

Analyzing the Influence of Pre-school Government Regulations for Children and their Families



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Importance of Regulation and Child Care



- Occupational licensing is among the fastest-growing labor market institutions in the U.S. economy and about 29 percent of the U.S. workforce requires a license from some government entity to work , and more than 800 occupations are licensed in at least one state (Kleiner and Krueger, 2009).
- Recent surveys suggest that 43% of children under age 5 and 53% of children between ages 3-4 are in some type of non-parental child care, the majority of which is provided by professional child care providers (U.S. Census Bureau, 2008). In 2008 54 % of preschoolers were in public schools. In contrast, 86 % of kindergartners were in public school.

Importance of Regulation and Child Care



- High variability in the quality of non-parental care and concern for the safety of children spurred the development of government licensing and regulation of child care facilities.
- Regulatory provisions of child care and early education facilities by states grew by more than 39 percent from 1983 to 2007 (Hotz and Xiao, 2005, our survey, 2009).

Examples of Regulations on Costs and Access

Tennessee Regulations:

“In July 2000, the state legislature passed new standards for child-care agencies and granted DHS numerous tools to enforce those laws. The guidelines were comprehensive, ranging from higher standards for child-care employees to stricter transportation guidelines. [...] Effective or not, the new guidelines mean that many providers must spend more money to comply. "We want the new standards, but we can't afford them, and that's making it look like providers don't want quality care and don't want to adhere to the standards,"

Examples of Regulations on Costs and Access

- Carol Hoxie has been director of Memphis Jewish Home's Children's Corner daycare center for 10 years. During her tenure the center has become one of the most popular and respected providers in Shelby County. A program of age-appropriate activities, involved parents, and reasonable tuition rates has kept the center's waiting list full. "No center is perfect, but we are good," says Hoxie. But the 50-child center will shut its doors at the end of February, leaving the children to seek care elsewhere and Hoxie and her 15-person staff without jobs. [...] "Things in the child-care industry needed to change, but it's a vicious circle," she says. "The regulations are good, but centers cannot afford to adhere to them, so the price of child care is raised. Parents then cannot afford to pay the rates and the centers go out of business."

Preschools face loss of top teachers

- New Zealand's National Requirements for Teachers

Early childhood centres will have to sack some of their most experienced teachers next year because they have not completed a specialised course. The teachers do not have a diploma or a bachelor of teaching degree in early childhood education. The qualification move come as the Ministry of Education estimates centres will be short of between 1500 and 2600 teachers next year. Early Childhood Council chief executive Sarah Farquhar said the ministry's stifling qualification requirements were exacerbating the chronic teacher shortage. The Government has indicated it may rethink the requirements because of the looming shortage.

Preschools face loss of top teachers

- "For many thousands of children in early childhood centres, it would be a shame to be losing some very experienced and capable staff for the sake of meeting a target based on ideology, not practicality. We don't want to be losing people who are very experienced and who our children depend on."

Key Questions for our study



- Has Tougher State Regulation of Child Care Raised Costs?
- Has State Regulation of Child Care Improved Child Outcomes?
- Has State Regulation of Child Care Changed the Composition of Center and Family Based Care within States?

Key Findings



- State Regulation of Child Care Facilities and Workers has increased over time.
- Tougher Regulations are Associated with Higher Earnings for Child Care Workers.
- Tougher Regulations are Associated with the Enrollment in Center and Family Based Care Facilities.
- No Measureable Impact on Test Scores of Tougher Regulations

Basic Regulation Data & the Child Care Industry



- The child care industry is regulated to some degree by each state. In 2005, there were approximately 335,520 licensed child care providers in the U.S.; one third of which were center-based and two-thirds were family based providers (NCCIC, 2005).
- State regulations fall into two categories:
 - **Structural** regulations include maximum child-to-staff ratios, minimum experience/education requirements, ongoing education requirements, and maximum classroom size.
 - **Safety** regulations include stipulations regarding staff training in CPR/First Aide, immunizations, criminal background checks, and compliance with the provision of nutritional meals.

Regulation & the Child Care Industry



- Regulation of the child care industry varies by state.
- Example:

Variations in Minimum Regulations in Minnesota (MN) and Iowa (IA), 1996		
	MN	IA
ECE training hours, center teacher*	120	0
Minimum age, center teacher	18	16
Minimum education, center teacher	14	0
License fee, center	\$325	\$0
Rate of inspection, family home	Annual	Five years
Rate of inspection, center	Biennial	Never
Ongoing training hours, center teacher	40	6
Ongoing training hours, family provider	20	.4
Maximum number of 4 and 5-year olds, center	20	No max.
Maximum number of children, family home	10	6

* ECE stands for Early Child Education.

Child Care Regulation & Child Care Quality



- Education Research suggests that higher levels of state regulation are linked with higher process quality care in regulated types of care, including family and center-based care (see Raikes, Raikes and Wilcox, 2005; Rigby, Ryan, and Brooks-Gunn, 2007; Chipty, 1995; Hofferth and Chaplin, 1998; Blau, 2003; Heeb and Kilburn, 2004).
- However, further evidence also exists to suggest that stricter regulation may not lead to improvements in structural or process quality.
 - The link between the quality of care children experience and structural indicators of quality (regulated or otherwise) may be modest.
 - Child care regulations may not be adequately implemented or enforced, thus implying that effects of regulation would be weaker than intended.

Definition of Center- and Family-Based Child Care



- **Center-based** refers to programs offered in a dedicated facility or non-home environment such as a church, community center, etc.
- **Family-based** refers to programs offered in a caregiver's private residence for children related and unrelated to the caregiver. This does not include informal care provided by a family's relative.

Association of Child Care Regulation on Price, Supply, and Demand



- Regulation of center-based child care reduces the supply of child care centers, by increasing the costs of providing care (Hotz and Xiao 2005).
- Analysis of state regulations and the economics of the child care and early education market has found:
 - Child care regulations affecting labor costs have the effect of restricting the supply of child care in the regulated sector.
 - Reduction of supply will lead to a higher price for child care and early education in the regulated sector.
 - Excess demand for one arrangement of child care can lead families to: remain in regulated center-based program, substitute with family-based child-care, or exit the regulated child care market.

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Key Elements of Child Care Regulations



- **Types and Anatomy of Child Care Regulations**

Type of Regulation	Example of Regulation
Child development	Do regulations require a child developmental program?
	Do regulations require child developmentally appropriate equipment such as soft toys
Child development, Group size	Max. group size for age 0-11months in day care center < 12
Child development, Ratio	Max child/caregiver for children at various ages
	Is annual ongoing training required for assistant teacher at a day care center?
	Previous experience or training required for assistant teacher at a day care center

Key Elements of Child Care Regulations



- Types and Anatomy of Child Care Regulations (cont'd)

Type of Regulation	Example of Regulation
Child development, Staff training	Minimum age for assistant teacher, director, or child care worker
	Minimum hours of child development coursework required
	Education requirement
	Amount of annual ongoing training required
Health & safety	Amount of indoor and outdoor space required per child
	Is a criminal background check required for any employees at a day care center?
	Is a health evaluation required for any employees at a day care center?
	Are children who attend centers/family homes required to be immunized?

Key Elements of Child Care Regulations



- **Types and Anatomy of Child Care Regulations (cont'd)**

Type of Regulation	Example of Regulation
Health & Safety	Is the facility required to carry liability insurance?
	Do regulations indicate that centers/family homes may release children only to parents
	Is corporal punishment prohibited under all circumstances, including all ages
	Do regulations require that ill children be excluded from childcare?
Oversight	Are fines imposed for facilities that defy licensing regulations and requirement
Oversight	Do regulations specify that parents be allowed free access to their children ?
Oversight	Does the licensing agency have the authority to revoke a childcare license?

Data - Child Care Regulation and our Contribution



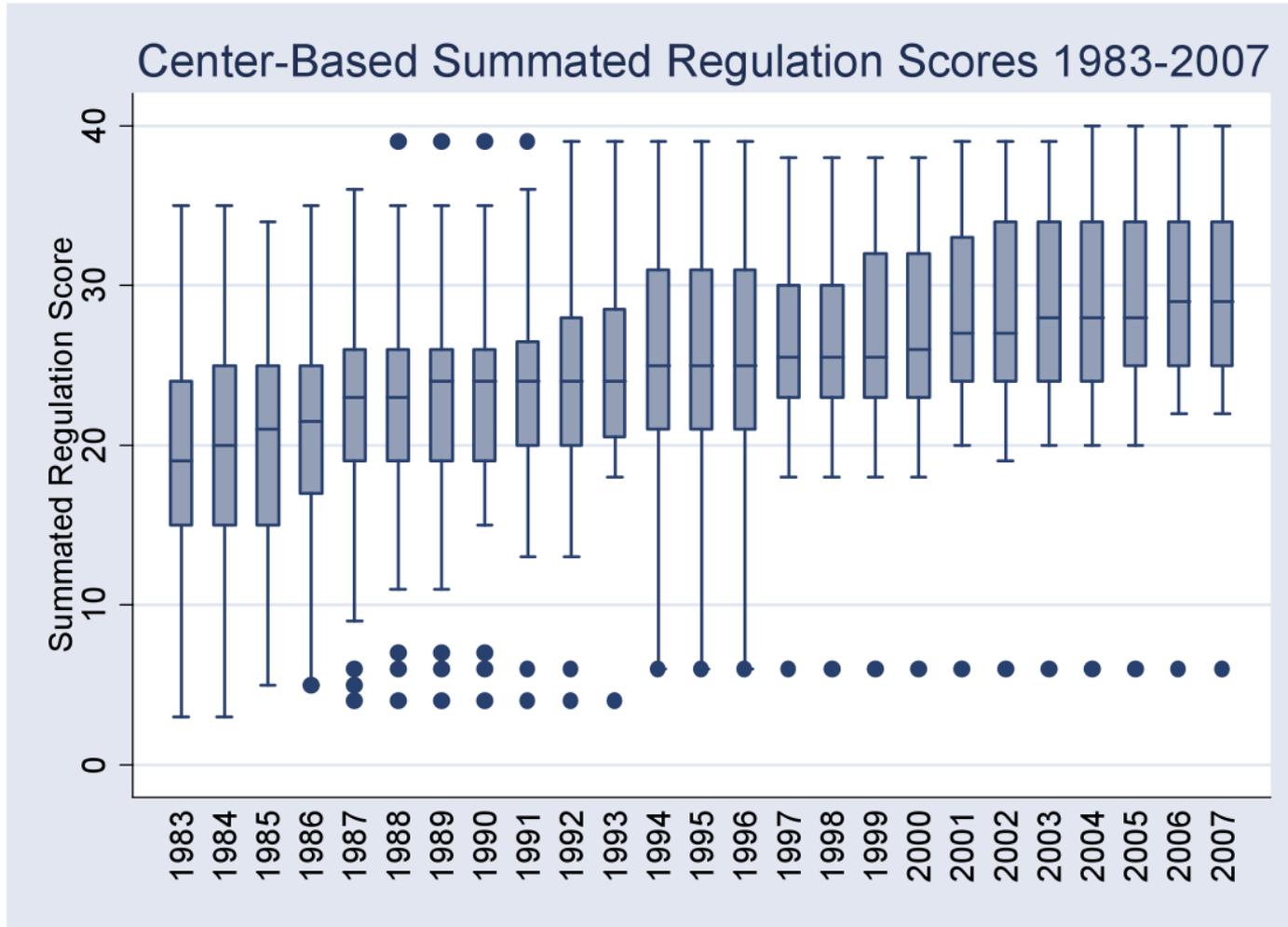
- Based on data compiled by V. Joseph Hotz and Rebecca Kilburn, which contains state level regulations of center and family based child care facilities for all 50 states from 1983-2000
- We updated the regulation data through 2007 using the same approach as Hotz and Kilburn
- Provides information on:
 - Nature of regulatory environment
 - Training needed for instructors/directors
 - Required child to teacher ratio
 - Physical requirements of facilities

Data - Child Care Regulation

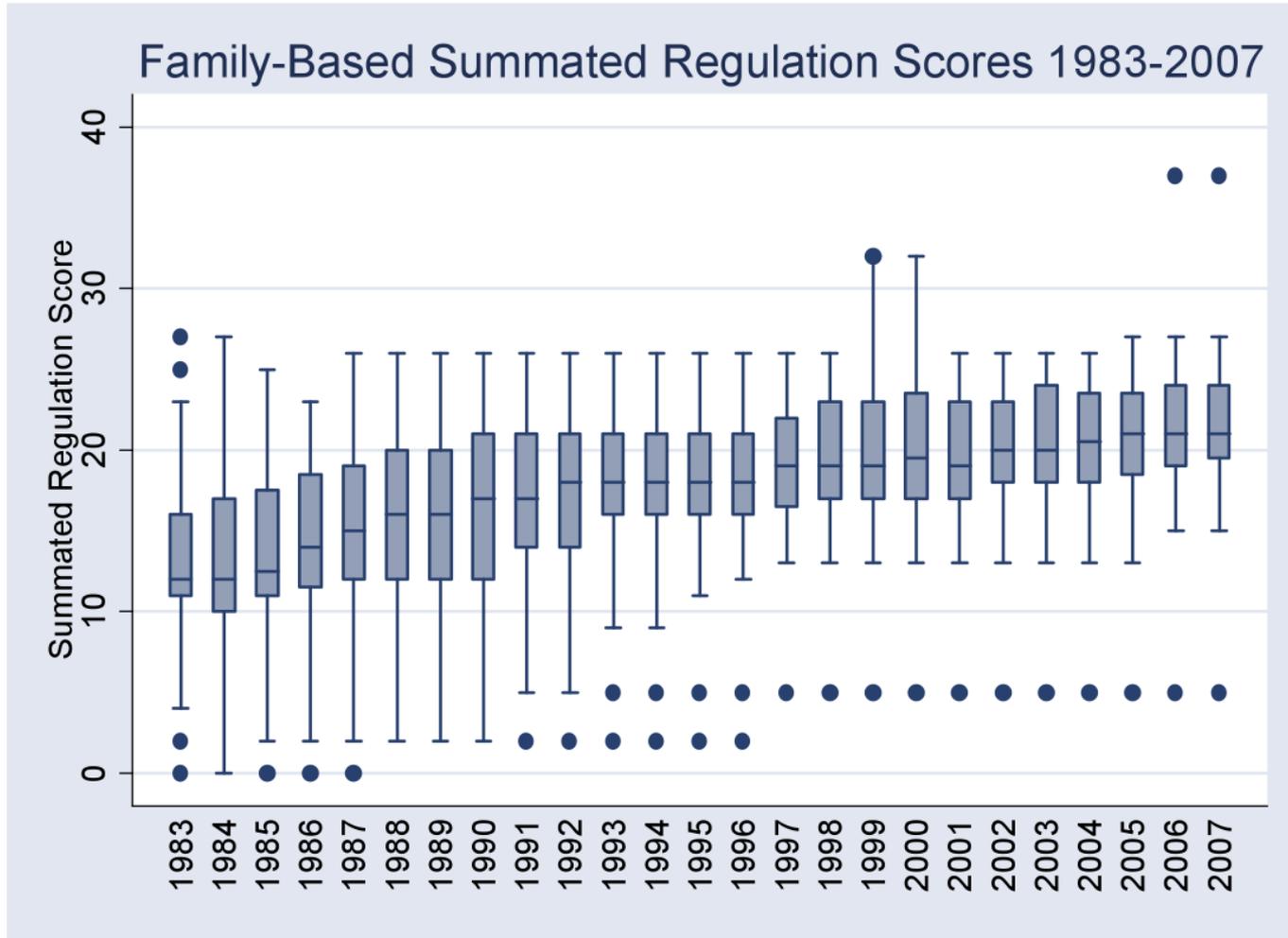


- Used data to create state level child care regulation indices to:
 - Quantify degree and nature of regulation by adding up number of regulations
 - Level of state regulation for child development, child health and safety, and oversight and enforcement
- Data is supplemented with a variety of state level characteristics from several sources to control for possible state characteristics that may be confounded with child care policies

Growth and Variation of Child Care Regulations by State



Growth and Variation of Child Care Regulation by State



State Levels and Changes in Child Care Regulations, 2007



Top 5 States by Center-Based Regulation 2007

Rhode Island	40
Massachusetts	39
Minnesota	36
New York	36
Maine	35
Illinois	35

Top 5 States by Family-Based Regulation 2007

New York	37
Montana	25
Colorado	25
North Carolina	25
Utah	24
Ohio, New Hampshire, Mississippi, Massachusetts & Alaska	24

State Levels and Changes in Child Care Regulations, 2007



Bottom 5 States by Center-Based Regulation 2007	
Idaho	6
Georgia	22
Hawaii	22
Alaska	23
Iowa	23

Bottom 5 States by Family-Based Regulation 2007	
Idaho	5
Iowa	15
Georgia	16
Indiana	18
Missouri & Virginia	18

Top 5 States by Change in Center-Based Regulation 1983-2007	
Mississippi	24
Kentucky	18
Alaska	13
Tennessee	12
Utah & Pennsylvania	10

Top 5 States by Change in Family-Based Regulation 1983-2007	
New York	21
North Carolina	14
Mississippi	14
Indiana	14
Alaska	13

Testing a Wage Model for Child Care Teachers with Occupational Licensing Regulations



- The Hourly Earnings as Dependent Variable

$$\ln(\text{Earnings}_{ist}^{T/A}) = \alpha + \beta R_{st} + \gamma X_{ist} + \delta_s + \eta_t + \mu_{ist}$$

Earnings_{ist} is the hourly earnings of Teachers (T) and Assistants (A) for child care workers i at state s in time period t ;

R_{st} is the index in person i 's state s in time period t ;

X_{ist} is the vector includes covariates measuring characteristics of each person;

δ and η are state and year fixed effects, respectively; and

μ_{ist} is the error term.

Testing a Wage Model for Child Care Teachers with Occupational Licensing Regulations



- The Hourly Earnings as Dependent Variable

Index includes total value and components of the index

$$\ln(\text{Earnings}_{ist}^{T/A}) = \alpha + \beta R_{st} + \gamma X_{ist} + \delta_s + \eta_t + \mu_{ist}$$

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Estimates of Wage Model for Family Based Child Care Teachers with Occupational Licensing Regulations Using the American Community Survey (2000-2007) *



In wage on Individual Regulations for samples of...			
	Child Care Worker	Preschool Teachers	Child Care Worker & Preschool Teacher
Education licensing requirement for Family Day Care Provider	0.148 (0.138)	0.256* (0.122)	0.201* (0.097)

*With controls for age, years of education, experience, gender, marital status, and race

Standard errors in parentheses
**p<0.01, * p<0.05 with state and year fixed effects

Estimates of Wage Model for Center-Based Child Care Teachers with Occupational Licensing Regulations Using the American Community Survey (2000-2007)*



In wage on Individual Regulations for samples of...			
	Day Care Worker	Preschool Teachers	Day Care Worker & Preschool Teacher
Education licensing requirement for Center Teacher required to have 14 years or more education	0.263*** (0.0972)	0.0781 (0.0809)	0.170** (0.0668)

*With controls for years of education, age, experience, gender, marital status, and race

Standard errors in parentheses
***p<0.01, ** p<0.05, * p<0.1
Regression includes full set of year and state dummies

Data – ECLS-K



- Provides information on child outcomes and child care (cost and type)
- Consists of cross sectional data of >17,000 children and their parents across the 50 states from kindergarten class of 1998-1999
- Used the restricted version of the ECLS-K for the study, which provides information on:
 - Child care arrangements;
 - The state in which the child lives;
 - Individual academic skill assessments; and
 - Background information on the child's parents

Data – ECLS-K



- Child's overall skill on assessment test is given an Item Response Theory (IRT) skill score
- IRT scores are standardized across children and is the key dependent variable in the models used to measure effect of regulation on academic achievement
- Type of child care is matched to level of state regulation
- Information on family background available for use covariate. Variables such as parental attitudes can be used as a proxy for factors that influence parental choice of care arrangements and children's achievements.

Enrollment in Primary Child Care Arrangement in the Year Before Kindergarten



Primary Child Care Arrangement	Frequency	Percent	Cumulative Percentage
Center Based Care	8,009	45.15%	45.15%
Family Based Care	1,700	9.58%	54.73%
Head Start Care	1,918	10.81%	65.54%
Nonrelative Care	148	0.83%	66.38%
Relative Care	2,631	14.83%	81.21%
Parental Care	3,334	18.79%	100.0%
Total	17,740	100.00%	

Data – ECLS-B (to be added)



- Nationally representative birth cohort of 14,000 children born in 2001.
- Longitudinal study that follows children from birth until kindergarten.
- Includes parent interviews and direct child assessments.
- Available data was collected when children were approx. 9-months, 2-years (2003), and 4-years (2005)
- Provides detailed information about child care experiences, information on state of residence, family backgrounds, and assessments of child development

Data – NLSY Maternal & Child Supplement



- A panel of children born to mothers between ages of 14-21 in 1979.
- Direct child assessments conducted on the children on a biennial basis starting in 1986.
- For this study, all cohorts of children age 3-4 between 1984 and 2000.
- Obtained permission for restricted dataset which includes information on: child care arrangements, child cognitive and academic skills assessments, and parental and household characteristics.
- NLSY used Peabody Picture Vocabulary Test and Peabody Individual Achievement Tests to assess children's achievement

OLS Model



- This study estimates three effects of government regulation of child care facilities: children's early academic skills and type of care chosen.
- Underlying theoretical model:

$$y_{is} = \delta z_s + x_{is} \beta + w_s \lambda + \varepsilon_{is} \quad (1)$$

Where y_{is} is the outcome (achievement, type of child care chosen, or child care price) we observe for child i in state s . x_{is} is a row vector of individual characteristics affecting a child's outcome and one element is equal to one (this gives a constant term). w_s is a row vector of state characteristics affecting a child's outcome. z_s is the state child care regulation index. ε_{is} is an error term containing unobserved variables that affect a child's test score. The vectors β , λ and δ scalar are the structural parameters we will estimate, where δ gives the partial effect of government regulation on a child's outcome measure.

Implications of the OLS Model



- Each of the explanatory variables in the model must be uncorrelated with the error term in order to obtain a consistent estimator for δ .
- Numerous covariates available in the ECLS-K, ECLS-B, and NLSY datasets are used to increase the likelihood that the assumption will hold.
- As additional covariates are added to the models, if we do not observe substantial changes in the estimated effect of state regulation on the dependent variable, we can be confident that our estimator is not subject to large levels of omitted variable bias (Altonji, Elder, and Taber, 2005)

Hypothesis Testing (1)



- *Question 1: Do stricter state government regulation in early education and child care markets enhance the academic achievement-related skills of children?*
 - Theory suggests that child care and early education regulations affect children's school readiness by improving the quality of child care.
 - Data from the NLSY, ECLS-K and ECLS-B is used to estimate cross-sectional ordinary least squares models, state fixed effects models, and two-stage least squares models
 - Hypothesize positive affects for children who attend more stringently regulated child care. State regulations designed to improve child development are expected to have a positive impact on early child academic achievement.

Hypothesis Testing (1)



- *Question 1: Do stricter state government regulation in early education and child care markets enhance the academic achievement-related skills of children?*
 - Estimate the OLS model by
 - ✦ Center-based care and family-based care
 - ✦ Match children with state regulation variables, then predict reading and math test scores.
 - FE models will address question about whether changes in state regulations are related to changes in children's school readiness.

OLS Estimates of Center Based Regulation and Child Outcomes – Math Scores (ECLS-K)

Regulation Index	Math Scores						
Overall	0.03						
	-0.18						
Development		0.04					
		-0.09					
Health			0.92				
			-0.82				
Human				0.08			
				-0.11			
Oversight					-3.24		
					-2.16		
Physical						0.03	
						-3.7	
Ratio							-0.19
							-0.61
Constant	10.37**	10.52**	4.3	10.17**	14.21***	7.96	5.46
	-4.85	-5.27	-8.11	-5.17	-4.47	-9.1	-5.17
Observations	6512	6512	6512	6512	6512	6512	6512
R-squared	0.361	0.361	0.361	0.361	0.361	0.361	0.361

With controls for family, state, neighborhood, human capital and individual effects

Standard errors in parentheses**p<0.01, * p<0.05

OLS Estimates of Family Based Regulation and Child Outcomes – Math Scores (ECLS-K)

Regulation Index	Math Scores						
Overall	0.41 (0.30)						
Development	0.31 (0.25)						
Health	0.35 (0.43)						
Human	1.59*** (0.56)						
Oversight	-2.22* (1.14)						
Physical	1.17** (0.59)						
Ratio	0.20 (1.54)						
Constant	-0.65 (10.07)	5.47 (7.45)	4.46 (8.04)	1.29 (7.90)	18.48** (7.84)	10.06 (7.18)	4.26 (7.44)
Observations	1395	1406	1437	1415	1446	1437	1457
R-squared	0.406	0.406	0.403	0.406	0.403	0.403	0.403

With controls for family, state, neighborhood, human capital and individual effects

Standard errors in parentheses***p<0.01, * p<0.05

OLS Estimates of Center Based Regulation and Child Outcomes – Reading Scores (ECLS-K)

Regulation Index	Reading Scores						
Overall	0.44 (0.34)						
Development	0.58 (0.44)						
Health	0.88 (0.80)						
Human	0.04 (0.10)						
Oversight	-1.66 (3.73)						
Physical	-2.30 (4.16)						
Ratio	-0.48 (0.61)						
Constant	12.87* (7.26)	15.03** (5.91)	23.06** (10.07)	29.45*** (8.05)	22.48*** (5.46)	28.88** (11.36)	19.89** (7.90)
Observations	6371	6371	6371	6371	6371	6371	6371
R-squared	0.345	0.345	0.345	0.345	0.345	0.345	0.345

With controls for family, state, neighborhood, human capital and individual effects

Standard errors in parentheses**p<0.01, * p<0.05

OLS Estimates of Family Based Regulation and Child Outcomes – Reading Scores (ECLS-K)

Index	Reading Scores						
Overall	0.08						
	-0.14						
Development	0.21						
	-0.39						
Health	0.31						
	-0.49						
Human	0.1						
	-0.78						
Oversight	-0.22						
	-1.86						
Physical	0.18						
	-0.95						
Ratio	0.41						
	-1.4						
Constant	10.47	8.49	4.76	11.77	12.65	11.46	11.42
	-9.04	-8.73	-9.39	-9.06	-9.61	-8.66	-8.89
Observations	1352	1363	1394	1372	1403	1394	1414
R-squared	0.379	0.378	0.372	0.378	0.371	0.372	0.371

Standard errors in parentheses**p<0.01, * p<0.05

With controls for family, state,
neighborhood, human capital and individual
effects

Academic Achievement Using the NLSY (Family-Based Estimate)*



Influence of Summated Family- based Regulation Scores on Reading and Math Scores Using the
NLSY 1984-98

VARIABLES	(1) Math	(2) Reading
summated family based overall index	-0.143 (0.123)	-0.149 (0.119)

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

*With controls for mother's AFQT, family, and demographic characteristics

Academic Achievement Using the NLSY (Center-Based Estimates, 1984-1998)



VARIABLES	(1)	(2)
	Math	Reading
Summated Center based overall summated regulation rating	0.0901 (0.0708)	-0.00443 (0.0652)

Standard errors in parentheses

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

*With controls for mother's AFQT, family, and demographic characteristics

Hypothesis Testing (2)



- *Question 2: Do stricter state regulations influence the type of child care facility experienced by children?*
 - Theory suggests that more stringent state regulation of certain types of child care may increase the cost of care.
 - A decrease in the proportion of children that attend center based care is expected if greater regulation has the effect of increasing prices of center based care.
 - ✦ Stricter education requirement will lead to reduced quantity of care supplied.
 - ✦ Restrictions on child to adult ratio and group size will lead to reduced quantity of care supplied.
 - ✦ Stricter regulations in areas with lower child enrollment in center or family based care.

Results for Question 2



- Increased regulation of center based care arrangements decreases the likelihood that a child will enroll in center based care and to a lesser extent family-based care.

Center based regulation's effect on type of childcare enrolled

	(1)	(2)	(3)
	Type of care in year before kindergarten:		
	Center	Family	Relative
overall number of center regulations/100	-0.21**	-0.10*	0.07
	(0.09)	(0.05)	(0.06)

Notes: *p<.10; **p<.05; ***p<.01. Sample size is 16, 417.

***A one standard deviation increase in center based regulation score implies approximately a 1.2% decrease in the probability that a child is enrolled in center based care.

Results for Question 2



- Increased regulation of family based care arrangements decreases the likelihood that a child receives family care and relative care.

Family based regulation's effect on type of childcare enrolled

(1) (2) (4)

Type of care in year before kindergarten:

Center **Family** **Relative**

Overall number of family regulations family/100	0.03	-0.21***	-0.23***
	(0.12)	(0.07)	(0.09)

Notes: *p<.10; **p<.05; ***p<.01. Sample size is 15,392 (some states are missing information on family-care regulations in 1997).

***A one standard deviation increase in family based regulation score implies approximately a 1% decrease in the probability that a child is enrolled in family based care.

Conclusions and Key Findings



State regulation of child care facilities and workers has increased over time.

Tougher regulations are associated with higher earnings of child care workers.

Tougher regulations are associated with the composition of center and family based care facilities.

No impact on test scores of children.

Conclusions and Key Findings



Preliminary analysis of data suggests that:

Increased regulation of center based care arrangements decreases the likelihood that a child will enroll in center based care and to a lesser extent in family-based care.

Increased regulation of family-based care arrangements decreases the likelihood that a child receives family care and relative care.

Unanswered issues



- Are the Health and Safety of Children enhanced with further regulation?
- What happens to the Labor Supply of men and women with fewer child care facilities?
- Are there longitudinal effects of regulation of child care and their teachers?