When mothers take childcare subsidies and go to work: are they harming their children? Evidence from administrative data.

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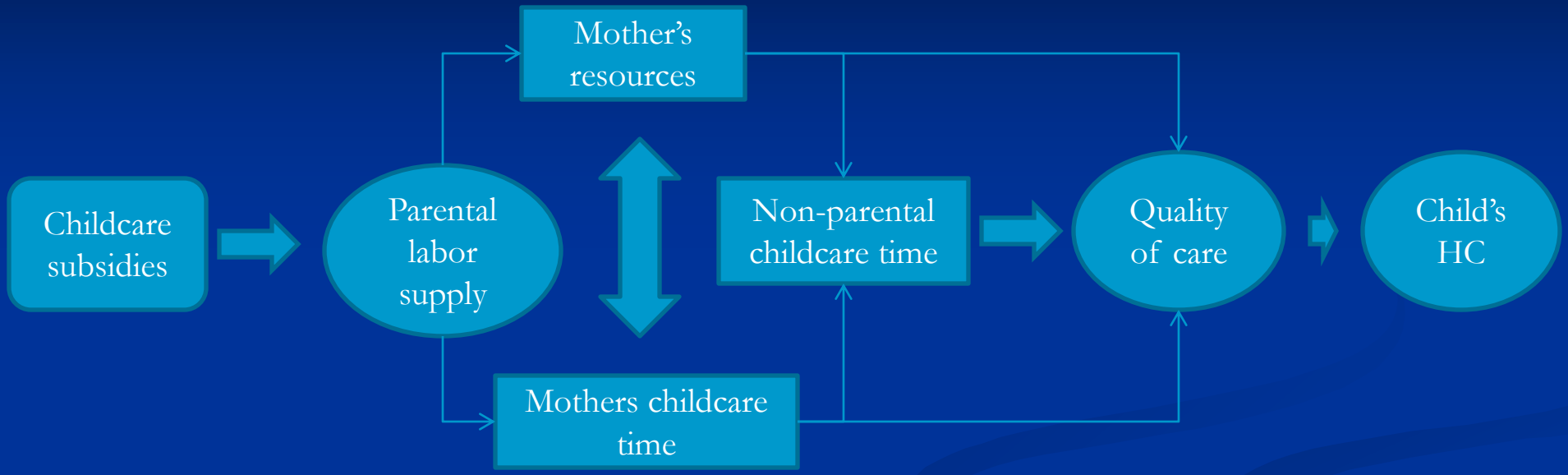
The Research Question:

What are the effects of childcare subsidies on children's cognitive development?

Channels: From childcare subsidies to human capital



1) Childcare subsidies affects labor supply

2) Mother's own resources and time invested in HC are reallocated

3) Parental care is substituted with non-parental care of certain quality

4) Quality of care affects development of child's human capital

Challenges to answer the research question:

Limited availability/quality of data:

- For this specific research purpose ECLS-K/ Three-city

Complex treatment definition:

- Duration, threshold, type, age of exposure

Pervasive endogeneity-selection problems:

- Unobservable factors explain simultaneously employment, subsidy receipt, choice of type and cognitive development (work preferences; work ethics)

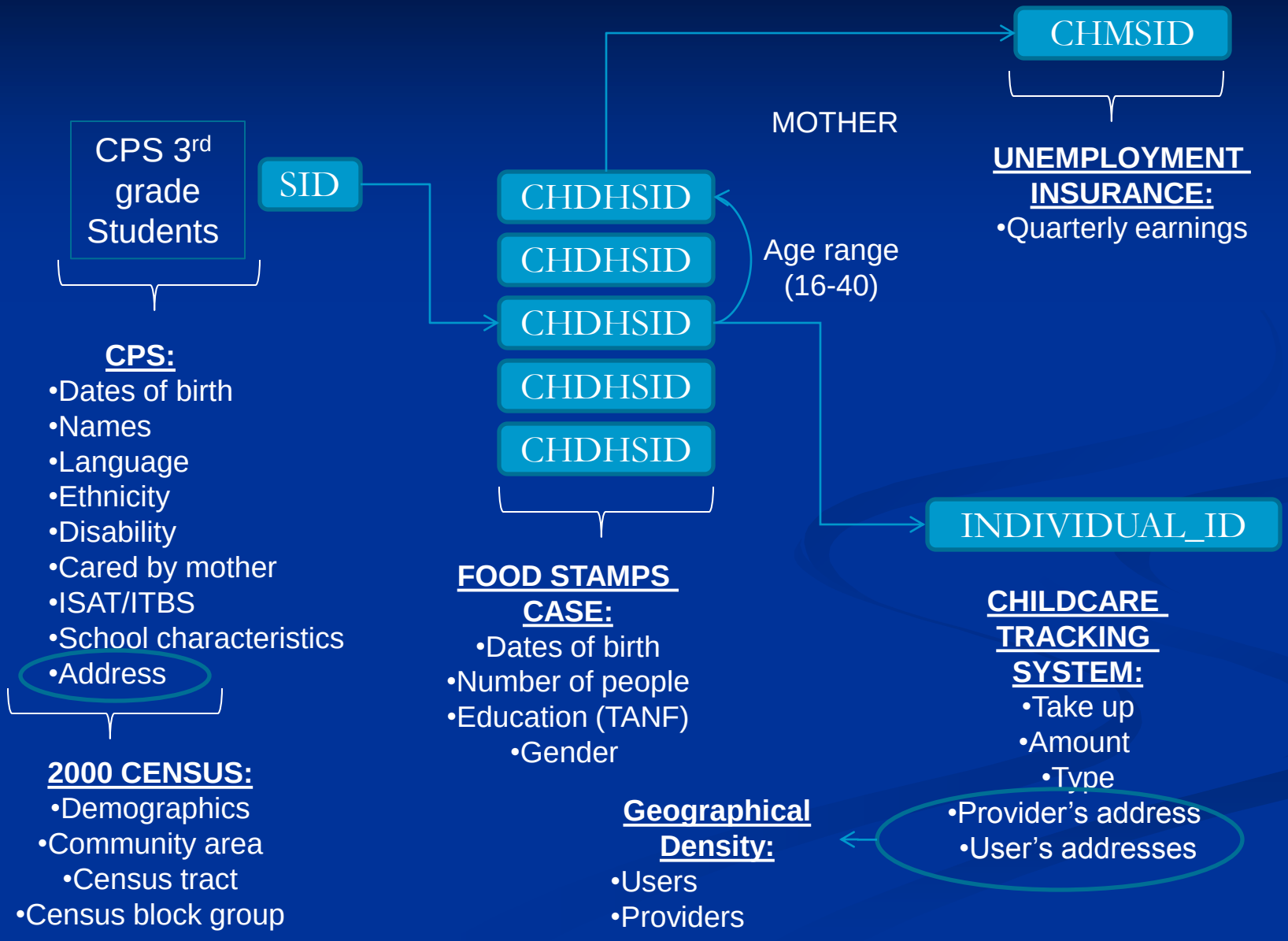
- Women do not select into childcare subsidies at random

- Subsidies usually contingent on employment

How do we address the challenges?:

- We use a unique dataset to identify effects
- We consider type of childcare as potential source of heterogeneity
- We develop a novel identification strategy

A unique dataset:



A unique dataset:

- ISAT/ITBS TEST SCORES (1991-2010)
- HISTORY OF CHILDCARE PARTICIPATION (1997-2010)
  - MONTHLY TAKE UP
  - TYPE OF PROVIDER
  - AMOUNT RECEIVED
- 11 YEARS OF QUARTERLY EARNINGS (1995-2006)
- DEMOGRAPHIC CHARACTERISTICS
- TRACK OF GEOGRAPHIC LOCATION (1990-2000 CENSUS)
  - ENABLES CENSUS DATA MATCH

The Data: take up rates by type/ age ranges

TABLE 1:
CHILDCARE SUBSIDY TAKE UP
(TOTAL AND RATES BY AGE OF THE CHILDREN AND TYPE OF CARE)

Age range/ type of care	Number of treated obs.	% take up
Take the subsidy at ages 0-5 of the kid?	9,636	32.02%
Licensed centers and homes	1529	5.08%
Unlicensed	8107	26.94%
Unlicensed non relatives	1940	6.45%
Unlicensed relatives	6167	20.49%
Take the subsidy at ages 0-3 of the kid?	7478	24.85%
Take the subsidy only at ages 0-3 of the kid?	1846	6.13%
Take the subsidy at ages 3-5 of the kid?	7790	25.89%
Take the subsidy only at ages 3-5 of the kid?	2158	7.17%

Notes: (1) The denominator in the "% take up" column is 30091 observations and represents the total sample.

The Data: take up rates by type/ age ranges

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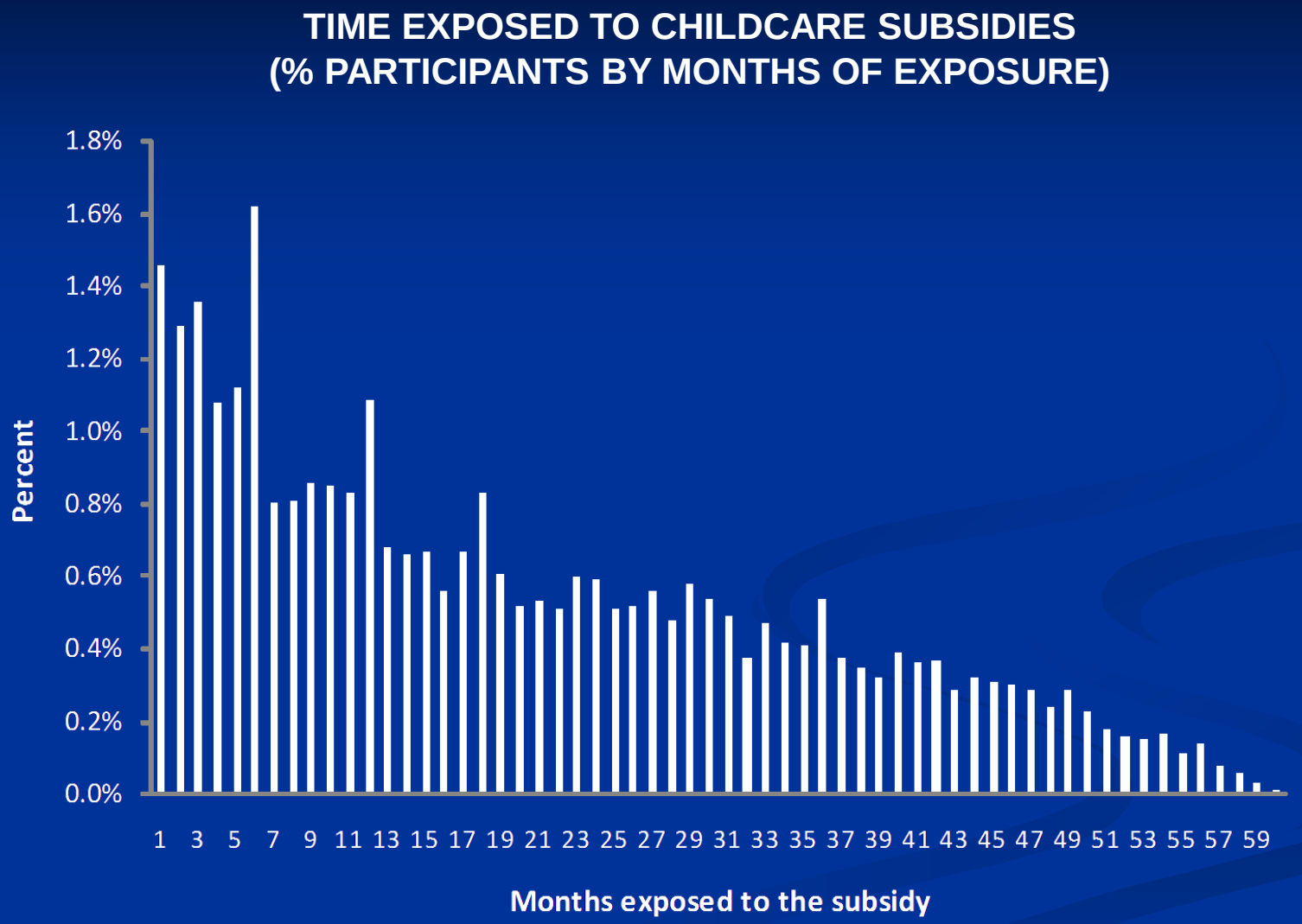
The Data: How long do spells last?



The Data: Treatment and comparison groups

	TREATMENT GROUP	COMPARISON GROUP
Overall (0-5)	Children 0-5 year old	Children 0-5 year old
	Participated in the program (Received payments)	Did not participate in the program (0-5)
Licensed (0-5)	Children 0-5 year old	Children 0-5 year old
	Participated in the program (Received payments and paid for licensed childcare)	Did not participate in the program (0-5)
Unlicensed (0-5)	Children 0-5 year old	Children 0-5 year old
	Participated in the program (Received payments and paid for unlicensed childcare)	Did not participate in the program (0-5)

The Data: Treatment and comparison groups

Overall (0-5) treatment and comparison can be distinguished along:

	Comparison group (20,455)		Treatment group 9,636)	
	Mean	S. Dev.	Mean	S. Dev
Worked pregnant	26.3%	0.44	45.6%	0.498
Earnings year pre-treatment	2.316	3.72	4.02	4.056
Mother's age at focal child birth	25.1	5.7	23.2	5
Education years (census)	10.924	3.123	11.305	3.17
Child in CPS is youngest in HH	0.476	0.499	0.508	0.5
Race Black	55.1%	0.497	86.2%	0.344
Race Hispanic	40.2%	0.49	11.9%	0.324
English spoken at home	63.7%	0.481	91.0%	0.286
School free lunch	89.3%	0.309	91.4%	0.28
Class Size	24.901	8.382	24.421	8.418

The Data: Treatment and comparison groups

Participants are:

a) Higher earnings in the pre and post program periods/ higher probability of employment during pregnancy.

b) Younger and give birth younger to the CPS children, their children are youngest children in the household

c) Race Black, followed by Hispanics/ predominantly English at home

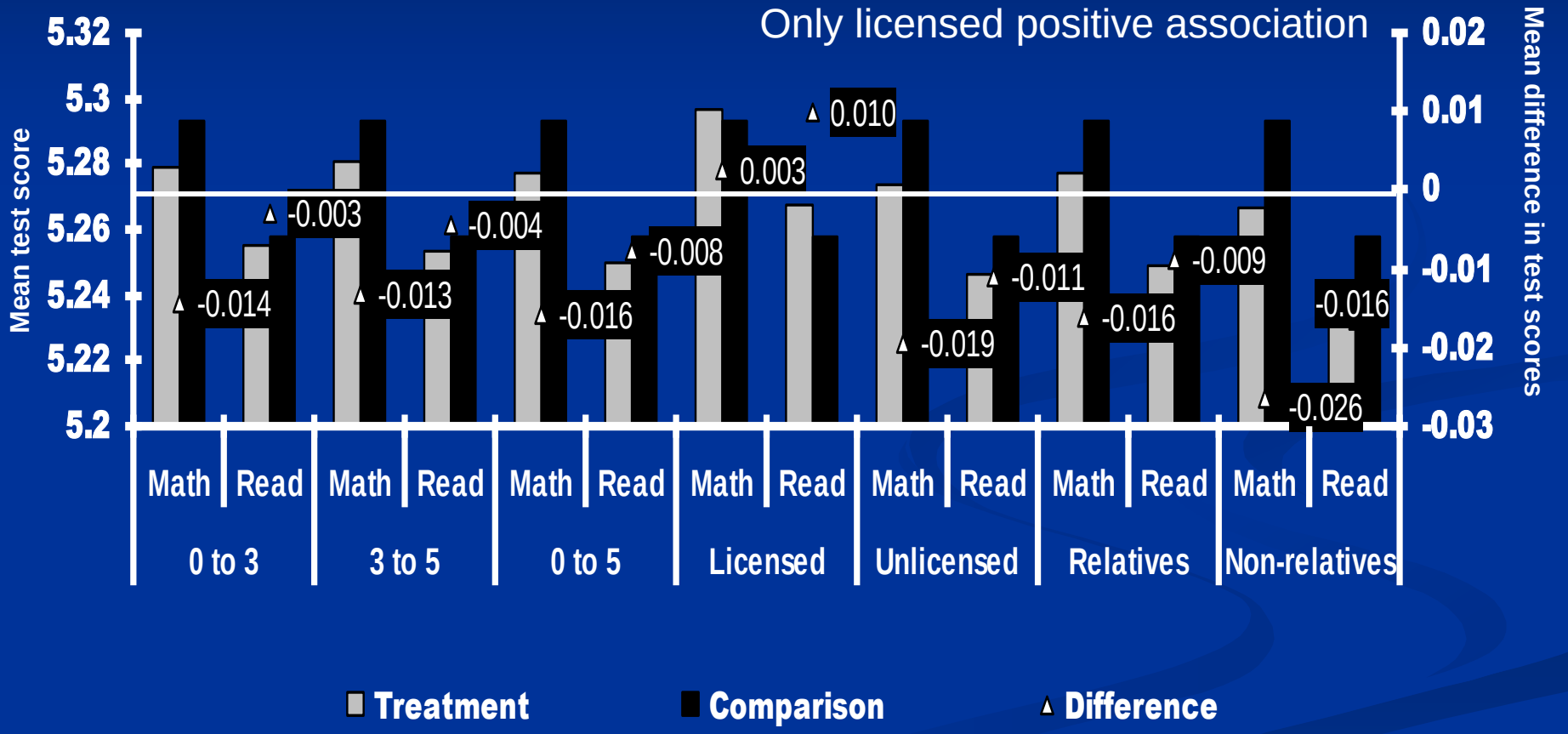
d) Live in smaller community areas and block groups

e) Smaller schools and class size; more likely in free lunch programs.

f) Higher education of the mother

The Data: Non-parametric associations

Mean difference in log of test scores between treatment and comparison groups



The Data: Non-parametric associations

- **Overall (**children in the 0-5 year old ages range) we found **negative** and significant mean differences for log of math and reading test scores of children who participate in childcare subsidies with respect to children who do not.

- Better performance in math and reading test scores among subsidy takers who attend **licensed care** facilities with respect to children who do not take childcare subsidies. The difference is statistically significant for reading test scores but not for math.

- **Negative association** between attending **unlicensed childcare** and test scores; as reflected by a lower mean among children who attend unlicensed care vis a vis children who do not participate in childcare subsidies.

- A **"quality ranking"** that places **licensed** care facilities at the top of the positive effects ranking, followed by **unlicensed relative** care (with moderate negative effects) and lastly **unlicensed non-relative** care (strongly negative effects).

Back to the research question: effects of childcare subsidies on test scores

The identification problem:

•Unobservables explain both the probability of take up and test scores of children

•Selection into program is not random (explained by unobserv.)

The identification strategy:

•Use pre-program density in utilization as an IV for take up

•Higher density implies lower transaction costs associated to the policy.

Identification strategy:

- Density measures average propensity in the CA to get a CCS

- Density is confounded with factors that explains being more “at risk” of initiating a subsidy spell in the pre-program period

- Serially correlated factors explaining being more “at risk” of initiating a subsidy spell in the pre-program period and take up today

- Density reflects the demand for childcare subsidies in the pre-program period
    - Factors determining the demand for subsidies at t_0 can be correlated with test scores of children at t_1

The IV assumption of no correlation between take up and unobservables in the outcome is violated

Identification strategy:

Under what conditions is density valid as an IV:

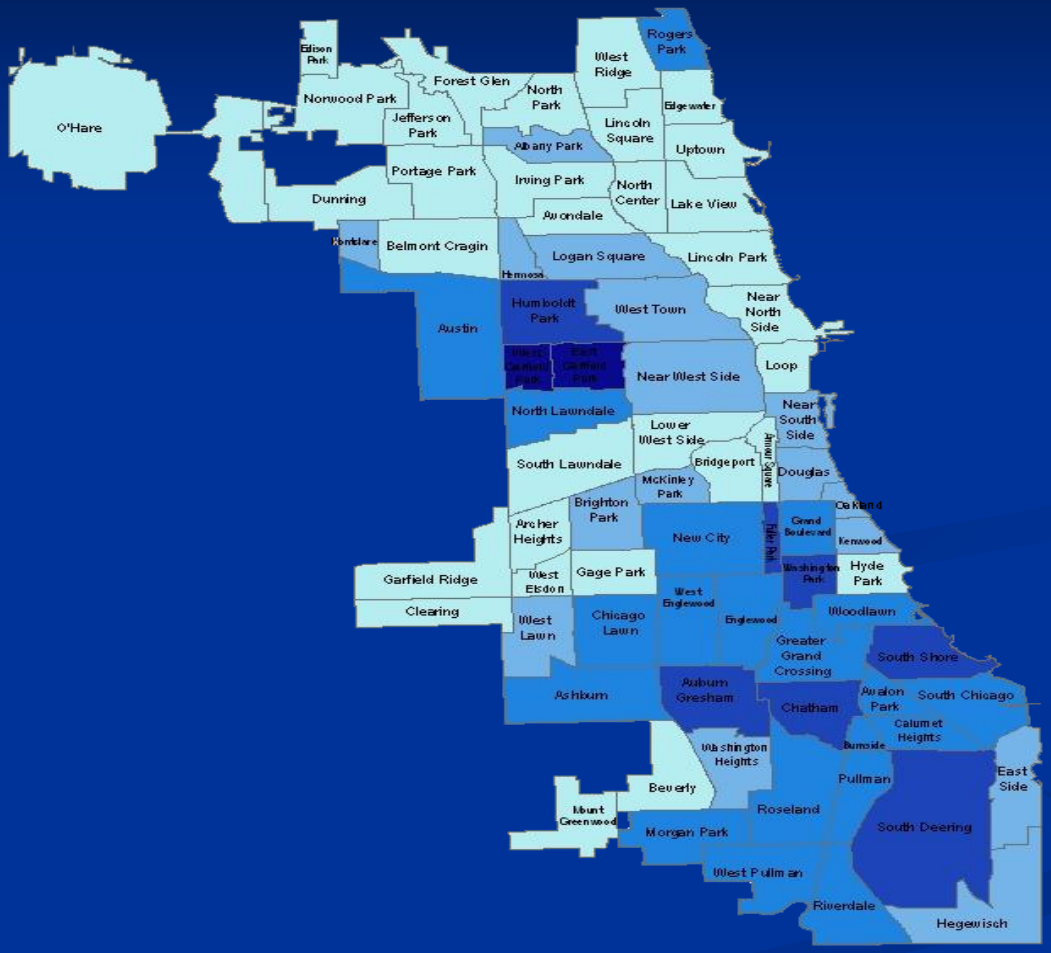
Hold constant observable and unobservable factors that characterize the population at risk of initiating a subsidy spell in the pre-program (characterize the demanders)

Make use of the richness in the data:

We use average CT pre-program ITBS/ covariates of children who participate in the pre-program period

The Data: Chicago: Density in utilization

77 Community areas (March 2009)



Deeper blue implies higher density in use of childcare subsidies

Does take up increases monotonically with density?

The Data: Is association explained by CA characteristics?

DENSITY VARIABLE	Correlation coefficients	OLS density coefficients
# providers/population	22.67%	0.43***
		(0.0566)
# providers/children_18	22.15%	0.65***
		(0.0566)
# users/population	22.37%	2.25***
		(0.2168)
# users/children_18	21.48%	3.01***
		(0.2721)

Empirical Analysis:

OLS AND IV ESTIMATES OF THE SUBSIDY EFFECT
(SUBSIDIES TAKEN ANYTIME IN THE 0-5 YEARS OLD AGE RANGE)

	(1)
MATH	
OLS coefficient	**-0.0042****
Standard error	(0.0018)
IV- treatment coefficient	**-0.1083***
Standard error	(0.0618)
F-statistics (1st stage)[a]	25.32
READING	
OLS coefficient	**-0.0044****
Standard error	(0.0019)
IV- treatment coefficient	**-0.1600****
Standard error	(0.0681)
F-statistics (1st stage)[a]	24.66
ITBS-VARIABLE[b]	NO
PRED. VARIABLES[c]	NO
IV DENSITY[d]	YES
IV Comm. Area ITBS[e]	NO

COLUMN (1)

- IV: density in utilization
- Do not hold constant pre-program var.
- Big, significant effects:
  - 78% and 115% of one SD

Empirical Analysis:

OLS AND IV-2SLS ESTIMATES OF THE SUBSIDY EFFECT (SUBSIDIES TAKEN ANYTIME IN THE 0-5 YEARS OLD AGE RANGE)

	(1)	(2)
MATH		
OLS coefficient	**-0.0042****	**-0.0041****
Standard error	(0.0018)	(0.0018)
IV- treatment coefficient	**-0.1083***	**-0.0394**
Standard error	(0.0618)	(0.0743)
F-statistics (1st stage)[a]	25.32	11.82
READING		
OLS coefficient	**-0.0044****	**-0.0041****
Standard error	(0.0019)	(0.0019)
IV- treatment coefficient	**-0.1600****	**-0.0547**
Standard error	(0.0681)	(0.0782)
F-statistics (1st stage)[a]	24.66	11.45
ITBS-VARIABLE[b]	NO	YES
PRED. VARIABLES[c]	NO	YES
IV DENSITY[d]	YES	YES
IV Comm. Area ITBS[e]	NO	NO

COLUMN (2)

- IV: density in utilization
- Hold constant pre-program var:
  - ITBS
  - Observables
- Effects drop to a factor of 2/3:

Empirical Analysis:

OLS AND IV-2SLS ESTIMATES OF THE SUBSIDY EFFECT (SUBSIDIES TAKEN ANYTIME IN THE 0-5 YEARS OLD AGE RANGE)

	(1)	(2)	(3)
MATH			
OLS coefficient	**-0.0042****	**-0.0041****	**-0.0042****
Standard error	(0.0018)	(0.0018)	(0.0018)
IV- treatment coefficient	**-0.1083***	**-0.0394**	**-0.0769**
Standard error	(0.0618)	(0.0743)	(0.0679)
F-statistics (1st stage)[a]	25.32	11.82	20.04
READING			
OLS coefficient	**-0.0044****	**-0.0041****	**-0.0043****
Standard error	(0.0019)	(0.0019)	(0.0019)
IV- treatment coefficient	**-0.1600****	**-0.0547**	**-0.1115**
Standard error	(0.0681)	(0.0782)	(0.0727)
F-statistics (1st stage)[a]	24.66	11.45	19.61
ITBS-VARIABLE[b]	NO	YES	NO
PRED. VARIABLES[c]	NO	YES	YES
IV DENSITY[d]	YES	YES	YES
IV Comm. Area ITBS[e]	NO	NO	NO

COLUMN (3)
Explore how much driven by IBTS

Empirical Analysis:

OLS AND IV-2SLS ESTIMATES OF THE SUBSIDY EFFECT (SUBSIDIES TAKEN ANYTIME IN THE 0-5 YEARS OLD AGE RANGE)

	(1)	(2)	(3)	(4)
MATH				
OLS coefficient	**-0.0042****	**-0.0041****	**-0.0042****	**-0.0042****
Standard error	(0.0018)	(0.0018)	(0.0018)	(0.0018)
IV- treatment coefficient	**-0.1083***	**-0.0394**	**-0.0769**	**-0.0149**
Standard error	(0.0618)	(0.0743)	(0.0679)	(0.0803)
F-statistics (1st stage)[a]	25.32	11.82	20.04	10.34
READING				
OLS coefficient	**-0.0044****	**-0.0041****	**-0.0043****	**-0.0043****
Standard error	(0.0019)	(0.0019)	(0.0019)	(0.0019)
IV- treatment coefficient	**-0.1600****	**-0.0547**	**-0.1115**	**-0.0063**
Standard error	(0.0681)	(0.0782)	(0.0727)	(0.0841)
F-statistics (1st stage)[a]	24.66	11.45	19.61	10.13
ITBS-VARIABLE[b]	NO	YES	NO	NO
PRED. VARIABLES[c]	NO	YES	YES	YES
IV DENSITY[d]	YES	YES	YES	YES
IV Comm. Area ITBS[e]	NO	NO	NO	YES

Column (4): instrument CT ITBS with CA ITBS

Empirical Analysis:

CONCLUSION:

- **USE OF DENSITY MEASURE AS IV LIKELY GIVE INCONSISTENT ESTIMATES**
- **UNLESS PRE-PROGRAM CHARACTERISTICS OF THE SAMPLE PARTICIPATING ARE CONTROLLED**
- **BOTH UNOBSERVABLE AND OBSERVABLE COMPONENTS MATTER IN EXPLAINING PROPENSITY IN PRE-PROGRAM**
- **SUBSTANTIAL MEASUREMENT ERROR IN THE TEST SCORE AVERAGES VARIABLE**
- **EFFECTS DROP FROM 78% and 115% OF ONE STANDARD DEVIATION TO 10% and 4.5%**

Empirical Analysis:

LATE?

How LATE?

EXPLORE HETEROGENEITY BY TYPE

Empirical Analysis: Heterogeneity by type of childcare

Take CCS and pays for:	Licensed provider	
	(1)	(2)
MATH		
OLS coefficient	**0.0036**	**0.0035**
Standard error	(0.0037)	(0.0037)
IV- treatment coefficient	**0.000**	**0.000**
Standard error	(0.0086)	(0.0245)
F-statistics (1st stage)[a]	0.57	0.71
READING		
OLS coefficient	**0.0053**	**0.0053**
Standard error	(0.0038)	(0.0038)
IV- treatment coefficient	**0.000**	**-0.0583**
Standard error	(0.0084)	(0.3279)
F-statistics (1st stage)[a]	0.65	0.72
ITBS-VARIABLE[b]	NO	NO
PRED. VARIABLES[c]	NO	YES
IV DENSITY[d]	YES	YES
IV Comm. Area ITBS[e]	NO	YES

- Odd columns: IV is density in utilization/ do not hold constant pre-program var.
- Even columns: controls for pre-program instrument CT ITBS with CA ITBS

Empirical Analysis: Heterogeneity by type of childcare

Take CCS and pays for:	Licensed provider		Unlicensed provider	
	(1)	(2)	(3)	(4)
MATH				
OLS coefficient	**0.0036**	**0.0035**	**-0.0049****	**-0.0048****
Standard error	(0.0037)	(0.0037)	(0.002)	(0.002)
IV- treatment coefficient	**0.000**	**0.000**	**-0.0893***	**-0.0078**
Standard error	(0.0086)	(0.0245)	(0.0582)	(0.0722)
F-statistics (1st stage)[a]	0.57	0.71	34.19	14.47
READING				
OLS coefficient	**0.0053**	**0.0053**	**-0.0054*****	**-0.0054*****
Standard error	(0.0038)	(0.0038)	(0.002)	(0.002)
IV- treatment coefficient	**0.000**	**-0.0583**	**-0.1337****	**-0.0033**
Standard error	(0.0084)	(0.3279)	(0.0000)	(0.0755)
F-statistics (1st stage)[a]	0.65	0.72	33.15	14.12
ITBS-VARIABLE[b]	NO	NO	NO	NO
PRED. VARIABLES[c]	NO	YES	NO	YES
IV DENSITY[d]	YES	YES	YES	YES
IV Comm. Area ITBS[e]	NO	YES	NO	YES

- Odd columns: IV is density in utilization/ do not hold constant pre-program var.
- Even columns: controls for pre-program instrument CT ITBS with CA ITBS

Empirical Analysis: Heterogeneity by type of childcare

Take CCS and pays for:	Licensed provider		Unlicensed provider		Unlicensed rel. provider	
	(1)	(2)	(3)	(4)	(5)	(6)
MATH						
OLS coefficient	**0.0036**	**0.0035**	**-0.0049****	**-0.0048****	**-0.0014**	**-0.0014**
Standard error	(0.0037)	(0.0037)	(0.002)	(0.002)	(0.0022)	(0.0022)
IV- treatment coefficient	**0.000**	**0.000**	**-0.0893***	**-0.0078**	**-0.0954**	**-0.0114**
Standard error	(0.0086)	(0.0245)	(0.0582)	(0.0722)	(0.067)	(0.0826)
F-statistics (1st stage)[a]	0.57	0.71	34.19	14.47	24.93	11.59
READING						
OLS coefficient	**0.0053**	**0.0053**	**-0.0054*****	**-0.0054*****	**-0.003**	**-0.003**
Standard error	(0.0038)	(0.0038)	(0.002)	(0.002)	(0.0023)	(0.0023)
IV- treatment coefficient	**0.000**	**-0.0583**	**-0.1337****	**-0.0033**	**-0.1439***	**0.0013**
Standard error	(0.0084)	(0.3279)	(0.0000)	(0.0755)	(0.0736)	(0.087)
F-statistics (1st stage)[a]	0.65	0.72	33.15	14.12	23.81	11.11
ITBS-VARIABLE[b]	NO	NO	NO	NO	NO	NO
PRED. VARIABLES[c]	NO	YES	NO	YES	NO	YES
IV DENSITY[d]	YES	YES	YES	YES	YES	YES
IV Comm. Area ITBS[e]	NO	YES	NO	YES	NO	YES

- Odd columns: IV is density in utilization/ do not hold constant pre-program var.
- Even columns: controls for pre-program instrument CT ITBS with CA ITBS

Empirical Analysis: Heterogeneity by type of childcare

Take CCS and pays for:	Licensed provider		Unlicensed provider		Unlicensed rel. provider		Unlicensed non-rel. provider	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
MATH								
OLS coefficient	**0.0036**	**0.0035**	**-0.0049****	**-0.0048****	**-0.0014**	**-0.0014**	**-0.0108*****	**-0.0109*****
Standard error	(0.0037)	(0.0037)	(0.002)	(0.002)	(0.0022)	(0.0022)	(0.003)	(0.003)
IV- treatment coefficient	**0.000**	**0.000**	**-0.0893***	**-0.0078**	**-0.0954**	**-0.0114**	**-0.1066**	**-0.082**
Standard error	(0.0086)	(0.0245)	(0.0582)	(0.0722)	(0.067)	(0.0826)	(0.1144)	(0.1226)
F-statistics (1st stage)[a]	0.57	0.71	34.19	14.47	24.93	11.59	20.20	8.36
READING								
OLS coefficient	**0.0053**	**0.0053**	**-0.0054*****	**-0.0054*****	**-0.003**	**-0.003**	**-0.0097**	**-0.0096*****
Standard error	(0.0038)	(0.0038)	(0.002)	(0.002)	(0.0023)	(0.0023)	(0.0031)	(0.0031)
IV- treatment coefficient	**0.000**	**-0.0583**	**-0.1337****	**-0.0033**	**-0.1439***	**0.0013**	**-0.1893***	**-0.0282**
Standard error	(0.0084)	(0.3279)	(0.0000)	(0.0755)	(0.0736)	(0.087)	(0.0988)	(0.1231)
F-statistics (1st stage)[a]	0.65	0.72	33.15	14.12	23.81	11.11	20.14	8.42
ITBS-VARIABLE[b]	NO	NO	NO	NO	NO	NO	NO	NO
PRED. VARIABLES[c]	NO	YES	NO	YES	NO	YES	NO	YES
IV DENSITY[d]	YES	YES	YES	YES	YES	YES	YES	YES
IV Comm. Area ITBS[e]	NO	YES	NO	YES	NO	YES	NO	YES

- Odd columns: IV is density in utilization/ do not hold constant pre-program var.
- Even columns: controls for pre-program instrument CT ITBS with CA ITBS

Empirical Analysis: Heterogeneity by type of childcare

CONCLUSIONS:

TREATMENT EFFECT POTENTIALLY HETEROGENEOUS ALONG THE TYPE PROFILE

- **NEGATIVE EFFECTS ASSOCIATED TO UNLICENSED NON-RELATIVE**
- **ZERO EFFECTS ASSOCIATED TO UNLICENSED RELATIVES**
- **NON-NEGATIVE EFFECTS ASSOCIATED TO LICENSED**

Conclusions:

Policy relevance:

Post welfare reform objectives promote work:

- Welfare to work policies entail use of childcare

  - For high ability low income women this might not be good for children
  - Effects vary strongly according to type:
    - Non-relatives should be focus of policy towards improvement
  - High income-high ability-highly educated mothers stay at home
    - Inequality?
  - Do returns to experience for low income, low education increase?

Methodological insights:

- Geographical distance and density measures used as IV require additional conditions for identification

Thanks!

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