The Kindergarten Movement and the US Demographic Transition

Philipp Ager Francesco Cinnirella Peter Sandholt Jensen

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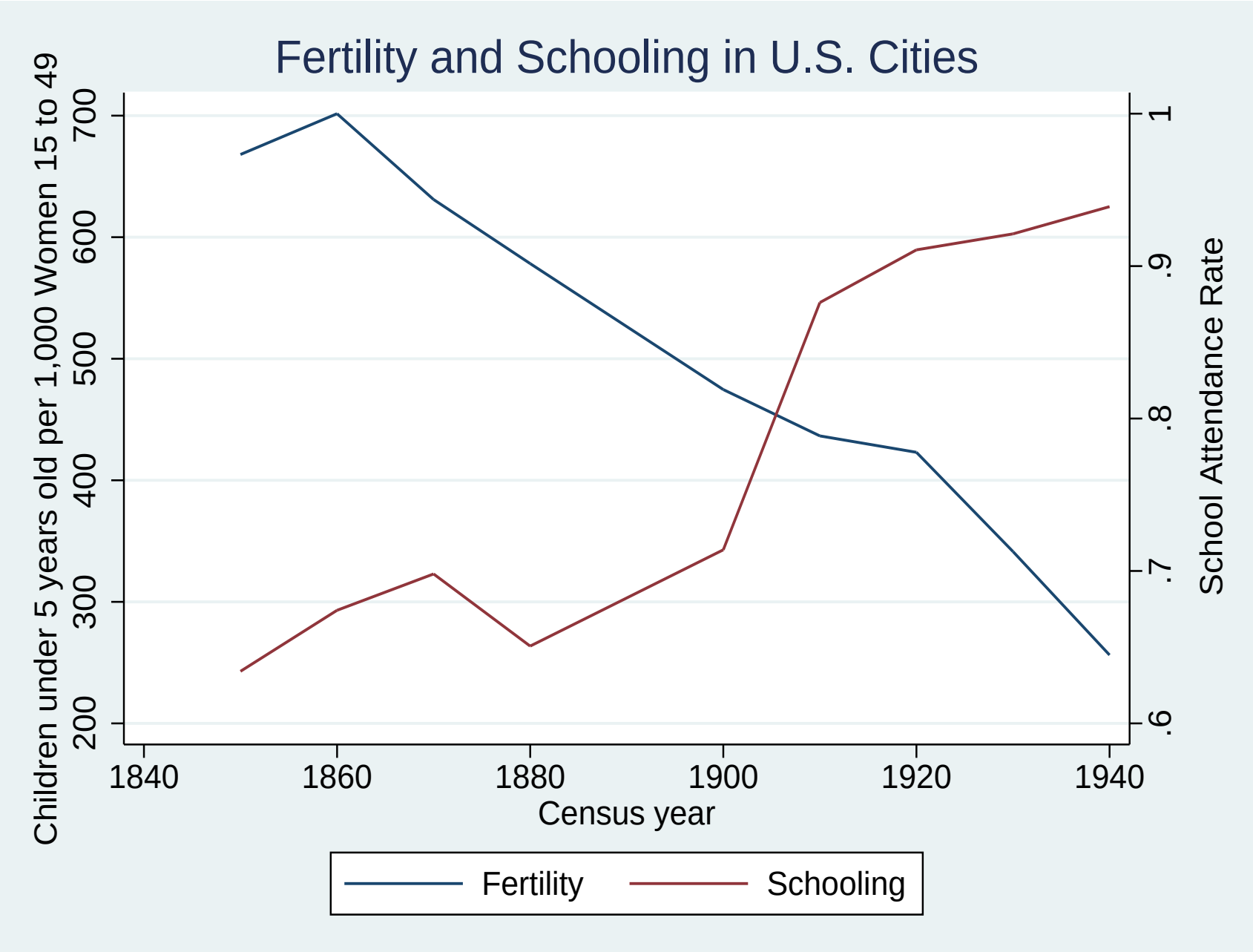
The Demographic Transition and Schooling in US Cities



Fertility and Early Childhood Education

- Negative correlation between education and fertility
- What is the role of early childhood education for the demographic transition?
  - Quantity-Quality trade-off or alternative theories
  - Long-term consequences (lower fertility and higher income levels)
- The kindergarten was transplanted to America by German migrants during the second half of the 19th century

Questions

- How does the spread of the kindergarten affect fertility?
  - Cost of education
  - Cost of raising children
  - Labor market opportunities
- Who was affected by the establishment of kindergartens?
  - Fecund mothers, children age 4 to 6
  - Role of German communities for kindergarten diffusion

Main findings

- Kindergarten diffusion lead to an overall fertility decline
- German communities play important role for kindergarten diffusion and contribute to the fertility decline in US cities
- Higher school attendance rates of 4 to 6 years old exposed to kindergartens
- Children exposed to kindergartens have higher earnings and school attainment later in life

Related Literature

- **US Demographic Transition:**
  Easterlin (1971), Haines (1979), Greenwood and Seshadri (2002), Jones and Tertilt (2008)
- **Quantity-Quality Trade-off in the US:**
  Bleakley and Lange (2009), Aaronson et al. (2014)
- **The Role of Kindergartens in the US:**
  Cascio (2009), Heckman et al. (2010), Haimovich (2014)

History of Kindergarten in the United States (1)

German-American Interaction (Allen, 1997)

- Kindergarten a German "cultural institution" (Froebel)
  - M. Schurz: first US Kindergarten in 1855 (Watertown, WI)
  - E. Peabody: first English speaking kindergarten in 1860 (Boston, MA)
  - S. Blow: First public kindergarten in 1873 (St. Louis, MO)
- Peabody facilitated the spread of Kindergartens to a broader English-speaking constituency
- Peabody trained with female German migrants the first generation of American (mainly female) kindergarten teachers

History of Kindergarten in the United States (2)

- *Mission*: "the public school kindergarten stands as a mediating element, in which it is sought to provide for the children of the people the best kind of nurturing and scientific care, to give them the best kind of physical, mental, social, and spiritual training"

  Take-away:

  $\Rightarrow$ Kindergarten very popular among educated, middle-class American women

  $\Rightarrow$ German influences important in each stage of the Kindergarten Movement: "transplanted institution"

History of Kindergarten in the United States (3)

Figure: Susan Blow (Source: The State Historical Society of Missouri)

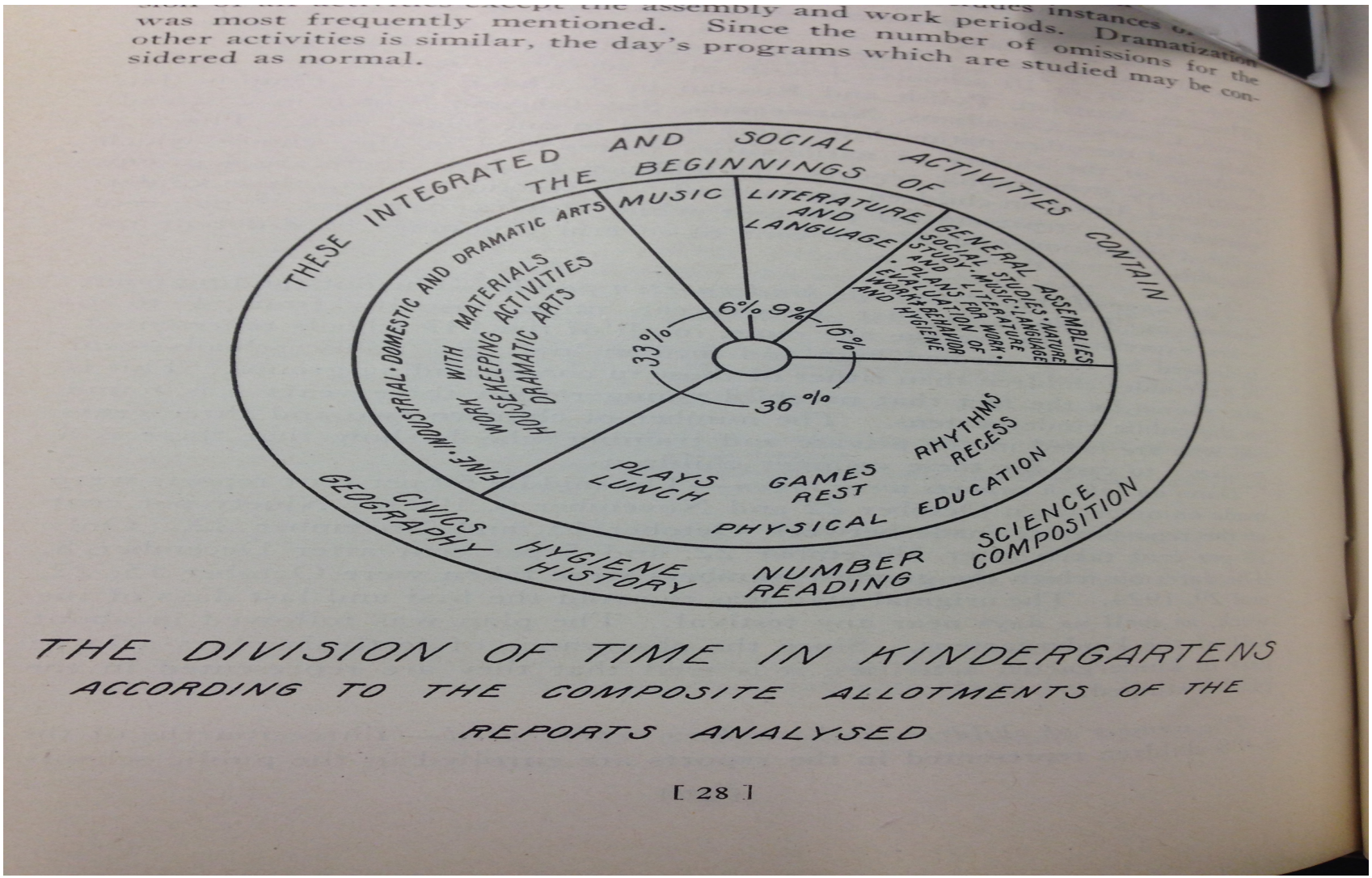
Kindergartens in the Q-Q Trade-off Framework

Returns to Education/Cost of Schooling:

- Ellen M. Quigley, Troy, NY: [. . .] "little children who have had the great privilege of being trained in a kindergarten by a skillful, enthusiastic kindergartner have many advantages over those who come from even the best homes directly to first grade (Bureau of Education, Bulletin 1914, 6, p.107)"
- Nellie Walton Ford, St. Paul, MN: "Kindergarten children possess greater self-control, are more mature, less timid, pay better attention, take commands more intelligently, do better handwork, and have a better vocabulary (Bureau of Education, Bulletin 1914, 6, p.112)"
- Survey of school teachers (Palmer, 1915): Overall kindergarten children have better school habits, are more fluent in language and are better to work with others

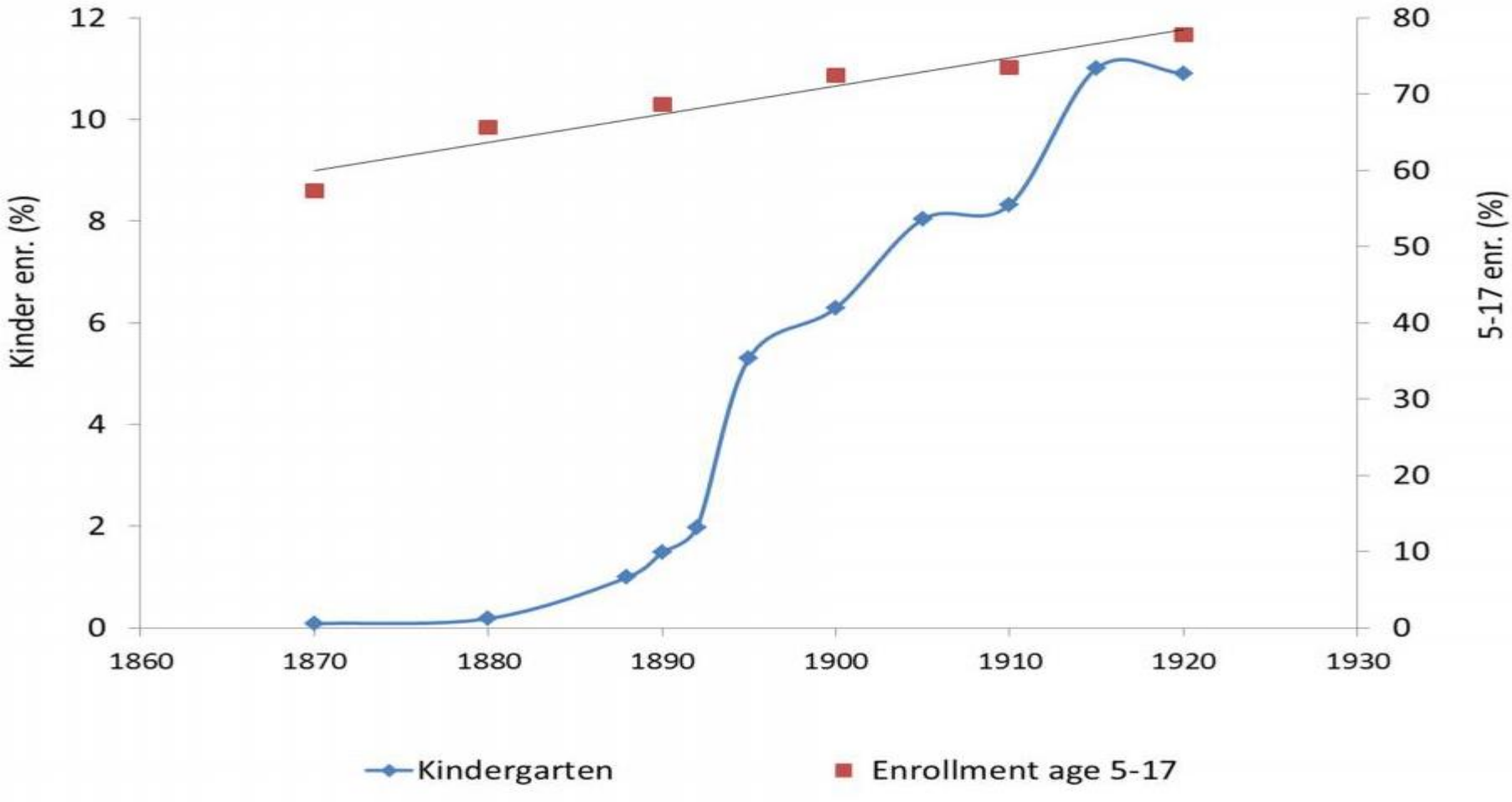
Division of Time in Kindergartens

Figure: General Practice in Kindergarten Education in the United States, Davis (1925, p.28)



National Kindergarten Movement

Figure: National Enrollment in Kindergartens (Haimovich, 2014, mimeo)



Relevance of Kindergarten Education

- Almost no kindergarten enrollment of children age 4-6 in 1880, around 5% in 1902, increased to about 9 percent in 1912
- In 1912, 87% were public kindergartens, 85% of the enrolled children attended public kindergartens
- Large variation across states in 1912: in New Jersey 28% of children between 4-6 years were enrolled in kindergarten; in West Virginia only 0.1%

Questions:

1. How does the establishment of kindergartens affect fertility?
2. Is there a fertility reduction due to higher returns to education as sketched in the historical narrative (Q-Q trade-off)?

Kindergarten: Data Collection (1)

- We have digitized data on Kindergarten from 1880 to 1910 ($n \approx 11700$) mainly from statistical reports commissioned by the Bureau of Education
- Information digitized: name, location (municipality), county, state, year of establishment, number of pupils, type (public/private)
- Match data on kindergarten with city code from IPUMS
  - 1880: 10%
  - 1900: 5%
  - 1910: 1%

$\Rightarrow$ In total we have about 104,000 women, age 20-49 listed as spouse or household head at the time of the Census.

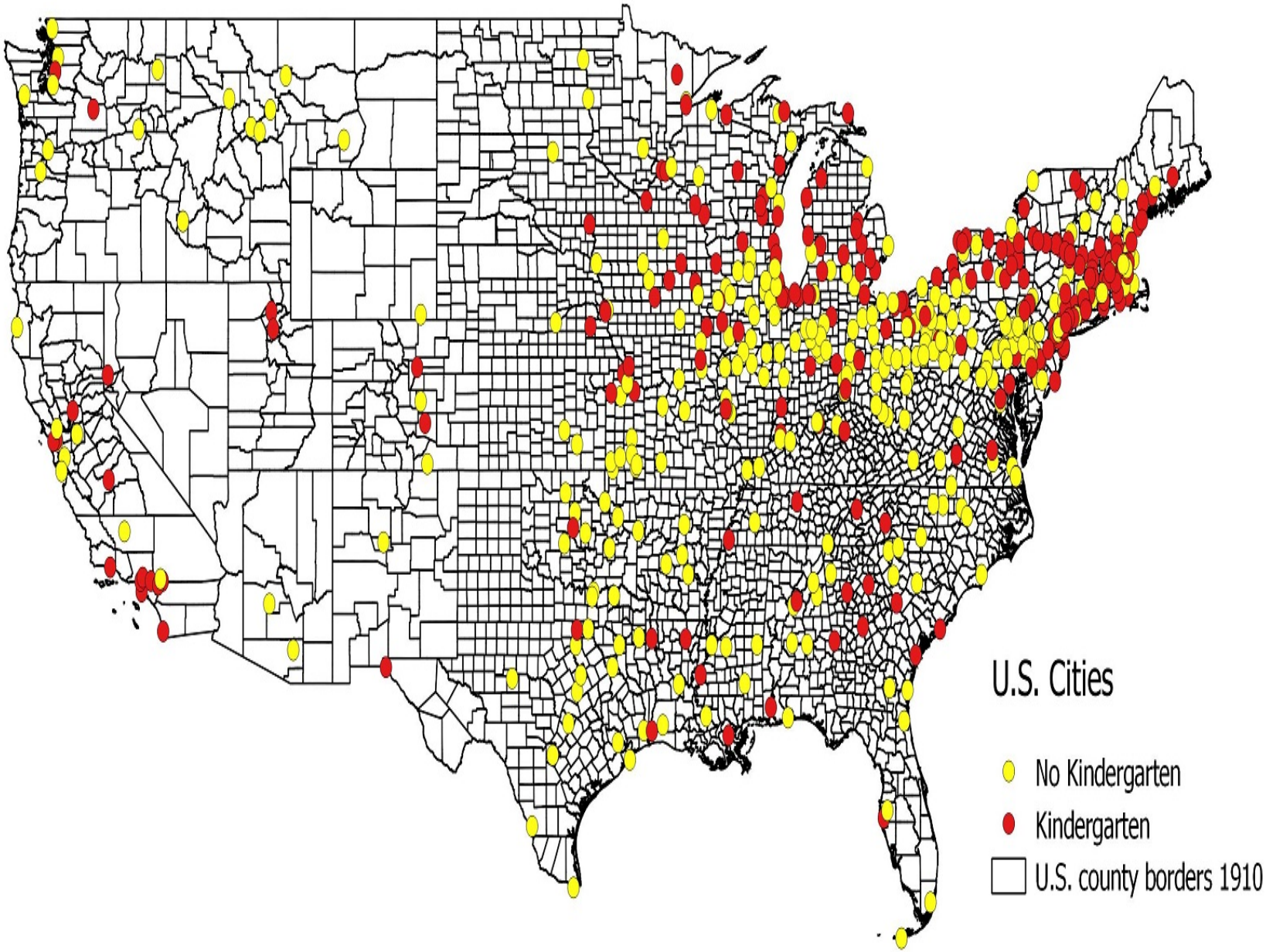
Kindergarten: Data Collection (2)

Figure: Enrollment Rates by State 1912
Source: Bureau of Education, Bulletin, 1914, No. 6, p.24

TABLE 5.—*Statistics of public-school kindergartens for year ended June 30, 1912*—Continued.

Cities and towns.	Total population, census of 1910.	Estimated population of kindergarten age.	Public-school kindergartens.	Children enrolled in public-school kindergartens.	School year in days.	Average daily attendance.	Age children may enter kindergarten.	Age children must leave kindergarten.	Kindergarten teachers.			Assistant kindergarten teachers.		One or two sessions a day.	Same teachers in both sessions.	Public-school kindergarten established.	Preparation required of kindergarten teachers.
									Number.	Maximum salary.	Minimum salary.	Maximum salary.	Minimum salary.				
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
INDIANA.																	
Attica	3,335	143	1	47	173	31	5	7	1	$450	.....	.....	.....	1	.....	1892	High-school graduation; kindergarten training school graduation.
Columbus	8,813	378	2	80	180	55	4	6	2	585	$405	.....	.....	1	.....	1899	Graduation from kindergarten training school.
Converse	1,164	49	1	53	157	50	5	8	1	560	360	.....	.....	2	Yes...	1900	College course.
Crawfordsville	9,371	402	3	60	178	45	4	6	6	653	612	$225	$180	1	.....	1911	Special kindergarten training, 2 years.
East Chicago	19,098	821	7	276	190	173	4	6	8	850	650	350	300	2	Yes...	1900	High-school graduation; kindergarten school graduation.
Evansville	69,647	2,994	12	721	185	530	5	6	12	700	465	400	400	2	Yes...	1902	Graduation from kindergarten college.
Fort Wayne	63,933	2,749	10	511	192	282	5	6	14	750	500	550	400	[1] 1	Yes...	1899	High-school graduation; kindergarten college graduation.
Gary	16,802	722	5	613	196	([2])	4	6	7	900	600	.....	.....	2	Yes...	1907	Two years kindergarten training following 4 years' high school.
Hammond	20,925	899	14	461	190	258	4	6	13	760	570	475	475	2	Yes...	1893	High-school graduation; kindergarten training school graduation.
Huntington	10,272	441	2	72	178	41	5	[3] 6	2	630	.....	270	.....	2	Yes...	1911	Graduation from 2 years' kindergarten course.
La Porte	10,525	452	3	230	190	162	5	6	4	712	598	646	522	1	.....	1886	Graduation from kindergarten college or license.
Madison	6,934	298	2	58	180	41	5	6	1	630	.....	.....	.....	2	Yes...	1908	Graduation from approved kindergarten training school.
Michigan City	19,027	818	7	299	175	197	4½	6	7	595	423	.....	.....	1	.....	1902	Do.
Mishawaka	11,886	511	3	139	178	106	4½	6	6	675	450	.....	.....	1	.....	1907	Two years' kindergarten training.
Richmond	22,324	959	8	405	186	208	4½	[3] 6	8	675	675	.....	.....	1	.....	1895	High-school graduation; kindergarten college graduation.
Shelbyville	9,500	408	5	135	180	100	4	6	2	450	450	.....	.....	2	Yes...	1901	Two years' special preparation.
South Bend	53,684	2,308	14	[4] 700	175	600	5	6	28	648	585	630	540	1	.....	1898	Graduation from kindergarten school.
Terre Haute	58,157	2,500	29	683	190	537	5	6	15	655	565	.....	.....	1	.....	1911	License.
Valparaiso	6,987	300	1	69	87	45	4½	6	1	450	.....	.....	.....	1	.....	1892	High-school diploma or equivalent.

Map of Kindergartens by US Cities in 1910



Outcome Variables

Fertility Measures:

- Children less than 5 years old

Education Data:

- School attendance 4 to 17 years old
- Educational attainment from Iowa 1915 (Goldin and Katz, 2010)
- Returns to kindergarten education (Goldin and Katz, 2010)

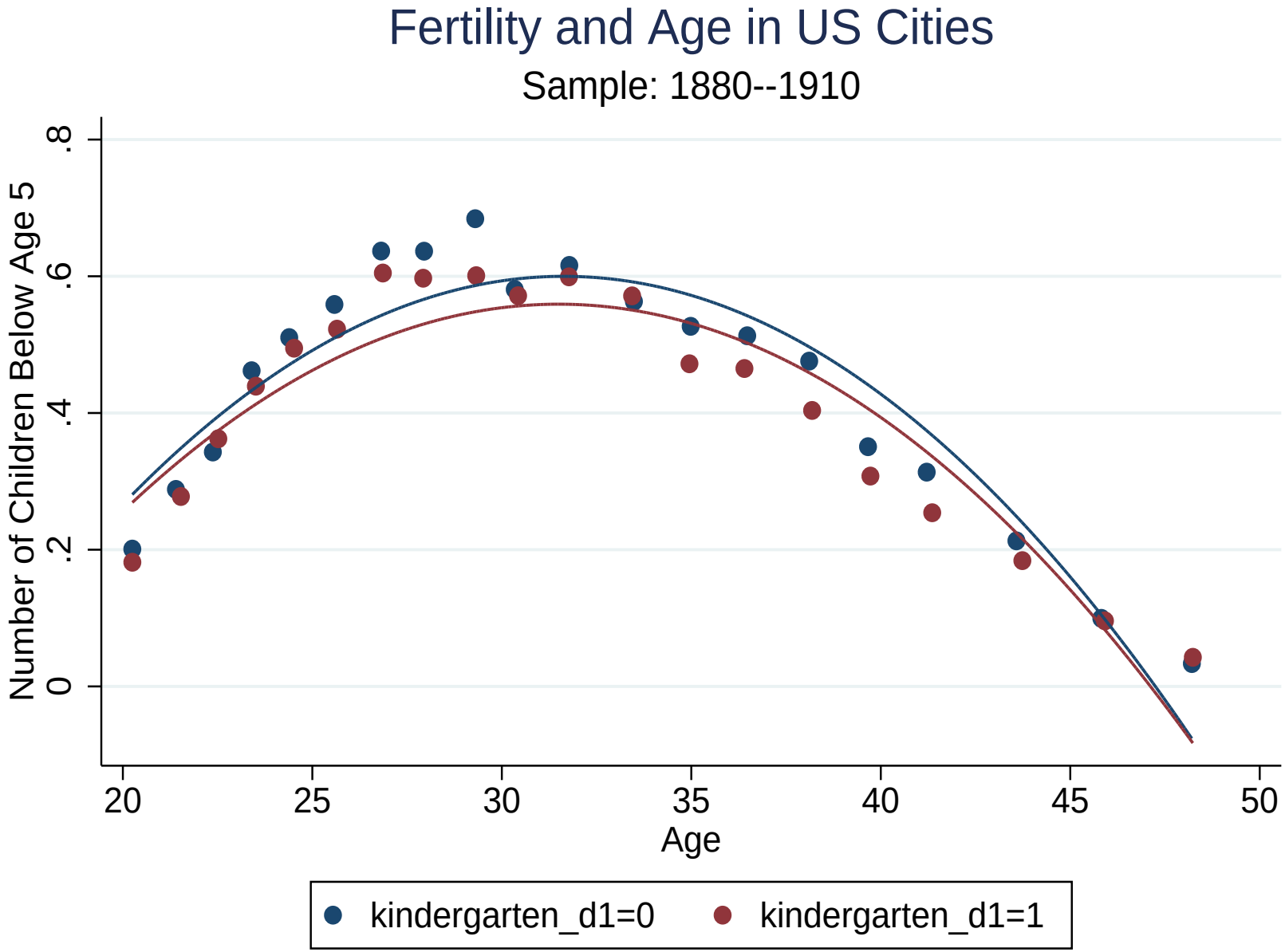
In progress: Family size constructed from the US Census 1900, 1910 and 1940

Estimation Strategy

$$\text{Fertility}_{ict} = a_c + b_t + \delta KG_{ct} + Controls_{ict} + \epsilon_{ict}$$

1. Fertility_{ict}: number of own children below age 5
2. KG_{ct}: number of kindergartens per inhabitants
3. $Controls_{ict}$: individual controls (race, quadratic in age, birthplace, marital status, literacy)
4. City fixed effects (a_c)
5. Time fixed effects (b_t)

The Spread of Kindergartens and Fertility



The Spread of Kindergartens and Fertility

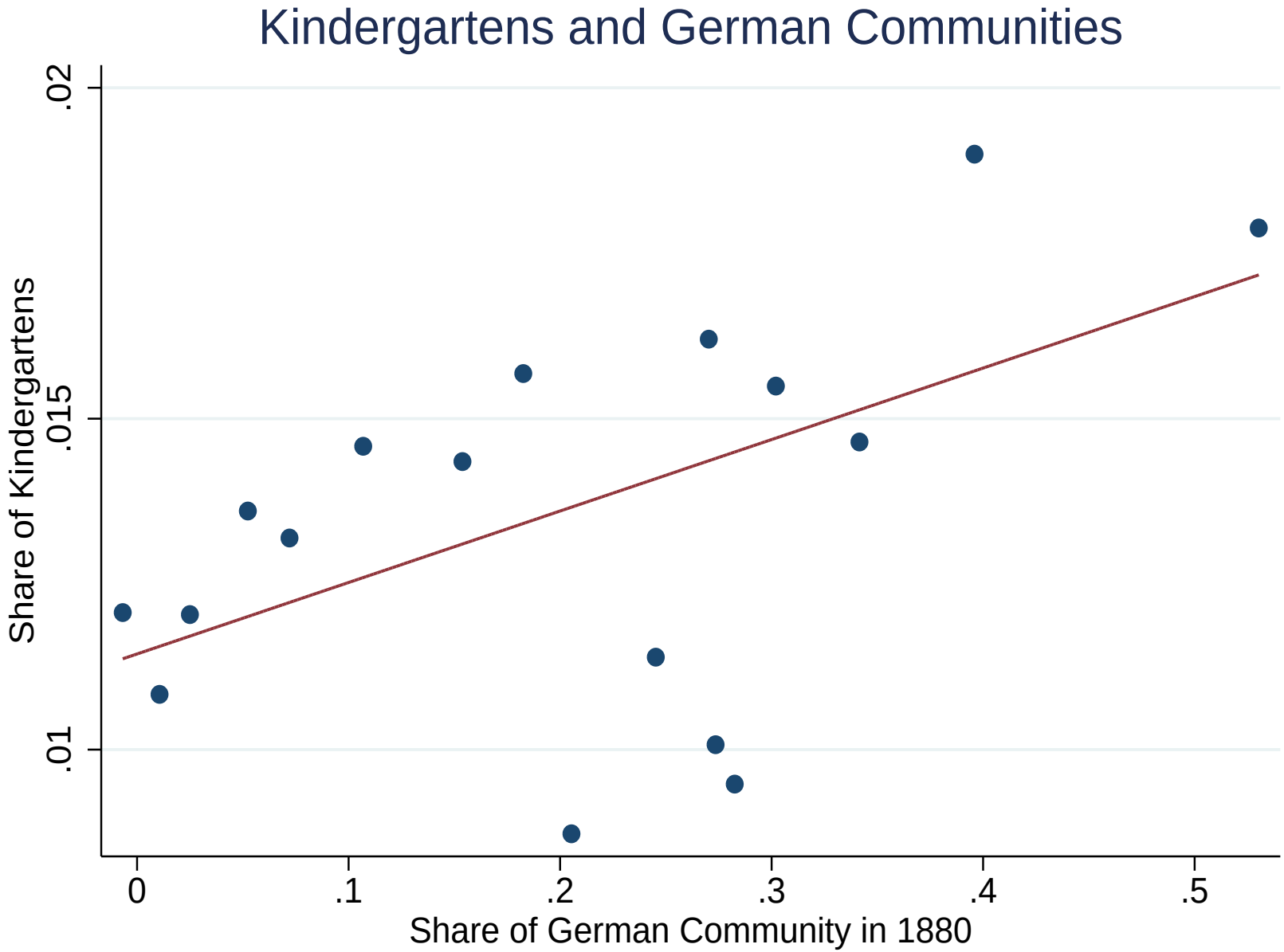
	(1)	(2)	(3)	(4)	(5)	(6)
			Number of Children below Age 5			
VARIABLES	Whole Sample		Kindergarten Established 10 Years Earlier		Late Kindergarten Adopters 10 Years Earlier	
Share Kindergarten	-1.011**		1.445		1.063	
	(0.482)		(0.902)		(1.271)	
Share Kindergartens x Age 20-24		-0.672		-0.107		0.608
		(0.662)		(1.036)		(1.302)
Share Kindergartens x Age 25-29		-1.911***		-0.562		0.108
		(0.651)		(0.869)		(1.166)
Share Kindergartens x Age 30-34		-0.773		0.815		1.479
		(0.705)		(0.721)		(0.941)
Share Kindergartens x Age 35-39		-0.982*		-0.290		-1.326
		(0.593)		(0.666)		(0.868)
Share Kindergartens x Age 40-44		-0.534		-0.438		-0.533
		(0.497)		(0.583)		(0.924)
City FE	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
City x Time FE	No	Yes	No	Yes	No	Yes
Observations	104,065	104,065	51,514	51,514	15,160	15,160
R-squared	0.192	0.198	0.190	0.195	0.198	0.208

The sample spans females (household head or spouse) age 20 to 49 from 1880 to 1910. Individual controls are dummies for being literate, white, married, birthplace, and a quadratic in age, and dummies for age cohorts. Robust standard errors clustered at the city level in parentheses: *** p<0.01, ** p<0.05, * p<0.1.

Wrap-up Results

- On average, moving from zero kindergartens to the mean (to the 95th percentile) would decrease the number of children below 5 by 2% (6%)
- Interacting the share of kindergartens with the different age cohorts reveals that there is a significant decline in fertility in the cohort age 25 to 29 relative to the 45 to 49 years old
- Placebo tests do not indicate any lead effect in kindergarten adoption

The Role of German Communities

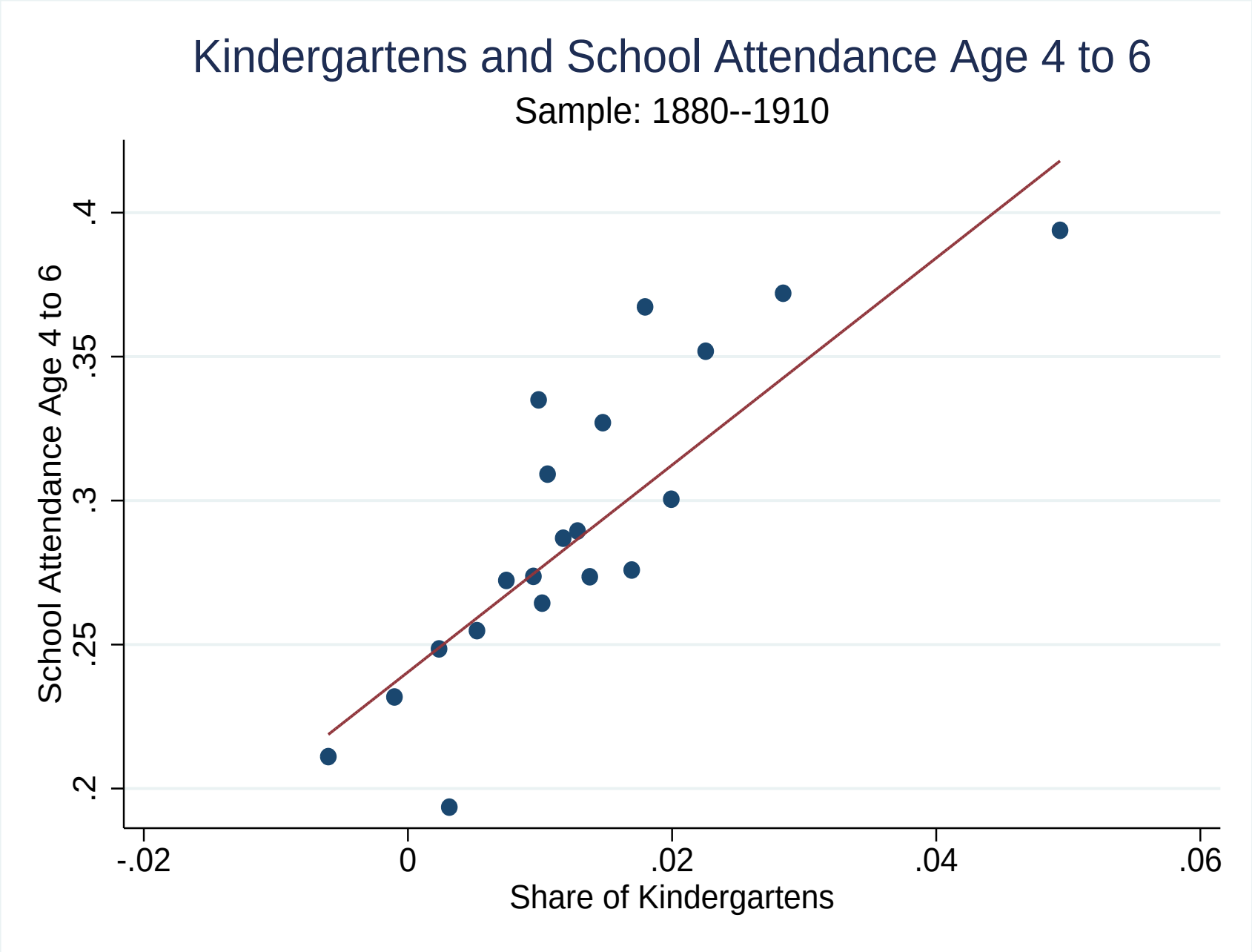


The Spread of Kindergartens, German Communities (GC) and Fertility

	(1)	(2)	(3)	(4)	(5)	(6)
			Number of Children below Age 5			
VARIABLES	Whole Sample	Whole Sample	Placebo Test		Sample: ==1 if Literate	
Share Kindergartens	-0.154		-1.392**	-0.114		-1.428**
	(0.602)		(0.582)	(0.601)		(0.575)
Share Kindergartens x GC in 1880	-6.551***			-7.449***		
	(2.300)			(2.501)		
Share Kindergartens x Age 20-24 x GC in 1880		-2.584			-1.728	
		(5.389)			(5.660)	
Share Kindergartens x Age 25-29 x GC in 1880		-14.77***			-14.15***	
		(4.061)			(3.984)	
Share Kindergartens x Age 30-34 x GC in 1880		-14.10***			-14.13***	
		(4.582)			(4.632)	
Share Kindergartens x Age 35-39 x GC in 1880		-5.992			-5.690	
		(4.117)			(4.354)	
Share Kindergartens x Age 40-44 x GC in 1880		-5.984*			-7.097**	
		(3.174)			(3.113)	
Share Kindergartens x Irish Community in 1880			1.952			1.799
			(2.029)			(2.204)
Share Kindergarten x Age Cohorts	No	Yes	No	No	Yes	No
German Community x Age Cohorts	No	Yes	Yes	No	Yes	Yes
City FE	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
City x Time FE	No	Yes	No	No	Yes	No
Observations	104,065	104,065	104,065	95,201	95,201	95,201
R-squared	0.188	0.198	0.189	0.180	0.191	0.182

The sample spans females (household head or spouse) age 20 to 49 for the period 1880 to 1910. Individual controls are dummies for being literate, white, married, birthplace, German ancestry (Columns 1, 2, 4, and 5), Irish ancestry (Columns 3 and 6), a quadratic in age, and dummies for age cohorts. Robust standard errors clustered at the city level in parentheses: *** p<0.01, ** p<0.05, * p<0.1.

School Attendance of the Relevant Group



The Spread of Kindergartens and School Attendance (1880-1910)

VARIABLES	(1) School Attendance Age 4-17	(2) School Attendance Age 4-6	(3) School Attendance Age 4-17
Share Kindergartens x Age 4 to 6			1.700***
			(0.483)
Share Kindergartens	0.771***	2.042***	
	(0.277)	(0.491)	
City FE	Yes	Yes	Yes
Time FE	Yes	Yes	Yes
City x Time FE	No	No	Yes
Observations	158,085	37,830	158,085
R-squared	0.415	0.354	0.416

The sample spans children age 4 to 17. Individual controls are dummies for being white, birthplace, a quadratic in age, and dummies for age cohort 4 to 6 (Column 3). Robust standard errors clustered at the city level in parentheses: *** p<0.01, ** p<0.05, * p<0.1.

The Effect of Kindergarten Exposure on Educational Attainment and Earnings

	(1)	(2)	(3)	(4)	(5)
			Sample: Iowa 1915		
VARIABLES	Total Years of School Attended			ln (Earnings)	
== 1 if Exposed	0.350***	0.354***	0.0593**	0.0936***	0.0609**
	(0.108)	(0.117)	(0.0275)	(0.0304)	(0.0287)
==1 if US Born	2.095***	2.092***	0.261***	0.259***	0.0957***
	(0.134)	(0.134)	(0.0300)	(0.0298)	(0.0276)
== 1 if White	2.851***	2.851***	0.475***	0.474***	0.259***
	(0.251)	(0.248)	(0.0441)	(0.0432)	(0.0466)
==1 if Female	0.136**	0.132**	-0.529***	-0.526***	-0.567***
	(0.0644)	(0.0644)	(0.0220)	(0.0220)	(0.0212)
Years of Schooling					0.0752***
					(0.00343)
City FE	Yes	Yes	Yes	Yes	Yes
Qudratic in Age	Yes	No	Yes	No	No
Age FE	No	Yes	No	Yes	Yes
Observations	6,959	6,959	4,049	4,049	4,049
R-squared	0.075	0.078	0.310	0.319	0.408

The sample spans individuals that turned 6 in the 5 years before the first kindergarten establishment (preexposed) and individuals that turned 4 in the five years after the first kindergarten establishment (exposed). Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1.

Evidence on the Q-Q: Wrap-up

- We already showed a negative effect of the diffusion of kindergartens on fertility
- We find that the school attendance rate of 4 to 6 years old is significantly higher in places with a higher kindergarten share
- The Iowa 1915 state census data reveal that individuals exposed to kindergartens in their early life had significant gains in earnings and years of schooling compared to individuals who were just too old to attend

Alternative Mechanisms

VARIABLES	(1)	(2)	(3)	(4)
	== 1 if works		*Child Mortality*	
Share Kindergartens	-0.133	-0.0303	0.655	0.537
	(0.153)	(0.186)	(0.807)	(1.041)
Share Kindergartens x GC in 1880		-0.715		1.090
		(0.793)		(5.407)
City FE	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes
Observations	104,065	104,065	66,249	66,249
R-squared	0.287	0.287	0.127	0.127

The sample spans females (household head or spouse) age 20 to 49. Individual controls are dummies for being literate, white, married, birthplace, German ancestry, and a quadratic in age, and dummies for age cohorts. For Columns (3)-(4) the sample spans married females (household head or spouse) age 20 to 49 for the years 1900 and 1910. Robust standard errors clustered at the city level in parentheses: *** p<0.01, ** p<0.05, * p<0.1.

Conclusions

- We showed that the diffusion of kindergartens in the United States increased educational attainment and reduced fertility
- Our evidence supports the quantity-quality trade-off as mothers saw kindergartens as an opportunity to invest in the quality of their children
- The establishment of kindergartens seems not to have had a significant impact on female labor supply and child mortality during 1880 to 1910
- Our results indicate that German cultural values related to child education have diffused into American communities via kindergartens

Thanks for you attention!

Figure: Source: Bureau of Education, Bulletin, 1914, No.6

B. "ONCE UPON A TIME."
Good stories are to a child what good books are to a grown-up.