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COMPARING PUBLIC LIBRARY SYSTEMS

Malcolm Getz

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ABSTRACT

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The operations of 31 large public library systems across the country are compared using information from the author's interview survey. Operations are compared in physical terms: hours of service, materials, locations, and staffing. Differences in operations are found to be associated with differences in labor costs, local fiscal circumstances, and demographics. The libraries seem to reduce hours in the face of higher labor costs. Differences in the use of the libraries are found to be associated with differences in library services and demographics. The number of materials acquired per capita has a strong impact on library use.

Malcolm Getz
Box 6221-B
Vanderbilt University
Nashville, Tennessee 37235
(615) 322-2872

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Malcolm Getz

COMPARING PUBLIC LIBRARY SYSTEMS

Public library systems differ substantially in the services they provide their clients. This essay will compare the operation of 31 large public library systems across the country.[1] One concern is to discover what forces shape the library systems. For example, how are library operations different when labor costs are higher? The focus is on service characteristics that are explicitly under library control such as hours, materials and locations. A second concern is to discover how the library operations influence outcomes. For example, how is the circulation of library materials influenced by the number of hours of service or the number of branch locations? The focus here is on the response of users to library services. This essay deals with the main components of library budgets: the number of locations, the size and age of collections, the number of hours of service, and staffing. Later essays will delve more deeply into issues of technical services (acquisition and cataloging of materials) and technological change. A previous essay has examined some of the literature of library evaluation and examined the operation of the New York Public Library.[2]

The initial discussion of the library systems examines the libraries in three groups: city, metropolitan, and suburban. City libraries serve a central city alone. Suburban library systems serve suburban areas alone. Metropolitan library systems serve a central city and a substantial suburban area.[3] One question to be explored is whether this grouping appropriately differentiates the libraries. The groupings are for exposition only however, and do not play an important role in subsequent analysis.

MEASURING LIBRARY OPERATIONS

The central features of a large public library system are the number of locations where services are provided, the size of collections of materials, the rate at which new materials are added, the hours of service, and the character of the staff. These features are observed in an interview survey of 31 large public library systems in 19 states. The cities are indicated in an appendix.

Locations

Most large public library systems operate many facilities. The total number of locations per 100 square miles of area served gives a rough indication of the average distance users must travel in order to get to a library. The average number of locations per 100 square miles among the library systems surveyed is 17.39, as indicated in Table 1. Metropolitan and suburban library systems are significantly different than city libraries, however. While the central city systems average 32 locations per 100 square miles served, the metropolitan and suburban systems average 4 and 3 per 100 square miles. The Brooklyn Public Library averaged 84.29 locations per 100 square miles while San Antonio and San Diego County average less than 1 per 100 square miles. The very great diversity in the density of branches, of course, reflects the differences in the age and density of development of the different areas, as will be seen below.

A circle of radius 1 mile subtends an area equal to the average area served by the library facility in the average city system. Because the cities include some systems like Houston, Dallas, and San Antonio with relatively low branch densities, the typical older central city system has branch densities higher than the reported average for cities. The suburban systems

Table 1

Library Activities and Services
Means and Standard Deviations by Geographic Type

	City	Metropolitan	Suburban	All	$F_{(2,28)}$
Locations per 100 Square Miles	32.11 (26.78)	4.00 (2.48)	3.05 (1.32)	17.39 (23.28)	8.74***
Bookmobiles	2.07 (1.39)	3.67 (1.22)	5.43 (7.85)	3.29 (3.93)	1.91
Volumes Acquired Annually per capita	0.15 (0.06)	0.11 (0.05)	0.18 (0.08)	0.15 (0.06)	2.54**
Titles acquired annually	25,667.00 (19,545.00)	13,841.00 (7,400.00)	9,926.00 (3,426.00)	18,679.00 (15,638.00)	3.54**
Serials Titles	4,680.20 (2,633.57)	2,399.00 (2,065.80)	1,433.86 (1,380.31)	3,313.70 (2,612.45)	5.806***
Volumes in Stock per capita	2.09 (0.90)	1.88 (0.75)	2.14 (0.78)	2.04 (0.81)	0.26
Average Branch Hours per Week	45.33 (10.70)	48.72 (9.42)	53.43 (12.27)	48.15 (10.85)	1.38
Staff per thousand population[a]	0.47 (0.17)	0.30 (0.07)	0.49 (0.16)	0.42 (0.16)	4.29**
Percentage of[a] Public Service Staff in the Main Library	41 (13)	42 (10)	8 (10)	34 (18)	23.25***
Percentage of[a] Public Service Staff Professional	39.8 (8.4)	40.6 (10.4)	32.5 (15.6)	38.3 (11.1)	1.30
Percentage of employment supported by CETA	8.4 (10.3)	8.9 (10.5)	3.3 (2.4)	7.4 (9.2)	0.90
Volunteer Hours[b] as percentage of Employment	1.3 (2.7)	0.5 (0.9)	0.7 (0.6)	0.9 (1.9)	0.60
Number of Library Systems	15	9	7	31	

Source: survey of library systems

a. Information not available from the Chicago Public Library. Total is for 30 library systems.

b. Information available from 12 city, 8 metropolitan and 7 suburban libraries.

The F statistic tests for significant differences across the geographic groups relative to variation within groups. Statistical significance is indicated: *** .01 level; ** .05 level.

each serve 32.787 square miles on average. A circle of 3.23 miles subtends such an area. The suburban group includes San Diego County and the Jacksonville system with service areas that include large amounts of undeveloped land. Thus, the effective branch densities for library users is probably somewhat higher than the average reported here. It is clear, however, that the central city systems maintain ten times as many branches per unit of area as the suburban systems. The ten fold greater branch density only reduces the average travelling distance to branches by just over 3 times because distance and area are related by the square root.

Library service locations are differentiated. Twenty-seven of the thirty-one libraries surveyed identify one facility as a main library. Four suburban library systems eschew a main library. The New York Public Library designates four facilities as library centers. Main libraries or library centers usually offer larger, more varied collections and better library service than other facilities. Some main libraries may approximate the sophistication of a college library, with subject area specialists, microfilm collections, and substantial depth of collection. The Boston Public Library operates a large research library with 3 million volumes in a non-circulating collection, a unique service for a library operating as a department of city government. The scope of main library services will be addressed again when materials and staffing are considered.

Some library systems further differentiate their facilities by designating some branches as regional libraries. The New York Public Library, the Free Library of the Philadelphia and the Atlanta Public Library for example have regional libraries both to decentralize the management of the organization as well as to provide larger more varied collections in more areas of the city. In part such regional facilities may have served as alternatives to the

expansion of the main library, or as an effort to move away from over branching, that is, as a prelude to consolidating or closing marginal neighborhood branches. The survey did not attempt to measure the scope of regional library operations.

Some libraries operate unstaffed library stations. Small collections of a few hundred books may be kept in fire stations, nursing homes, hospitals, schools, community centers and the like. Eighteen of the 31 libraries surveyed indicated maintaining one or more stations. Dallas, Cincinnati, and Birmingham have over 20, and Philadelphia maintains 335 stations. Library stations are not investigated here in any detail.

Public libraries also provide services by truck. Bookmobiles typically house a collection of a few thousand books and operate as mobile branch libraries. While a patron can order a book for later delivery, most select materials from those on board. Only Brooklyn and Chicago among the systems surveyed do not offer bookmobile service. Cutbacks in bookmobile service does seem to be a response to budget pressure however, so that some cities with bookmobiles were not operating them at the time of the survey. Only one system operated more than 5 bookmobiles, and that is St. Louis County where 23 bookmobiles operate. St. Louis County has elected to operate fewer branches than most systems and to operate very many bookmobiles. The intensity of bookmobile service also varies. San Antonio has 34 stops for its 5 bookmobiles; Hennepin County has 100 stops for its 2 bookmobiles. Presumably the frequency and duration of bookmobile stops also influence the amount of use of bookmobile service.

Materials

The stock of materials reflects both the items in the main library and

in all the branches. Materials could be disaggregated on several dimensions. The most important media is the book. Recordings are the most important non-book material. Prints, films, microfilm and pamphlets play a lesser role, especially in the branches. The materials might be differentiated by audience: adult vs. juvenile; and by subject: fiction versus non-fiction. Too few libraries have records that allow easy disaggregation along the different dimensions so only totals can be compared across a substantial number of systems. The systems averaged two volumes in stock per capita. There is no significant difference between the city, metropolitan and suburban systems in the number of volumes in stock per capita.

Age is another important dimension of library materials. New materials generate much more use than old materials. The acquisition of new materials can be characterized by examining the number of volumes acquired annually per capita. While the libraries average .15 new volumes per capita, there is a significant difference among the three geographic types. Central city libraries acquire more than metropolitan; suburban libraries acquire more than either of the other two.

The acquisition program of a public library has a quality dimension as well. The number of new titles cataloged annually indicates the breadth and depth of collection development. (There need be no strong link between the number of volumes acquired and the number of titles acquired because most public libraries buy multiple copies of many books.) The libraries differ significantly in the number of new titles acquired annually. The city libraries average over 25,000 titles; metropolitan near 14,000; and suburban just under 10,000. These compare with the over 30,000 new titles produced in the United States each year.

The differences in the number of titles acquired reflect basic differences

in the objective of the libraries. At the one extreme is the Boston Public Library acquiring over 90,000 titles each year. The Boston Public has an aggressive collection development program. It seeks to build a research quality collection in a great range of subjects. The other city libraries surveyed average just under 20,000 new titles per year, still more than double the average for the suburban libraries. With a few exceptions, the city libraries have ambitious collections development programs comparable to those of many universities. At the other extreme, the suburban libraries for the most part do not speak of collections development. Their acquisitions are aimed primarily at current use rather than at posterity. Since the suburban systems buy more volumes per capita and many fewer titles than the city libraries, we can conclude that they buy many more multiple copies. Until recently, the St. Louis County Library bought the same titles for all its locations, thus it rarely acquired a book in single copy. The contrast with the Boston Public is clear.

The contrast in the breadth of materials is also seen in the number of serials titles subscribed to. The Boston Public Library subscribes to about 11,000 serials titles. The city libraries average 3,314 serials titles. The suburban libraries average 1,431. Nine of the library systems surveyed subscribe to fewer than 1000 titles. Of course, the suburban systems may subscribe to the same titles for each facility, while most of the titles in the research oriented main libraries will be acquired in single copy.

The objective of materials acquisition differs markedly across the public libraries. On the one hand, a library may seek to hold materials representative of the full thought and practice in a particular area, be it French literature, nuclear physics, or the federal tax system. Completeness of coverage is the target. On the other hand, a library may seek materials that will lead

to the highest amount of use. Popular interest is the target.[4]

Some surveys of librarians compare the materials acquisitions of libraries by comparing the proportion of the library budget devoted to materials. Such a measure is inadequate for several reasons. First, higher salaries will cause personnel costs to be higher and so the fraction of the budget devoted to material acquisition to be smaller even though the same number of staff and the same number of materials are acquired. Second, the expenditure on materials does not indicate how many volumes are purchased, nor how many titles are included in the acquisition. The measurement of number of volumes, number of titles, and number of staff gives a much clearer picture of library services as users may observe them.

Hours

The hours of service is dramatically related to library use, as found in the study of the New York Public Library.[5] Branch libraries are open an average of 48 hours per week in surveyed systems. While there is no significant difference across the geographic types, the variance in hours in each group is substantial. The 22 hour average in New York City contrasts with the 72 hours per week in the St. Louis County Library.

Staffing

The single most expensive item of library operation is the staff. The total professional and clerical work force is compared across library systems.[6] The libraries average 0.42 staff members per thousand population. There is significantly smaller staff per capita in the metropolitan library systems. A more detailed investigation of the sources of the differences will be made below.

About three-fourths of the staff are engaged in activities directly

related to public services. The other quarter engage in administration and technical services. Technical services involves the acquisition and cataloging of materials. The public service staff may select materials, control circulation, and respond to user queries, the reference function.

While part of the affect of changes in staffing in public services is to change the hours of service, and the character of materials selection--activities that have already been examined--the nature of the public services staff may also be of direct influence on users. The capability of the library to handle user queries, for example, may be a direct consequence of the proportion of the staff that has professional training as librarians. The libraries averaged 38.3 percent professional staff.[7] While there is no significant difference across the geographic types, there is some variation among the libraries. Over half of the public service staff is professional in San Antonio, Buffalo, and Nashville; while less than twenty percent of the public service staff is professional in St. Louis County and San Diego County.

The public service staff is allocated between a main library and branches. The city and metropolitan libraries on average have 42 percent of their public service staffs assigned to the main library. Over half of the public service staff is assigned to the main library in Boston, Dallas, Minneapolis, San Antonio and Birmingham. Four of the seven suburban library systems have no main library; the seven suburban systems average eight percent of their public service staff in the main library. The pattern of staff assignments confirms the differing nature of main library services indicated by the acquisitions policies of the libraries.

Part of the staff may be supported by federal Comprehensive Employment and Training Act (CETA) funds. While the CETA workers may be both clerical and professional and similar to other library employees, it may be of interest

to observe the pattern of use of CETA workers. Twenty-five of the 31 library systems have one or more CETA employees. CETA workers account for 7.4 percent of the library's work force on average. CETA workers account for over 20 percent of the work force in five library systems surveyed: San Antonio, Birmingham, Nashville, Brooklyn, and New York.

Libraries may use volunteers to supplement paid workers. Some libraries employ a personnel officer just to co-ordinate and train volunteer workers. Of twenty-seven libraries that responded to the question about volunteers, ten indicated that volunteers are used. When the number of volunteer hours contributed each week are compared to the average number of paid hours worked, one finds that the twenty-seven systems averaged about 0.9 percent volunteer effort as a percent of paid effort.

EXPLAINING LIBRARY OPERATIONS

Having measured a variety of characteristics of library operations, it is appropriate to explain the differences in activities of the libraries. Why do some have long hours of service? Why do some buy fewer titles than others?

Correlations Among Inputs

Because each library system is faced with a budget constraint, each must make tradeoffs among different services. For example, a library that wants to collect a large number of titles may acquire fewer volumes per capita, that is fewer books in multiple copies. A library that operates many hours per week may have fewer locations. For these reasons the correlations between some inputs will be expected to be negative indicating they are substitutes.

On the other hand, the pursuit of a particular philosophy of what public library services should be may lead a library to have higher levels of certain activities jointly. For example, a library acquiring many titles may also have a higher proportion of its public service staff in the main library. In this case, the correlations among inputs would be positive indicating they are complements.

The correlations among inputs presented in table 2 reveal some of both kinds of groupings. Hours in branches and the number of locations seem to be substitutes. This finding is consistent with the experience of the New York Public Library. The maintenance of a large number of locations is at the expense of fewer hours of operation in each location. The number of bookmobiles is negatively correlated both with the proportion of public service staff in the main library and the proportion that is professional. These suggest that on average across the library systems there may be a trade off between bookmobile service and main library service and between bookmobile service and professional librarians. The bookmobile correlations may be influenced by the St. Louis County Library because it operates so many more bookmobiles than any other of the observed systems.

The positive correlations between acquisistions and stock, acquisitions and staff, stock and staff, and titles and staff are consistent with these activities being complements with each other. More titles and staff tend to be found in library systems operating more locations. Libraries that have more books in stock also seem to acquire more books, acquire a greater variety of titles, have a larger staff, and operate more locations per 100 square miles than other libraries. Thus, some libraries emphasize more materials in more locations at the expense of hours while others emphasize hours of service with bookmobiles. The interactions among the different dimensions of service are, of course, complex.

TABLE 2

Pearson Correlation Coefficients Between Inputs

	LOCATIONS per 100 sq. miles	BOOKMOBILES	ACQUISITIONS per capita	TITLES	STOCK per capita	HOURS per week	STAFF per 1000 pop.	MAIN %	PROFES %	CETA %
BOOKMOBILES	-29.7*									
ACQUISITIONS	6.2	-11.1								
TITLES	55.7***	-11.2	9.2							
STOCK	4.6	-16.3	69.4***	11.1						
HOURS	-46.8***	42.2***	14.5	-23.2	-12.3					
STAFF	29.4*	-21.0	78.3***	39.8**	72.5***	-11.2				
MAIN	10.1	-31.2**	-26.3*	34.2**	0.7	-21.2	-10.3			
PROFESS	17.7	-33.6**	4.1	12.4	16.5	-16.1	3.3	18.2		
CETA	14.1	-9.7	-35.7**	-17.6	-43.4***	-2.4	-48.7***	20.1	20.4	
VOLUNTEER	-8.9	-7.3	46.9***	-6.4	46.4***	3.9	31.2*	8.7	13.1	5.7

Note: Pearson Correlation coefficients are calculated with pairwise deletion of missing values. Statistical significance is indicated: *** .01 level; ** .05 level; * .10 level.

Variables are as defined in Table 1.

Determinants of Activities

The variation in library activities may be associated with differences in the areas the libraries serve. For example, high labor cost may shift library activities away from labor intensive services to other services. The fiscal circumstances of the local government may shape the mix of library services through the local budget process. The characteristics of the local population may influence the character of the local public library. The measurement of each of these factors is discussed and then the influence of these factors on library activities is examined.

Labor Cost

If a library can substitute one type of service, say, additional materials, for another, say, hours of service, while being just as attractive to users, then one might expect to find different mixes of activities given different costs. That is, if a library chose to provide as much service value as possible within a given budget, it will substitute away from more expensive activities relative to less expensive ones. In particular, those libraries that face higher labor costs will be expected to adjust the mix of services so as to economize on the use of labor.

Total annual compensation for a recruit librarian adjusted to a 40 hour work week and including fringe benefits averaged $14,911 in the surveyed libraries as reported in table 3. While there is no statistically significant difference across the geographic types, there is substantial variation among the libraries from a low of $10,287 in St. Louis County to a high of $26,278 in Chicago. Sources of variation in labor cost will be examined in a later essay. The range of variation in the cost of labor is sufficient to induce differences in the mix of library activities if substitution is possible and if libraries are responsive to economic incentives.

TABLE 3

Library Service Area and System Characteristics
Means and Standard Deviations by Geographic Type

	City	Metropolitan	Suburban	All	$F_{(2,28)}$
Recruit Librarian Compensation[c]	$15,771.87 (3,393.54)	13,832.34 (2,349.89)	14,455.85 (2,146.16)	14,911.61 (2,921.62)	1.38
Own Revenues Net of Library Expenditures per capita[b]	$ 382.39 (214.06)	339.62 (97.04)	295.28 (143.22)	350.31 (171.03)	0.63
Intergovernmental Revenue Per Capita[b]	$ 178.71 (176.64)	186.52 (75.71)	167.29 (47.85)	178.40 (128.83)	0.04
Percentage of Libraries that are Departments of Govern.[c]	53.3	55.6	71.4	58.1	0.31
Population[a] in thousands	1275.78 (1019.14)	811.46 (361.36)	619.27 (164.56)	992.73 (779.36)	2.20
Percentage of Adults who are High School Graduates[a]	49.51 (9.88)	54.79 (6.76)	70.74 (7.61)	55.84 (11.89)	14.58***
Population Growth 1960 to 1970[a]	3.89 (15.28)	9.83 (8.21)	52.17 (17.72)	16.52 (24.07)	28.76***
Number of Library Systems	15	9	7	31	

Sources: a. Census of Population 1960, 1970.

b. Census of Governments 1972. The Cleveland Public Library is not reflected in the 1972 Census of Governments. Survey information for 1977 was substituted.

c. Author's survey.

The F statistic tests for significant differences across the geographic groups relative to the degree of variation within groups. Statistical significance is indicated: *** .01 level; ** .05 level.

Fiscal Indicators

The fiscal circumstances of local government may influence the level of library activities through the budget making process. First, those libraries that are departments of city or county governments may be more subject to trade-offs against other government services, say schools or police, than a library that is an autonomous or semi-autonomous agency. Eighteen of the 31 libraries surveyed are departments of government. The other thirteen are at least semi-autonomous. Nine of the library systems receive earmarked tax revenue, thus further insulating the library's expenditures from the exigencies of local finance.

Library activities may be influenced by the stringency of the local fiscal position in general although the direction of the effect may be unclear. On the one hand, a locality that raises large amounts of money may have more to spend on libraries as well as on many other services. On the other, a city that finds it necessary to raise a large amount of revenue for other purposes may be less likely to spend a great deal on the library.

There are two main sources of funds for local government. Funds may be raised from local sources, principally the property tax, and funds may come from the state and federal governments. The census of governments reports summary financial information for 1972. The own revenues per capita net of library expenditures averaged $350.31 in the library areas surveyed. Direct expenditure less revenue from local sources is taken to be intergovernmental transfers. Netting out the expenditures on libraries yields the intergovernmental figures reported in Table 3. The library areas averaged $178.40 per capita. The per capita expenditures on libraries indicated in the census of governments was $6.44. It is possible that library expenditures are influenced differently by funds from local sources than from intergovernmental transfers.

First, intergovernmental transfers may be subject to a variety of conditions that limit their use. State aid for education may be distributed on a matching formula that draws in local funds to education. In this case, expenditures on the public library may be associated with lower levels of other expenditure. On the other hand, general revenue sharing, because it is untied, may stimulate local expenditures on libraries more than local tax funds.

Some states provide per capita grants for public libraries. Such grants are likely to stimulate higher levels of expenditure in libraries. The census does not indicate the level of aid going directly for libraries.

Unfortunately, the census gives no indication of the terms that condition intergovernmental transfers, and so tied funds can not be distinguished from untied funds. Consequently, the net direction of the association between library activities and intergovernmental transfers is unclear.

Library Users The library services will also be influenced by the character of library users. Previous studies of library use have found that use increases with income and education and declines with age.[8] In this comparison of library systems it is not possible to explore the influence of the many characteristics of users. Nevertheless, the percent of adults who are high school graduates is thought to be an important indicator of the public interest in library activities. The proportion of adults who are high school graduates differs significantly from 50 percent in the central cities, to 55 percent in the metropolitan systems, to 71 percent in the suburban areas. The variation across individual areas is even greater from 32 percent in Brooklyn to 80 percent in Montgomery County. Adults with more education are expected to want more library services.

Library systems may respond only slowly to changes in the service area. The opening and closing of facilities is likely to be slow relative to changing use patterns both because buildings are durable and because the development of the political support necessary to make changes may take time. Therefore, the ratio of the gain in population from 1960 to 1970 relative to 1960 population may be associated with differences in library activities. The suburban areas show an average of 52 percentage points of growth, while both city and metropolitan areas averaged less than 10 points. Fewer locations and smaller stocks of materials will be expected in areas of higher growth.

The total size of the area served in terms of population may also influence the mix of activities. An area with more people might be expected to have more main library activities in total but less per capita because of economies of scale. That is, the more people who share the cost of a main library, the lower the cost to each. There may be other economies of scale as well, perhaps in technical services or acquisitions. Organizational diseconomies may affect the largest systems. A very large system may have a higher proportion of its budget absorbed in administration than a smaller organization. The library systems surveyed averaged 993 thousand population without statistically significant difference across the geographic types. Chicago's 3,367,000 is the largest; Minneapolis's 434,000 is the smallest in the group.

Regression Analysis of Operations

Each measure of library operations is related to labor cost, the local fiscal situation, and to the characteristics of the local population in a series of multiple regressions. The purpose is to discover systematic sources of differences in library operations.

The first measure of library operations examined is library expenditure per capita as reported in the 1972 census of governments. Many studies of local government activity use expenditure per capita as the principal indicator of activity. Expenditures, however, are a poor guide to understanding operations. The expenditure regression is reported in the first column of table 4. Expenditures are found to be statistically significantly associated with local expenditures from own sources net of library expenditures in per capita terms. Does this mean that cities that spend more on other services also buy more library services? The regressions for the inputs themselves indicate no statistically significant relationship between own expenditures on other services and the level of library services. Thus, the use of per capita expenditures is misleading. Library expenditures per capita are found to be positively associated with labor costs. Labor costs are a component of library expenditures, so it is not surprising that a positive association is found. A negative association between expenditures and intergovernmental revenues per capita (net of library expenditures) is consistent with intergovernmental revenues being tied to other purposes. Or they may simply be directed to low spending places via distribution and project evaluation formulae. The intergovernmental revenue effect found for library expenditures does not seem to be found on most operations; it appears only for staff. Again, the examination of expenditures reveals little about operations. The examination of individual service characteristics is much more revealing.

Labor cost is associated with different operations in different ways. Hours and labor cost are negatively related. Those library systems with lower labor costs operate longer hours on average than those with higher labor costs,

TABLE 4

Library Activity Regressions in Lineary Form

	Expenditure per capita	Locations per 100 sq. miles	Bookmobiles	Volumes Acquired per thousand population	Titles Acquired in thousands	Volumes in stock per capita
Labor Cost in thousands of dollars	0.963*** (2.734)	2.842 (1.626)	-0.758 (-1.807)	12.441** (2.090)	3.234** (2.159)	0.271*** (4.945)
Own Expenditures per capita	0.009** (2.176)	0.030 (1.411)	0.000 (0.000)	0.011 (0.145)	0.015 (0.711)	-0.397 (-0.597)
Intergovernmental Revenues per capita	-0.024*** (-3.241)	0.002 (0.045)	-0.010 (-1.085)	0.069 (0.506)	-0.048 (-1.404)	-1.068 (-0.856)
Department (binary)	-2.020 (-1.607)	-2.366 (-0.351)	-2.240 (-1.495)	-21.536 (- 0.939)	0.691 (0.118)	-657.425*** (- 3.114)
Percentage of Adults who are High School Graduates	-0.028 (-0.345)	-0.064 (-0.152)	0.042 (0.430)	1.902 (1.308)	-0.168 (-0.460)	9.992 (0.741)
Population Growth Ratio 1960-1970	0.007 (0.202)	-0.336* (-1.800)	0.028 (0.644)	-0.326) (-0.513)	-0.150 (-0.939)	-6.214 (-1.063)
Population Served in thousands	0.002 (1.194)	0.011 (1.211)	0.002 (1.069)	-0.043 (-1.444)	0.003 (0.431)	-0.589** (-2.149)
Constant	-5.352	-34.182	12.675	-100.074	-16.767	1089.455
R-squared	.500	.600	.347	.384	.336	.671
F	2.998**	4.710***	1.593	1.961	1.589	6.413***
n	29	30	29	30	30	30

Note: Numbers in parentheses are t-statistics. Two-tailed tests are applied. Statistical significance is indicated: *** .01 level; ** .05 level; * .10 level.

TABLE 4--continued

	Average Weekly Branch Hours	Staff per million population	Percentage of Public Service Staff		CETA Employees as percentage of total staff	Ratio of Volunteers to staff
			in main library	professional		
Labor Cost in thousands of dollars	-0.002** (-2.586)	0.046*** (3.418)	0.033 (0.297)	0.062 (0.510)	-1.800** (-2.234)	0.328** (2.102)
Own Expenditures per capita	0.014 (1.387)	0.047 (0.287)	-0.0009 (-0.063)	0.021 (1.411)	-0.007 (-0.680)	-0.0001 (-0.044)
Intergovernmental Revenues per capita	0.027 (1.416)	-0.544* (-1.756)	-0.030 (-1.211)	0.004 (0.134)	0.050** (2.719)	0.004 (1.069)
Department (binary)	-2.616 (-0.790)	-72.564 (- 1.386)	6.746 (1.585)	0.166 (0.032)	2.827 (0.911)	-0.952 (-1.275)
Percentage of Adults who are High School Graduates	-0.189 (-0.900)	4.246 (1.279)	-0.655** (-2.428)	-0.266 (-0.894)	-0.340* (-1.726)	-0.036 (-0.759)
Population Growth Ratio 1960-1970	0.186* (2.024)	-0.881 (-0.607)	-0.402*** (-3.413)	0.060 (0.465)	0.031 (0.362)	-0.009 (-0.454)
Population Served in thousands	-0.012** (-2.706)	-0.023 (-0.345)	-0.007 (-1.344)	-0.005 (-0.775)	-0.002 (-0.602)	-0.002** (-2.645)
Constant	89.559	-331.450	81.404	0.395	46.110	0.145
R-squared	.540	.487	.729	.119	.464	.325
F	3.694***	2.983**	8.443***	.424	2.726**	1.306
n	30	30	30	30	30	27

other things equal. No other activity (except CETA employees to be discussed below) is negatively associated with labor cost, thus the only apparent response to high labor cost seems to be cuts in hours. Because the survey study is a cross section, it is, of course, inappropriate to conclude that over time libraries have been induced to cut hours because of rising labor costs. Nevertheless, the cross section evidence is consistent with such behavior. This finding tends to reenforce the evidence in the study of the New York Public Library: hours are more readily cut than locations or materials.

More volunteer effort relative to paid staff is found in libraries with high labor costs. Libraries may be led to put more effort into using volunteers where labor costs are high. The level of volunteer effort, however, is lower in larger library systems. Larger systems may be less effective in organizing the use of volunteers; perhaps larger systems show more bureaucratic inertia.

Labor cost is positively associated with acquisitions, titles acquired, stock, and staff. High labor costs are not associated with lower levels of service in these dimensions. The strength of the positive relationship is a little surprising. While these activities differ from central city to suburban systems (as shown in table 1), labor costs do not differ significantly across the georgraphic types. Therefore, the association between labor cost and the material and staff intensive library systems reflects more than just a central city---suburban difference. Perhaps the political and organizational arrangements that lead to more materials and staff also lead to higher labor costs.

CETA employees are a smaller fraction of staff in library systems with higher labor cost. Apparently CETA employment has been concentrated in cities with lower labor costs.

Intergovernmental revenues per capita are positively associated with CETA workers. Because CETA funds may be included in the intergovernmental transfers, this association is quite understandable. Moreover, similar criteria may be used in distributing other intergovernmental transfers as in distributing CETA funds.

Intergovernmental transfers are negatively associated with the level of staff. This association may reflect the dominance of tied grants in intergovernmental transfers. Restrictions on grants, say for education or law enforcement, may require that local funds be directed to specific purposes as with matching formulae. Untied aid, as for example, general revenue sharing, would be expected to induce somewhat higher levels of local expenditure. Aid tied to library services would be expected to have the largest impact on libraries. The displacement effect of tied aid for purposes other than libraries must dominate the influence of untied aid and library specific aid with respect to staff. This result is a little surprising. It is unclear why this result should be found for staffing but not for other categories of library services.

Libraries that are departments of local government have less autonomy than departments that are independently chartered. Library departments may be less successful in competing for local funds against the police and schools than the autonomous library. The only statistically significant association found is with volumes in stock per capita. Fewer volumes are found in libraries operated as departments of city government than in libraries that are autonomous.

Library systems serving areas with a higher proportion of adults who are high school graduates are little different, on average, than library systems with relatively fewer high school graduates. They have a statistically

significant smaller proportion of their public service staff in a main library, and they have relatively fewer CETA employees. Suburban systems have populations with more education and are less likely to develop a main library service. One might have expected higher levels of service in areas with a population with more education, because library use increases with education. That no such finding is apparent---indeed the more highly education populations have smaller main libraries---suggests that something other than the reading tastes of the resident population is shaping the library service.

The ratio of 1970 to 1960 population is negatively associated with the number of library locations per 100 square miles. This is consistent with a substantial lag in the development of additional locations as a response to increases in population. Also, areas that show population growth will be at much lower population density than areas that have mature development. Lower densities embody automobile oriented consumption patterns, and lower densities of library locations are desirable in such circumstances.

Libraries in areas of recent growth operate more hours per week on average than those in slower growing areas. Having fewer branches, they concentrate their energy in operating more hours. Not having inherited too many branches, they do not have to close branches in order to sustain a high level of hours of service.

The libraries in rapidly growing areas have smaller main libraries. Just as with locations, a main library takes time to develop. Therefore, it is not surprising that library systems in growing areas have smaller main libraries. On the other hand, the library systems in growing areas may have decided against providing a substantial main library service. The notion that libraries in growing areas have a different philosophy of service can not be ruled out.

A distinction might be made here between an age affect and a vintage affect. The age affect implies that particular kinds of library service such as a main library cumulate with age. Each 25 year old library system will have similar main libraries. The difference in main libraries may reflect the fact that the library systems are of widely differing ages; the suburban systems are much younger than the city and metropolitan systems. If the age affect is dominant, then when the suburban systems are 100 years old they will look much more like the 100 year old city systems observed now. The weak association between population growth and the stock of materials suggests that the age affect is not very powerful. The vintage affect implies that each library is molded at birth by the context of that time. Libraries created in the 1920's had many neighborhood branches for walking access, a substantial demand for sophisticated main library services, and the orientation toward collecting materials for posterity. Libraries created today may reflect an orientation toward meeting the circulation requirements of current users, and emphasize automobile access. Thus longer hours, more multiple copies, and fewer locations may be appropriate. The vintage hypothesis depends on the assumption that libraries are slow to change to new circumstances. An analogy might be made to grocery stores. The size and distribution of grocery stores of the 1950's are being transformed into larger stores at lower density in the 1970's. If library systems are slow to change, they may reflect their vintage. It is difficult to disentangle age and vintage affects from cross section evidence alone: a cross section over time is necessary. But I suspect that vintage affects are important for locations and the age affect may be important for the main library.

The size of the area served is indicated by the population. Library systems serving larger populations seem to stock fewer books per capita. Perhaps there are economies of scale in the book stock. That is, perhaps certain materials are acquired in single copy for the whole system. Such materials will be spread over a larger audience in a larger system, and so the stock of materials might be smaller in per capita terms in a larger library system.

Systems serving larger populations tend to operate fewer hours than smaller systems. It is unclear why larger systems should offer fewer hours than the average system.

Overall, the differences in library services are not all that well explained. Labor costs have some role especially in limiting hours of service. The libraries in growing areas have fewer locations, operate longer hours, and have smaller relative commitments to main library services than libraries in areas with smaller population growth rates. These influences do not tell the full story, however. First, the history of each library system is probably very important. Library systems seem to be very durable; once in place they tend to stay in place. The level of bureaucratic and political inertia may be very high. It may be difficult to close or relocate branches and to change the basic features of the library services. If sophisticated main library service is developed, it may be difficult to reduce the level of such service should the demand for it change. Second, residents are not the only library users. Employment in central cities may be larger than the number of residents. The demand for public library services may be influenced in important ways by the character of employment. For example, an area with a large number of financial firms and corporate headquarters may require more

library services than say manufacturing activities. This investigation has not given sufficient attention to the history of the library systems and to the character of employment in the area.

EXPLAINING LIBRARY USE

The library activities discussed above can be related to the use of the library systems. How do different sets of activities influence the level of use? Perhaps more hours and more books generate more use. The study of branches in New York demonstrated that library use is very responsive to the hours of service, and is somewhat responsive to the acquisition of materials.[9] In this study use is compared across library systems.

Measuring Use

The main category of use is circulation. Circulation figures are available from most library systems and has been used as a quasi-output measure in other studies.[10] Circulation at the time of the survey is examined relative to 1970 population. On average, 4.66 books circulated per year per capita in the library systems surveyed as reported in Table 5. There is a statistically significant variation across the geographic types. Suburban library systems average over seven circulations per capita while city systems averaged under four. Pittsburgh averaged 1.75 circulations per capita while Fairfax County averaged over 10. The likely differential growth of the jurisdictions will only have heightened the differences.

Circulation could be disaggregated in several ways. The circulation of adult materials could be distinguished from the circulation of juvenile materials. Fiction might be distinguished from non-fiction. The circulation of books might be distinguished from non-book materials. Too few libraries have such disaggregated information available to make analysis possible.

TABLE 5

Measuring Library Use

Means and Standard Deviations by Geographic Type

Item	City	Metropolitan	Suburban	All	F
Circulation per capita	3.74 (1.32) n=15	4.09 (1.36) n=9	7.34 (2.44) n=7	4.66 (2.17) n=31	12.38***
Cards per capita	0.41 (0.16) n=13	0.29 (0.08) n=8	0.41 (0.17) n=4	0.37 (0.14) n=25	2.19
Interlibrary Loans Received	1334.07 (1020.67) n=14	877.57 (1305.97) n=7	6393.14 (4841.61) n=7	2484.71 (3377.32) n=28	10.91***
Interlibrary Loans Sent	11256.07 (11878.28) n=14	10071.88 (10004.33) n=8	6198.43 (4384.19) n=7	9708.59 (9948.04) n=29	0.59
Loan Period in weeks	3.00 (0.65) n=15	3.33 (0.71) n=9	3.14 (0.69) n=7	3.13 (0.67) n=31	0.68
Percentage Allowing Renewals	73.33 (45.77) n=15	55.56 (52.70) n=9	85.71 (37.80) n=7	70.97 (46.14) n=31	0.87
Average weeks wait for Best Seller	6.15 (6.57) n=13	4.67 (4.08) n=6	10.33 (8.39) n=3	6.32 (6.20) n=22	0.83

Source: author's survey of libraries. Numbers in parentheses are standard deviations. The F-statistic tests for statistically significant differences across the geographic groups relative to variation within groups.

Statistic significance is indicated: *** .01 level; ** .05 level; * .10 level.

Circulation figures, of course, do not reflect all the dimensions of library use. In particular, the number of persons served may be as important as the number of materials used. One way of considering the number of persons who use the library system is to count the number of cardholders. Of the 31 systems, six either do not require cards or keep no central count of the number of cards outstanding. The renewal period varies for the cards from an annual card renewal required in San Diego, New Orleans, and Fairfax County to permanent cards in Houston, and St. Louis County. Note that non-residents may acquire cards in several places, and therefore the possible number of cards is not limited by the population of the area. The library systems averaged 37 cards per 100 population with no statistically significant difference across the geographic types.

Library use might also be compared by observing attendance. Turnstile counts are available from only a very few libraries, however, so attendance can not be examined. Reference questions asked could also be compared across systems, and many libraries do count questions asked. Reference queries may be of many different sorts, however. It would be useful to try to identify some particular categories of questions. The survey asked how many questions were received by telephone, but too few libraries were able to sort out the number of telephone inquiries from questions from other sources. Consequently, the issue of reference questions is not examined here.

Libraries also interact with other libraries via the interlibrary loan of materials. The survey asked about the number of materials sent and the number received. On average 9708 materials were sent and 2484 materials were received via interlibrary loan. These figures occur in the surveyed systems where circulation averaged over 3.5 million. Thus the interlibrary flow of materials accounts for less than half of one percent of circulation. (Some

libraries may require materials received via interlibrary loan to be used in the library, thus interlibrary flows may not appear in the circulation figures.) Relative to the total scope of library services, interlibrary flows seem inconsequential.

The receipt of materials through interlibrary loan varies significantly across the geographic types; city and metropolitan libraries have much smaller inflows of materials than the suburban systems. These differences may reflect the greater commitment of central city and metropolitan systems to central library services, an issue that will be explored below.

The outflow of materials does not differ significantly across the geographic types. The suburban systems on average have a rough balance of inflows and outflows. The central city and metropolitan systems are net lenders.

The library use will be conditioned by several other dimensions of the service. For example, the length of the loan period may influence the level of use of the library. The loan period varies from two to four weeks with a mean of three weeks. Nine of the 31 library systems do not allow material to be renewed. Because renewals count as additional circulations, libraries that disallow renewals are likely to have lower levels of circulation than those that allow renewals. Three library systems allow renewals to be made by telephone: San Antonio, St. Louis County, and Birmingham. The quality of service may also be influenced by the length of the wait for popular materials. The survey asked the libraries to estimate how long on average one would have to wait for a best seller. Twenty-two libraries were willing to guess at this number. The average reported wait is six weeks. The mean wait varies from one week in Milwaukee, and San Francisco to over 20 weeks in San Diego and San Diego County. Of course, the actual wait will likely follow some skewed distribution with the most popular book having the longest wait.

The length of the queue will vary over the life of the book, from a long queue when the book is new and heavily promoted, to a sharp drop off when a paperback version becomes available. Nevertheless, the rough measure of waiting time may indicate a dimension of the quality of service not captured in circulation figures.

Regression Analysis of Use

Differences in use can be explored by regressing the measures of use on the library activities and the measures of the public taste for library services. The central hypothesis is that use will be greater the higher the level of activity the library system provides. The more hours, books, and locations, the more use there should be.[11] The regressions are reported in Table 6.

The simple linear regression explains over 84 percent of the variation in circulation per capita across the 31 library systems surveyed. The most important influence is the level of education: the higher the proportion of adults who are high school graduates, the higher the level of circulation. Among library services, the most important factor seems to be the number of acquisitions. Higher levels of acquisitions are associated with higher levels of circulation. The elasticity of circulation with respect to new acquisitions, evaluated at the means, is 0.32.

Libraries that allow renewals have more circulation per capita, other things equal. The coefficient indicates that on average one circulation per capita per year is a renewal. Taking account of renewal policy seems to be important in comparing circulation across library systems.

The other variables in the regression show no statistically significant associations with circulation. In particular, the average hours of service

TABLE 6

Library Use Regressions

	Circulation per capita	Cardholders per 100 population	Interlibrary Loan Flows in thousands		Average Wait for Bestseller in weeks
			Received	Sent	
Locations per 100 square miles	-45.116 (- 0.335)	-0.610 (-0.045)	-3.776 (-0.875)		
Weekly Branch Hours	0.118 (0.578)	-0.93 (-0.338)	-0.071 (-0.922)		
Volumes Acquired per thousand population	0.010*** (2.924)	0.079 (1.683)	0.009 (0.715)	-0.014 (-0.424)	-0.012 (-0.549)
Titles Catalogued in thousands	0.006 (0.412)	0.493*** (3.204)	0.0026 (0.055)	0.0001 (0.968)	0.00005 (0.677)
Loan Period in weeks					3.489* (1.715)
Renewals Allowed (binary)	0.967** (2.217)				
Card Renewal Period in years		0.874 (0.867)			
Population in thousands	-0.0005 (-0.155)	-0.006 (-1.633)	-0.0008 (-0.483)	-0.0008 (-0.202)	-0.00008 (-0.045)
Percentage of Adults who are High School Graduates	0.124*** (6.208)	0.131 (0.460)	0.035 (0.032)	0.154 (0.596)	0.286* (1.829)
Percentage of Public Service Staff in Main Library			-9.274 (-1.612)	23.323 (1.411)	
Constant	-5.000	16.943	8.852	-6.049	-18.685
R-squared	.846	.625	.414	.221	.393
F	18.100***	4.041***	1.921	1.246	2.069
n	31	25	27	28	22

Note: Numbers in Parenthesis are t-statistics. Two-tailed tests are applied.

Statistical Significance is indicated: *** .01 level; ** .05 level; * .10 level.

at branches is unrelated to circulation in the comparison of library systems. This result is at variance with that for the New York system. Apparently, hours are very important given the low level of hours of service found in the New York system, but are much less important in the range observed here, that is among systems averaging 48 hours of service in branches each week. It may also be that variance among branches within systems is important while variation across the systems is not.

The number of locations is also unrelated to circulation in the regression. The systems with large numbers of locations tend to offer fewer hours, and that affect may dominate here. The number of titles catalogued is also unrelated to circulation in the regression. Thus, there is no evidence to indicate that the large, varied, sophisticated collections of systems with larger main libraries generate more circulation than those systems with many fewer titles. The lack of association between population in the area and the per capita circulation tends to suggest that there may be little economy of scale in the provision of public library circulation services among these relatively large library systems.

Somewhat different factors seem to explain the number of cardholders per hundred population. In particular, many more people seem to hold cards of library systems with more titles cataloged annually. Thus while the sophistication and variety of collections indicated by the number of titles cataloged does not seem to account for differences in circulation, they do seem to account for differences in the number of cardholders. Inclusion of a variable for the number of years between renewals of the card does not affect the relationship: the number of cardholders is apparently little affected by the renewal cycle. Thus the main affect seems to be that of titles. It would be interesting to have turnstyle counts or sample surveys for the

library systems indicating attendance to see whether the number of cardholders gives a clue to in-library use. One might also like to know what fraction of cardholders reside outside the jurisdiction of the library, as a way of examining geographic spillovers. Because holding a card is not a direct benefit, it is possible that cardholding is weakly associated with any particular library use. Nevertheless, because the cardholding patterns seem different than circulation patterns, it may be that cardholding reflects other categories of library use.

Interlibrary loan flows are not well explained by the variables at hand. One would expect a library system with a large main library and one that is acquiring a large number of titles each year would both lend more materials and borrow fewer materials through interlibrary loan. One might further expect that some of the same factors that lead to own circulation would also lead to more interlibrary loan inflows, that is, areas with more educated adults would be expected to have more demand for interlibrary loan inflows. Finally, one might expect that larger systems would both require more inflows and be more important suppliers of interlibrary loans. These hypotheses are only weakly substantiated. Regressions of the gross flows are reported in Table 6. The coefficients on the percentage of public service personnel who are assigned to the main library is statistically significant at the .10 level with a one-tailed test. Larger main libraries have somewhat lower demands for interlibrary inflows and supply greater levels of outflows. Population, titles, and volumes acquired are unrelated to interlibrary loan flows. The overall explanatory power of the relationship is low, however, and unobserved influences are probably important.

Interlibrary loan flows are never large relative to total system circulation. Users for the most part rely on materials available locally. Inter-

library loan becomes more important when elaborate interconnections between libraries develop. Some libraries are designated regional centers. For example, the State of Pennsylvania has designated four libraries as resource centers, and the subject categories of the dewey decimal system have been parcelled out. A resource center library receives some state funds to support its collections development in its assigned subject areas. It then has a responsibility to respond to interlibrary loan requests in its subject area. Library interconnections may also develop locally. The libraries in the Washington D.C. area have daily delivery service so that interlibrary loans can be filled quickly. Some libraries have special relationships with smaller libraries in nearby jurisdictions such that all requests for interlibrary loans flow through the larger library. Interlibrary loan flows will be greater in libraries that are a part of active regional systems for the exchange of materials. The survey asked whether libraries belonged to a network, and over 90 percent responded affirmatively. Yet the level of development of organizations is quite varied. Interlibrary loan operations are not free outlets either for promoting the use of large collections or for collections that are too small or thin. Interlibrary loan operations require investment in the development of institutions to make them work. Not all public libraries participate aggressively in such services.

The number of weeks a user must wait on average for a bestseller may be influenced on the one hand by the number of volumes acquired and on the other by the number of people using the system. The longer the loan period in the library system the longer each user may hold a book, and so the longer the wait other things equal. Some libraries systems have special shorter loan periods for best sellers, but the survey inquired only about the normal loan period.

The wait for bestsellers is only poorly explained by the regression, at least in part because the information reflects the best guess of the librarians rather than systematic data gathering. Nevertheless some of the hypotheses receive weak confirmation. On average, a one week longer loan period is associated with 3.887 weeks longer wait for bestsellers, a figure statistically significant at the 10 percent level with a one tailed test. Secondly, the wait is longer in library systems with more educated adults. The pressure of demand increases the wait. Third, there seems to be no relationship between the number of volumes acquired per capita and the length of the wait. Of course, a library may meet the demand for bestsellers by renting books, so the lack of association here may not indicate a lack of response of libraries to the length of queues for popular materials.

The comparison of library use across the library systems has not done justice to the uses of main library services. While circulation, cardholders, attendance, and reference questions figures might be revealling, especially if available in disaggregated form, an important quality dimension is overlooked. The value of a sophisticated main library service depends in important ways on the quality of the collection and the breadth and depth of study that may be done using the materials. A scholar may spend each day for weeks in a library exploring a particular theme. Simple counts will not do justice to the value of the library service to such an individual. The relevant question from the point of view of the public interest in libraries, however, is what institutions are most appropriate for meeting research library needs, and how should they be financed. The results presented here suggest that the research library function may have little serendipity with the current circulation orientation of most public library users.

SUMMARY OF THE COMPARISON OF PUBLIC LIBRARIES

Measuring library services in direct physical terms proves more revealing than relying on expenditure comparisons. The expenditure comparisons are influenced by differences in labor costs as well as by differences in the services offered. Expenditure comparisons also do not reveal the differences in service mix. For example, public library systems are found to substitution hours for locations (in cross section). Library services are not provided in fixed combinations of staff, hours, materials and locations.

While the public library systems are quite varied in the combinations of services they supply, a rough division seems possible along the following lines. Some libraries have many locations, buy many book titles, have larger staffs in per capita terms, and put relatively more effort into the main library. Such libraries operate for fewer hours, and use fewer bookmobiles. Other libraries do the opposite. While classification of the library systems geographically into city, metropolitan and suburban systems explains some of the differences in service mix, most importantly the number of locations, and the number of book titles, the geographic classification does not explain the differences in hours, stock, and bookmobiles.

The differences in service mix is explained in part by differences in labor costs. Systems with higher labor costs operate significantly fewer hours per week on average. The high labor cost systems also have more materials in stock, acquire more books and more titles, and have more staff. Reductions in hours in response to higher labor costs may be seen as a temporary adjustment to financial pressure, while adjustment of locations, stocks, acquisitions and staff may be slower and viewed as more permanent. The higher levels of materials and locations being associated with higher labor costs may indicate some historical overexpansion of expenditures.

The level of education of adults in the jurisdiction explains little of the differences in service mix even though education is very strongly associated with differences in library use. Given the fact that adults with more education use the public library more than others, one would expect the political system to deliver significantly more library services in areas with higher levels of education. That education has little association with differences in library services suggests that the political system is not very responsive to ultimate users.

The rate of population growth of the jurisdiction is important in explaining some differences in library services. Areas that have experienced rapid growth tend to have fewer locations per 100 square miles, to have less commitment to main libraries, and to operate longer hours. To what extent these affects result from delays in the growth of library services and to what extent they reflect changing tastes and technologies in services is difficult to determine without time series evidence.

The differences in library services are associated with differences in use, but the dominant importance of hours of service found in the New York study is not found in the comparison of library systems. The important service characteristic in comparing systems seems to be volumes acquired per capita per year. This reenforced the finding that the age of the stock of materials is very important in user decisions to use the library.

The level of cardholding, on the other hand, seems to be influenced importantly by the number of titles acquired. The greater diversity of collection as indicated by the number of titles may attract more individuals to the library. Attendance and reference question usage information would be more attractive usage measures.

It might be interesting to try to use the coefficients of services in the usage regressions as measures of library effectiveness. The cost of increasing each type of service might be estimated. Some method for valuing the usage might be devised, and some marginal benefit cost ratios for the different services might be stated. Using the coefficient on acquisitions in the circulation regression in Table 6 suggests that if a circulation is worth more than one tenth the cost of acquiring an additional volume, additional acquisitions should be made. On average the systems may be acquiring too few materials. While the coefficient of titles in the cardholder regression suggests that an additional thousand titles would attract 493 additional cardholders per 100,000 population, it is difficult to imagine what the value of an additional cardholder might be. Other important library uses are not examined, and so a complete assessment of the relative efficiency of the average library service in choosing a mix of services is impossible with present evidence.

FOOTNOTES

[1]The survey was conducted by interview in 1978. Most of the information reflects the latest fiscal year for which information was available in February 1978. The 50 largest public library systems in the country in terms of population served were identified by the listing in the American Library Directory. The 31 interviewed were selected on the basis of replies to a letter asking for preliminary information. Several libraries that replied to the letter interview declined the interview: Los Angeles, Oklahoma City, Baltimore, and Louisville. Two libraries had to be excluded because of interview cost: Hawaii and Seattle. While the interview group is not a random sample, it does include over half of the largest public library systems in the country.

[2]Malcolm Getz, "The Efficient Level of Public Library Services," manuscript, 1979.

[3]The assignment of library systems to groups may be a little more difficult than it would seem. Dallas and Houston are served by a city library but the cities encompass large areas of what would be suburbs in other metropolitan areas. The Milwaukee Public Library serves some limited area outside the city on a contract basis. Perhaps it should be called a metropolitan library. Many of the service areas do not match the political jurisdiction. Nineteen municipalities in Jefferson County do not participate in the Public Library of Birmingham and Jefferson County, Alabama. Two municipalities in St. Louis County, Missouri have independent libraries. Tacoma Park is a municipality that is partly in Montgomery County and partly in Prince Georges County, Maryland; it participates in neither library system.

[4]Library acquisition policy will also be concerned with issues of quality and taste. The Free Library of Philadelphia captured national attention for its refusal to stock the Nancy Drew stories on grounds that the stories are not of the standard of quality that the Library could recommend them. Public libraries may differ in their willingness to acquire Gothic novels. The interview survey did not pursue this issue.

[5]Getz, "The Efficient Level," op. cit.

[6]Maintenance and security personnel are more difficult to compare because such services are frequently performed by contractors or by other agencies of government. Thus the library budget may not reflect the full cost of maintenance and security activities.

[7]In most libraries, a certified librarian has a masters degree in library science. American Library Association certification required a masters degree in 19 . Some libraries use librarians with bachelors degrees in much the same way as others use the masters degree holders. We have classified personnel as professional according to the job labels used in the library system. There has been some movement toward paraprofessional librarians. The interviews did not pursue this issue.

[8]Bernard Berelson, "The Library's Public," Columbia University Press, 1949.

[9]Getz, "The Efficient Level," op. cit.

[10]Kathleen F. Feldstein, "The Economics of Public Libraries," Ph.D. dissertation, MIT 1977.

[11]One might like to control for the simultaneity of library activities and use. More library services may be offered in areas where people value library services more highly. Greater levels of use may induce higher levels of hours, books, and locations. In the study of New York, (M. Getz, The Efficient Level, op. cit.) this simultaneity is dealt with directly. In the cross system study, the sample size is too small to use the instrumental method to control for simultaneity.

Table A-1
Library Activities

City	Locations per 100 sq. mile	Book-mobiles	Branch hours per week	Volumes Acquired per capita	Titles Acquired	Volumes in stock per capita	Staff per capita	Public Service Staff	
								in main	profes-sional
Boston	58.70	3	40	.141	90,811	1.99	.68	.56	.46
Brooklyn	84.29	0	44	.102	26,127	1.46	.34	.27	.40
Chicago	34.91	0	60	.116	33,100	1.28	---	---	---
Cleveland	51.39	2	41	.273	31,574	3.73	.78	.45	.39
Dallas	4.99	3	42	.155	31,250	1.94	.49	.58	.31
Denver	20.95	2	40	.156	13,992	3.31	.46	.28	.49
Houston	5.52	4	54	.150	21,148	1.52	.43	.33	.48
Milwaukee	13.57	3	53	.279	21,771	3.30	.60	.43	.36
Minneapolis	28.30	1	40	.184	21,414	3.35	.70	.57	.30
New Orleans	4.92	2	47	.063	10,763	1.27	.31	.49	.23
New York	65.57	2	22	.108	26,184	1.07	.32	.17	.40
Philadelphia	40.09	2	41	.112	17,531	1.56	.35	.32	.36
San Antonio	0.80	5	68	.105	11,543	1.24	.17	.51	.52
San Diego	7.39	1	49	.119	10,155	2.10	.40	.43	.38
San Francisco	60.22	1	39	.181	17,642	2.28	.53	.41	.49
Metropolitan									
Atlanta	5.09	4	55	.164	9,384	1.62	.36	.43	.44
Birmingham	1.52	5	45	.061	6,910	1.50	.21	.50	.36
Buffalo	5.10	4	40	.147	29,000	2.70	.25	.49	.52
Cincinnati	8.92	3	50	.124	19,928	3.45	.39	.39	.48
Indianapolis	6.05	4	44	.133	11,239	1.59	.39	.36	.45
Jacksonville	1.44	1	50	.097	10,023	1.93	.30	.49	.33
Nashville	3.00	3	50	.072	6,492	1.09	.26	.45	.54
Pittsburgh	2.61	5	36	.039	12,600	1.28	.24	.43	.31
Sacramento	2.30	4	69	.173	18,993	1.71	.34	.18	.23
Suburban									
Contra Costa Co.	2.35	1	60	.155	8,141	1.62	.37	.25	.35
Fairfax Co.	4.19	2	57	.220	16,798	2.90	.69	.16	.27
Hennepin Co.	4.81	2	40	.250	8,451	3.15	.60	0	.34
Montgomery Co.	3.60	3	61	.296	6,709	2.51	.63	0	.50
Prince Geo. Co.	3.17	5	45	.096	8,416	2.27	.48	0	.53
St. Louis Co.	2.34	23	72	.127	12,000	1.49	.33	0	.12
San Diego Co.	0.86	2	40	.120	8,966	1.04	.29	.15	.16

Table A-2
Library System Characteristics

City	Population in thousands	Percent Adults High School Grads	Population Growth 1960-1970	Own Net exp per capita	Inter-govern. expend. per cap.	Recruit Librarian compensation 40 hours	Department = 1
Boston	641	54	-8	425	76	16,286	1
Brooklyn	2,602	32	-1	619	581	16,926	0
Chicago	3,367	44	-5	421	120	26,278	1
Cleveland	751	37	-14	205	87	14,559	0
Dallas	844	54	24	168	24	13,640	1
Denver	515	62	4	275	132	13,693	0
Houston	1,232	52	31	707	34	14,859	1
Milwaukee	717	49	-3	434	246	17,437	0
Minneapolis	434	58	-10	159	55	16,662	0
New Orleans	593	42	-5	231	123	13,511	1
New York	3,306	48	-1	619	581	16,670	0
Philadelphia	1,949	40	-3	369	255	14,845	1
San Antonio	773	43	31	191	155	10,584	0
San Diego	697	66	22	133	61	14,865	1
San Francisco	716	62	-3	779	152	15,763	1
Metropolitan							
Atlanta	615	66	9	444	199	11,834	1
Birmingham	645	47	2	200	129	14,452	1
Buffalo	1,113	50	5	368	330	18,409	1
Cincinnati	924	51	7	439	125	15,410	0
Indianapolis	792	55	14	343	148	11,704	0
Jacksonville	529	52	16	207	199	13,543	1
Nashville	448	51	12	297	101	10,543	1
Pittsburgh	1,605	55	-1	305	168	13,799	0
Sacramento	632	66	26	455	280	14,796	0
Suburban							
Contra Costa Co.	558	68	37	556	220	13,275	1
Fairfax Co.	455	79	65	362	155	15,392	1
Hennepin Co.	526	77	46	155	180	16,687	1
Montgomery Co.	523	80	53	159	226	15,463	1
Prince Geo. Co.	661	67	85	352	148	15,851	0
St. Louis Co.	951	61	35	283	85	10,287	0
San Diego Co.	661	64	44	200	157	14,237	1

Table A-3
Library Use

City	Circulation per capita	Cards as percentage of population	Interlibrary loan		Loan per weeks	Renewal = 1	Weeks wait
			in	out			
Boston	3.71	74	200	23,000	2	0	8
Brooklyn	2.43	24	492	1,970	3	1	-
Chicago	1.96	20	920	6,225	3	1	3
Cleveland	3.64	NA	NA	7,954	3	1	3
Dallas	4.53	40	1,688	NA	3	1	4
Denver	5.77	59	1,587	13,946	3	1	8
Houston	4.00	55	4,201	21,698	2	1	3
Milwaukee	4.19	53	1,002	12,260	3	0	1
Minneapolis	5.79	NA	958	44,588	4	1	-
New Orleans	2.20	29	2,688	3,896	3	1	3
New York	2.42	34	1,399	1,099	4	0	10
Philadelphia	2.88	30	666	10,248	3	1	6
San Antonio	2.97	42	879	6,013	2	1	4
San Diego	5.90	42	997	1,688	4	0	26
San Francisco	3.77	28	1,000	3,000	3	1	1
Metropolitan							
Atlanta	4.47	35	NA	865	4	0	12
Birmingham	3.02	15	498	26,400	2	1	7
Buffalo	4.17	34	3,766	9,610	4	0	-
Cincinnati	5.46	38	188	6,130	3	1	2
Indianapolis	4.68	28	334	2,072	4	1	-
Jacksonville	3.68	27	931	5,011	3	1	3
Nashville	3.24	32	424	5,487	4	0	2
Pittsburgh	1.75	19	2	25,000	3	0	2
Sacramento	6.31	NA	NA	NA	3	1	-
Suburban							
Contra Costa Co.	5.43	NA	13,170	14,206	4	1	-
Fairfax Co.	10.88	61	848	2,492	3	1	-
Hennepin Co.	8.62	34	12,022	2,572	3	1	-
Montgomery Co.	9.75	45	5,959	3,293	3	1	-
Prince Geo. Co.	5.60	NA	6,188	7,852	4	1	5
St. Louis Co.	6.70	25	762	3,940	2	1	6
San Diego Co.	4.43	NA	5,803	9,034	4	0	20