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THE VIRTUES AND VICES OF SCHOOL DISTRICT CONSOLIDATION: EVIDENCE FROM U.S. CITIES, 1880-1912*

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Beginning in the late nineteenth century, many small urban school districts were consolidated into large citywide school districts. This study assembles new city-level school finance data from the 1880 and 1912 federal censuses and historical school reports to examine the effects of consolidation on the provision of local public schooling. Using a difference-in-differences framework, the analysis yields two main findings. First, consolidation generated economies of scale in the provision of public education. Second, consolidation weakened local residents' willingness to pay taxes for city schools, which in turn constrained the growth of public school financing following consolidation.

Keywords: Public School; District; Consolidation; City; Tax
JEL Classification: N31; I22; O18

1. INTRODUCTION

The centralization of public school finance in the United States is often cited as a key factor constraining investment in elementary and secondary education. Concerns about the growing role of state governments in school funding intensified following court-mandated school finance reforms in the 1970s and 1980s. However, evidence from the existing literature indicates that the centralization of American public school finance and administration began much earlier. The total number of school districts declined sharply during the twentieth century, falling from 117,108 in 1939 to 14,166 in 2005.

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Moreover, the share of state revenue in school funding began to increase more rapidly than the share of local revenue as early as 1925. In the early twentieth century, more than 80 percent of elementary and secondary public school revenue came from local sources, while only about 15 percent originated from state sources (Go, 2009). By 1995, these shares had converged, with 46.44 percent of total school revenue coming from local sources and 46.76 percent from state sources.

The centralization of American public school finance began earlier than is often suggested in the existing literature. Although the share of school revenue derived from local sources continued to rise in the late nineteenth and early twentieth centuries, centralization was already underway at the sub-state level. Numerous small school districts were consolidated into larger municipal or township units. This tendency toward centralization was particularly pronounced in cities, where consolidation began as early as the mid-nineteenth century. In rural areas, school district consolidation also began in New England in the late nineteenth century, although most rural districts elsewhere were consolidated gradually through the twentieth century.

The consolidation of school districts is widely recognized as a movement in rural America that transformed traditional one-room, one-teacher schools into modern graded schools. Graded schooling -along with teacher certification, expanded curricula, and compulsory attendance- was a defining feature of contemporary urban school systems. Indeed, the rural school consolidation movement of the early twentieth century was part of a broader effort to import the city school system, which was widely regarded in the late nineteenth century as the “one best system” (Tyack, 1974; Steffes, 2008). The success of this consolidation movement ultimately contributed to the formation of the modern public school system that exists today.

From the colonial period onward, public primary schools in the United States were initially established and governed through small school districts, in which voters held regular meetings to manage and finance local schools. By the mid-nineteenth century, however, cities began to abolish these small districts and reorganize their schools under centralized municipal systems. As a result, urban schools diverged from the traditional one-room schools that remained prevalent in rural hinterlands and frontier areas. The consolidation of school districts into municipal units bureaucratized school administration and centralized school finance. Following this centralization, district-level school taxes declined and, in many cities, were ultimately replaced by municipal funding during the consolidation process.

The centralization of public school finance induced by school district consolidation had the potential to both facilitate and hinder the development of public schooling. On the one hand, consolidation may have generated economies of scale, thereby reducing the cost of providing education. On the other hand, by enlarging the school tax unit, consolidation may have weakened the competitive efficiency associated with Tiebout-type sorting (Tiebout, 1956). This paper examines the effects of consolidation on the early development of American public schooling using newly assembled city-level school finance data from 1880 and 1912.

A difference-in-differences analysis indicates that school district consolidation had both positive and negative effects on public school finance at the turn of the twentieth century. Consolidation increased school size, generating economies of scale and reducing the per-pupil cost of schooling. Both the number of teachers per school and the number of pupils per school rose significantly following consolidation. At the same time, consolidation led to a compression of school funding, consistent with the predictions of the Tiebout hypothesis. After consolidation, the supply of schools and teachers declined, enrollment and attendance rates fell, and public school revenue per school-age child decreased.

The rise of the city school system in the late nineteenth century has attracted substantial attention from historians of education, including Tyack (1974), Bullough (1974), and Katz (1975). Much of this literature, however, has focused on the bureaucratization of school administration or on the roles of professionals, reformers, and "school men" in the development of urban school systems. The quantitative effects of school district consolidation during the nineteenth century have received far less attention. Economic historians have also contributed important research on educational investment and expansion. Fishlow (1966) and Solmon (1970) examined levels of investment in schooling in the nineteenth century, while Landes and Solmon (1972), Margo and Finegan (1996), Moehling (1999), and Lleras-Muney (2002) studied the effects of compulsory schooling and child labor laws on children's educational attainment. Goldin and Katz (2008) and Parman (2011) analyzed the expansion of high schools in the late nineteenth and early twentieth centuries. Despite these contributions, a gap remains in the literature regarding the relationship between school district consolidation and the evolution of the city school system.

Contemporary economists have also been actively engaged in the study of school district consolidation, with particular attention to the rural consolidation movement of the twentieth century. MacKinnon and Minns (2008) examined improvements in school quality and the emergence of graded schools in early-twentieth-century British Columbia using administrative data. Fischel (2007) analyzed the misalignment between school district and municipal boundaries, attributing it to constraints on voter preferences. Strang (1987) argued that state bureaucracy accounted for a substantial share of school district consolidation between 1938 and 1980. A related strand of the literature focuses on cost structures and outcomes. Duncombe, Miner, and Ruggiero (1995) and Duncombe and Yinger (2007) documented economies of scale in modern rural school district consolidation in New York. Kenny and Schmidt (1994) explained consolidation between 1950 and 1980 by changes in factors affecting school district cost structures, while Berry and West (2010) estimated the effects of consolidation on student outcomes.

However, the earliest episodes of school district consolidation in American cities have received little attention in the economics literature. This paper aims to document and explain these early urban consolidations, which abolished small school districts and established municipalities or townships as the smallest basic units for school taxation.

Importantly, the consolidation of school tax units did not necessarily entail the consolidation of individual schools. Examining the relationship between consolidation and school characteristics therefore raises new questions about the underlying causes of school district consolidation. The empirical findings of this paper also shed light on two additional issues: the effects of compulsory schooling laws and the origins of urban school problems. These implications and related avenues for future research are discussed in the final section.

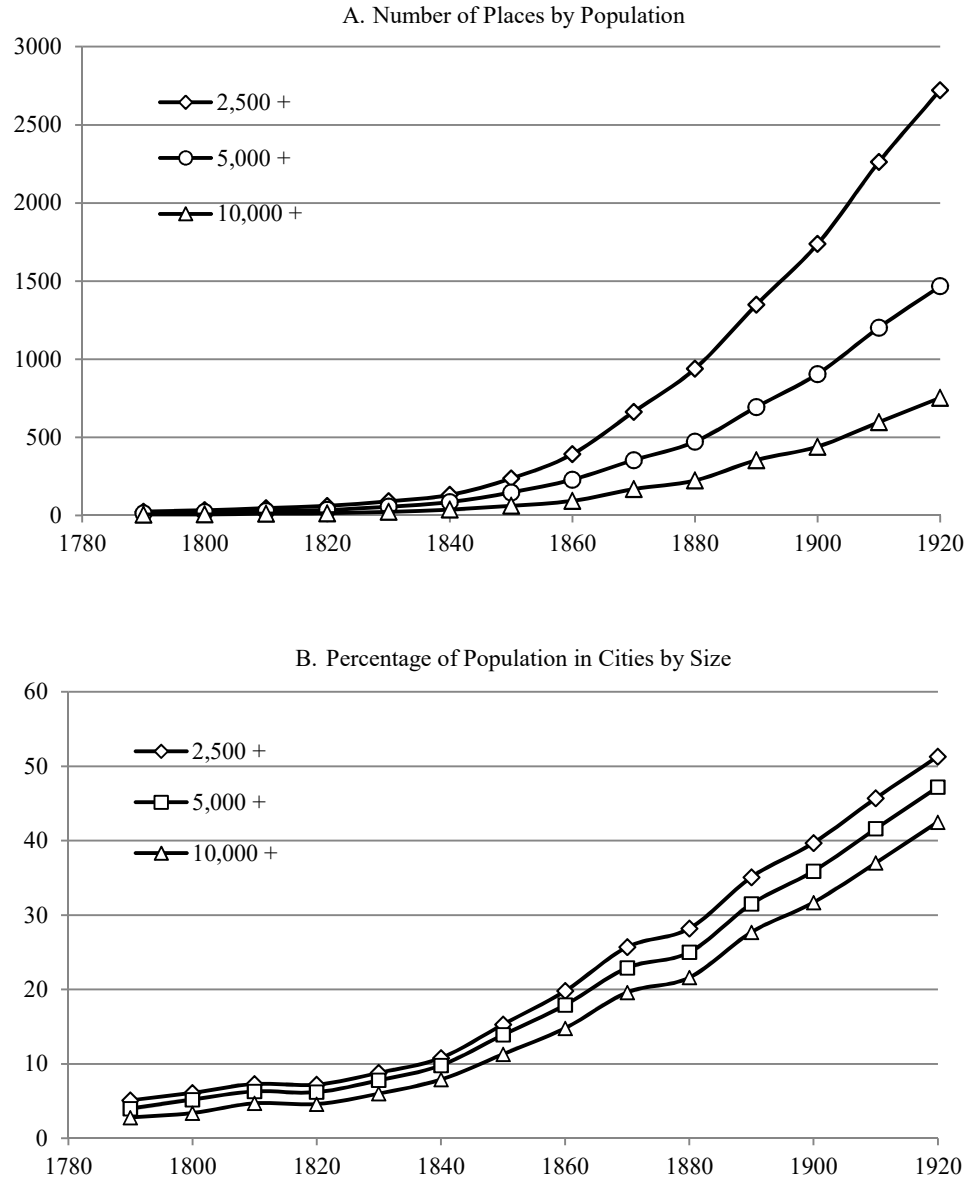
2. THE CONSOLIDATION OF SCHOOL DISTRICTS

American cities expanded rapidly during the nineteenth century. In 1790, only six cities had populations exceeding 8,000. By 1880, this number had grown to 286, and these cities together accounted for 22.5 percent of the total U.S. population (Philbrick, 1885). Figure 1 illustrates the accelerated growth of American cities following the Civil War. Using a population threshold of 2,500, there were 392 such cities in 1860, housing just 19.8 percent of the total population. By 1920, the number of places with populations exceeding 2,500 had risen to 2,722, and the share of the population residing in these cities had increased to 51.3 percent.

The growth of American cities was accompanied by profound changes in everyday life and the emergence of new social institutions. Public schools in urban areas developed institutional forms that were distinct from those of rural schools. Late-nineteenth- and early-twentieth-century school reformers viewed the city school system as a major triumph of progress over the traditional, community-based rural school system, and indeed many reforms were first realized in urban schools. One-room, ungraded schools were replaced by graded schools housed in newly constructed multi-story buildings. Demand for teacher quality rose substantially, leading to an increase in professionally trained and certified teachers educated in normal schools. Urban schools were also reported to have longer school terms and smaller class sizes during the late nineteenth century. In addition, the curriculum expanded significantly, with subjects such as art, music, and physical training incorporated into instruction. Some reformers even argued that enrollment and attendance rates increased more rapidly in city schools than elsewhere (Cubberley, 1919).

Nevertheless, the early city school system was not without shortcomings, many of which are now recognized as central problems of urban education. For example, Tyack (1974) characterized late-nineteenth-century urban schools as failing to treat children as clients, inadequately educating poor students, and perpetuating institutionalized racism. Despite these concerns, the late-nineteenth-century American city school system had become the dominant model for school reform by the onset of World War I. It served as the primary template for the early twentieth-century school consolidation movement. Throughout the twentieth century, American public education continued to develop

along paths first established in urban schools. Core features of today's system -such as the K–12 elementary, middle, and high school structure and the standardized set of core subjects- were initially conceived, tested, and refined within the city school system.



Source: Census of Population, 1960. Volume 1, Characteristics of the Population, U.S. Summary, 1-14 – 15.

Figure 1. The Growth of Cities in the United States, 1790 – 1920

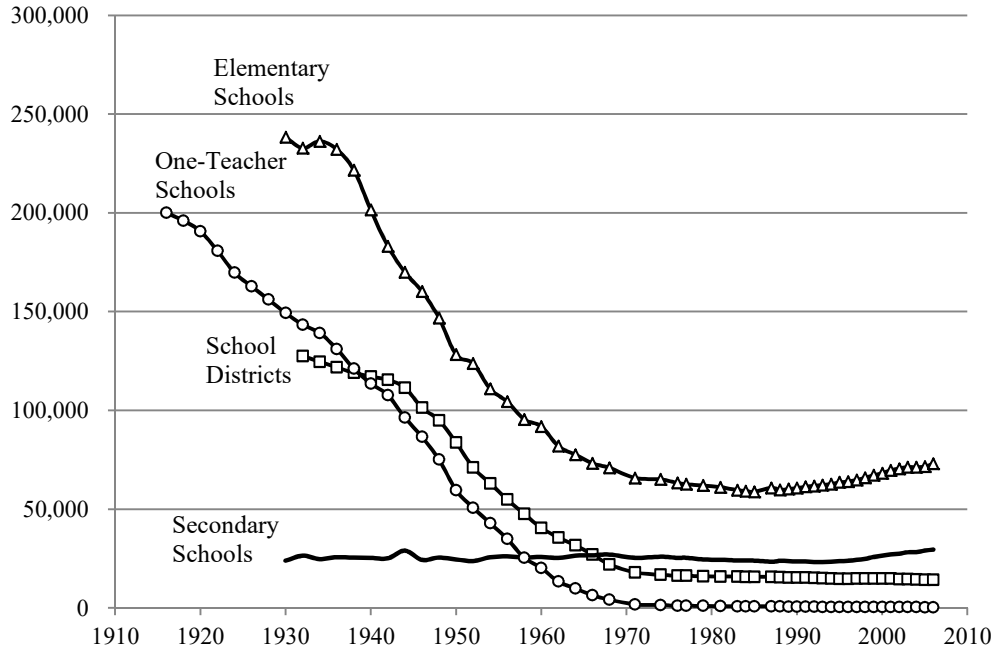
Multiple forces shaped the emergence and expansion of the city school system. Advocacy by “school men” played a central role in its early development. The bureaucratic structures established through city boards of education, superintendents, and other educational elites and professionals also enabled early reformers to pursue their objectives more effectively. These institutional changes were closely tied to the consolidation of basic units of school administration and finance, as authority shifted from numerous small school districts to larger municipal entities.

Small school districts were the foundational units in which American public schools first emerged. From the colonial period onward, early settlers voluntarily established public primary schools within their communities, and the neighborhood surrounding a school typically constituted a school district. Most districts were small and operated only a single common school. The school district system originated in colonial New England and subsequently spread westward with the migration of New England settlers. By the late nineteenth century, unconsolidated school districts generally maintained one ungraded, one-room school, taught and administered by a single schoolmaster or teacher. Instruction in these elementary schools centered on the “three R’s”-reading, writing, and arithmetic -with geography and American history added later (Cubberley, 1919). Most teachers had completed only common or grammar school, although some were graduates of academies or the newly established high schools, and schoolmasters in large Northeastern cities were often well educated (Cubberley, 1919). Students of varying ages and skill levels were taught together in a single classroom, and recitation was the dominant mode of instruction.

Improving conditions in one-room schools was a central concern of nineteenth-century school reformers. One of their earliest demands was the introduction of graded schooling. By the mid-nineteenth century, many American cities and towns had established grammar schools, which served as precursors to modern secondary schools. Although grammar schools in the European tradition focused on Latin instruction, in the United States they evolved into intermediate-level institutions that supplemented basic literacy and numeracy taught in primary schools. In the latter half of the nineteenth century, high schools emerged as a distinct form of secondary education, gradually replacing academies -older private institutions that combined elementary and secondary instruction. At the same time, urban primary schools were transformed from one-room schools into graded, multi-classroom institutions. The supply of qualified teachers also expanded substantially with the establishment of urban normal schools for professional teacher training, many of which were founded in the last quarter of the nineteenth century. The first normal school was established in 1839 in Lexington, Massachusetts, and by that time only eleven state normal schools were operating nationwide (Cubberley, 1919). Alongside the spread of normal schools, many states introduced certification requirements for public school teachers. As a result, urban schools offered a broader curriculum and longer school terms to students.

These changes, often celebrated by contemporary “school men” as major achievements, were accompanied by the administrative and financial consolidation of

school districts. In many localities, the school district ceased to function as the basic unit of administration and taxation, and the entire township or municipality instead became a single, centralized unit for school governance and finance. Notably, city school consolidation preceded the twentieth-century rural consolidation movement, which primarily aimed to eliminate one-room, one-teacher schools. As shown in Figure 2, school district consolidation appears more pronounced in rural America than in cities. However, caution is warranted when interpreting national trends. The timing of consolidation varied substantially across states, and urban consolidation is less visible in aggregate statistics because the number of urban school districts was always small relative to the vast number of rural common schools.

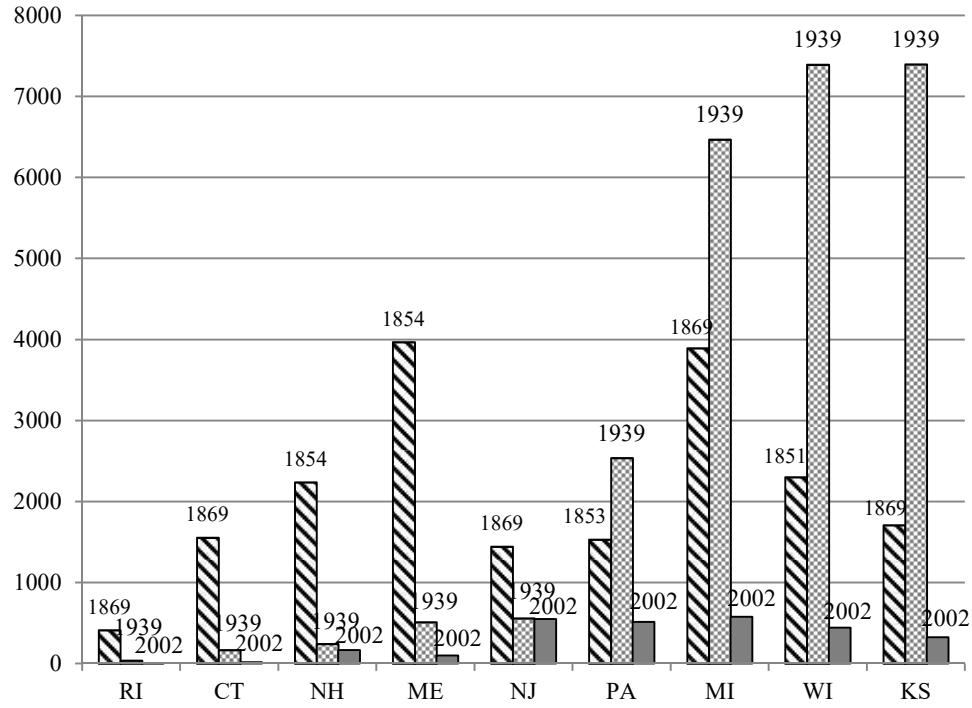


Source: 1916-1995 data are from Cater et al. (2006), Historical Statistics of the United States: Millennial Edition; 1996-2006 data are from 2007 Digest of Education Statistics.

Figure 2. Number of Public School Districts and Schools, 1916-2006

Figure 3 confirms that the timing of the consolidation movement varied substantially across states. Rural school consolidation was predominantly a twentieth-century phenomenon, particularly in the South and Midwest, as evidenced by the sharp decline in the number of school districts between 1939 and 2002 in states such as Pennsylvania,

Michigan, Wisconsin, and Kansas. In contrast, in the Northeastern states the number of school districts had already begun to decline in the late nineteenth century. In Rhode Island, Connecticut, New Hampshire, Maine, and New Jersey, the peak of the school district consolidation movement occurred in the late nineteenth century.

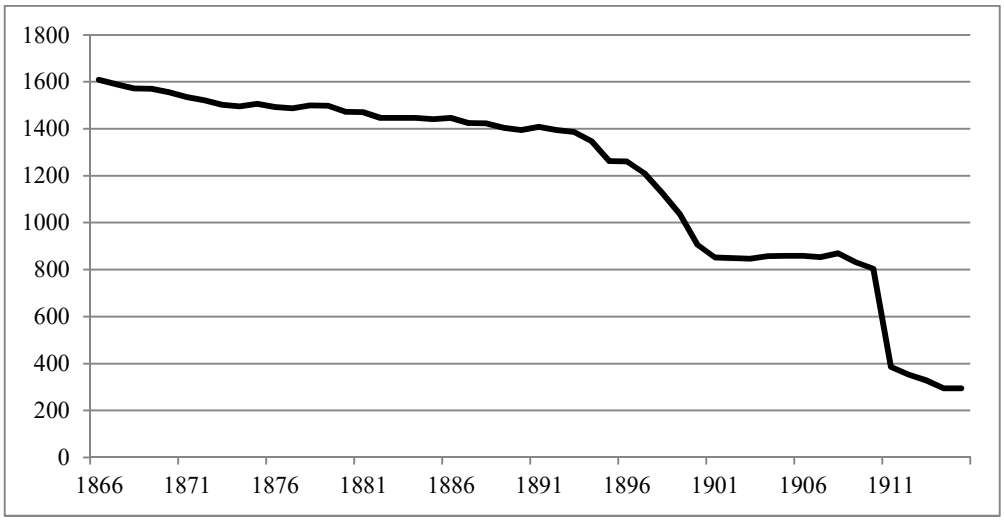


Source: 1851-1869 data are from various state school reports; 1939 data are from the Biennial Survey of Education, 1939; 2002 data are from the Census of Government, 2002.

Figure 3. Number of Public School Districts in Nine States, 1851-2002

There was also substantial variation in the timing of school district consolidation within states. In many cases, the transition from small school districts to larger centralized units began in cities and only later spread to rural areas, often driven by state legislation. The case of Connecticut, illustrated in Figure 4, clearly demonstrates this pattern. By the mid-1890s, school district consolidation was confined to a small number of large cities. By 1900, however, the movement had spread to most urban areas, and subsequent mandatory consolidation legislation ultimately reduced the number of school districts in Connecticut to equal the number of townships.

The abolition of school districts in urban areas dates back to the second quarter of the nineteenth century. Buffalo established a unified city school system in 1832. Detroit followed in 1842, abolishing the district system and organizing a unified system of schools under a city board of education. Chicago created its city board of education in 1857, thereby assuming control of public schools and eliminating the district system (Cubberley, 1919). When small school districts were abolished, the school system was reorganized at the level of the entire municipality or township, effectively consolidating school districts into a single, larger unit for administration and taxation. In most cities, such consolidation initially occurred voluntarily in the period following the Civil War and was later mandated by state legislation during the late nineteenth and early twentieth centuries.



Source: Annual Report of the Board of Education of the State of Connecticut, 1866-1915.

Figure 4. Number of Public School Districts in Connecticut, 1866-1915

Many states repealed the school district system during the second half of the nineteenth century. Indiana was the first to abolish the system statewide, doing so in 1852, and most New England states followed thereafter. The resulting consolidated arrangement was commonly referred to as the township system, reflecting the consolidation of school districts into township-level units in New England. In Massachusetts, the idea of a township system had been advocated as early as the era of Horace Mann, although legislation mandating the system was not enacted until 1882. Sher (1977) interprets the early debate over the township system as a conflict between Whigs, who favored centralization, and Jacksonian Democrats, who emphasized local control. Orestes Brownson, a leading Jacksonian Democrat in Massachusetts, was a

prominent opponent of Horace Mann's consolidation proposals. Mandatory township laws first spread through the Northeastern states, including New Hampshire and Vermont in 1892, Maine in 1893, New Jersey in 1895, and Michigan in 1909. Rhode Island and Connecticut adopted only permissive township system laws, partly because their relatively limited rural areas reduced the perceived need for mandatory consolidation (Sher, 1977). Southern states also enacted mandatory township systems during the 1880s, including Georgia in 1887 and Florida in 1889 (Cubberley, 1919).

The transition from small school districts to municipal school systems reshaped both the administration and financing of public education. Under the earlier system of small districts, voters met annually to deliberate and decide on school management and budgets. With the abolition of these districts and their consolidation into township or municipal systems, however, much control over public schools shifted from the general electorate to a narrower group of elites, including professional educators, administrators, and bureaucrats. Although major decisions -such as setting school tax rates or enacting legislative changes- still required voter approval, school officials gained substantial authority over budgetary details and the strategic direction of urban school systems. The city school system thus provided reformers with an institutional framework through which they could implement their educational agendas more effectively. Meanwhile, schools in rural hinterlands continued to be governed collectively through local district meetings and did not adopt many of the reforms that had become common in urban areas. As a result, by the early twentieth century, disparities between urban and rural schools had widened considerably, prompting urban reformers to criticize small school districts as a major source of rural educational backwardness (Boone, 1909; Cubberley, 1927).

The consolidation of school districts into municipal or township units was neither smooth nor easily achieved. Because consolidation typically required voter approval, it often took decades before the idea gained majority support in many states. In Massachusetts, for example, the legislature attempted statewide transitions to a township system in 1853 and 1860, but consolidation was not realized until 1882 (Sher, 1977). New York offers a particularly illustrative case of the challenges surrounding statewide consolidation. Supporters of consolidating school districts into a township system -primarily urban professionals, reformers, and educators- viewed the bureaucratic township structure as a means to extend the "one best system," characterized by graded schools, certified teachers, and standardized curricula, to lagging rural areas. After a prolonged advocacy campaign, the New York State Legislature abolished the school district system on May 2, 1917, and instituted the township system beginning in the 1917–1918 school year. The reform, however, quickly encountered strong opposition from rural voters. In March 1918, the legislation was repealed, largely due to concerns over increased school taxes. The new system entailed several quality-enhancing initiatives, such as improvements in school sanitation, the introduction of physical education, and the hiring of additional school clerks. Moreover, at the start of the 1917-1918 school year, townships lacked surplus revenues that might have mitigated the need for tax increases (Griffey, 1936). Under these circumstances, the establishment of

the township system necessitated tax hikes that proved unacceptable to a majority of voters.

In agricultural Midwestern states, legislative efforts to implement the township system were likewise often unsuccessful. Although Indiana and Ohio designated the township as the unit of local school control in their constitutions of 1852 and 1853, respectively, both states continued to rely on district-level school taxation through the late nineteenth century. Iowa, Nebraska, Missouri, the Dakotas, Minnesota, and Pennsylvania attempted to introduce the township system but did not achieve lasting consolidation until the early twentieth century. Wisconsin enacted its first permissive township law in 1896, only to repeal it in 1911. Illinois adopted a hybrid arrangement, using the township system for high schools while retaining the district system for elementary schools (Abel, 1923).

In summary, the city school system had emerged in the late 19th century as an archetype of the modern public school system that we still have today. The system demanded reforms such as introducing a grade system, as well as requiring an increase in school revenue to hire certificated teachers, and the introduction of brand-new curriculums and schoolhouses. Meanwhile, the formation of the city school system was accompanied by the consolidation of school districts into the municipal unit. All these changes were characterized by the centralization of school finance and administration.

3. CENTRALIZATION AFTER CONSOLIDATION

Between the 1840s and the onset of the Great Depression, local governments in the United States substantially expanded their role in the provision of local public goods, driven largely by the rise of property tax finance. Table 1 documents the growth of municipal expenditures and the corresponding increase in investment in public goods such as schools, roads, and sewage systems. Property tax revenue served as the primary funding source for these newly expanded local services (Legler, Sylla, and Wallis, 1988; Wallis, 2000). The existing literature often interprets the rise in local public spending during the late nineteenth century as evidence of increased localization. However, at least in the context of public school finance, the expansion of local funding did not necessarily reflect greater local autonomy. Instead, the second half of the nineteenth century was characterized by increasing centralization in public school finance.

American cities were the primary arenas in which centralization advanced most rapidly. To supplement emerging state school taxes, cities began to levy municipal school taxes. As urban populations expanded, school districts within cities were abolished and consolidated into larger municipal units. Although city boundaries and school district boundaries were not always identical in the United States (Phillips, 1927), Fischel (2007) shows that these boundaries were nearly perfectly congruent in large and long-established municipalities, particularly in New England, New Jersey, and Virginia. Changes in city-level school finance further confirm this trend toward centralization in

public education.

To examine the distribution of school tax revenue across different levels of government, I construct a dataset of 224 cities for the 1879–1880 school year. The 1879–1880 report of the federal Office of Education provides detailed statistics on city school systems for 243 cities. Of these, 224 cities can be matched to city-level tax revenue data from the 1880 federal census. For some cities, state, county, and school district tax revenues are not reported. In such cases, I estimate these values by allocating county-level revenues in proportion to each city's share of the county's total assessed taxable property value. Of the 19 cities excluded from the tax sample, 18 are located in Ohio and lack city-level assessed property values and municipal tax information; the remaining city is Ogdensburg, New York. In addition, Wilmington, Delaware, and Vicksburg, Mississippi have partial missing data, which reduces the sample with complete tax information to 222 cities. The dataset includes tax receipts by government unit and assessed values of real and personal property, allowing the calculation of effective property tax rates. A comparable city-level dataset for 1912 is constructed using the same methodology. The 1912 sample contains fewer observations because the census reports cover fewer cities.

Table 1. General Expenditure for Operation of Cities Having Populations over 100,000. (Million $, %)

Year	Total	Schools	Public safety	General control	Highway	Health, Hospitals, and Sanitation	Public welfare	ETC	Schools as % of Total
1902	221	58	57	28	26	23	7	20	26.24
1912	414	116	97	52	47	54	14	35	28.02
1923	1,069	394	218	107	96	141	36	77	36.86
1927	1,429	519	291	139	131	194	49	106	36.32
1931	1,780	632	346	168	149	236	120	130	35.51
1932	1,741	607	325	157	128	226	177	123	34.87
1933	1,652	542	295	149	111	201	238	117	32.81
1934	1,666	527	295	142	111	199	288	103	31.63
1935	1,715	546	304	146	111	202	278	128	31.84
1936	1,762	572	327	154	109	210	277	111	32.46
1937	1,873	596	330	160	106	226	332	123	31.82
1938	2,004	625	347	163	112	242	381	135	31.19
1939	2,025	630	345	167	116	245	384	138	31.11
1940	2,013	631	351	169	109	250	367	137	31.35

Source: Bureau of the Census, Historical Review of State and Local Government Finances, State and Local Government Special Studies No. 25, June 1948.

As shown in Table 2, the average total tax rate was 25.31 mills, the majority of which consisted of municipal taxes. The average municipal tax rate was 15.34 mills, of which 14.09 mills were allocated to non-school purposes. Because municipal taxes were levied only on city residents, there was a substantial disparity in tax burdens between urban residents and those in the surrounding countryside. In contrast, average state and county tax rates were much lower, at 2.87 and 4.48 mills, respectively.

Table 2. Tax Statistics of 224 American Cities, 1880

Variables	Obs	Mean	St.Dev.	Min	Max
Total Tax Rate (in mills of assessed property value)	224	25.31	11.82	5.22	80.95
State Tax Rate	223	2.87	2.36	0.03	20.25
State School Tax Rate	223	0.83	0.90	0.00	7.68
State Other Tax Rate	223	2.04	1.85	0.03	14.78
County Tax Rate	222	4.48	4.31	0.00	30.25
County School Tax Rate	223	0.22	0.64	0.00	5.00
County Other Tax Rate	222	4.25	4.08	0.00	30.25
Municipal Tax Rate	222	15.34	7.32	0.00	58.25
Municipal School Tax Rate	222	1.19	1.78	0.00	8.09
Municipal Other Tax Rate	224	14.09	7.34	0.00	58.25
School District Tax Rate	222	2.77	3.30	0.00	17.25
School Tax Rate	222	5.01	3.02	0.00	24.93
Local School Tax Rate (Municipal and District)	222	3.96	2.97	0.00	17.25
State Tax Share of the Total School Tax	221	0.20	0.23	0.00	1.00
Municipal Tax Share of the Total School Tax	221	0.29	0.40	0.00	1.00
District Tax Share of the Total School Tax	221	0.46	0.38	0.00	1.00
No District Tax (Indicator)	222	0.31	0.46	0.00	1.00
Have a Municipal School Tax (Indicator)	222	0.38	0.49	0.00	1.00

Source: 1880 Census and 1879-1880 U.S. Office of Education Annual Reports.

Note: Tax rates are measured by mills.

The average school tax rate was approximately five mills. More than half of this amount consisted of school district taxes, which averaged 2.77 mills. However, the structure of city school taxation varied systematically across regions, as shown in Table 3. State school taxes were common during this period, although notable regional differences existed. Many New England states, as well as some Midwestern states strongly influenced by New England traditions, had no state school taxes at the time. In contrast, most other states levied state school property taxes of approximately one to two mills. Counties did not serve as effective administrative units in the Northeast, and county school taxes were therefore largely absent; a similar pattern prevailed in much of

the Midwest. In the South, however, counties historically functioned as the primary local administrative units, making county school taxes a central source of school finance. County school taxation was also widely used in Western states.

Table 3. Average School Tax Rates, in Mills, by Government Unit and State, 1880

	State	State Tax Rates	County Tax Rates	City Tax Rates	District Tax Rates
North East	CT	0.64		2.51	1.29
	MA			3.81	
	ME	1.00		2.53	0.41
	NH			3.09	
	NJ	1.89		0.01	1.71
	NY	1.28		0.12	3.19
	RI			1.42	0.54
	VT			3.20	4.88
	PA				5.65
South	AL	1.45		0.50	
	FL	1.00	2.94		
	GA	0.41	0.86	1.47	
	KY	2.30	0.00	1.88	0.21
	LA	2.01		2.18	
	MD	1.02		0.83	
	MS	0.96	2.33		
	NC	1.55			
	SC	2.14		2.00	
	TN	1.90	1.92	1.87	
	TX	1.11			
	VA	1.73	0.48		1.07
Mid West	AR	3.17			5.16
	IA		1.00		8.18
	IL	1.51			6.50
	IN	1.69			2.63
	KS				6.31
	MI	1.00			7.34
	MN	1.00			3.40
	MO	0.50			4.58
	NE	1.00			6.96
	WI		0.60	4.63	1.69
West	CA	2.32	1.15		1.69
	CO		3.00		3.94
	NV	0.50	5.00		
	OR	2.21			2.80
	Total	0.83	0.22	1.19	2.77

Source: The Sample of 224 cities reported in the 1880 Census and 1879-1880 U.S. Office of Education Annual Reports.

Table 4. Descriptive Statistics of the City School System, 1873-1885

	1873-1874			1879-1880			1884-1885		
Variables	Obs	Mean	Std. Dev	Obs	Mean	Std. Dev	Obs	Mean	Std. Dev
Enrollment Rate	107	0.56	0.20	220	0.63	0.23	247	0.62	0.21
Attendance Rate	101	0.37	0.15	203	0.44	0.17	235	0.44	0.16
Pupils per Teacher	122	56.26	11.94	241	58.29	23.51	276	52.96	10.34
Teachers per Public School	118	5.85	3.28	222	6.03	3.32	252	6.48	3.47
Nominal expenditure per									
- Enrolled Pupil	119	20.59	10.22	237	14.06	4.92	270	16.77	6.42
- Attending Pupil	114	30.33	13.14	220	20.38	7.10	254	23.78	8.92
- School-age child	108	11.79	7.91	216	8.91	4.70	244	10.49	5.66
Real expenditure per									
- Enrolled Pupil	119	180.65	89.66	237	266.10	115.28	270	103.44	69.40
- Attending Pupil	114	137.40	48.08	220	199.16	69.38	254	87.07	45.93
- School-age child	108	173.76	66.52	216	246.40	92.43	244	108.69	58.65

Source: U.S. Office of Education Annual Reports; Carter et al., Historical Statistics, Series Cc1, a price index for which 1982-1984 = 100.

The school district system itself originated in New England, and school district taxes were commonly used in most states outside the South. Some Southern states, such as Kentucky and Virginia, also levied school district taxes, having adopted the district system after the Civil War. In contrast, none of the Massachusetts or New Hampshire cities in the sample reported any school district taxes during this period, reflecting the earlier abolition of the district system in these states. Given that no state had enacted mandatory township system legislation by 1880, cities in Massachusetts and New Hampshire appear to have voluntarily adopted township systems and consolidated school tax units at the municipal level.

As American cities established centralized school systems and increased tax revenues, urban schooling underwent substantial change. Table 4 documents these developments using comparable city samples for 1874, 1880, and 1885. The average enrollment rate in the sample cities rose from 56 percent in 1874 to 63 percent in 1880, while the average attendance rate increased from 37 percent to 44 percent over the same period. Although these levels remained below the national averages -reflecting the fact that urban areas lagged behind rural areas in enrollment and attendance during much of the nineteenth century- the increase of approximately seven percentage points within just six years represents a notable improvement.

Average class size, measured as pupils per teacher, increased slightly from 56.26 in 1874 to 58.29 in 1880, before declining to 52.96 in 1885. The average number of

teachers per school rose steadily over the period, from 5.85 in 1874 to 6.03 in 1880 and 6.48 in 1885. At the same time, nominal expenditures per enrolled pupil, per attending pupil, and per school-age child declined. Part of this decline reflects growth in the denominators, as enrollment, attendance, and the school-age population expanded substantially. In addition, the period was characterized by deflation. As shown in Table 4, when expenditures are adjusted for price changes using index numbers from Carter et al. (2007), real expenditures per pupil or per child did not decline markedly between 1874 and 1885, although they were temporarily lower around 1880.

Progress in public schooling during this period was largely confined to urban areas. Rural schools were slow to eliminate primitive conditions such as one-room schoolhouses, minimally qualified teachers, and rudimentary instruction. In the first half of the nineteenth century, rural America had been a global leader in establishing small community schools and achieving relatively high enrollment and attendance rates. By the latter half of the century, however, rural areas had ceded leadership in educational innovation to cities. A key explanation for this reversal lies in the divergent growth of school tax revenues between rural and urban areas. Small rural school districts in the hinterland faced persistent difficulties in raising revenue, as their tax bases were inherently limited. Cities, by contrast, were able to expand school funding more readily by consolidating basic tax units into larger municipal jurisdictions. Urban areas also benefited from rising property values, which further strengthened their fiscal capacity (Go, 2009).

In addition to the urban-rural divide, there was substantial variation in school finance, school characteristics, and the timing of school district consolidation across cities. This heterogeneity provides an opportunity to examine the consequences of school district consolidation in American cities. Before turning to the empirical analysis, the following section discusses the economic theory underlying the effects of school district consolidation on the provision of public education and local school finance.

4. THE IMPACT OF CONSOLIDATION ON PUBLIC SCHOOL FINANCE

School district consolidation can affect public school finance through multiple channels. Economic theory highlights at least two key mechanisms linking consolidation to school finance. The first is the presence of economies of scale, which can alter the cost function of public schooling. The second is a change in taxpayers' incentives, as emphasized by the Tiebout hypothesis.

The Tiebout hypothesis implies that, under certain conditions, the local provision of public goods can be fully efficient (Tiebout, 1956). Central to the Tiebout framework are competition among local jurisdictions and the capitalization of property taxes into housing values. When households are mobile and can freely choose their place of residence, local governments compete by offering distinct bundles of taxes and public

goods. For example, a locality may set higher property tax rates to finance a greater supply of high-quality public goods, thereby attracting residents with a higher willingness to pay. Because both property taxes and location-specific public goods are capitalized into housing prices, property values function as a price mechanism that coordinates demand and supply, potentially yielding an efficient allocation of local public goods.

School district consolidation weakens this price-coordination mechanism. As consolidation increases the size of local jurisdictions, mobility across localities becomes more costly and less feasible, undermining the conditions required for a Tiebout equilibrium. Moreover, large municipalities typically levy a single property tax to finance multiple public goods -such as schools, roads, and sanitation- making it difficult for the tax rate to signal preferences for any specific public service. As a result, property taxation becomes a less effective instrument for revealing and aggregating preferences, and the efficient provision of public goods is less likely to be achieved. In consolidated jurisdictions, public goods may therefore be underprovided, accompanied by lower tax revenues.

At the same time, consolidation may improve public goods provision through economies of scale. A substantial body of late twentieth-century research documents significant cost savings from school district consolidation. Using data from New York State in 1990, Duncombe, Miner, and Ruggiero (1995) estimate educational cost functions and find that per-pupil costs decline as enrollment increases, with approximately 80 percent of cost savings arising from the consolidation of districts with fewer than 500 students. Duncombe and Yinger (2007) further show that economies of scale are especially pronounced for small districts, even after accounting for the adjustment costs associated with consolidation. Their estimates suggest that a 100 percent increase in enrollment reduces per-pupil operating costs by 31.5 percent in districts with fewer than 300 students.

Given that American school districts were generally very small in the nineteenth century, consolidation during this period likely generated substantial cost savings. Indeed, anticipated economies of scale were a central motivation for the late-nineteenth- and early-twentieth-century consolidation movement, which aimed to replace one-room schools with larger, graded institutions. Many one-room schools enrolled only a handful of pupils taught by a single teacher, resulting in highly heterogeneous instruction across ages and skill levels. Educational professionals therefore argued that consolidating these schools into multi-grade institutions -with more teachers and improved facilities- would yield significant efficiency and quality gains.

The rise of high schools was also closely linked to cost savings generated by consolidation. High school education required more highly trained teachers and specialized facilities for relatively small student populations, making it substantially more expensive than elementary schooling. Consolidation allowed a single high school to serve students from multiple districts while maintaining the same cadre of qualified teachers and facilities. Consequently, high school districts were often larger and

administratively distinct from common school districts in the latter half of the nineteenth century. In New York, unified high school districts were widespread. Illinois organized high school districts at the township level while retaining smaller districts for elementary education.

Throughout the twentieth century, especially in rural America, potential economies of scale remained the primary justification for school district consolidation. This effect may have been even stronger in urban areas, where consolidation entailed little or no additional transportation cost. However, in cities, consolidation of taxing units also increased the likelihood of losing the efficiency gains associated with the Tiebout mechanism. In particular, when property taxation failed to function as an effective price coordinator for public goods provision, public goods -including education- may have been underprovided. In such cases, taxpayers would have contributed less to the consolidated school district, and tax revenues could have declined in the absence of offsetting gains in property values.

5. EMPIRICAL ANALYSIS

To investigate the effects of school district consolidation on the characteristics of city school systems, I estimate ordinary least squares regressions using city-level data on school finance and related outcomes. Data on public schools are drawn from the Report of the Commissioner of Education for the years 1880 and 1912–1913. Information on municipal finance is obtained from the 1880 Census report and the 1912 Census bulletin on the financial statistics of cities with populations exceeding 30,000.

The estimating equation is as follows:

$$y_{it} = \alpha + \beta(year_{it} \times nodist_{it}) + \gamma year_{it} + \delta nodist_{it} + \theta X_{it} + \varepsilon_{it}.$$

Here, i represents each city, and t is either 1880 or 1912. $year_{it}$ is an indicator that has 1 for 1912 data, and 0 for 1880 data. $nodist_{it}$is an indicator that equals 1 for the cities having no school districts, and 0 for those with school districts. Then, the coefficient for the interaction of two indicators, $\hat{\beta}$, is the difference-in-difference estimator that shows the effect of school district consolidation on each dependent variable. X_{it} is the matrix of control variables, which includes the average tax rate, the relative size of non-tax school revenue, the relative size of school-age population, total city population, and the south indicator variable.

As for the dependent variables y_{it}, various measures representing the contemporary condition of city schools are used. The dependent variables fall neatly into four groups – the enrollment and attendance rates, the school size, the supply of schools and teachers, and school expenditure and revenue. The enrollment and attendance rates are defined by public school enrollment or attendance as a share of the number of children in the legal school age. The legal school ages varied across places. It was typically set by state

legislation, but there was also a little variation across cities in some states. The minimum school age varied from 4 to 7, and the maximum ranged from 15 to 21. To identify the effects of the right-hand side variables on the development of the graded school system, the primary and higher-grade enrollment rates are added separately. The school size variables are public school teachers per public school and public-school pupils per public school. Both variables also represent the possible onset of the grade system within a school. As for the supply of schools and teachers, the number of public schools per 1,000 school-age children, the number of teachers per 1,000 school-age children, and the number of public-school teachers per 1,000 pupils are used as a proxy variable. The latter is typically interpreted as the reciprocal of the class size. The last group of variables consists of public-school expenditure and revenue per pupil or per school-age children.

Measuring the economies-of-scale effects of school district consolidation is difficult without specifying an appropriate cost function and having detailed information on school production inputs. The available data for urban public schools in 1880 and 1912 are limited, which precludes direct estimation of the cost function. As a result, the economies of scale associated with school district consolidation can only be assessed indirectly through changes in school size.

The regression result reported in Table 5 indicates that school district consolidation significantly increased the average size of public schools in cities. Consolidation increased the number of teachers per school by 3.28 and the number of pupils per school by 127.06, on average. The expansion in teaching staff enabled late nineteenth-century public schools to operate graded systems and to offer additional curricular subjects. Indeed, physical training, art, and music were incorporated into formal primary and secondary school curricula, alongside traditional subjects such as English, mathematics, science, and history.

School district consolidation also significantly reduced the number of schools. As reported in Table 5, consolidation decreased the number of schools per 1,000 school-age children by approximately two. Given that the consolidation movement during this period focused on converting one-room schools into multi-grade institutions, this finding further supports the conclusion that schools became larger by accommodating more teachers and pupils.

By contrast, the effect of school district consolidation on school expenditures is less clear. The estimated effects of consolidation on expenditure and revenue, reported in Table 5, are unclear. This ambiguity likely reflects the offsetting effects of consolidation on school spending. Holding educational quality constant, economies of scale would tend to reduce per-pupil expenditures. However, consolidation was also associated with improvements in school quality, including the construction of new school buildings, the hiring of better-qualified teachers, and the introduction of new curricula, all of which may have increased per-pupil spending. Consequently, the sign and magnitude of the effect of consolidation on per-pupil or per-child expenditures are theoretically ambiguous.

Table 5. The Effect of Consolidation on the Public School System

Dependent Variable	$\hat{\beta}$	Robust S.E.
Teachers per School	3.2830	1.1202
Pupils per School	127.0649	57.5276
Enrollment Rate	-0.1604	0.0409
Attendance Rate	-0.1060	0.0318
Enrollment Rate (Primary Schools)	0.0200	0.0438
Enrollment Rate (Higher Grades)	-0.1730	0.0361
Schools per 1,000 Children in School Age	-1.9913	0.4416
Teachers per 1,000 Children in School Age	-2.3777	1.0234
Teachers per 1,000 Pupils	0.383	0.8637
Expenditure per Pupil	0.5117	1.5917
Expenditure per Child in School Age	-1.0329	1.1384
Revenue per Pupil	-2.9695	2.3295
Revenue per Child in School Age	-3.3693	1.6897

Note: This table reports the coefficient estimates for the interaction between the year indicator and the no-school-district indicator, along with robust standard errors. All specifications control for the two main indicators, the total tax rate, wealth per child, non-tax school revenue, the school-age population, total population, and an indicator for Southern states, as specified in the regression equation in the text.

Economic theory predicts that public goods may be underprovided in large cities because property taxation can no longer function effectively as a price coordinator for public goods provision. As school districts expand through consolidation, inter-district mobility costs increase, weakening competition among localities in the provision of public goods. Moreover, during the late nineteenth century, municipal revenue sources became increasingly diversified. As cities began to provide multiple public goods -such as sewage systems and roads- through a unified tax structure, the direct link between property values and public school provision weakened.

Evidence of a transition from efficient local provision toward underprovision in consolidated cities can be observed in the estimated effects of consolidation on enrollment and attendance rates. Table 5 shows that consolidation substantially reduced both enrollment and attendance. Enrollment rates declined by approximately 16 percentage points, while attendance rates fell by about 10 percentage points. The decline in enrollment was particularly pronounced at the secondary level. Consolidation reduced secondary school enrollment rates by roughly 17 percentage points, while having no discernible effect on primary school enrollment.

At first glance, the negative effect of consolidation on secondary school enrollment is surprising, given that consolidation facilitated graded schooling and the expansion of high schools. However, this finding does not necessarily contradict the positive role of consolidation. Rather, the negative effect indicates that investment in secondary education was significantly lower in consolidated cities than in cities that retained district-based systems. Although consolidation increased average school size, the overall level of investment in secondary education declined as school finance became more centralized.

Additional evidence of reduced educational investment can be found in Table 5. Consolidation lowered the supply of public schools per 1,000 school-age children by about two and reduced the number of teachers per 1,000 school-age children by approximately 2.4. Importantly, these reductions do not imply a deterioration in school quality. Consolidation had no clear effect on the number of teachers per 1,000 enrolled pupils, which is the inverse of the conventional class-size measure.

Consistent patterns also emerge in Table 5. The result shows that public school revenue per school-age child declined following consolidation, whereas revenue per enrolled pupil did not. In other words, school quality -as measured by revenue per pupil- did not decrease, but the overall level of investment in public education -as measured by revenue per school-age child- was reduced. This result aligns with predictions from public economics theory: when local taxpayers lose a clear mechanism linking their tax payments to the benefits of public education through property values, aggregate investment in local public schooling diminishes, even if the quality of education provided to enrolled students remains unchanged.

6. CONCLUSION

American cities emerged as national leaders in the evolution of public education during the late nineteenth century. They provided fertile ground for education reformers and professional administrators to implement their visions. Through the consolidation of school districts into municipal systems, reformers centralized both the administration and finance of public schooling.

Economic theory suggests that consolidation can generate two distinct, though not necessarily contradictory, effects: cost savings through economies of scale and reduced incentives for taxpayers to invest in local public education. The difference-in-difference estimates based on city-level data from 1880 and 1912 capture evidence of both effects. While consolidation increased school size without diminishing quality measures, enrollment rates declined and school revenue per school-age child fell.

These findings shed light on the historical origins of contemporary problems facing urban public schools. Today, urban schools often exhibit lower quality provision, reflected in larger class sizes and lower per-pupil expenditures. Such outcomes are

commonly attributed to suburbanization and the constraints of centralized school finance. This paper traces the roots of these challenges back to the late nineteenth and early twentieth centuries, when city school systems first emerged and replaced smaller, decentralized school districts.

An additional issue raised by these results concerns the role of compulsory schooling laws. Following the Civil War, legislation mandating school attendance and restricting child labor spread nationwide. Yet existing empirical studies find limited effects of compulsory schooling laws on enrollment. If these laws coincided with the development of centralized city school systems, the consolidation effects identified here may help explain their limited observed impact. Contemporary administrative reports frequently expressed concerns about truancy, suggesting that further research should carefully examine the labor market participation of "truant" children in the late nineteenth and early twentieth centuries.

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