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EXPANSION OF PUBLIC LIBRARIES IN THE UNITED STATES, 1870-1930

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ABSTRACT: The period 1870-1930 witnessed the emergence of the local public library as a widespread and enduring American institution. In this paper we document the expansion of public libraries in the United States over these years, using data drawn from library surveys conducted by the federal Bureau of Education, and review some causal accounts for that expansion. Exploiting cross-state and temporal variation in the data, we estimate panel regressions to assess plausible demand and supply factors affecting the pace of library development. We consider a number of the social and economic variables that have been found to correlate with the development of educational institutions, including income, urbanization, and ethnic composition, as well as average levels of education and literacy themselves. We also examine the effect of supply-side factors that were specific to public libraries, such as state library commissions and associations.

Introduction

Public libraries in the modern sense—local or municipal institutions offering free library services to the general public and supported by tax money—date back at least to 1833 in the United States when Peterborough, New Hampshire, established its public library. The first large public library in a major city was established in Boston over the period 1848-54. In 1849 New Hampshire became the first state to pass comprehensive enabling legislation, facilitating the process for localities to establish public libraries. But the public library movement grew only slowly in the decades after these New England firsts (McMullen 2000, p. 31). During the 1890s,

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however, the growth of libraries accelerated, as can be seen in Figures 1 and 2, which plot public libraries and volumes held in public libraries on a per capita basis for the period 1875-1929. The underlying data are derived from Bureau of Education library survey reports (discussed below), for different thresholds of library size.³

Although public libraries have come to fill a variety of roles, recreational as well as educational, they were originally conceived as part of the nation's broader educational movement, and it was their educational function that provided the principal justification for public support. Thus it is instructive to place the timing of public library expansion within the broader context of two other important changes in the educational apparatus of the United States: primary and secondary education. The free and compulsory elementary school movement championed by Horace Mann was already almost 50 years old by the time the library movement got rolling. By the late 19th century most children in the country were enrolled in primary school, and many states were approaching nearly universal primary education. The high school movement, on the other hand, gained momentum slowly in the 1890s and took off after 1910 (Goldin 1998). Figure 3 plots a measure of public library penetration—library volumes per capita—along with secondary school enrolment rates. By these measures, the public library movement appears to have begun its acceleration somewhat in advance of the major uptick in high-school enrolments.⁴

There has been little if any statistical analysis of the factors influencing the establishment of public libraries. Many researchers in the field of library history have devoted attention to the emergence and growth of the public library movement (Learned 1924; Thompson 1950; Green 1972; Colson 1973; Sturges 1994; Martin 1998; McMullen 2000). Some of them have made use of the comprehensive library censuses conducted periodically by the United States Bureau of Education and its successor departments. Wilson (1938) uses maps and univariate comparisons to examine the relationship between public library development as of the 1930s and a variety of economic and social variables in state-level cross sections. But no study seems to have

³ The survey years included here are 1875, 1884, 1895, 1900, 1903, 1913, 1923, and 1929. Data on public libraries with at least 1000 volumes were available only through 1903; data on libraries with at least 3000 volumes were unavailable for 1913, so the plots interpolate a straight line between 1903 and 1923 for those series.

⁴ Although it might be natural to view high-school education as a precursor to demand for library services, the timing suggests that library development was coincident or perhaps even prior to the spread of secondary education. Indeed, a case could be made for a causal role of libraries in the high school movement. Andrew Carnegie's library philanthropy, for example, quite plausibly extended the reach of the public high school movement. Jones [1995, 94] observed that: "In many towns, Carnegie libraries were the only large public buildings, and they became hubs of social activities like concerts, lectures, and meetings and did double duty as museums and community storehouses." It is not unimaginable that they also served as catalysts for high schools.

connected the library statistics with census and other data sources and then used statistical techniques to weigh the importance of various causal factors.

This paper aims to fill the statistical gap by exploring the impact of various factors that have been adduced to explain the growth of public libraries. The next section discusses the library survey data we employ and summarizes the growth path of the public library movement, highlighting the period of expansion after 1895 and geographical variation in the extent and timing of library development. We then review some of the salient theories that purport to explain the trends in library development. Finally, we provide some preliminary time-state panel estimates of the correlates of public library development.

Measuring the growth of public libraries in the United States after 1870

Early momentum to establish public libraries was slow. In his exhaustive study of American libraries prior to 1876, McMullen (2000, pp. 123-25) was able to identify only 484 free public libraries as having existed at any point in time in the United States during the period before 1876. More than half (253) were located in New England. One-sixth (81) were the last remnants of an ill-fated experiment by the states of Michigan and Indiana, which passed state laws mandating the creation of so-called township libraries. In all, 1,559 of these township libraries were created in these two states during the 1840s and 1850s, but the vast majority were very short-lived, and so were not included by McMullen in his 484 total. The southern states lagged in the early development of public libraries, as they did in the development of educational institutions more generally, with only 12 free public libraries identified through the entire first century of the country's existence. Thus a region that accounted for nearly a third of the country's total population and a quarter of its white population in 1870 had produced only about 3 percent of its public libraries.

To track and analyze the spread of public libraries after 1870, we have assembled and coded data on individual libraries from special reports on libraries issued intermittently by the U.S. Bureau of Education.⁵ These reports included extensive tables of information on individual libraries gathered from surveys conducted by the Bureau. The surveys covered in our data set were conducted in 1875, 1884, 1891, 1895, 1903, 1913, 1923, and 1929. The first of these reports, which appeared in 1876, notes that planning for the survey began with a list of every town "the population of which was sufficient to seem to justify the belief that it possessed a

⁵ Details of the data will be made available in a data appendix from the authors.

public library of some sort” (U.S. Bureau of Education 1876, p. xviii). Letters of inquiry were then sent, generally to the local postmaster, soliciting the names of any public libraries. In larger towns and in cities, the superintendent of public schools was also contacted, and in the larger cities “persons were selected to make special investigations” (xviii). Previous listings of libraries, city directories, gazetteers, offices of institutions societies, clergy, public officials, etc., were also consulted. Direct inquiries were then sent the libraries identified: “This preliminary work involved the writing of some 10,000 letters, to which the responses have generally been most prompt and gratifying” (xix). Statistics of libraries with at least 300 volumes were tabulated in chapter 37 of the special report. Subsequent reports appear to have used similar methods.

The statistics reported in the published tables typically included the name and location of the library, some classification as to type of library, whether services were free or by subscription, and number of volumes in collection; in some years they included financial statistics, year of founding, and/or name of librarian. Unfortunately, reports for different years use different minimum size thresholds for publishing individual library data. The reports for 1875 and 1884 list all libraries with 300 or more volumes; the reports of 1891, 1895, and 1903 use a threshold of 1,000 volumes; 1923 and 1929 a threshold of 3,000 volumes; and 1913 a threshold of 5,000 volumes. Consistency across years obviously requires restricting our attention to consistent size thresholds.

Our interest here is in public libraries in the conventional sense of publicly (government) supported free local libraries. The library surveys typically reached a much wider range of libraries, such as those run by private associations, schools, and other sorts of institutions. This makes classification a challenge, particularly in the early years before public libraries were well-established and institutionalized. The classification schemes used in the reports are inconsistent across years and unsatisfactory for our purposes. In this paper, we restrict our attention to free public libraries using a narrow definition, classifying libraries as public based on their name (e.g., “XX Public Library” or “YY City Library”) and whether they were free libraries. In subsequent work we intend to examine the implications of using a broader definition that includes quasi-public social or association libraries.

Counts of total libraries and total volumes by minimum size threshold are presented in Table 1. We calculated two basic measures of the penetration of public libraries by state and year of survey: libraries per capita, and library volumes per capita. In this paper we focus on the latter (volumes) for two reasons: first, volumes seem like a natural measure for actual library services;

and second, the volumes measure is less sensitive to truncation problems introduced by varying thresholds of library size in the reports. Figures 1 and 2 illustrate the effect on per capita measures of varying the threshold number of volumes for inclusion in the data. Excluding smaller libraries leads to a fairly significant undercount of libraries (Figure 1), but the impact on the volumes count is much more modest (Figure 2).⁶ Larger libraries get more weight in the volume count, so excluding the lower tail has less impact. In the volume count, we have also topcoded the number of volumes in any single library at 50,000. This procedure prevents a very small number of huge libraries (such as the New York Public Library) from dominating our statistics. Volume counts for such “libraries of record” are probably not indicative of the access of the general public to library books.

Figure 4 plots volumes per capita by region (using the 5000 threshold for consistency). As in the case of secondary education (Goldin 1998), the Northeast led the way early on, but by the late 1920s the West had assumed the lead with the highest per capita penetration of library services. In the South, public libraries continued to be all but nonexistent before 1903, and even after that the region’s library development lagged far behind the rest of the country. A question we can address with the statistical analysis is whether the South’s retardation in library development can be explained by other regional differences, such as lower rates of urbanization, income, or general education in the South.

Explaining the growth of public libraries

Shera (1973, 39) reviews early work by historians of the public library movement, and suggests that Borden’s (1931) essay in the first volume of *Library Quarterly* was a “harbinger of a new phase in library historiography.” Borden adduced several factors behind the rise of public libraries, which he (prematurely) dated as occurring between 1850 and 1890. First was the role of the federal government, second was the largesse of philanthropists, and third was the demand for educational activities resulting from the rise of an affluent middle and working class with more time for leisure and more capable of influencing public spending through suffrage. Borden seems to have been the first historian to begin cataloguing the set of supply and demand factors

⁶ Indeed, the apparent differential between the 3000 and 5000 volume lines in Figures 1 and 2 is exaggerated, because data for the 3000 count are missing in 1913, so the plot draws a spuriously straight line between 1903 and 1923. Presumably the plot for the 5000 threshold, with its acceleration after 1913, is more indicative of the actual pace of library development.

and institutional innovations that were likely responsible for the growth of public libraries in villages, towns, cities, and counties across the United States.

The remainder of this section follows his lead, reviewing many factors discussed by Borden's successors (Leigh and Social Science Research Council 1950; Steig 1952; Shera 1973). While our list has a bit of the "what to buy at the store" quality, it is abbreviated compared with Spencer's (1943) colossal dissertation on the establishment of the Chicago Public Library in 1872. She concludes her work with a list of 94 causes that led to the establishment of the library at that particular moment in history. We divide our discussion into the following four kinds of factors, though obviously there is much overlap: (1) institutional precedents for public libraries; (2) institutional innovations that enabled the establishment of public libraries; (3) supply-side factors; and (4) demand-side factors.

Institutional precedents

The public libraries that marched across the American landscape after 1895 evolved from a number of antecedent institutions, most notably so-called social libraries and school district libraries. Social libraries were typically corporations formed by voluntary associations and funded by subscription or issuance of shares. McMullen (2000, p. 59) identifies 3,296 social libraries in existence at some point in time before 1876. Many of these social libraries were ultimately transformed into public libraries (Joeckel 1935; Shera 1973). As McMullen (2000, p. 123) notes, "When the members of a library society lost interest in their collection, they often turned it over to the town government, which converted it to a public library by supporting it financially and opening it to the citizens of the town." In some communities, publicly supported libraries competed with social libraries for a time. In Otsego, Michigan, for example, the Ladies' Library Association developed its own collection of books beginning in 1868, despite the presence of a Township Library founded in 1844. Eventually, however, expansion of the Township Library collection in the 1880s drew members away from the Association: according to Helms (1964, p. 115): "Free service, supported by taxes, was much more attractive than membership in an organization of somewhat limited service." The two institutions ultimately merged when the Ladies' Association sold their building and books to the township in 1905.

Social libraries commonly shared the same basic organizational form as free public libraries, being governed by a board of trustees whose membership often constituted a local citizens' "who's who." In a number of communities, free public libraries would continue to be

non-governmental legal entities and provided their services under contract to local governments. As late as the early 1930s, according to Joeckel (1935, p. 79), one-sixth of public libraries in cities of more than 30,000 people were owned or controlled by associations or corporations legally independent of the city government. In this sense, boards of trustees of the social libraries agreed to turn over the 'private' social libraries for public use in return for steady funding from municipalities. The existence of a large supply of these social libraries available for conversion must be taken into account when explaining the growth of public libraries. Joeckel (1935, p. 24) estimates that, "[O]f the first twenty-five free libraries established in Massachusetts... seventeen absorbed one or more preceding social libraries in various ways, some as outright gifts, some by purchase, and some as more or less permanent loans." Of course, taking account of the role of social libraries as a precursor of truly public institutions merely pushes the question of causal factors back a step.

The school district library was another important precursor to the modern free public library. Libraries run by local school districts were often intended to make reading materials available not only to school children but to adults as well. In 1835 the state of New York passed the nation's first school district library law, permitting school districts to tax for the purpose of providing free library service to pupils and the public (Bobinski 1969, p. 4). Similar laws would be passed in 14 other states by 1855. Such libraries were quite numerous by mid-century: the Census of 1850 reported a total of just over 12,000 nationwide (McMullen 2000, p. 156). The scheme of providing library services to the general public through libraries administered by local school districts eventually gave way to the public library run by towns or cities. Joeckel (1935) and Thompson (1950) suggest that the school district library movement was ill-fated in all but a few places, having been imposed top-down from the state level and generally creating libraries that were too small to be viable community institutions: "Beginning with much promise in most states, [the school district library movement] either died out completely or became solely a school library movement..." (Joeckel 1935, pp. 13-14). Nevertheless, school district libraries set important precedents, establishing the legitimacy of taxation in support of free public library service, and linking libraries and public education (in this case, adult education) in the mind of the public.

Institutional innovations

Localities desirous of public libraries could not just establish them willy-nilly. Before the New Hampshire enabling legislation of 1849 spread to other states, a locality had no convenient legal basis for taxing local property to fund a library. The spread of library enabling legislation was then a crucial legal innovation permitting the establishment of libraries. Enabling legislation that authorized localities to use tax funds to support public libraries evolved from the school district library movement, mentioned above. Legislation during the period after 1870 was much more expansive in giving municipalities authority to establish tax-supported public libraries. In some states, residents had to vote on measures to authorize taxation for libraries (Colson 1973), while in other states town councils could enact the necessary legislation on their own (Kilpela 1964).

The state constitutions of Indiana and Michigan included provisions essentially mandating township libraries during the period 1830-1860. Consequently, of 1659 free public libraries that McMullen was able to identify in the Midwest states between 1786 and 1876, some 1559 of them were township libraries in either Michigan or Indiana. Thus during this period, for seemingly exogenous reasons, Michigan and Indiana had more public libraries than similar states nearby, such as Wisconsin, Illinois, or Ohio. For reasons not entirely understood, most of the township libraries established in Michigan and Indiana during the mid-1800s were small and did not survive many years. By the beginning of the period under consideration in this paper (1875) Michigan and Indiana did have more public libraries per capita than their neighbors Illinois and Ohio, but not more library volumes per capita.

Also important in enabling public libraries were state library commissions and state library associations, which acted as full-time advocates and guides for the creation of new libraries in townships and counties in the state. Established by legislation, library commissions were state entities, typically with small budgets, consisting of a few professional and full-time employees charged with helping localities establish libraries. These officials traveled the state explaining library legislation and helping establish libraries. They also explained procedures for obtaining Carnegie grants for public library buildings. Writing about Alabama, White (1997, p. 38) opined that, "Without an effective state library program in place and lacking public support, communities experienced great difficulty in gathering information necessary for participation in the Carnegie program." Associations were voluntary organizations with a similar mission,

having as members the librarians of existing public libraries. The American Library Association was founded in 1890, and state library associations followed.

The timing of the great expansion of public libraries coincides closely with the formation of state library associations and commissions. Figure 5 details the diffusion of commissions and associations across states after 1890.⁷ Of course, to some extent these entities were endogenous outgrowths of the spread of local public libraries and allied interest groups.

Students of local and national public library history note that the library movement was inextricably tied to the growth of women's organizations and eventual attaining of suffrage. The last quarter of the nineteenth century witnessed a proliferation of women's literary and cultural clubs in American cities and towns (Blair 1980). The clubwomen's ideology of "Domestic Feminism" emphasized the role of women in education and cultural uplift, and libraries became a key component of their civic reform efforts (Blair 1980, p. 100; see also McCauley 1971; Mussman 1982). A frequent claim in the library historiography is that by the 1930s, "75 percent of the public libraries in this country owed their origins to women's clubs" (Gere 1997). Although the original source and the veracity of this figure are uncertain, it seems to be of a plausible magnitude. Watson (1996, p. 162) cites documentary evidence from a number of states to back up the general claim. As of 1937, for example, 70 percent of Oklahoma public libraries "owe[d] their existence to women's clubs." Women's organizations also founded the large majority of public libraries in such states as Kansas, Virginia, Florida, and North Dakota during the period under consideration, and they often were the driving force behind soliciting funds from philanthropic sources such as Andrew Carnegie. In Iowa, the Iowa Federation of Women's Clubs was a prime mover in pressing the state legislature for the establishment of a state library commission to promote local library development and librarian training (Goldstein 2003).

On the supply side

The philanthropy of Andrew Carnegie played an important role in the spread of public libraries. Carnegie grants, for example, helped establish about 85% of the larger public libraries in California existing in 1919 (Kortun 1990, p. 1). Almost 1700 communities received grants to establish, improve or replace library buildings. A common refrain is that Carnegie (Akst 2005) "transformed the American library landscape." Figure 6 plots cumulative Carnegie library grants

⁷ Data on commission and association founding dates were derived from a variety of sources, including Bureau of Education reports, association and commission websites and correspondence (see data appendix).

along with the total number of public libraries of at least 5000 volumes enumerated in the library surveys for the period 1890-1923. Because Carnegie grants did not always establish new libraries, and because some percentage of Carnegie libraries presumably fell below the 5000-volume threshold to be counted in the survey data, the two series are not strictly comparable, but the plot nonetheless suggests that Carnegie libraries constituted a significant share of public libraries built prior to World War I. Carnegie attached only a few conditions to the grants: the municipality had to donate the land and had to agree to dedicate for the library annual tax revenue equivalent to 10% of the building grant; and building plans were reviewed by Carnegie's secretary, James Bertram, before funds were delivered.

Carnegie was not the only library philanthropist, and across the country major benefactors either funded libraries during their lifetime or left bequests for public libraries. To our knowledge, no one has compiled a set of comprehensive numbers to estimate the sum of this other private philanthropy, but casual observation of the histories of hundreds of local libraries suggests it was substantial. Green (1972) is a contemporary account reminiscing on the author's involvement with many of the philanthropic and volunteer efforts of the period. Wellard (1937) also gives prominence to philanthropy.

Local governments were obviously the other principal source of funding for public libraries, and the fiscal capacity of local governments seems to have grown substantially during this period. Wallis (2000, p. 69) refers to the period 1842-1933 as "the era of property finance and local government." Between 1890 and 1922, corresponding roughly to the period of rapid public library expansion, local government revenues increased from under 3 percent of GDP to over 5 percent. The share of local government in total government revenues at all levels reached its historical peak on the eve of World War I, at about 56% (figures derived from Wallis 2000, p. 65). The predominant source of local tax revenues was property taxes. Increased property taxation was politically feasible to the extent that it funded benefits that increased local property values, such as schools, public utilities, local infrastructure, and perhaps library services (Wallis 2000). Although libraries probably remained a small and fairly stable fraction of local budgets, the general expansion of local governments over this period shifted the budget constraint for all forms of local spending.⁸

⁸ Joeckel (1935, p. 29) notes that the share of library operating expenses out of total municipal expenditures in American cities remained steady at about 1.3% between 1905 and 1930.

Demand factors

To the extent that public libraries are viewed as an aspect of a broader movement toward increased public provision of education, some of the same demand factors associated with the rise of mass schooling in the 19th and early 20th centuries should be relevant for libraries as well. Recent research suggests that economic growth and consequent rising average income and wealth, well underway in the United States at the turn of the century, played an important role in the increase in school enrolments at both the primary and secondary levels (Lindert 1994; Goldin 1998). But rising income can only be part of the story. As Goldin and Katz (1997) note, high school attendance rates in England lagged far behind those in the United States during the first half of the mid-20th Century, in spite of similar per-capita incomes.

Rising levels of literacy and educational attainment themselves must have increased demand for library services, although the reverse causation may have occurred as well. A perennial debate in the history of education and literacy in the United States is the importance of legislative mandates. In explaining high school enrolment rates, attention has been paid to compulsory schooling and child labor laws. Recent work suggests that compulsory schooling laws had a quite modest causal impact on school enrolments (Goldin and Katz 2003). But to the extent that these laws were effective, they bolstered the demand for libraries, under the weak assumption that libraries and schooling were seen as complements rather than substitutes (Steig 1952, p. 265). For a timeline of compulsory education laws see, Steinhilber and Sokolowski (1966).

Many authors have suggested that libraries were demanded by established citizens as a way to assimilate or control immigrant groups. But the presence of large numbers of immigrants may also have worked against the demand for public libraries to the extent that ethnic heterogeneity was associated with lower levels of civic engagement, as suggested for example by Goldin and Katz in their work on the high school movement. Kahn and Costa (2003) summarize a range of empirical work by economists using both current and historical data that shows lower civic engagement in communities with greater ethnic or economic heterogeneity, where civic engagement is measured by rates of volunteering, membership in organizations, state spending on public goods or redistribution, self-reported levels of trust, etc.

Finally, shifts in preferences and ideology were probably important, if difficult to measure. Such shifts were actively pursued by early library promoters, who were often referred to as missionaries. Martin (1998) suggests that the ideology of the public library movement was

an amalgam of four conceptions of the role of libraries: as democratic institutions promoting good citizenship (see Ditzion 1947); as educational institutions complementing public schools--early on intended for continuing adult education and self-education, but by the 1920s increasingly serving children as their main educational function; (3) as a source of recreational reading material; and as serving a humanitarian mission, offering an alternative to the saloon, elevating youth, and controlling the masses. Swetman (1991) carefully reviews public discourse surrounding drives to establish public libraries in twenty communities of Utah and Washington at the turn of the century. In the booming Inland Empire communities of Washington, libraries were seen as markers of economic progress and enticements to settlers to take up residence in progressive “can-do” kinds of towns. In Utah, by contrast, public discourse treated libraries as places where the morals of wayward youth might be improved. Swetman draws attention in particular to libraries as an amenity and signal of prosperity used in the competition between towns to attract new residents, even in cases where current residents did not place much value on library services.

Statistical analysis

To assess the potential importance of some of these factors in the spread of public libraries, we present preliminary empirical results based on panel regressions at the state-by-year level of aggregation, using as a dependent variable per capita library volumes held in public libraries with at least 5000 volumes. These regressions must be considered essentially reduced-form and descriptive, but the results are nonetheless suggestive of factors at play in library development, and point to some similarities as well as contrasts with the case of secondary education.

Table 2 provides summary statistics for the dependent and explanatory variables used here, combining all years. Census-based variables are linearly interpolated to the year of the library survey. Our core model variables are very much in the spirit of the variables used in Goldin and Katz’s state-level regressions on secondary education. Real property tax revenue per capita should serve as a proxy for both local fiscal capacity on the supply side and per-capita wealth on the demand side. State-level estimates of per-capita income, which are available for some years in our sample period, are positively correlated with our property tax variable and yield similar results in regressions not reported here. Basic demographic controls include proportion of the population 60 and over and proportion under 18, proportion female, proportion

black, and proportion foreign-born. Demand for library services may have varied with the local age composition, to the extent that libraries were viewed as complementary to educational services more generally. Furthermore, as Goldin and Katz argue, demographic variables may serve as proxies for community solidarity or homogeneity (or its absence), which could have been important in decisions over the provision of a public good such as libraries. In their results, a measure of ethnic heterogeneity (percent Catholic) is negatively related to secondary education rates, whereas proportion elderly is positively related, the latter variable perhaps proxying for community stability and therefore solidarity.

We use two urbanization variables, both of which measure the proportion of the population residing in “urban” areas: the first employs the conventional census urban population threshold of 2500, and the second a larger urban threshold of 20,000. Place size would matter if library services were subject to local scale economies. Addition of the larger threshold reflects our presumption that rather few towns with populations as small as 2500 would have been able to support their own libraries; Carnegie, for example, gave the large majority of his grants to towns with populations in excess of 2500. Under the assumption of some minimum population threshold, library penetration in a state might also have depended not only on the proportion of the population urban but also on the actual *number* of such places per capita. We experimented with including as regressors the ratio of the number of urban places to population, at the same urban population thresholds, but these variables are highly collinear with the standard urbanization variables and are not presented here.

In some specifications we include the literacy rate or the school enrolment rate as proxies for educational attainment. Needless to say, these variables may be endogenous to library development, so interpretation requires caution. We also examine the impact of two proxy variables for statewide institutions in support of library development: state library commissions and associations. Using the founding dates of each association and commission, we calculate the number of years in existence at the time of each library survey. These variables measure the length of exposure to any library-boosting activities undertaken by such institutions. Obviously, these institutions are also very likely to be endogenous to local library development or other unobserved factors affecting demand for public libraries.

The panel regressions reported here include state fixed effects. By controlling for fixed effects, we capture any unobserved systematic differences across states in the propensity to develop public libraries. In particular, the fixed effects should control for cross-state variation in

initial conditions, such as the extent of quasi-public social or association libraries that might be converted to public libraries. We also ran random-effects versions using the same regressors (results not reported here). The random-effects and fixed-effects results were usually qualitatively similar, but in most cases a Hausman test rejected the random-effects specification. We believe fixed-effects is the preferred specification, and focus on those results. In each regression we also include a separate dummy variable for survey year. The coefficients on the year dummies capture any time trend in public library development not explained by movements in our other dependent variables. Finally, we add interactions between the year dummies and a dummy variable for the South. This allows us to see whether the pattern of divergence between the South and non-South, so evident in Figure 4, can be explained by movements in the measurable independent variables.

Table 3 reports the results for three alternative specifications, the first using regressors that were most likely exogenous to public library development, the second and third adding variables that may have been endogenous but are of considerable interest here: library associations and commissions, and the school enrolment rate. In column (1), as expected, the coefficient on per capita tax revenue is positive, although only weakly statistically significant (at the 10% level). Quantitatively, the effect is modest: an increase of per-capita tax levies of \$5, which is fairly close to one standard deviation across states in 1903, would have increased per-capita library volumes by about 0.03, compared with a cross-state standard deviation that year of 0.16. The effect of proportion of employment in manufacturing is not significant.

Among the demographic controls, the coefficients on proportion under 18 and proportion foreign-born are both positive and significant. Locations with a relatively younger population had greater library services per capita, whereas proportion elderly (60+) has no significant effect. The effect of nativity is particularly large. A one-standard deviation increase in proportion foreign-born is associated with an increase in volumes per capita of about 0.18, which is more than half the sample standard deviation. The sizable positive impact of proportion foreign-born is the reverse of the effect of ethnic heterogeneity that Goldin and Katz find for secondary schooling, suggesting that the ideology of Americanization may have played a relatively more important role in the demand for public libraries than did social homogeneity or solidarity. The remaining demographic controls—proportion female and proportion black—do not have significant effects.

The two urbanization coefficients are similar in magnitude but of opposite signs: Other

things equal, an increase in the proportion of the population residing in small towns (2500-20,000) has a negative impact on library development, whereas an increase in the proportion in larger towns (20,000+) has a positive impact. This seems consistent with some minimum scale threshold for the viability of a local public library. The year dummies suggest a significant positive time trend in library development outside the South, even after controlling for the variables included here. The interactions of the South and year dummies, with their clear negative time trend, reveal that the South was falling behind the rest of the country in library development, even after controlling for income (as proxied by tax revenue), urbanization, and basic demographics.

Specification (2) adds the variables for state library associations and commissions. The library commissions coefficient is positive and significant. An additional ten years of exposure to a library commission increases volumes per capita by 0.06, about a fifth of a standard deviation. As noted, the existence of a library commission may be endogenous to local library development, so this coefficient cannot be assumed to reflect causation. Specification (3) replaces the library commission and association variables with the school enrolment rate for children ages 5-17. Unexpectedly, this coefficient is significantly negative. Because school enrolment affects educational attainment with a lag, it is possible that this variable is proxying for states that started with low average levels of schooling, although one might expect this to be captured by the fixed effects. Furthermore, when we replace the enrolment rate with the adult literacy rate—a contemporaneous measure of educational attainment—it too has a significantly negative coefficient.

From Table 1 it is apparent that the 5000-volume threshold for inclusion in the data misses a large number of small public libraries, particularly in the earlier years of our sample. To check the robustness of our results to this truncation, we ran the panel regressions for the period 1875-1903, for which we can include all libraries with at least 1000 volumes. Table 4 shows that the basic results are very similar whether the 1000- or 5000-volume threshold is used. In these regressions, the property tax and proportion foreign-born coefficients are similar to their values in the full sample. The proportion female is positively associated with library development in this earlier subsample; why is unclear, although perhaps this variable is correlated with patterns of settlement in the western states.

Conclusions

Public libraries are an enduring institutional legacy of the Progressive era in the United States. Using data from detailed library surveys conducted by the U.S. Bureau of Education, we have documented the acceleration of public library development after 1890. Panel regressions using state-year data show that access to public library services, as measured by volumes per capita, was positively associated with local tax revenue per capita, proportion of the population under 18, proportion of the population foreign-born, and the presence of a state library commission. A significant positive time trend in library development remains, however, net of our controls. Furthermore, the factors captured by our regressors do not explain the significant lag in library development in the South relative to the rest of the country.

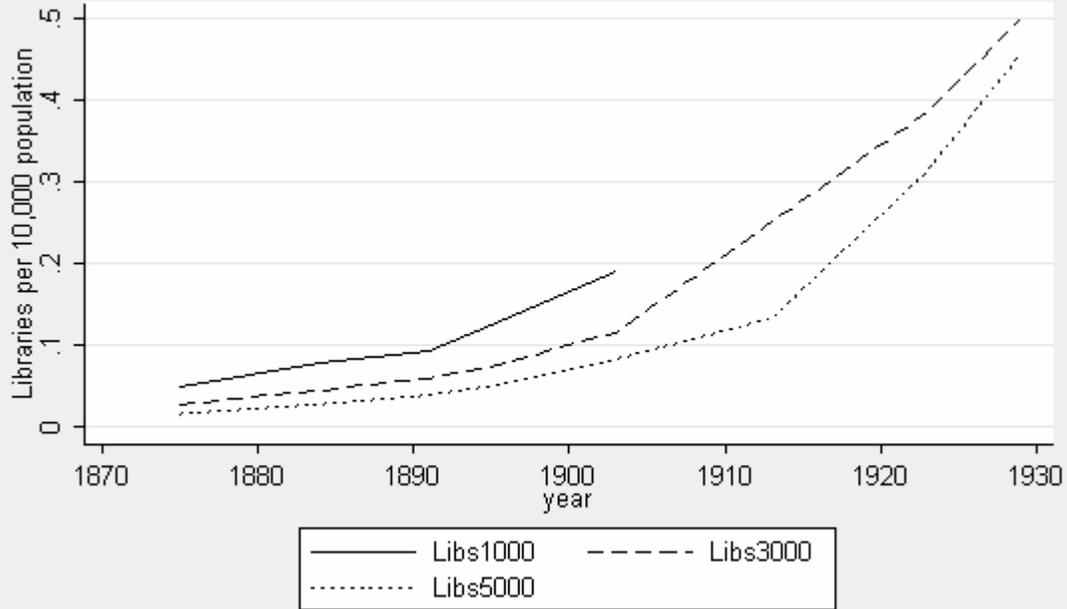
In future work, we plan to expand and refine our set of measures of supply, demand, and institutional factors accounting for library development and to analyze the library survey data at a more detailed level of aggregation, such as the county or township level. We also intend to model and control for the endogeneity of some of the institutional factors we have identified, such as the existence of state library commissions. Finally, we hope to isolate and quantify the impact of library philanthropy, in particular the extraordinary role of Andrew Carnegie in funding the development of a large number of libraries during our period.

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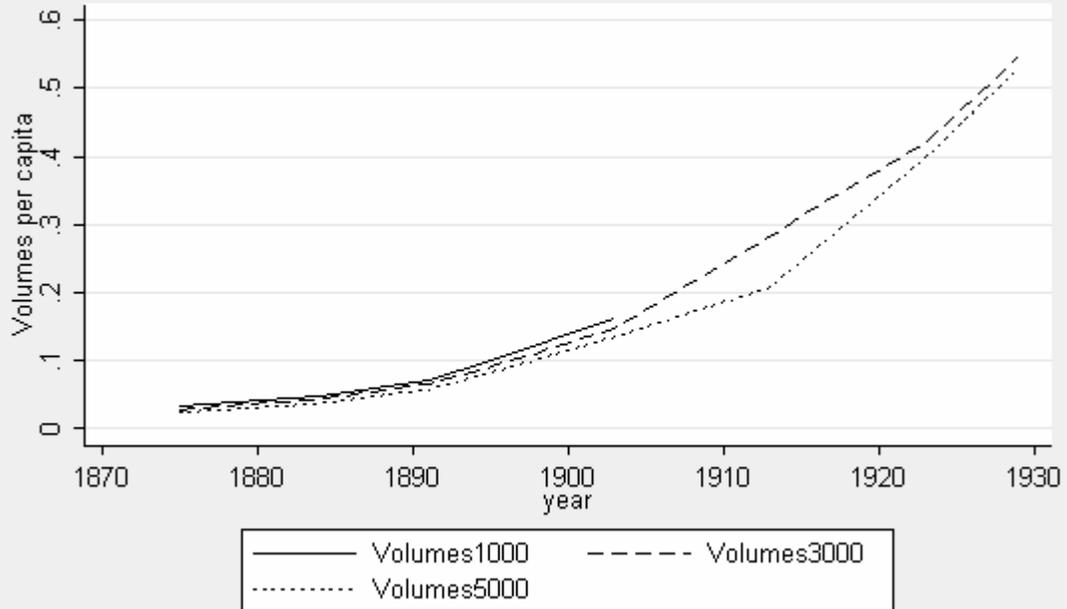
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Figure 1: Public libraries per 10,000 population



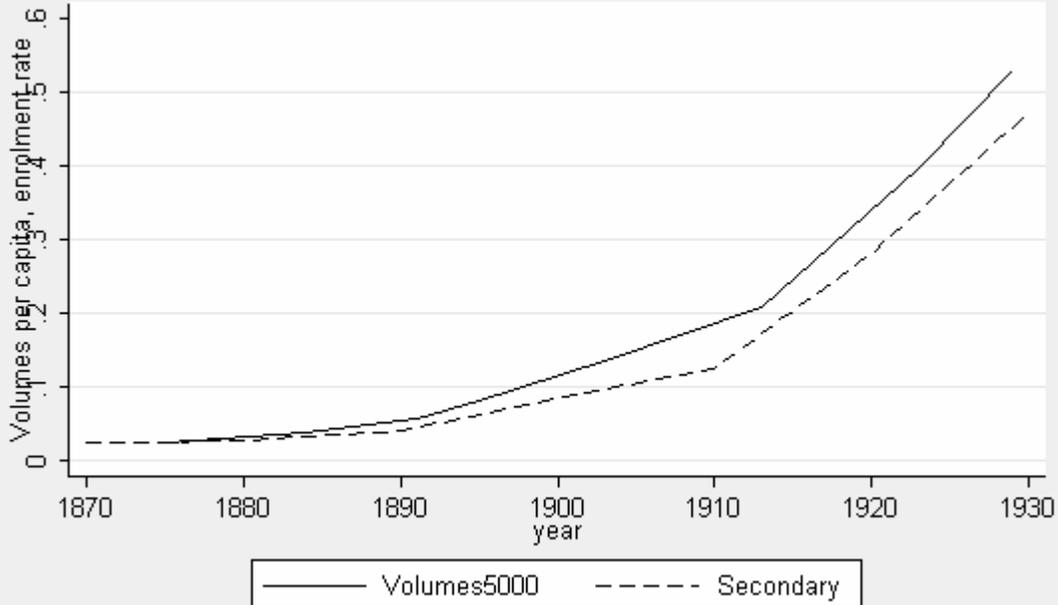
Libraries with at least 1000, 3000, or 5000 volumes. Source: U.S. Bureau of Education (see text)

Figure 2: Volumes in public libraries per capita



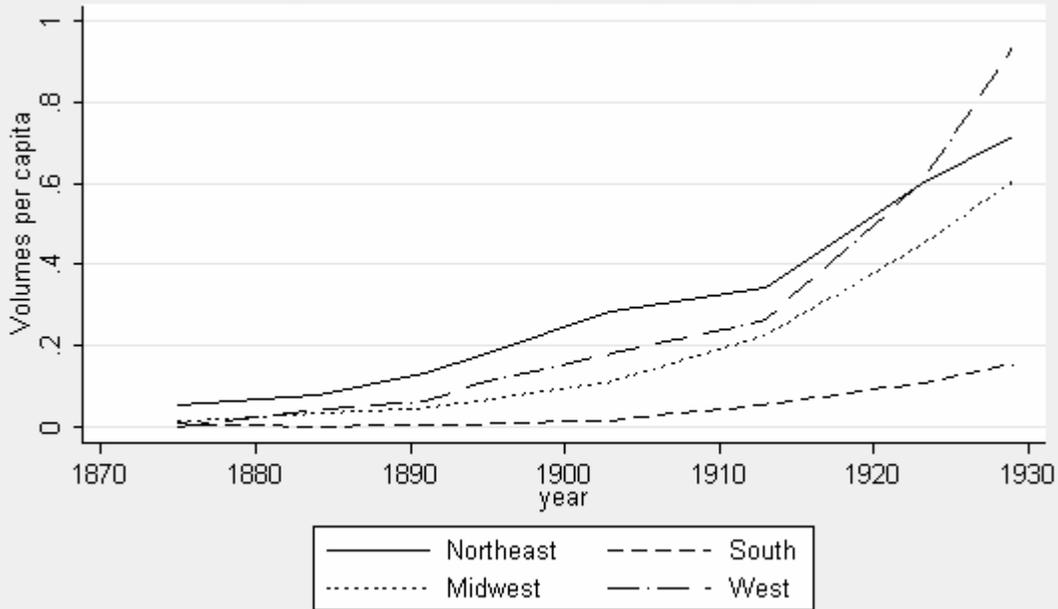
Libraries with at least 1000, 3000, or 5000 volumes. Source: U.S. Bureau of Education (see text)

Figure 3: Volumes per capita and secondary enrolment rate



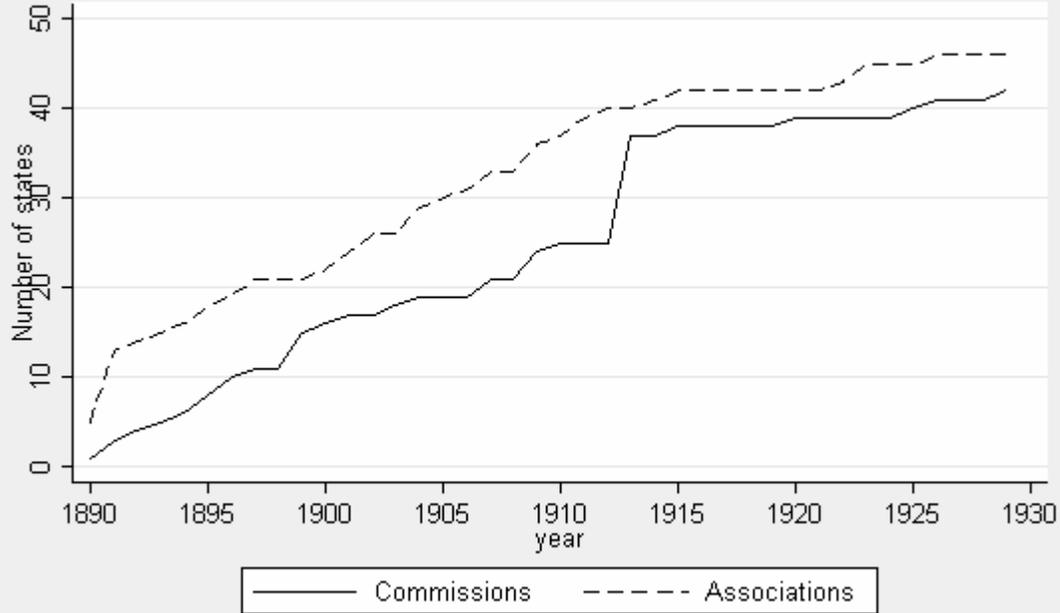
Public libraries with at least 5000 volumes, enrolment grades 9-12 / age 14-17. Source: U.S. Bureau of Ed.

Figure 4: Volumes per capita by region



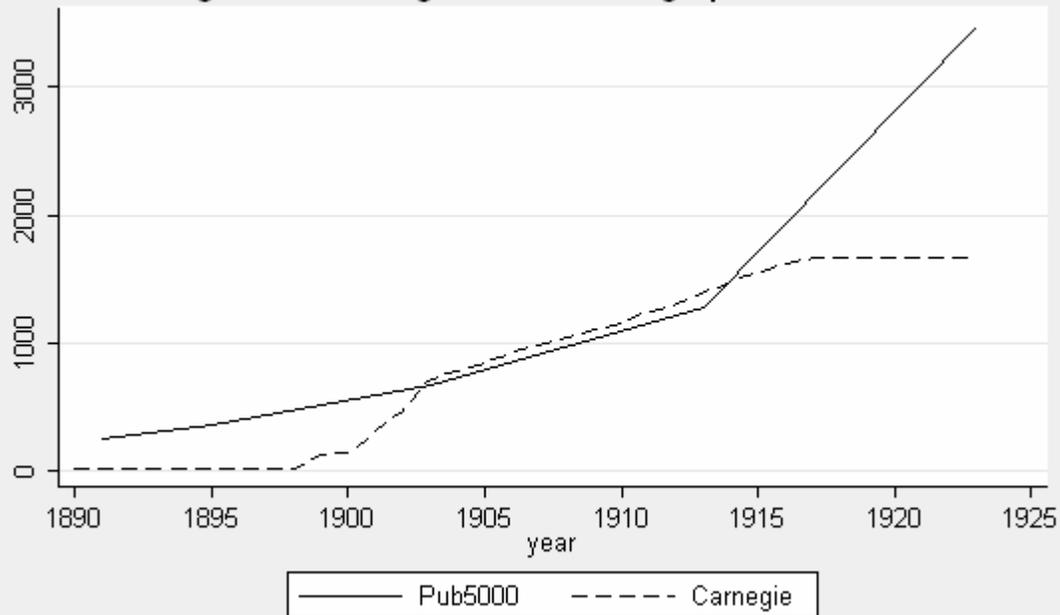
Public libraries with at least 5000 volumes. Source: U.S. Bureau of Education (see text)

Figure 5: State library commissions and associations, 1890-1929



Source: See text

Figure 6: Carnegie and total large public libraries



Public libraries with at least 5000 volumes; cumulative Carnegies of any size

Table 1: Number of public libraries and total volumes in public libraries from library surveys, for different minimum size thresholds

Year	Libraries with at least			Volumes in libraries with at least		
	1000 vols	3000 vols	5000 vols	1000 vols	3000 vols	5000 vols
1875	220	127	75	1,436,638	1,273,744	1,073,030
1884	429	251	158	2,701,066	2,399,933	2,049,807
1891	606	388	254	4,609,463	4,234,134	3,726,057
1895	864	519	353	6,941,194	6,321,332	5,681,752
1903	1,546	937	671	12,956,604	11,868,416	10,853,911
1913			1,285			19,997,141
1923		4,284	3,480		46,665,388	44,044,164
1929		6,060	5,544		66,217,558	64,224,107

Table 2: Summary statistics for panel regression data (all years combined)

Variable	Obs	Mean	Std. Dev.	Min	Max
Volumes per capita	398	0.18	0.30	0.00	2.22
Real property tax levies per capita (1900 \$)	384	10.59	6.61	0.73	33.27
Proportion of workers in manufacturing	385	0.15	0.11	0.01	0.56
Proportion of population over age 59	385	0.06	0.02	0.01	0.13
Proportion of population foreign-born	387	0.14	0.11	0.00	0.50
Proportion of population under age 18	385	0.40	0.07	0.20	0.52
Proportion of population female	392	0.47	0.05	0.23	0.53
Proportion of population black	391	0.11	0.17	0.00	0.60
Proportion of population in cities of 2500+	394	0.35	0.23	0.00	1.00
Proportion of population in cities of 20,000+	384	0.22	0.22	0.00	1.00
Age of state library association	398	7.46	11.55	0.00	39.00
Age of state library commission	398	5.35	9.67	0.00	39.00
Proportion of ages 5-17 enrolled in pub. school	377	0.73	0.13	0.09	1.00

Table 3: Fixed-effects regressions, 1875-1929
 Dependent variable: Volumes per capita in public libraries of 5000+ volumes

	(1)	(2)	(3)
Real property tax levies per capita (1900 \$)	0.0067 [0.0039]	0.0046 [0.0039]	0.0076* [0.0038]
Proportion of workers in manufacturing	0.154 [0.289]	0.018 [0.285]	-0.159 [0.284]
Proportion of population over age 59	-0.225 [1.180]	-0.879 [1.166]	-0.514 [1.179]
Proportion of population foreign-born	1.655** [0.278]	1.619** [0.274]	1.411** [0.270]
Proportion of population under age 18	1.266* [0.518]	0.873 [0.525]	0.954 [0.496]
Proportion of population female	-0.75 [0.744]	0.436 [0.793]	0.414 [0.756]
Proportion of population black	-0.218 [0.539]	0.021 [0.533]	-0.688 [0.524]
Proportion of population in cities of 2500+	-1.354** [0.278]	-1.446** [0.274]	-1.446** [0.277]
Proportion of population in cities of 20,000+	0.999** [0.241]	0.994** [0.238]	1.142** [0.244]
year1884	0.07 [0.036]	0.073* [0.035]	0.075* [0.035]
year1891	0.140** [0.042]	0.144** [0.041]	0.139** [0.041]
year1895	0.203** [0.044]	0.202** [0.043]	0.204** [0.044]
year1903	0.302** [0.051]	0.282** [0.050]	0.301** [0.051]
year1913	0.489** [0.063]	0.439** [0.063]	0.499** [0.063]
year1923	0.752** [0.075]	0.645** [0.078]	0.768** [0.076]
year1929	0.967** [0.085]	0.825** [0.090]	0.972** [0.086]
south*1884	-0.051 [0.056]	-0.046 [0.054]	0.013 [0.056]
south*1891	-0.089 [0.058]	-0.076 [0.057]	0.022 [0.059]
south*1895	-0.129* [0.059]	-0.109 [0.058]	-0.005 [0.061]
south*1903	-0.180** [0.062]	-0.140* [0.061]	-0.035 [0.064]
south*1913	-0.313** [0.068]	-0.246** [0.068]	-0.162* [0.069]
south*1923	-0.458** [0.077]	-0.358** [0.079]	-0.295** [0.077]
south*1929	-0.583**	-0.470**	-0.409**

	[0.082]	[0.085]	[0.082]
Age of state library association		0.001	
		[0.002]	
Age of state library commission		0.006**	
		[0.002]	
Proportion of ages 5-17 enrolled in pub. school			-0.574**
			[0.119]
Constant	-0.271	-0.599*	-0.185
	[0.270]	[0.276]	[0.261]
Observations	378	378	371
Number of states	49	49	49
R-squared	0.78	0.8	0.8

Standard errors in brackets

* significant at 5%; ** significant at 1%

Table 4: Fixed-effects regressions, 1875-1903, comparing volume thresholds
 Dependent variable: Volumes per capita in public libraries of 5000+ volumes

	Libraries with at least	
	1000 vols.	5000 vols.
Real property tax levies per capita (1900 \$)	0.0071 [0.0049]	0.0064 [0.0040]
Proportion of workers in manufacturing	-0.482 [0.327]	-0.441 [0.270]
Proportion of population over age 59	-3.315* [1.291]	-2.003 [1.065]
Proportion of population foreign-born	1.491** [0.236]	1.207** [0.195]
Proportion of population under age 18	-0.255 [0.476]	-0.224 [0.392]
Proportion of population female	1.490* [0.648]	1.169* [0.534]
Proportion of population black	0.076 [0.572]	0.142 [0.472]
Proportion of population in cities of 2500+	-0.267 [0.215]	-0.222 [0.178]
Proportion of population in cities of 20,000+	0.072 [0.212]	0.164 [0.175]
year1884	0.062** [0.020]	0.035* [0.016]
year1891	0.113** [0.029]	0.070** [0.024]
year1895	0.183** [0.033]	0.122** [0.027]
year1903	0.287** [0.043]	0.198** [0.035]
south*1884	-0.046 [0.026]	-0.027 [0.022]
south*1891	-0.073* [0.030]	-0.045 [0.025]
south*1895	-0.124** [0.032]	-0.081** [0.026]
south*1903	-0.185** [0.037]	-0.120** [0.031]
Constant	-0.579** [0.219]	-0.499** [0.181]
Observations	231	231
Number of states	49	49
R-squared	0.68	0.66

Standard errors in brackets

* significant at 5%; ** significant at 1%