and preferences for communication via email vs. phone). I will also seek the advice of other researchers who have conducted interviews with providers in the state including the Bessie Tartt Wilson Initiative for Children (Washington & Reed, 2008) and the Urban Institute (Adams, Snyder & Tout, 2003).
Interviews with child care directors/decision-makers will take place over the phone. Prior to implementing data collection, I will conduct four pilot interviews with two participating and two non-participating providers in order to test and refine the interview protocol. Interviews should take approximately one hour to conduct and will not be taped or transcribed. Instead, I will take detailed interview notes. At the start of the designated interview time, information about the current study will be explained to the child care director/decision-maker. Additionally, they will be informed that 1) any information obtained from the interview will not be attributable to their names or organizations, 2) interview notes will be stored on a password-protected secure server and 3) their participation in the interview is strictly voluntary and that refusal to participate will not be communicated to EEC.

The pilot interviews conducted with the non-participating providers will also allow for the assessment of whether or not non-participating providers can offer useful information for the study. Non-participating providers may struggle to recall how and why they decided not to participate in the subsidy system. Additionally, non-participating providers may be harder to recruit for the study. Therefore, if pilot interviews do not yield any significant information, with the approval of the dissertation committee, I may refocus Paper 3 on assessing only those providers who are currently participating in the subsidy system.

2. Measures

Data will be collected through interviews with provider decision-makers using two semi-structured interview guides, one for participating providers and one for non-participating providers. The guides will include, at minimum, questions about decision-maker processes/practices relevant to the study’s three research questions. The guides will document providers’ history of participation in the subsidy system and the reasons for entry and exit. It will
include probes for whether providers consider mission in their decisions. The guide will also ask questions about providers’ use of private donations or grants and revenue from private pay clients in the context of decisions regarding subsidy participation and whether established relationships with CCR&Rs play a role in provider decision-making. Questions regarding the general capacity of the organization will include discussions about staffing and support services and knowledge of subsidy rules and training specific to subsidy management. Finally, the guides will ask questions about providers’ future involvement in the subsidy system and views regarding effective incentives and barriers to participation.

The interview guide for participating providers will contain additional questions related to provider decisions about the volume of subsidy recipients accepted and the mechanism of participation (contracts and/or vouchers). The guide will probe for questions about providers’ cost structure and capacity and how they may influence decisions regarding subsidy recipient volume and participation mechanisms. Questions will also assess providers’ opinions about the costs and benefits of each subsidy mechanism and how that may affect providers’ participation.

3. Data Analysis Plan

All interview data collected will be coded and analyzed using NVivo software to identify themes within and across service regions and within and across provider decisions related to whether, to what degree and through which subsidy mechanism they choose to participate in the subsidy system. Coding will be conducted using 1) deductive codes developed prior to interviewing child care providers based on the conceptual model of provider decision-making about child care subsidy participation (Figure 2) and findings from the quantitative models predicting participation and 2) inductive codes that emerge from the interview data (Fereday & Muir-Cochrane, 2006). For example, deductive codes may include “loss in revenue from
subsidies”, “mission alignment”, “umbrella organization resources”, etc.; whereas, an example of an inductive code that may emerge from interviews is “provider feelings of obligation to the local community”. As suggested by Yin (2009), I will use the strategy of returning to original propositions identified through the conceptual model while also examining emergent and rival explanations to original hypotheses throughout my analysis to ensure that all critical findings are identified. Additionally, in order to support the reliability of the study’s findings, I will have a fellow student researcher or member of the Institute for Child, Youth and Family Policy (ICYFP) team at Brandeis University code notes from approximately 3-4 interviews. These codes will then be triangulated with my own codes to assess reliability. Specifically, I will use NVivo software to run a coding comparison query to produce a percentage agreement statistic and Cohen’s Kappa Coefficient. The percentage agreement statistic indicates the “percentage of the source’s content where the two [coders] agree on whether the content may be coded at a node”, whereas Cohen’s Kappa Coefficient “takes into account the amount of agreement that could be expected to occur through chance alone” (QSR International, 2014). Cohen’s Kappa Coefficient can range from 0 to 1. The closer the coefficient is to 1, the more closely the coding is aligned. I will use these statistics to assess the inter-rater reliability of the study’s coding. Using Altman’s (1991) suggested Cohen’s Kappa Coefficient rubric, I will assess reliability based on the following thresholds:

<table>
<thead>
<tr>
<th>Kappa Coefficient</th>
<th>Strength of Agreement</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.81 - 1.00</td>
<td>Very Good</td>
</tr>
<tr>
<td>0.61 - 0.80</td>
<td>Good</td>
</tr>
<tr>
<td>0.41 - 0.60</td>
<td>Moderate</td>
</tr>
<tr>
<td>0.21 - 0.40</td>
<td>Fair</td>
</tr>
<tr>
<td>&lt; 0.20</td>
<td>Poor</td>
</tr>
</tbody>
</table>

Finally, findings from the quantitative methods will be triangulated with findings from the qualitative research. In doing so, this study will seek to build a more robust and
comprehensive set of predictors of provider participation in subsidy systems.

**D. Data Protection & Confidentiality**

All data collection and analysis procedures proposed under this dissertation have been reviewed by the Brandeis University Institutional Review Board (IRB) as a requirement for protection of confidential data. It has been determined that this dissertation does not constitute research involving human subjects and, therefore, does not fall under the purview of the IRB (see Appendix B). However, confidentiality of all quantitative and qualitative data will be strictly enforced throughout the study. No study subject names will be attached to any interview notes and all qualitative and quantitative results will be reported in the aggregate.

All quantitative and qualitative data collected under this dissertation will be stored on a Brandeis University secure network server. The secure server contains all necessary analytic software to conduct analysis and files can only be moved onto or off the server using secure file transfer protocol (SFTP). Access to the secure network data storage folder is granted only to researchers at Brandeis University who have been authorized by EEC to access the data.

**E. Study Limitations and Future Research**

There are several limitations to this study that can be addressed by future research. First, given the data available for this study are compiled into a cross-sectional dataset, 1) causal inferences cannot be determined and 2) there may be selection bias based on the time period selected. In other words, results of this study are only representative of the study period. Future research could seek to compile a longitudinal dataset that follows changes in provider characteristics, services offered and local market factors over time.

Second, the ZCTA-level market factors used in this study may be too small or large of a geographic area to produce significant effects on provider decision-making. Future research
could identify or collect data at different geographic units (e.g. census tract or town) to understand how local market constraints are associated with provider decision-making. Interview data from this study may identify providers’ own viewpoints on the geographic boundaries of the local child care market in which they operate. This information may also be used in future work to identify more appropriate local child care market boundaries.

Third, this study may suffer from omitted variable bias that could be corrected with future data collection based on additional decision-making factors identified through the study’s qualitative research. This work could involve developing and administering a large scale survey that collects data not routinely collected by the state.

Fourth, the qualitative portion of this study explores a small sample of center-based providers in two regions of the state. Future work could qualitatively explore a larger sample of providers statewide and include an in-depth assessment of family child care provider decision-making.

Fifth, this study relies on providers’ use of child care subsidies as a form of payment as an indicator of participation in the subsidy system. However, it does not address providers’ willingness to participate in the subsidy system. Some providers may be willing to participate but do not have a child come to their facility seeking care using a subsidy. Alternatively, some providers may say they are willing, but find ways to deny subsidy users. Some of this information may be uncovered through this study’s qualitative interviews. However, future work could more explicitly examine providers’ willingness to participate against 1) actual use of subsidies as forms of payment and 2) the number of subsidy recipients who have tried but been denied access to care as well as the reasons for denial.

Finally, the results of this study may not be directly extrapolated to other states or
localities. However, the models developed through this study may provide other child care
subsidy administrators, policy-makers and/or CCR&R agencies with a framework for examining
provider participation in their own communities.

F. Publication of Research Findings

Paper 1

I plan to submit Paper 1 to *Children and Youth Services Review* for publication. This
paper aligns with the journal’s interest in interdisciplinary research on service programs for
children and youth in that it looks at provider participation in the child care subsidy system from
an economic, business and social policy perspective. In particular, the journal may be interested
in the dissertation’s conceptual model, which makes a substantial contribution to the child care
research field by analyzing participation in the subsidy system through an interdisciplinary lens.
Further, this paper is appropriate for submission given *Children and Youth Services Review* has
published several quantitative research studies regarding the child care subsidies and the child
care market.

Paper 2

Paper 2 will be targeted for publication in the *Journal of Policy Analysis and
Management*. Given paper 2 assesses determinants of the volume of provider participation in the
child care subsidy system and mechanisms of participation (contracts and vouchers), it aligns
with the journal’s focus on issues that impact public management and operations. The
readership of this journal includes government researchers and practitioners, economists,
operations researchers and consultants. This paper will provide, in particular, government
researchers and practitioners as well as operations researchers and consultants, with critical
insight into variation in provider participation by different types of providers, under different
policy and market conditions and through different subsidy mechanisms. The paper may also
direct state administrators to market particular subsidy mechanisms (contracts or vouchers)
towards particular types of providers in specific communities in order to increase participation
and reduce potential inequities in access to care.

**Paper 3**

I plan to submit Paper 3 for publication in *Social Service Review*. Established in 1927, *Social Service Review* publishes research on social welfare policy issues from a broad range of
disciplines, theories and methodological traditions, including research on the child care market
and child care subsidy system. In particular, the journal has published quantitative, qualitative
and mixed/multi-method research. Therefore, Paper 3’s triangulation of findings from this
dissertation’s qualitative and quantitative inquiry on provider participation in the child care
subsidy system is appropriate for publication in this journal.

**IV. Significance and Implications for Policy and Research**

Two of the core goals of CCDF are to “provide child care to parents trying to achieve
economic self-sufficiency” and “promote parental choice” in care selection (OPRE, 2014, p.2).
Key to achieving these two goals is to ensure that subsidy recipient families have access to a
broad range of high quality child care. However, if child care providers are not willing to accept
subsidies as a form of payment, low-income families will not be able to use them to access
otherwise unaffordable care, which, in turn, may have detrimental impacts not only on parental
choice in care, but also on parental employment and child development. Yet there is surprisingly
little research on provider participation in the subsidy system (Adams & Rohacek, 2012) and the
limited research that is available is largely descriptive and/or based on small samples of
providers in particular counties or local communities. This study will make significant
contributions to the child care subsidy field by establishing a conceptual model of provider participation that can be used and further refined by other researchers. The model will be tested using a multi-method approach that will incorporate a large statewide dataset, multivariate models, and qualitative data that will capture factors that are likely to be omitted from state administrative data systems.

The model developed and tested through this dissertation will provide child care subsidy administrators, policy-makers, and CCR&R agencies with critical insights into 1) variation in participation by different types of providers, under different policy and market conditions, and through different subsidy mechanisms and 2) potential determinants of and barriers to participation in the subsidy system. These results may direct subsidy administrators, policy-makers, and/or CCR&R agencies to target recruitment efforts towards particular types of providers in specific communities in order to ensure more equitable access to care and enhance parental choice. Likewise, these results may direct state subsidy administrators to target contracts with particular types of providers in specific communities in order to reduce inequities in access to care. With many states facing constricting budgets and no state able to offer reimbursement rates at market value (NWLC, 2013), this study will also provide administrators with critical insights into the types of providers that are able to remain financially resilient while still participating in the subsidy system. This information may assist administrators in both recruiting and maintaining provider participation.

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34 Many states contract with providers to increase the supply of particular types of care (NCCIC, 2010). For example, according to a review of FY2010-2011 CCDF state plans, as of July 2009, 7 states contracted with child care providers that offer services before and after school, 5 states contracted with child care providers that served children with special needs, and 4 states contracted with providers that served specific geographic areas (NCCIC, 2010). Based on the results of this study, Massachusetts may seek to contract with particular types of providers in particular areas of the state where access to care is limited.
V. References


Massachusetts Department of Early Education and Care [EEC]. (2012b). *Child care resource


VI. Appendix

A. Letter of Support from the Massachusetts Department of Early Education and Care
B. Brandeis University Institutional Review Board (IRB) Determination Letter