DOES STATE PRESCHOOL CROWD-OUT PRIVATE PROVISION? THE IMPACT
OF UNIVERSAL PRESCHOOL ON THE CHILDCARE SECTOR IN OKLAHOMA
AND GEORGIA

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ABSTRACT

The success of any governmental subsidy depends on whether it increases or crowds out existing consumption. Yet to date there has been little empirical evidence, particularly in the education sector, on whether"government intervention crowds out private provision. Universal preschool policies introduced in Georgia and Oklahoma offer an opportunity to investigate the impact of government provision and government funding on provision of childcare. Using synthetic control group difference-in-difference and interrupted time series estimation frameworks, we examine the effects of universal preschool on childcare providers. In both states there is an increase in the amount of formal childcare. In Georgia, both the private and public sectors grow, while in Oklahoma, the increase occurs in the public sector only. The differences likely stem from the states' choices of provision versus funding. We find the largest positive effects on provision in the most rural areas, a finding that may help direct policymaking efforts aimed at expanding childcare.

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I. Introduction

Governments often intervene to subsidize or provide goods and services that are considered to be under-provided in the private sector. For example, government involves itself in the provision of education, housing, health insurance and protection against crime. Theoretically, a major concern with government intervention of this type is that it will crowd-out private provision of a good or service, perhaps even rendering the overall amount of consumption to be the same under the scenarios with and without government intervention. If crowd-out occurs, valuable public resources may be being used inefficiently.

Efforts to find empirical support of the theoretical notion of crowd-out have been both relatively limited and mixed in their findings. The lack of a consensus on the magnitude of crowd out is largely due to difficulty in finding credible identification strategies, but is also likely due to environment- and institution-specific factors that complicate the simple notion that government provision of a good crowds out private provision. Consider one of the most popular empirical settings for testing the crowd-out hypothesis: publicly provided health insurance. Researchers have found empirical support for the notion that publicly provided health insurance for low-income families with children crowds out some private insurance consumption, but have debated about the magnitudes of the crowd out (Cutler and Gruber 1996, Card and Shore-Sheppard 2004, Gruber and Simon 2008). While some of the debate has centered on assumptions underlying various identification strategies, the difference in results may also be driven by differences in the quality of publicly and privately provided insurance and in the ease of switching between private and public providers.

Universal preschool policies introduced by states in recent years offer a novel and rich opportunity to investigate the impact of government provision and funding. These universal

preschool programs are large in scope, generally providing preschool services to all families with age-eligible children who want to enroll. Importantly, the programs we study, those in Georgia and Oklahoma, also were introduced suddenly with widespread care quickly becoming available. In both cases the universal program was a distinct shift from the previously existing government subsidized preschool programs providing care to low-income families on a much smaller scale. Moreover, the childcare market is an interesting setting to examine how public subsidization affects private provision because the childcare sector is a mixed market (with private and public provision), has low barriers to entry, and is relatively less concentrated than other industries.

Understanding the full impact of government preschool provision is important in its own right, as early childhood educational interventions have received increasing attention as potential tools for improving child development and life outcomes for children and their families. To date, the literature on early childhood interventions has focused largely on how government provision and funding affects child outcomes and family decision making (Currie and Thomas 1995, 1999; Blau and Currie, 2004; Magnuson et al. 2004; Gormley and Gayer 2005; Gormley et al. 2005; Schweinhart et al. 1993; Fitzpatrick 2008; Fitzpatrick 2010; Herbst and Tekin 2010). However, the effect of interventions on these child and family outcomes likely depends in part on provider response to the government program. Specifically, the impact of any government investment in early childhood, either through direct provision or through funding only, will depend on the extent to which it leads to an introduction of new and/or higher quality services, rather than a supplanting of previously provided programs.[1]

Although recent evidence sheds light on how regulation, the other main tool for government intervention in the childcare arena, affects the supply of childcare (Hotz and Xiao

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[1] Throughout the paper, we make a distinction between government subsidization through provision, when the government opts to provide a good or service itself, versus subsidization through funding alone.

2011), we know very little about what effects government provision and funding have on the childcare industry.[2] This lack of understanding is in part because many of the most widely studied interventions have been too small in scope to produce general equilibrium consequences and in part because data sources needed to answer this question have only recently become available. It is also not specific to childcare. More generally, little research has assessed the effects of government intervention through funding and provision on firms and workers, instead focusing on the effects on consumer decision making (Gruber and Simon 2008), charitable giving (Hungerman 2005) or on intergovernmental grants on government spending (Knight 2002, Gordon 2004).[3]

In this paper, we tackle two related but distinct research questions. First, we examine the effects of a state's introduction of universal preschool policy on childcare providers. To answer this question we use a differences-in-differences framework, incorporating both traditional and synthetic control group methods. Identification stems from comparing the supply of formal childcare (as measured using Census Bureau data on childcare providers) in states with universal preschool to that in states without universal preschool before and after the universal preschool policies were introduced. In both states there is an increase in the amount of formal childcare; in Georgia the number of childcare providers increases by 25 percent, while in Oklahoma it increases by more than 30 percent. In this setting, therefore, government intervention seems to increase consumption.

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[2] Both our data and that used by Hotz and Xiao (2011) focus on measuring the supply side of the childcare sector. Of course, what such data actually incorporate is the intersection of supply and demand, but in the interest of brevity we refer to our data as measuring the supply side of the childcare market, as is conventional in the literature.
[3] Historically, this literature had trouble identifying a crowd out effect of government provision or funding, but more recent papers using more credible identification strategies have begun to find support for the crowd out theory. For a review, see Payne (2009).

The state programs we study differ from each other in ways that could impact their effects on the industry. For example, in Oklahoma, universal preschool is publicly provided and operates through the existing public school system. In contrast, in Georgia, the programs have been set up as voucher-like subsidies where money from the state government follows children to the government-certified provider of their parents' choosing (either public or private). As a result, our comparison of the effects of universal preschool on the supply in these two states provides a case-study for understanding how government provision and government funding may have different effects on the supply side of a market.

Basic economic theory predicts that government provision of a good should result in decreased private expenditures on the good and may result in less overall consumption than government subsidization through funding alone (Peltzman 1973). This is because when the government provides a specific amount or type of a particular good, there may be additional costs to consumers (above the market price) of purchasing additional units. Consider the case of universal preschool, which we study here. In most cases the government provides a set amount of care (three or six hours a day). In order to obtain daycare for a full workday shift (eight hours), parents may have to piece together multiple arrangements, which is likely more costly than just purchasing two hours of childcare (e.g. transportation costs). On the other hand, if the government only provides partial care, the private sector may survive if parents demand full workday care and private centers adjust to the new environment (e.g. by providing transportation or operating for different hours).

Moreover, with government provision a new competitor to the private sector is introduced. This addition may crowd out private provision of a good relative to an environment where the good is provided through private consumption and government funding. Therefore,

despite being partly motivated by the goal of increasing the supply and use of a good,

government provision may result in less use of a good, in part because of its effects on private

providers.[4]

When comparing the results across the two states, we find that in Georgia, the increase is

partly driven by an increase in the supply of formal childcare in the private sector and partly

driven by new publicly provided preschools. This makes sense, given that the government

allowed both public and private providers to receive universal preschool funds. However, even

though the formal childcare sector expanded, we estimate that 75 percent of the publicly funded

universal preschool in Georgia took place in pre-existing private childcare settings. Meanwhile,

in Oklahoma, the increase in childcare providers is driven by expansion in the public sector only,

which concords with the flow of funds from the state to public schools. The resulting

competitive pressure of this public sector expansion leads to little decrease in the number of

private providers, but may have pulled workers from the private childcare providers into public

preschools.

Our second research question centers on understanding the effects of direct competition

from the universal preschools on the supply of childcare at the *market level*. Specifically, we

ask: does the presence of universal preschools in a neighborhood serve to increase the number of

childcare providers (and their staff) in the market or does it crowd out existing centers and home

daycare providers? To answer this question, we utilize two unique administrative datasets, one

drawn from tax records on businesses operating in the childcare industry and the other from

reported state spending and enrollment in universal preschool in Georgia and Oklahoma. Here,

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[4] Government intervention is sometimes also motivated by increasing the quality of the good or service consumed. In what follows, we abstract from possible changes in the quality of childcare due to a lack of data. Understanding whether government funding and provision have differential effects on childcare quality is a valuable avenue for future research.

we use interrupted time-series methods that utilize variation across counties over time in the amount of universal preschool to estimate its effects on the overall number of providers as well as the number of private providers specifically. We also examine how patterns of entry and exit of individual firms are altered by increased competition from universal preschool providers.

The localized effects of universal preschool display similar patterns to those of the policies' introduction at the state level. For example, when a universal preschool center enters a county in Georgia, the overall formal care sector expands. About half of the expansion is driven by the public sector and half by private providers. Meanwhile, universal preschool driven expansion of the formal care sector in Oklahoma is driven exclusively by the public universal preschool providers. Moreover, although theory suggests government provision might crowd out private providers, we can rule out contractions of the private formal care sector in Oklahoma that are larger than one percent. Suggestive evidence supports the notion that what little crowd out occurs takes place through increased exit of existing providers. Since we measure childcare for all aged children and universal preschool is only available for four year olds, the lack of crowd out may be driven by the expansion of providers into care for different aged children. Alternatively, the short hours of part-day care may make it possible for the private providers in Oklahoma to supplement the publicly provided universal preschool.

These more micro-level analyses also allow us to examine how the effects of universal preschool differ across communities with different populations. For example, we find that universal preschool had its largest effects on the formal childcare sector in the most rural areas and in places with low pre-existing levels of supply, a finding that may help direct policymaking efforts aimed at expanding the childcare sector.

In the next section, we describe the universal preschool programs in Georgia and Oklahoma. In Section III, we detail the data we use to answer each of the above questions. In Section IV, we describe our research design and the results for each question in turn before concluding the paper in Section V with a discussion of the implications of our results for policy.

II. What is Universal Preschool?

Before detailing our analyses, it is worthwhile to describe the universal preschool programs that we study in more detail, particularly because the implementation of universal preschool has been somewhat different across states. Georgia's Lottery for Education Act, passed in 1992, instituted a lottery which funds both the HOPE scholarship program and a pre-kindergarten initiative for four year olds.[5] While initially both programs targeted low- and middle-income households, by 1995, when lottery revenues exceeded expectations, the programs had expanded suddenly to include all age-eligible residents. In 2010, approximately 55 percent of four year olds were enrolled in Georgia Pre-Kindergarten (GPK) at a total state cost of $341 million. In 1998, the Oklahoma legislature expanded its existing means-tested Early Childhood Program for Four Year Olds (ECPFYO) to include all age-eligible children regardless of income. By 2010, enrollment in the program reached 71 percent of four year olds and cost $167 million.[6] Figure 1 details how enrollment in these programs grew.

In both states the programs are voluntary, free, and available to all children irrespective of family income. They operate for the length of the school year, but Georgia mandates a 6.5

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[5] The HOPE scholarship has received much more attention from politicians and economists than its sister program, Georgia Pre-K. For examples, see Dynarski (2000) and Long (2004).
[6] http://nieer.org/yearbook/pdf/yearbook.pdf (March 13, 2007)

hour day while Oklahoma offers both half- (2.5 hours) and full- (6 hours) day options.[7]

Educational requirements for teachers exceed those required for licensed child care facilities in

both states. Similarly, both programs impose class size, ratio and curriculum regulations that

exceed licensing requirements in their respective states. As such, universal preschool is

generally of higher quality than most existing childcare.

A wide range of facilities can provide universal preschool care in both states, including

public schools, Head Start centers, private child care centers, faith-based centers and other non-

profit centers. In practice however, the composition of providers differs substantially across the

two contexts. The state of Georgia transfers lottery funds directly to centers. In Oklahoma,

public school districts receive money from the general revenue allotted for the program on a

first-come first-served basis. The districts may then provide the service themselves or contract

out to child care centers that meet the state requirements. This stream of funding has led to a

much different mixed market structure than in Georgia. Indeed, while in Georgia only 20

percent of providers are public schools, in Oklahoma about 90 percent of the universal preschool

slots are provided through the public school system. In both states, however, the care provided

by the universal preschool program is considered formal classroom-based care for four year olds,

a point to keep in mind as we describe the data and our results about the effects of universal

preschool.

In 2010-2011, expenditures per child on universal preschool in Georgia averaged

$4,298, though actual reimbursement rates varied slightly based on location and teacher

education. In the same year, expenditures averaged $3,461 per child in Oklahoma, though actual

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[7] Both options in Oklahoma are free to parents but reimbursement rates to providers depend on the length of care provided. Both states encourage centers to offer additional care (after set program hours and during the summer). However, neither pays the cost of this "supplemental" care.

reimbursement rates depended on whether children attended full- or part- day sessions.[8] To

place the size of the subsidies in context, average child care costs for full-day center care for four

year olds in the U.S. ranges from $3,900 to $10,200.[9]

III. Data on the Supply of Childcare

To examine the effects of universal preschool on childcare providers, we utilize a number

of data sources, including many that have never before been available for studying the childcare

industry. First, to measure the number of and size of childcare centers and daycare homes (terms

we define below), we use two data sources compiled by the U.S. Census Bureau from Internal

Revenue Service tax return data: the Longitudinal Business Database (LBD) and the Integrated

Longitudinal Business Database (ILBD). The former includes information on firms that have

employees on payroll and the latter includes 'nonemployer' or 'owner operated' firms.[10] Since

childcare centers employ workers as teachers, directors, teacher's aides, etc. and home daycare

settings are generally operated and staffed by a single person, we refer to the former group as

childcare centers and the latter as family daycare homes. When combined, the two datasets

provide us with information on any operating childcare business that filed tax returns in a given

calendar year.[11] We make a distinction between the formal and informal sectors, centers and

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[8] http://nieer.org/yearbook/pdf/yearbook.pdf (October 28, 2011). Centers cannot receive more than a small
registration fee from parents in either state.
[9] http://www.naccrra.org/randd/ (October 25, 2007)
[10] In the data, there is a distinction between establishments (single locations of operation) and firms (the overarching
company, which may operate several establishments). Since most firms in the childcare industry are single-
establishment firms, we will use the terms firm and establishment interchangeably. Future work may distinguish
between the two things, in part to determine whether universal preschool has caused a shift towards more multi-
establishment firms.
[11] We subset to only those firms in the childcare industry according to their SIC or NAICS code. This means we
may be missing childcare provided by employers in other industries (to the children of their own employees, e.g.
hospitals, universities, etc.) and in churches. Additionally, these tax-return data are unable to capture anyone
working in this market who does not claim income for doing so (i.e. not filing a 1040 Schedule C). Those missing
are most likely to be babysitters, nannies and relatives providing care "off the books."

daycare homes, respectively, because prior research suggests that formal center care is of higher quality, on average, than care in family daycare homes (Kontos, Hsu, & Dunn, 1994).

Because IRS forms ask filers for slightly different types of information depending on whether they have employees or not, we have different information for different types of childcare providers. We use the information available to create the following outcome variables: number of private childcare centers, number of employees in private childcare centers, pay per employee in private centers, number of daycare homes, and total receipts for daycare homes. This information exists at the state-level for the period from 1990 to 2009 and at the county level for the period from 1990 to 2005.[12] In what follows, we describe our other data sources in turn and the measures we create using each data source. The descriptions are of variables at the county level, which we then aggregate to the state level in our state-level analyses. The exception to this is that we do not conduct state-level analyses using the data on the informal sector because public-use data exist only for one year before universal preschool was introduced in Georgia, which renders the difference-in-difference identification strategy ineffective. Using restricted access data on daycare homes at the state-level produces similar results to the county-level findings we present in Section IV, so we omit the state-level results on the informal sector in the next section.[13]

Our second resource for data is published information about the funding amounts of and enrollment in universal preschool in Georgia. This information has been amalgamated from several sources, including historical government publications and more recent administrative

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[12] The state-level data on childcare businesses comes from aggregating the County Business Patterns and the Nonemployer Statistics, which are published data derived from the Business Register of all operating business in the U.S. These public data are available for the whole time horizon from 1990-2009. Because some of our county-level analyses utilize direct links of businesses with our other data using name and address information, we limit our county-level sample to the period over which the restricted-access data containing this information is available, 1990-2005.

[13] Results are available from the authors upon request.

data which the state's universal preschool administrators, the Department of Early Care and Learning, shared with us.[14] Using these data, we create measures of the penetration of government-funded universal preschool in a community in a given year: the number of childcare centers receiving universal preschool funds in a county and the number of universal preschool funded classrooms in a county.

Third, we construct comparable data on universal preschool in Oklahoma. Because in Oklahoma universal preschool is provided through the public school system, we use public school enrollment information from Common Core of Data (CCD) to construct measures of the diffusion of government provided preschool.[15] The CCD collects information on enrollment by grade in public schools and we aggregate this information to construct the following measures: the number of schools in each county that provide universal preschool and the number of universal preschool classrooms in the county.[16] These are comparable to the number of centers and classrooms per county in Georgia.

In addition, many other states offer pre-k programs targeted at low-income or learning disabled students (in 2011, 39 states offered such programs, Barnett et al. 2011). We therefore also use the CCD to measure the amount of pre-k enrollment occurring in schools in other states. We combine the CCD and the LBD to get measures of the total number of formal centers and

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[14] Depending on the year, the data include measures of enrollment in or funding provided to each universal preschool program. We use annually reported pre-child funding measures to translate between enrollment and funding. Note that the data are not available to construct these measures for the 1996 and 1997 school years, so we drop these years from the analysis.

[15] Because a small fraction of the enrollment (10 percent) in Oklahoma universal preschool occurs in private centers arranged by the school districts, we were concerned that the CCD data would not capture all universal preschool enrollments in Oklahoma. However, detailed information about the prevalence of community provider based care is not available. We therefore cross-checked the total enrollment in the CCD with the total enrollment as reported by the state's Department of Education. The measures of total enrollment match, making us confident that the CCD info accurately measures the extent of universal preschool in Oklahoma. However, since school districts are reporting enrollment they contract out to local providers, we may be slightly overstating the amount of public provision.

[16] The number of schools in a county providing preschool is the count of the individual schools with at least 1 child enrolled in preschool. The number of classrooms is computed by taking the number of children in a school divided by 18, the class size limit, and aggregating the number of classes at all the schools in a county.

classrooms, both public and private, in each county in states without universal preschool. Note that we also use this combined CCD and LBD data to measure the size of the formal sector in Georgia prior to when the universal preschool program was introduced.

To summarize, we create several measures of childcare provision at the state and county level that we believe proxy for the amount and type of childcare in the market. As a measure of the overall supply of formal childcare we use the total number of both public and private childcare centers and their employment. If universal preschool increases preschool take-up, one of these measures should increase upon universal preschool introduction. (Of course, if providers were operating below full capacity, childcare consumption could increase without any of these measures changing.) To capture the role of the private sector in the provision of formal childcare, we use the number of private centers and employees. If the public universal preschool programs crowd-out the private provision of formal care, we should see a decrease in these measures. To capture the role of the private sector in informal childcare, we use the number of family daycare homes. Finally, because prior work has linked the pay of childcare workers to the quality of care provided, we use the pay per employee in private childcare establishments as a loose proxy for the quality of those centers (Whitebook and Sakai, 2003; Shonkoff and Phillips, 2000).

The average and standard deviations of these measures across counties in Georgia and Oklahoma are reported in Table 1. Both states have similar distribution of formal childcare centers across their counties, but the counties in Oklahoma seem to have more daycare homes, on average, than those in Georgia. In contrast, the formal daycare centers in Georgia have higher levels of employment than those in Oklahoma.

IV. Determining the Effects of Universal Pre-Kindergarten

Identifying the Effects of a Statewide Universal Pre-Kindergarten Policy

In the first of our analyses, we are interested in identifying the effects of a state government's introduction of a universal preschool policy on the supply of childcare in the state. Note that universal preschool introduced in these states was layered on top of an existing network of state and federal child care and early education programs, such as Head Start. For this reason the question we answer is: what is the effect of the introduction of a universal preschool policy on the supply of childcare above and beyond the effects of preexisting government involvement? Given the existing landscape, we consider this the most relevant policy question. The assumption underlying our use of the difference-in-difference strategies detailed below to answer this question is that the universal preschool policies in Georgia and Oklahoma were orthogonal to any other changes in the childcare sector in these states (relative to the states in the comparison group).[17]

Although the universal preschool policies in the two states are generally similar, they differ in one important dimension. Georgia's program operates much more like a voucher system, where any type of provider can apply to run a universal preschool classroom (provided they meet certain requirements) and will receive funding directly from the state. The Oklahoma system, on the other hand, operates largely through the public school system because the funds flow through the local school districts. We hypothesize these differences in program design may lead to differences in the effects of the program on firms and employees and therefore we separate this analysis by state. Although there are other differences between Georgia and

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[17] For confirmation that universal preschool introduction is not confounded by expansions in other government programs, like Head Start, see Fitzpatrick (2008).

Oklahoma that may also lead to differential effects of a universal preschool program, we use the comparison of effects in the two states as a case study for comparing government funding alone to government provision.

Our empirical strategy leverages the exogenous introduction of universal preschool programs in Georgia in 1995 and in Oklahoma in 1998 in a differences-in-differences framework. We do this first by estimating the following equation:

$$Y_{st} = \alpha + \beta X_{st} + \theta UPKinGA_{st} + \gamma UPKinOK_{st} + \delta_s + \vartheta_t + \varepsilon_{st}. \tag{1}$$

Equation (1) represents a traditional differences-in-differences framework, in which s indexes the state and t the year of the observation and there are controls for state (δ) and year (ϑ) fixed effects. *Y* represents an outcome variable from our set of measures of the supply of childcare detailed in the previous section, e.g. the total number of formal care providers. The variables *UPKinGA* and *UPKinOK* are dummy variables that take a value of one once the universal preschool policy is introduced in Georgia and Oklahoma, respectively. The identification assumption underlying our use of this specification is that nothing else changed in these states concurrent with the introduction of universal preschool. To reassure ourselves that this is the case, we also control for time-varying factors that might be related to childcare provision, such as the unemployment rate, the employment rate of women in the state, the number of children of school age, the number of children ages zero to five, the racial composition of residents, the poverty rate and median income of residents. The standard errors are clustered at the state level in order to allow for the possibility of serially correlated errors.

Because we estimate the relationship between universal preschool introduction and the supply of childcare separately for each state, we essentially have two case-studies of universal preschool introduction. The extent to which our model can be used to estimate the causal impact

of universal preschool introduction depends on identification a comparison group that accurately captures the counterfactual supply of childcare in Georgia and Oklahoma in the absence of universal preschool introduction. We present results using three comparisons: (1) all others states; (2) Southern states; and (3) a synthetic control group. Synthetic control group methods were recently introduced for estimating the effects of an intervention that has been given to only one treatment group, in this case only to one state (Abadie et al. 2010). In our application, this requires creating a synthetic control group for each of our two universal preschool states that best approximates the counterfactual supply of childcare in these states in the absence of universal preschool and the pre-treatment evolution of other characteristics that may be related to the supply of childcare.

Following Abadie et al., we create synthetic control groups for Georgia and Oklahoma by picking the weighted combination of all other states that minimizes the mean squared prediction errors of the outcome variables and a set of observable characteristics in the pre-intervention period.[18] More specifically, we define X_1 as a vector of observable characteristics in Georgia (or Oklahoma) before universal preschool is introduced and X_0 is the matrix of these characteristics in other states. We choose a vector of weights, W, that minimizes the following function, which represents the distance between the pre-treatment characteristics of Georgia and the other states:

$$\|X_1 - X_0 W\|_V = \sqrt{(X_1 - X_0 W)' V (X_1 - X_0 W)}.$$

In what follows, we choose a matrix, V, that assigns weights to the pre-treatment outcomes and characteristics in order to minimize the mean squared prediction error in the pre-treatment

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[18] Control group weights are available from the authors upon request. We use each outcome individually when creating the synthetic control group for the analyses using that outcome as the dependent variable. The results are qualitatively similar when we use all pre-treatment outcome measures simultaneously to create a synthetic control group. The observable characteristics that we use in the creation of the synthetic control groups are consistent over all of the analyses and include population size, age and racial composition of residents, income levels, unemployment rates, etc.

period. We then conduct inference by randomly assigning treatment status to states in the comparison group and comparing the distribution of the estimates of these placebo tests to those for our treated states.

Universal Preschool in Georgia

A visual inspection of childcare supply measures over the period suggests that universal preschool had some positive effect on the amount of childcare being provided in Georgia. Figure 2 plots the total number of childcare centers (Panel A), number of employees working at childcare centers (Panel B), the total number of private childcare centers (Panel C), number of employees working at private childcare centers (Panel D), and the amount of pay per employee (in thousands of $2010, Panel E) over the period studied. The solid black lines in each panel measure the outcome for Georgia, while the dashed black lines plot the outcome for the synthetic control group. The vertical line in each figure represents the first year in which universal preschool was implemented in Georgia, 1996.

In Panels A and B, the introduction of universal preschool seems to have increased the overall formal childcare sector both in terms of the number of centers and employees in Georgia relative to the number of centers and employees in the synthetic control group. The former increased by about 25 percent, while the latter increased by about 33 percent. The increase in the private sector, meanwhile, was less dramatic (Panels C and D). The number of private childcare centers increased by about 7 percent and the number of childcare workers in private centers increased by 25 percent. Finally, the annual earnings per childcare worker remain similar in Georgia and the synthetic control group over the period. These results suggest that universal preschool in Georgia increased the amount of formal childcare taking place in the state by

increasing the amount of both publicly and privately provided care. (In absolute terms, for example, the figures suggest universal preschool added between 100 and 200 private centers while expanding the total number of childcare centers by approximately 400.)

Of importance, however, is whether these estimated effects of universal preschool introduction are statistically different from zero. In Table 2 we present results, first for a set of traditional difference-in-difference specifications, then using the synthetic control group methods. In column (1), we present the results from equation (1) using the 48 other states as a control group. In column (2), we also use all other states as the control group, but include state-specific time trends to account for any changes over time in the childcare market that may not fully be captured with our set of controls. The estimates in columns (1) and (2) suggest that universal preschool increased the amount of formal care in Georgia by increasing the overall number of private and public centers (by between 239 and 682 centers) and the amount of employment in centers (by 1,546 to 10,650 employees).

The estimates in columns (1) and (2) also suggest that universal preschool in Georgia had a positive effect on the private formal care sector. For example, the estimates in Panel D show that universal preschool increased the number of employees in private child care centers by between 718 and 9,392 employees (both estimates are statistically significant). The estimated positive effect on the private sector is not uniform across outcome measures and specifications, however. For example, although the statistically significant estimate in Panel C of column (1) suggests that universal preschool in Georgia increased the number of private childcare centers by 251 facilities, the comparable estimate in column (2) indicates universal preschool actually caused a contraction in the private formal care sector of 19 centers (though the estimate is not statistically significant).

The childcare utilization of families in Georgia may be very different than that in other parts of the county, like the northeastern states.[19] Therefore, in Columns (3) and (4), we repeat the estimation with and without state-specific time trends using only the other states in the Census Bureau-defined South as the comparison group. The expansion in the formal care sector is still evident in the estimates in Panel A and B of Table 2, but our narrowing of the control group to only other Southern States has caused the effects of universal preschool on private establishments to decrease to 123 for models without state trends and -37 for the model with state trends, though the results are not statistically significant in either case. Similarly, the estimated effect of universal preschool on the number of private center employees is smaller in the comparisons to southern states, though still positive and not statistically different from the estimates for the full comparison group.

Inference in the synthetic control group method compares the predicted effect of universal preschool using the actual treated state and its synthetic control group to the estimated effect of universal preschool in placebo tests.[20] The synthetic control group estimates of the effects of universal preschool in Georgia are presented in column (5) of Table 2. These estimates, which are our preferred specification because of the close match between pre-treatment outcomes and other characteristics in the treatment and synthetic comparison states, show that the universal preschool policy increased the overall formal sector by 399 establishments and 6,314 employees. Both of these estimates are statistically significant at the 5 percent level.

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[19] http://nces.ed.gov/pubs2005/2005099.pdf (Accessed March 8,2012)

[20] The placebo tests involve taking each contributing member of the control group in turn and creating a synthetic control group as though it were the treated state. The predictability (mean square prediction error) of each of these placebo tests for the pre-treatment period is compared to its predictability in the post period. If there really were a shock effect of universal preschool the model should do less well at predicting the outcomes in Georgia in the pre-period relative to the post-period than it does in each of the other states. We conduct these placebo tests for each outcome in each of the other 49 states in our sample and determine statistical significance using the fraction of control group states that have a larger MSPE ratio (post-period to pre-period) than Georgia.

At the same time, universal preschool increased the number of private establishments by 109 (though this is only statistically significant at the 10 percent level). The total number of employees at private childcare centers increased by 4,294, an estimate that is statistically significant at the 5 percent level. Therefore, it appears that universal preschool increased the overall amount of formal childcare in Georgia by increasing the number of both public and private providers and by increasing employment levels in both sectors.

Though the number of government funded pre-k providers in Georgia was about 1,700 in 2005 (Figure 1), our estimates suggest the introduction of the universal preschool policy increased the overall number of childcare centers in the state by just 399. This suggests that universal preschool expanded the formal childcare sector, but that the majority of the publicly funded preschool took place in schools and centers that either existed before the introduction of universal preschool took place (and the source of funds switched from parents to the state) or are new publicly funded centers that forced out the previously existing centers. We return to this issue in later analyses, detailing trends in the entry and exit of individual firms, which gives us more traction on what took place.

Universal Preschool in Oklahoma

Figure 3 presents the number of childcare centers, employees in those centers and payroll per employee for Oklahoma and its synthetic control group. The figures show a distinct increase in the number of formal childcare centers of 30 percent (public and private combined, Panel A) but almost no change in the number of their employees (Panel B). Visually, it appears that universal preschool in Oklahoma may have had a small positive, perhaps temporary, effect (4 percent, Panel C) on the number of private childcare centers while decreasing the number of

workers in the private sector by about 16 percent (Panel D). As with Georgia, there was essentially no change in the payroll per employee (Panel E). These results indicate that while universal preschool increased the number of entities providing formal childcare in Oklahoma, it may have resulted in a contraction of the private sector as workers moved from private childcare centers to the new universal preschool classrooms in public schools. Because the overall number of centers does not change, this would imply smaller childcare centers.

To determine whether this is the case, we turn to our methods for inference presented in Table 2. Since the results of the synthetic control group method are our preferred estimates, we focus the discussion on the estimates in column (5). These suggest that the introduction of universal preschool in Oklahoma led to an increase of 448 formal childcare establishments, an estimate that is statistically significant at the 5 percent level and consistent with most of the other estimation approaches. Most of the other outcomes give estimates that are neither statistically significant at the 5 percent level, nor consistent across methods. However, we do find a decrease in the number of workers in the private sector of 1,332 workers, an estimate that is statistically significant at the 5 percent level. Since there was no concurrent decrease in the total number of employees (Panel B), this suggests that some of the workers in the formal private sector moved to the newly expanded publicly provided programs.

Identifying the Effects of a Local Universal Preschool Implementation

While the effect of the introduction of a universal preschool policy is one question of interest, we are also interested in examining the effects of the competition from government-funded preschool on the supply of childcare at a more micro level. Specifically, we are interested in whether government-funded preschools in a market serve to crowd out the childcare

that was already being provided in the market or whether they expand the existing childcare

opportunities for residents. This analysis is valuable for two reasons. First, it allows us to

determine whether the expansion of care was widespread or concentrated in places that actually

saw increases in government subsidized preschool. Second, using the more micro county-level

analyses, we are able to look for differences in the effects of universal preschool subsidization

across different types of communities, such as by income levels, racial composition and

population density.

To answer this question, we use county-level data on the outcomes in Georgia and

Oklahoma described above.[21] Because of the differences in policy design, we analyze each state

separately. Here, our estimation strategy is the following:

$$Y_{ct} = \alpha + \beta X_{ct} + \gamma UPK_{ct} + \delta_t + \theta_c + \pi_c t + \varepsilon_{ct}. \tag{2}$$

That is, we regress outcome Y of county c in year t on our variable of interest, UPK_{ct}. In

Georgia, universal preschool is defined as the number of government-funded centers in operation

in a given county in a given year. In Oklahoma, universal preschool is defined as the number of

government-operated centers (i.e. schools with universal preschool) in operation in a given

county in a given year.[22] In addition, we control for county (θ) and time (δ) fixed-effects in all

specifications.

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[21] Readers may be concerned that a county is not a small enough geographic area to appropriately proxy for a
market. However, there are 159 counties in Georgia and 77 in Oklahoma, which means we are less concerned about
our geographic proxy for a market than if we were using other states that had fewer counties. We are able to
conduct some of our analyses (those using the LBD data) at the tract level and the results are qualitatively similar,
though slightly larger in magnitude. This concords with the notion that firms will have the most impact on the firms
and workers closest to them.
[22] In Oklahoma, the public preschool enrollment comes from the Common Core of Data, in which is recorded the
number of children who live in a school district and who are enrolled in universal preschool, whether the preschool
classroom is housed in that particular public school or in a childcare center in the school district. To come up with a
measure of universal preschool provision that most closely mimics our measure in Georgia, we count the number of
schools who record positive enrollment. We tested alternative measures of universal preschool enrollment,
including the number of preschool classrooms in a county, the percent of four year olds in the county who were
enrolled in universal preschool, etc. The results are much noisier with these other measures, but show mostly the
same patterns of effects in Georgia and Oklahoma.

To interpret our estimated effect of the number of universal preschool centers on childcare supply as causal requires that the timing and scale of universal preschool provision in a county is uncorrelated with other factors that are likely to drive childcare supply in the market, net of the other controls in the model. For this reason, in some specifications, we include a host of control variables in order to capture time-varying market characteristics (X_{ct}) that may be driving childcare supply, including the income levels, unemployment rate, racial and age composition of residents and various school characteristics. In some specifications, we also include county-specific time trends to capture any other unobserved characteristics that are changing steadily over time, such as a change in preference for childcare use. When the model includes the full set of controls, the effects of universal preschool provision are identified off of deviations from the trend in the number of universal preschool centers that are correlated with deviations from trends in the number of childcare centers, employees, etc.

The results of these county-level analyses are in Tables 3 and 4 for Georgia and Oklahoma, respectively. In each table, we report coefficient estimates from two specifications, each with state and year fixed effects: one with state-specific time trends (Column 1) and one with these trends and time-varying community characteristics (Column 2). In both states, an additional universal preschool center in the county leads to an increase in the amount of formal care, but the effects on private provision in the formal and informal sectors is mixed. In what follows, we interpret the estimates on the fully saturated model (Column 2).

In Georgia, the increase in formal childcare is 0.39 centers for each universal preschool center. The addition of one universal preschool facility is also associated with a 0.23 increase in the number of private formal centers. (These estimates are quite stable across specifications, though not always statistically significant.) Also, the addition of another government funded

preschool in a Georgia county appears to increase the number of both public and private employees in the county by two workers, though the results are not statistically significant at the five percent level in all specifications. Wages, however, are hardly affected by increased competition from universal preschool providers within the county. Combined, the results suggest that universal preschool funding expanded the use of formal care by expanding both the public and private sectors. As with the state-level analyses, based on these estimates, it is difficult to tell whether the growth of the childcare industry was driven by pure expansion or reshuffling of the private market. We return to this later.

Turning to Table 4, in Oklahoma, a new universal preschool center (i.e. a school that is newly providing universal preschool) leads to an increase in the number of formal care establishments by almost exactly one (the coefficient is 0.96 and is statistically significant at the 1 percent level). This increase is not connected to a large decrease in the number of private childcare centers (the coefficient is just -0.04). In fact, given the standard error of 0.05, we can rule out scenarios in which the publicly provided centers decrease the number of private daycare centers of more than 0.14 centers for each universal preschool providing school. Since there are approximately 800 schools providing universal preschool in Oklahoma, this means that about 100 private childcare centers do not exist because of universal preschool. This represents less than one percent of the childcare centers in Oklahoma before its universal preschool policy came into place. In Oklahoma, public provision did not lead to a significant contraction in the private childcare market, though it may have led to a decrease in the size of existing private centers by encouraging employees to migrate to the public sector. (Just as at the state level, the results of market level analyses in Table 4 suggest that an additional public provider of preschool leads to

decreases in the number of workers in private childcare centers, but little change in the number of employees in sector overall.)

Finally, the estimated effects of universal preschool expansion on informal daycare homes are also reported in Tables 3 and 4. In both states, the estimates suggest universal preschool may have led to contraction in the informal market. However, in results not presented here, these estimates bounce around a good deal, changing sign and magnitude depending on the set of included control measures. Additionally, the standard errors are generally quite large, often rendering the estimates statistically insignificant. This could be for one of two reasons. First, the informal sector may fluctuate more than the formal sector. The barriers to entry are lower because the regulations regarding inputs are usually less stringent. It also may be easier to start or close a business without any employees than it is to hire and fire workers. Second, and perhaps more relevant for our current setting, the data on the informal sector may be noisier. The tax-return data we use may not be good at capturing the actual operation of such nimble firms if they are less likely to consistently report income and operation. For this reason, we do not make much of the results using the informal childcare measures.

New Entry or Crowd Out?

The results we have presented so far suggest that the private formal sector expands when the government uses its funding, rather than provision, as the mechanism of subsidizing universal preschool. Moreover, there appears to be little, if any, crowd out effect of public universal preschool funding or provision on the private formal childcare sector. Of interest, however, are the competitive dynamics underlying these results. One extreme possibility is that all of the universal preschool providers are providers who were in existence already as private

childcare centers but have switched their funding source. We can tell that this extreme story is not true in either state because our estimates show that in both states additional universal preschool providers lead to increases in the size of the formal childcare sector. Furthermore, a close look at the providers entering the universal preschool program in Georgia in its first few years of existence shows that about 65 percent were new providers in the market.[23]

Given that we know universal preschool increases the amount of formal childcare provision, there are two other possible scenarios. The new universal preschool providers could be all new centers just added to the market on top of the existing childcare providers. The above descriptive information from Georgia suggests this is not the case. Alternatively, the new centers could partially crowd out existing providers by either increasing the probability that they exit or decreasing the probability of non-universal preschool providers entering the market. Given constraints on the available data, it is difficult to measure the extent to which either of these scenarios is true, but we now detail two attempts to investigate these dynamics further.

We estimated models of individual firm behavior in Georgia and Oklahoma. For example, we estimated the following equation:

$$Entry_{ict} = \alpha + \beta X_{ct} + \gamma NewUPK_{ct} + \delta_t + \theta_c + \varepsilon_{ict}. \tag{3}$$

In equation (3), the outcome is entry of firm i in county c in year t, but we also run the analysis using firm exit. Operationally, we define a firm to have entered the market if it was not in existence in the previous year, t-1, and to have exited if it is not in existence in the following year, t+1. The universal preschool measure in this equation is the number of *new* (previously non-existent) universal preschool providers in the county between the current and previous years.

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[23] Based on matched UPK administrative and LBD data. Because of the available data, we used name and address to match firms across data sets, which produces a match rate of approximately 75 percent.

The results of estimating this equation using both entry and exit as the dependent variables for the firms in both Georgia and Oklahoma are in Table 5. The addition of a new universal preschool funded center in Georgia is associated with a decrease in the probability of new firms entering (0.01 percentage point decrease in the probability of entry) and a small increase in the probability of firms exiting (0.04 percentage point increase). The estimated effect on entry is too noisy to be statistically significant at conventional levels. However, the estimated effects on exit are statistically significant and suggest that, on net, universal preschool funding in Georgia led to a fifteen percent increase in the propensity of existing firms to exit. This is supportive evidence of some crowd out of existing firms rather than of new universal preschool providers purely being added to the existing supply. Universal preschool provision in Oklahoma had similar effects on entry and exit, though the estimates are smaller and not statistically significant at traditional levels.

How Does the Effect Differ Across Communities?

Previous research points to different patterns of childcare use that are associated with community residents' race, income levels and their population density (Fuller, Loeb, Strath, & Carrol, 2004; Bassok, Fitzpatrick, Loeb, Paglayan 2012). To investigate whether universal preschool may have had differential effects across communities with different types of residents, we re-estimate equation (2) and include interaction terms between quintile dummies for various community characteristics and the universal preschool measure (as well as the quintile dummies themselves). Specifically, we separate counties based on the following four characteristics: percent of residents who are African American, median household income of residents, percent of residents residing in rural areas, and the number of LBD establishments in existence at the

beginning of the period. We chose the first two characteristics because previous research has shown that families of different races utilize childcare in different ways and because, for predictable reasons, income is linked to the use of paid childcare. We include the last two characteristics because the effects of government intervention in an industry may depend on the existing amount of supply in the industry, which differs in urban and rural areas.

The results for Georgia using the latter two characteristics are in Table 6. We did not find any patterns of statistically significant differences in the effects of universal preschool expansion across the first two community characteristics in Georgia or any of the community types in Oklahoma, so we omitted the results in the interest of brevity.[24] Note that we included each set of community characteristic interaction terms in separate regressions. For each outcome, we report the coefficient estimates from two specifications, one with just the county-specific time trends and one with these trends and the time-varying observable characteristics of the county. All specifications in these tables include county and year effects and county-specific time trends.[25]

The results in Panel A suggest that universal preschool has the largest effects on the amount of childcare centers and employees in the most rural areas of Georgia. In Panel B, we see that this is likely connected to the fact that the most rural areas are those with the least number of daycare centers at the beginning of the period. In places where supply was low before universal preschool was introduced, universal preschool has the largest impacts on the number of both public and private childcare providers. However, in counties that had the most providers

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[24] These estimates are available from the authors upon request.
[25] We have not reported any results using information about family daycare homes because of the apparent noisiness of that data. Additionally, because the estimated effects on payroll per employee in childcare centers are negligible, we have omitted them here. They are available from the authors upon request.

before universal preschool was implemented, the expansion of the formal care sector occurs only through expansion of public providers, not through increased numbers of private providers.

V. Conclusion

In this paper, we have detailed the effects of publicly funded and publicly provided preschool, both in terms of the macro-level natural experiment of policy introduction and in terms of the market level effects associated with increased direct competition. Some consistent patterns emerged that are likely linked to the design of the governments' intervention into the early childhood care and education market. First, government funding of universal preschool in Georgia led to increases in the number of childcare providers in the formal sector that were likely driven by increases in both the number of public and private centers operating. Despite the fact that three-fourths of the government funded preschool takes place in the care of pre-existing providers, the childcare sector in Georgia expanded by nearly 20 percent.

Second, publicly provided preschool in Oklahoma led to increases in formal childcare in the state, largely driven by increase in preschools within schools. We show that this expansion in public provision of classroom-based preschool for four year olds did not lead to contraction of the private formal classroom-based sector for all ages of children. Whether this is because the additional preschool care was added to the market in addition to the existing preschool care for four year olds or because private providers were able to move into caring for children of different ages will require research using data that is yet unavailable.

The differences in the effects of universal preschool across these two states is likely driven by the subsidization mechanism chosen for the universal preschool program. Subsidization through government funding alone, as in Georgia, likely encourages private

provision more than government provision. Because the two states are case-studies, we cannot rule out that there are other differences between them that drive the differences in effects of universal preschool. However, the localized estimates of the effect of universal preschool expansion control for differences in characteristics. Therefore, this empirical evidence is a crucial first step in understanding the effects of government provision and funding of goods and services on the supply side both in the childcare sector and the economy more broadly.

Finally, we present new evidence on the differential effects of government subsidization of childcare in rural and urban communities. Our results suggest that government subsidization expands the supply of childcare the most in communities that have low levels of supply. In the states we studied, rural areas had the least amount of childcare and saw the greatest expansion in childcare with the introduction of universal preschool. This is an important finding for policymakers to keep in mind when designing policies for government subsidization and for educational interventions more broadly.

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Figure 1. Percent of Four Year Olds in Georgia Enrolled in the Georgia and Oklahoma Universal Pre-K Programs
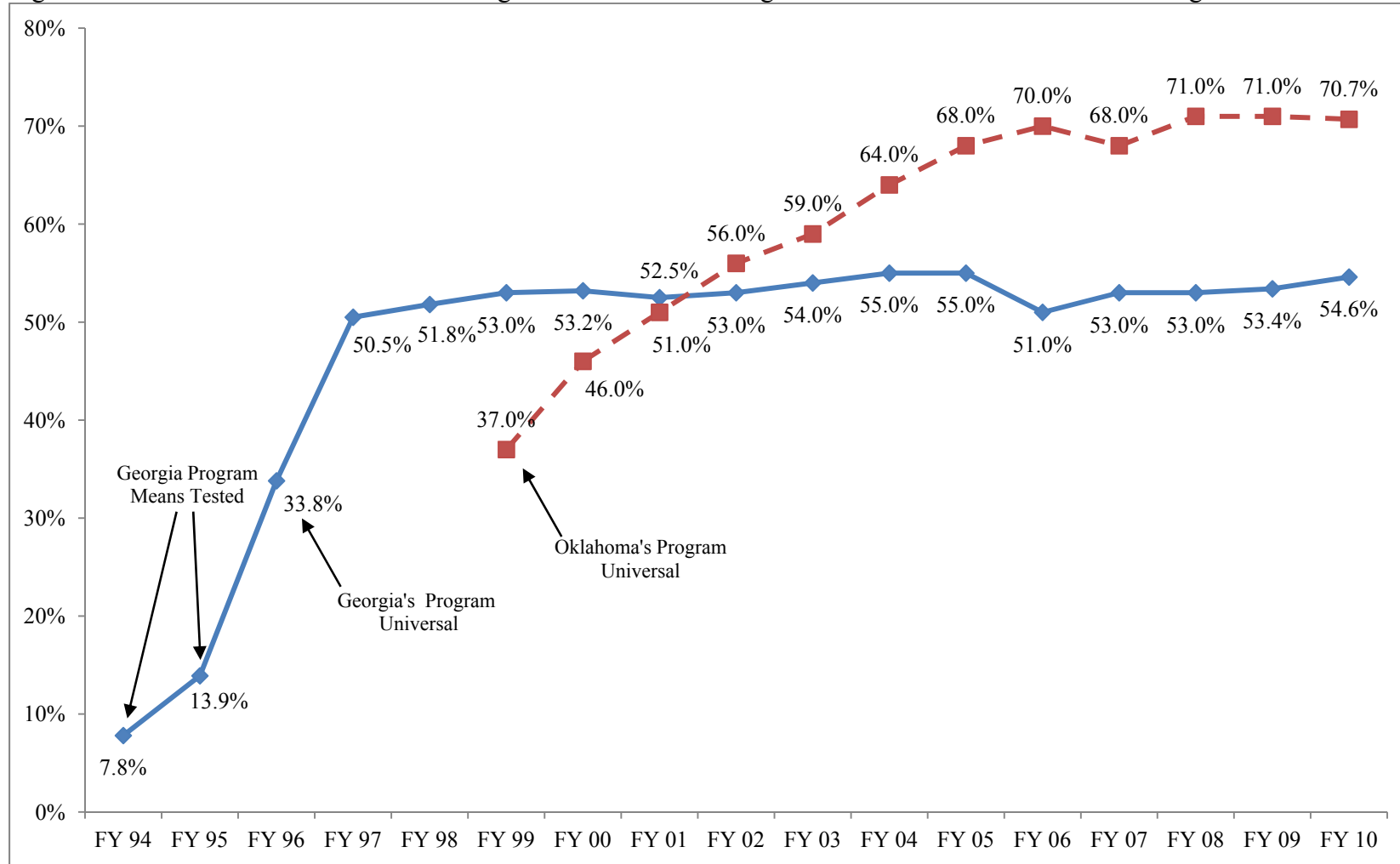

Notes: From Brackett, Henry and Weathersby (1999) and various web sources. A fiscal year runs from October of the previous year to September of the year in its name. For example, FY96 runs from October 1, 1995 to September 30, 1996. Percent of population of four year olds is calculated using the Census Bureau's Time Series of State Population Estimates by Age, which can be found at http://www.census.gov/.

Figure 2. Difference-in-Difference Estimates of the Effects of Universal Pre-Kindergarten on Supply of Childcare in Georgia
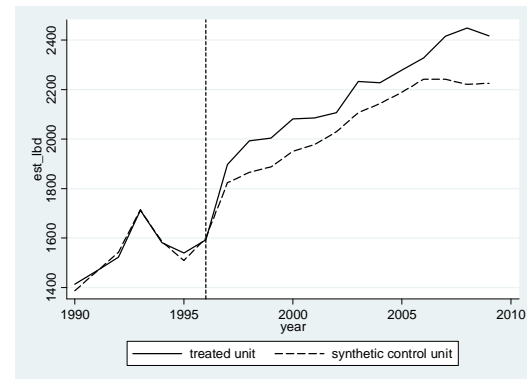
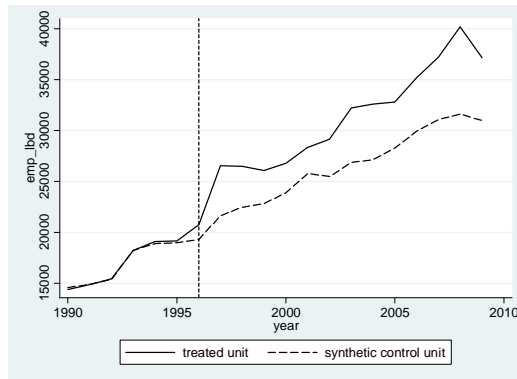Panel A. Total Number of Childcare Centers
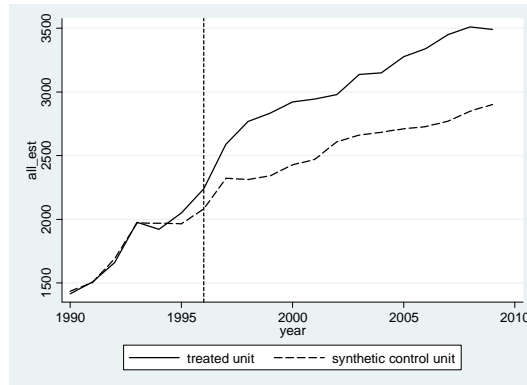
Panel B. Total Number of Childcare Center Employees
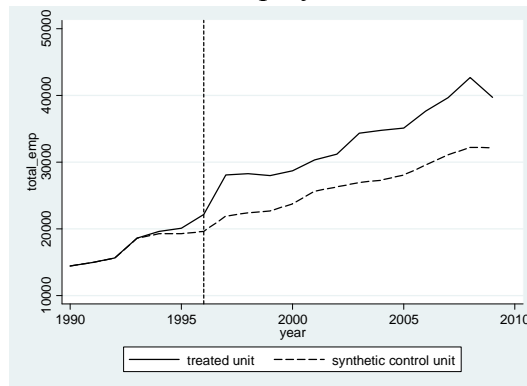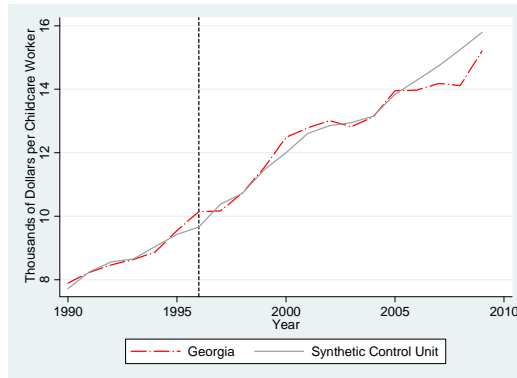

Panel C. Total Number of Private Centers

Panel D. Total Number of Childcare Center Employees in Private Centers

Panel E. Pay per Childcare Employee in the Private Sector ($1,000s)

Note: Based on the authors calculations using data from the CBP and CCD. The figures depict the synthetic control group estimate of the difference in a given measure of supply for Georgia (solid line) and a synthetic control group created as described in the paper.

Figure 3. Difference-in-Difference Estimates of the Effects of Universal Pre-Kindergarten on Supply of Childcare in Oklahoma

Panel A. Total Number of Childcare Centers

Panel B. Total Number of Childcare Center Employees

Panel C. Total Number of Private Centers
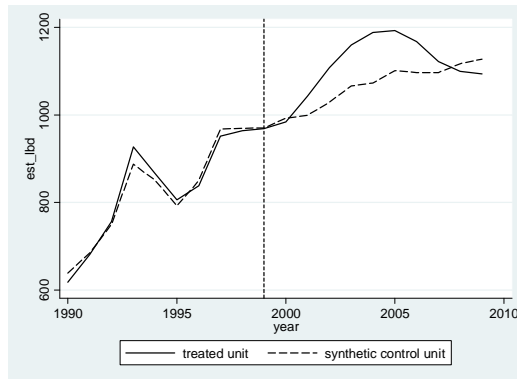
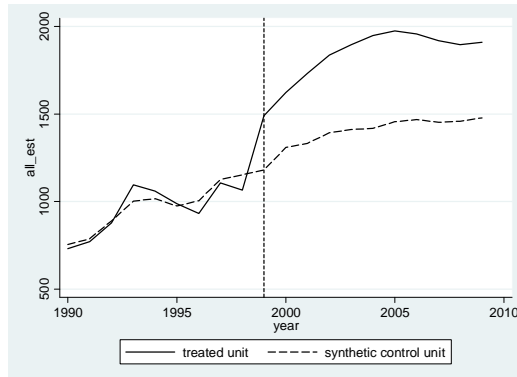Panel D. Total Number of Childcare Center Employees in Private Centers

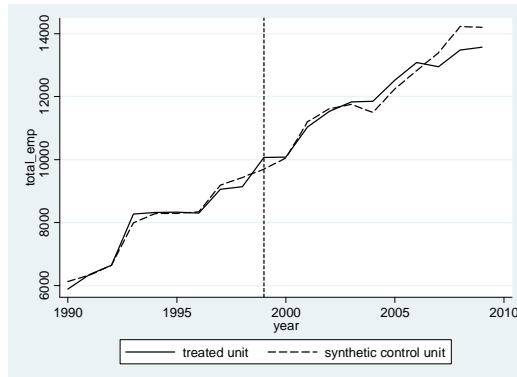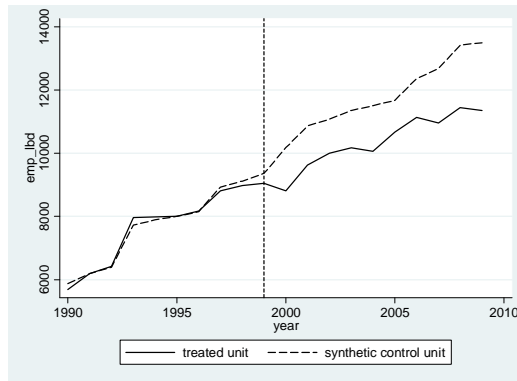Panel E. Pay per Childcare Employee in the Private Sector
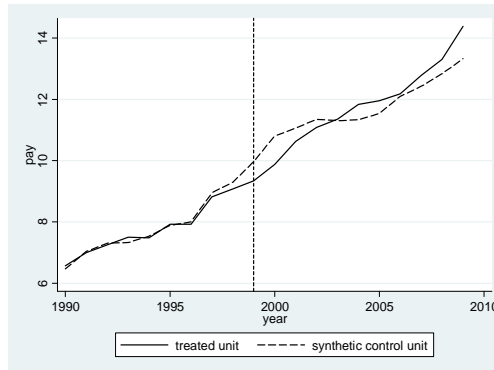
Note: Based on the authors calculations using data from the CBP and CCD. The figures depict the synthetic control group estimate of the difference in a given measure of supply for Oklahoma (solid line) and a synthetic control group created as described in the paper.

Figure 4. Enrollment of Four Year Olds in Universal Preschool across Counties in Georgia

Panel A. 1994

Panel C. 2002
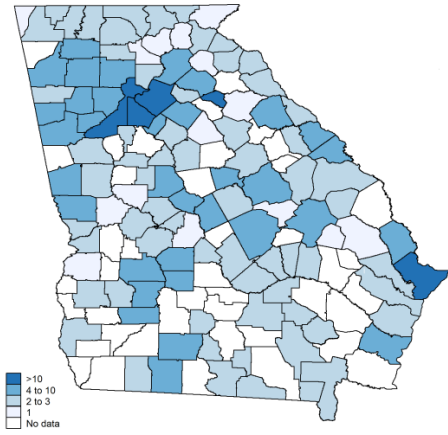
Panel B. 1998
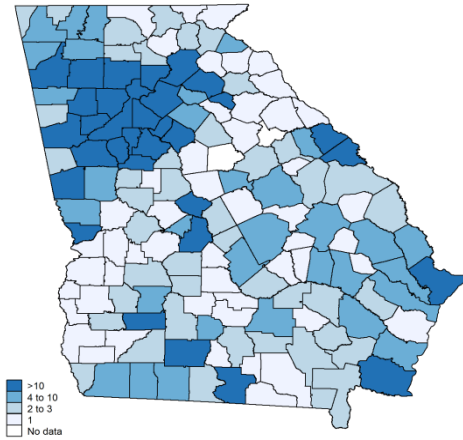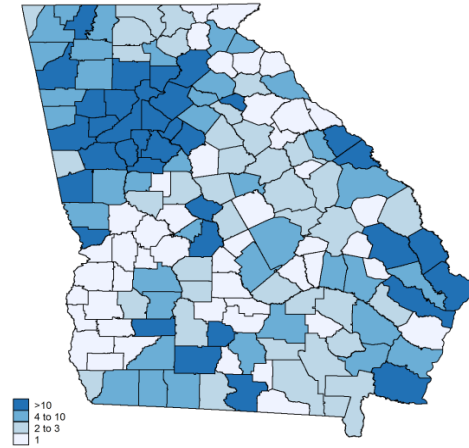
Panel D. 2005
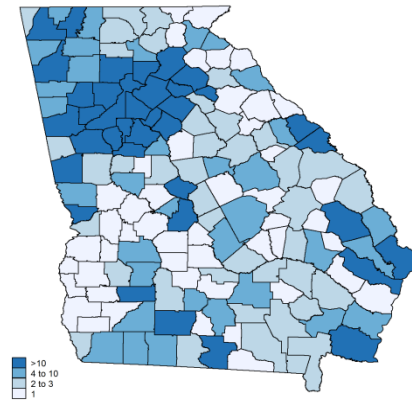
Note: Based on data compiled by the authors.

Table 1. Average Number and Characteristics of Childcare Centers and Family Daycare Homes across Counties in Georgia and Oklahoma, 1990-2005

| | Georgia | | Oklahoma | |
Outcome	Mean	Standard Deviation	Mean	Standard Deviation
Childcare Centers, Public and Private and Daycare Homes	92	199	109	241
Childcare Centers, Public and Private	19	40	20	41
Private Childcare Centers	13	31	14	30
Daycare Homes	73	160	89	201
Private and Public Childcare Center Employment	191	500	136	365
Private Childcare Center Employment	182	488	126	346
Private Childcare Center Payroll per Employee ($1,000s)	8	5	6	3
Daycare Home Receipts ($1,000s)	743	1,831	933	2,485
Number of Counties	159		77	

Note: Based on the authors' calculations using the LBD, ILBD and CCD for 1990 to 2005. Averages and standard deviations across counties over the whole period reported separately for Georgia and Oklahoma.

Table 2. Estimated Effect of Universal Pre-K Policy on Supply of Childcare in Georgia and Oklahoma

	Panel A. Childcare Centers, Public and Private				
UPK in Georgia	682**	239**	422*	290**	399*
	(143)	(76)	(179)	(90)	{0.02}
UPK in Oklahoma	301**	495**	65	453**	448*
	(89)	(18)	(145)	(34)	{0.04}
	Panel B. Childcare Center Employees, Public and Private				
UPK in Georgia	10,650**	1,546**	7,600**	1,725**	6,314*
	(1,569)	(234)	(2,052)	(480)	{0.02}
UPK in Oklahoma	-1,757	-16	-4,530**	188	-28
	(944)	(168)	(1,523)	(255)	{0.31}
	Panel C. Private Childcare Centers				
UPK in Georgia	251*	-19	123	-37	109
	(120)	(35)	(133)	(58)	{0.06}
UPK in Oklahoma	-148*	26*	-241**	-12	40
	(73)	(12)	(82)	(21)	{0.29}
	Panel D. Employees of Private Childcare Centers				
UPK in Georgia	9,392**	718*	6,649**	745	4,294*
	(1,491)	(299)	(1,891)	(569)	{0.02}
UPK in Oklahoma	-2,812**	-890**	-5,126**	-731**	-1,332*
	(872)	(170)	(1,231)	(245)	{0.04}
	Panel E. Pay per Employee in Private Childcare Centers, $1000s				
UPK in Georgia	-0.177	0.568**	-0.211	0.720**	-0.103
	(0.408)	(0.126)	(0.381)	(0.237)	{0.42}
UPK in Oklahoma	-0.674**	-0.429**	-0.455	-0.274*	0.090
	(0.132)	(0.090)	(0.270)	(0.129)	{0.48}
State X Year Trends		Y		Y	
Comparison Group	All States	All States	Southern States	Southern States	Synthetic Control
Number of Obs.	1,019	1,019	340	340	

Note: Based on the authors' calculations using the state-level CBP and the CCD for 1990 to 2005. Standard errors are in parentheses. Each row and column combination presents results for a separate differences-in-differences specification with the dependent variable given by the row header and the sample as listed in the bottom row. All columns include state and year fixed effects. Columns 3 and 5 include state specific time trends. The fifth column presents difference-in-difference estimates using the synthetic control group method of Abadie et al. (2010) with the corresponding probability levels from placebo tests of inference in brackets {}. ** and * represent estimates statistically significant at the 1 and 5 percent levels, respectively.

Table 3. Estimated Effect of Universal Pre-K Provision in a Market on Supply of Childcare in Georgia

	(1)	(2)
	Childcare Centers, Public and Private	
UPK Centers	0.358**	0.389**
	(0.115)	(0.120)
	Private Childcare Centers	
UPK Centers	0.219	0.228
	(0.123)	(0.144)
	Daycare Homes	
UPK Centers	-0.938	-0.345
	(1.369)	(1.469)
	Childcare Center Employees, Public and Private	
UPK Centers	2.576	2.477
	(2.282)	(2.690)
	Employees of Private Childcare Centers	
UPK Centers	2.312	2.229
	(2.340)	(2.760)
	Pay per Employee in Private Childcare Centers, $1000s	
UPK Centers	-0.019	-0.015
	(0.012)	(0.015)
Number of Observations	2,226	2,226
Year Fixed Effects	Y	Y
County Fixed Effects	Y	Y
County Specific Time Trends	Y	Y
Community Characteristics		Y

Note: Based on the authors' calculations using the county-level LBD, ILBD and CCD for Georgia from 1990 to 2005, where available. Each row and column combination represents estimates from a separate regression with the controls specified. Standard errors are in parentheses. ** and * represent estimates statistically significant at the 1 and 5 percent levels, respectively. The reported coefficients are for the effects of an additional center receiving universal preschool funds in a county on the supply measure reported in the row header.

Table 4. Estimated Effect of Universal Pre-K Provision in a Market on Supply of Childcare in Oklahoma

	(1)	(2)
	Childcare Centers, Public and Private	
PK Schools	0.943**	0.962**
	(0.057)	(0.046)
	Private Childcare Centers	
PK Schools	-0.057	-0.038
	(0.057)	(0.046)
	Daycare Homes	
PK Schools	-7.248**	-7.124**
	(1.468)	(1.348)
	Childcare Center Employees, Public and Private	
PK Schools	-0.719	-0.555
	(1.142)	(1.051)
	Employees of Private Childcare Centers	
PK Schools	-2.920*	-2.778*
	(1.298)	(1.223)
	Pay per Employee in Private Childcare Centers, $1000s	
PK Schools	-0.004	-0.006
	(0.011)	(0.011)
Number of Observations	1,232	1,232
Year Fixed Effects	Y	Y
County Fixed Effects	Y	Y
County Specific Time Trends	Y	Y
Community Characteristics		Y

Note: Based on the authors' calculations using the county-level LBD, ILBD and CCD for Oklahoma from 1990 to 2005, where available. Each row and column combination represents estimates from a separate regression with the controls specified. Standard errors are in parentheses. ** and * represent estimates statistically significant at the 1 and 5 percent levels, respectively. The reported coefficients are for the effects of an additional center receiving universal preschool funds in a county on the supply measure reported in the row header.

Table 5. Entry and Exit of Individual Childcare Centers in Georgia and Oklahoma

	(1)	(2)	(3)	(4)	(5)	(6)
	Entry			Exit		
Panel A. Georgia						
UPK Centers	-0.000176	-2.31e-05	-0.000110	0.000346**	0.000355**	0.000371**
	(0.000118)	(9.92e-05)	(0.000130)	(5.56e-05)	(5.66e-05)	(5.94e-05)
Number of Obs.	167,372					
Panel B. Oklahoma						
PK Schools	-0.000108	-0.000113	-5.88e-05	2.13e-05	4.10e-05	4.03e-05
	(0.000256)	(0.000243)	(0.000257)	(6.44e-05)	(6.80e-05)	(7.83e-05)
Number of Obs.	130,587					
Year Fixed Effects	Y	Y	Y	Y	Y	Y
County Fixed Effects	Y	Y	Y	Y	Y	Y
County Specific Time Trends	Y		Y	Y		Y
Community Characteristics		Y	Y		Y	Y

Note: Based on the authors' calculations using the firm-level LBD, ILBD and CCD for Georgia and Oklahoma from 1990 to 2005, where available. Each row and column combination represents estimates from a separate regression with the controls specified. Standard errors are in parentheses. * and ** represent estimates statistically significant at the 1 and 5 percent levels, respectively. The reported coefficients are for the effects of an additional center receiving universal preschool funds in a county on the supply measure reported in the row header.

Table 6. Estimated Effects of Universal Preschool Provision on the Supply of Childcare in Different Communities in Georgia

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Childcare Centers, Public and Private		Private Childcare Centers		Childcare Center Employees, Public and Private		Employees of Private Childcare Centers	
Panel A.								
# of Centers	0.359**	0.390**	0.221	0.230	2.597	2.491	2.333	2.243
	(0.116)	(0.121)	(0.124)	(0.145)	(2.305)	(2.723)	(2.363)	(2.794)
# of Centers X Rural Q2	0.083	0.095	0.001	0.025	-4.114**	-4.186**	-4.085*	-4.162*
	(0.226)	(0.239)	(0.122)	(0.129)	(1.551)	(1.581)	(1.585)	(1.614)
# of Centers X Rural Q3	-0.146	-0.145	-0.222	-0.217	-0.878	-0.725	-0.914	-0.773
	(0.165)	(0.161)	(0.132)	(0.132)	(1.792)	(1.900)	(1.754)	(1.870)
# of Centers X Rural Q4	0.064	-0.001	-0.018	-0.068	-0.133	0.637	-0.068	0.643
	(0.162)	(0.169)	(0.138)	(0.151)	(2.238)	(2.752)	(2.342)	(2.861)
# of Centers X Rural Q5	0.611*	0.526	0.698**	0.644**	-1.693	0.503	-0.464	1.657
	(0.266)	(0.346)	(0.195)	(0.196)	(2.969)	(3.161)	(3.035)	(3.033)
Panel B.								
# of Centers t	0.571*	0.449	0.674*	0.623*	3.139	4.483	3.464	4.905
	(0.253)	(0.253)	(0.274)	(0.254)	(3.994)	(3.696)	(4.117)	(3.784)
# of Centers t X # centers 1990 Q2	-0.181	-0.093	-0.394	-0.404	-4.048	-4.752	-4.631	-5.522
	(0.246)	(0.258)	(0.212)	(0.208)	(3.049)	(3.195)	(3.070)	(3.213)
# of Centers t X # centers 1990 Q3	-0.275	-0.175	-0.412	-0.393	-0.991	-1.832	-1.427	-2.388
	(0.230)	(0.247)	(0.216)	(0.221)	(3.039)	(2.974)	(3.113)	(3.022)
# of Centers t X # centers 1990 Q4	-0.372	-0.231	-0.652**	-0.595**	-1.564	-2.710	-2.158	-3.415
	(0.255)	(0.264)	(0.242)	(0.224)	(3.477)	(3.316)	(3.552)	(3.352)
# of Centers t X # centers 1990 Q5	-0.211	-0.058	-0.452*	-0.392	-0.554	-1.994	-1.143	-2.665
	(0.231)	(0.242)	(0.212)	(0.203)	(3.013)	(3.236)	(3.040)	(3.227)
Year Fixed Effects	Y	Y	Y	Y	Y	Y	Y	Y
County Fixed Effects	Y	Y	Y	Y	Y	Y	Y	Y
County Specific Time Trends	Y	Y	Y	Y	Y	Y	Y	Y
Community Characteristics		Y		Y		Y		Y

Note: Based on the authors' calculations using the county-level LBD, ILBD and CCD for Georgia from 1990 to 2005, where available. Each panel and column combination represents estimates from a separate regression with the controls specified. Standard errors are in parentheses. * and ** represent estimates statistically significant at the 1 and 5 percent levels, respectively. The reported coefficients are for the effects of an additional center receiving universal preschool funds in a county on the supply measure reported in the row header. The number of observations in each regression is 2,226.