

ECONOMIES OF SCALE IN THE LOCAL  
GOVERNMENT OF KANSAS

by

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I. SOME ASPECTS OF LOCAL GOVERNMENT  
IN KANSAS

One of the most obvious phenomena of the American governmental system is the extreme number and overlapping of units. We have a federal system with certain powers residing in the central government and others reserved to the states. In each of the fifty states, except Alaska, Connecticut, and Rhode Island,<sup>1</sup> a third layer of government--the counties--is added. In New England and the Middle West, the counties are divided into numerous townships. For specialized functions, further subdivisions are added. For the purpose of providing public education, the many school districts exist, and for certain other specialized functions (e.g., fire protection, sewage disposal, and soil conservation), still other special districts have been established. Dispersed unevenly throughout this already pyramided structure, are a large number of municipalities of various sizes and descriptions.

Statistics on the number of governmental units were first compiled between 1930 and 1933 by Professor William Anderson. Since that time the Bureau of the Census has periodically enumerated the units of local government, indicating that the number has been virtually halved from 182,602 at the time of Anderson's

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<sup>1</sup>U.S., Bureau of the Census, Census of Governments, Governmental Units in 1962, Preliminary Report No. 6 (December 6, 1962), 2.

enumeration<sup>2</sup> to 91,236 in 1962 (see Table 1). The reduction in the number of units over this period is shown in Table 1.

The large decrease in numbers over this thirty year period has been almost entirely the result of school district consolidation, the number of townships decreasing only slightly while the number of counties was virtually unchanged and the number of cities and special districts increased rather rapidly.

Many who have observed this situation in the past have criticized local units in America as being outmoded--as "horse and buggy government in a jet age"<sup>3</sup> and as "the dark continent of American politics".<sup>4</sup> Certainly, it is true that for the most part the boundaries were set in a period when technology was a major limitation on the size of local units. Significantly, counties are much larger and townships are nonexistent in the far western states which were the last to be settled.

Kansas, in 1962, ranked near the top among the fifty states in the number of local governmental units in each category and in total. It ranked third in the total number of units (5,411), following Illinois (6,453), and Pennsylvania (6,202). It also ranked third in the number of townships, fourth in the number of school districts, fifth in the number of counties and

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<sup>2</sup>The Council of State Governments, Committee on State-Local Relations, State-Local Relations, 1946, p. 183.

<sup>3</sup>Harrison Leslie Euler, County Unification in Kansas (New York: Teachers College, Columbia University, 1935), 7.

<sup>4</sup>Robert I. Wessel, "Iowa County Governments Face Different Problems," Iowa Farm Science, XVII, No. 8, pp. 14-17.

TABLE 1

## NUMBER OF GOVERNMENTAL UNITS IN THE UNITED STATES, 1930 TO 1962

Type of Unit	1930 <sup>a</sup>	1942 <sup>bc</sup>	1952 <sup>bc</sup>	1957 <sup>bc</sup>	1962 <sup>b</sup>
Total	182,602	155,116	116,807	102,392	91,236
U. S. Government	1	1	1	1	1
States	48	48	50	50	50
Local governments	182,553	155,067	116,756	102,341	91,185
Counties	3,053	3,050	3,052	3,050	3,043
Municipalities	16,366	16,220	16,807	17,215	17,987
Townships	20,262	18,919	17,202	17,198	17,144
School districts	127,108	108,579	67,355	50,454	34,678
Special districts	8,550	8,299	12,340	14,424	18,323

<sup>a</sup>Source: The Council of State Governments, Committee on State-Local Relations, State-Local Relations (Chicago: Council of State Governments, 1946), p. 183.

<sup>b</sup>Source: Norman Beckman and Marjorie Cahn Brazer, "Governments Galore," National Civic Review, LII, No. 3 (March, 1963), 134.

<sup>c</sup>Adjusted to include units in Alaska and Hawaii which were not states until 1959.

in the number of special districts, and eighth in the number of incorporated cities.<sup>5</sup> Yet, it ranked twenty-ninth in population,<sup>6</sup> thirteenth in land area, and thirty-eighth in population density.<sup>7</sup> As a result, there are over 65 governmental units per 1,000 square miles (or one governmental unit for every 15 square miles) and one unit for every 393 people. The number of Kansas governmental units over time is given in Table 2, and a comparison is made with the national average in 1962.

As on the national level, the reduction is due to the consolidation of school districts, over the observed period, as the number of counties has remained constant and the number of other units has increased. Kansas still has almost three times the number of units of the average state.

#### County Government in Kansas

In 1854, the first territorial legislature provided for 30 counties in eastern Kansas and three large county areas which would contain the remainder of the territory. But some of the 30 counties had inadequate populations for immediate organization, since it was the policy of the legislature to establish boundaries which were expected to contain an adequate population when settled.

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<sup>5</sup>William Anderson, Government in the 50 States (New York: Holt, Rinehart, and Winston, 1960), p. 22.

<sup>6</sup>U.S., Bureau of the Census, Nineteenth Census of the United States: 1960 Population. S-34.

<sup>7</sup>George S. Robb, "Certain Aspects of County Reform in Kansas" (unpublished Master's thesis, Department of Political Science, University of Kansas), pp. 9-10.



TABLE 2

## GOVERNMENTAL UNITS IN KANSAS, 1942 - 1962

Type of Unit	1942 <sup>a</sup>	1952 <sup>b</sup>	1957 <sup>c</sup>	1962 <sup>d</sup>	1962 National Average <sup>d</sup>
Total	11,115	6,932	6,214	5,411	1,825
School districts	8,632	3,984	3,140	2,262	694
Counties	105	105	105	105	61
Municipalities	589	606	610	618	360
Townships	1,524	1,514	1,540	1,546	343
Special districts	264	724	808	880	366

<sup>a</sup>Obtained from: U.S., Bureau of the Census, Governmental Units in the U.S., 1942, (1944).

<sup>b</sup>Obtained from: U.S., Bureau of the Census, Local Government Structures in the U.S., State and Local Government Special Studies No. 34, (1954), 35.

<sup>c</sup>Obtained from: U.S., Bureau of the Census, U.S. Census of Governments: 1957, VI, No. 14.

<sup>d</sup>Obtained from: U.S., Bureau of the Census, Governmental Units in 1962, Preliminary Report No. 6, (December 6, 1962).

So some of these counties were temporarily attached to others. After admission to the Union, the legislature set the population requirement for county organization at 600; but this was later increased from time to time.<sup>8</sup> The Kansas Constitution set the area requirement at 432 square miles.<sup>9</sup>

The post-Civil War population influx enabled other counties to organize until the total number had reached 104 by 1873. But a decade later, the legislature reduced the number to 95. By 1887, the number had risen to 106, but Garfield County was abolished by the Supreme Court of Kansas in 1892 because its area was less than the 432 square mile constitutional requirement. This brought the total to 105 as it now stands--seventy years later! Atchison, Doniphan, Geary, and Wyandotte are also less than 432 square miles in area, but they were established in territorial days.<sup>10</sup>

The size of Kansas Counties, like that of other states, was determined by two often conflicting considerations. One--the "horse and buggy" theory--required that the county seat be within such a distance from the farthest citizen that he could travel by horse and buggy to the courthouse and return between sunrise and sunset. The other consideration required that each

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<sup>8</sup>William H. Cape, County Government in Kansas, Citizen's Pamphlet Series No. 23, Governmental Research Center (Lawrence: University of Kansas, 1958), pp. 9-10.

<sup>9</sup>Robb, op. cit., p. 10.

<sup>10</sup>Cape, op. cit., p. 11.

county should have a certain minimum population.<sup>11</sup> The greater size of the counties of western Kansas is explained by the importance of this latter consideration. For instance, the ten counties along the eastern border have an average size of 493 square miles, while the seven along the western border have an average size of 881 square miles.<sup>12</sup>

While the county boundaries were set by considerations of a level of technology outdated by 70 to 100 years, the scope of the county's traditional functions, as well as the number and scope of new functions, have increased rapidly over the past two or three decades. Kansas counties, as well as those of other states, perform a dual role as both administrative agencies of the state and as independent local governmental units with certain powers of a legislative, an executive, and a judicial nature. At the turn of the century, they served primarily as arms of the state government in law enforcement and record keeping. But in the face of a declining role for townships, especially their transfer of the function of providing roads directly to the counties in 57 counties, the expansion of county administered state and federal programs, and modern technological innovations, the demand for county services has seen continued growth.<sup>13</sup>

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<sup>11</sup>Rhoten A. Smith, "The Financial Case for County Consolidation," Your Government, September 15, 1948, pp. 1-5.

<sup>12</sup>Robb, op. cit., pp. 12-13.

<sup>13</sup>Clarence J. Hein, "Kansas Counties Grow in Importance," National Municipal Review, XLV, No. 2 (February, 1956), p. 82.

The three important aspects of this increased demand for services are: (1) increased population; (2) increasing demands for higher service levels as people become accustomed to higher standards of living; and (3) the demand for more urban-type services (e.g., zoning, fire protection, etc.).<sup>14</sup> Specific developments which have necessitated increased county services are: (1) development of the automobile, which, of course, has required many miles of road; (2) the Great Depression, which resulted in administration of federal welfare aid from the county level; (3) the setting up of full-time county health departments by the federal government in several counties during World War II, which has since then led to widespread demand for such services at the county or multi-county level; (4) the building of county hospitals, which took place in about one-fourth of the counties from 1940 to 1945; (5) the increase in other urban-type services (e.g., libraries, airports, fire protection, zoning, etc.).<sup>15</sup> Table 3 indicates the growth in certain services over time for Kansas counties.

Since these data were compiled, some changes have occurred, although they are minor. The number of counties with road unit systems (i.e., those in which the county builds and maintains all local roads), has increased to 57. In the remaining 48 counties, the townships are responsible for certain local roads within their

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<sup>14</sup>Clarence J. Hein, "Rural Local Government in Sparsely Populated Areas," Journal of Farm Economics, XLII, No. 4 (November, 1960), 827.

<sup>15</sup>Hein, "Kansas Counties Grow in Importance," op. cit., p. 82.

TABLE 3

NUMBER OF KANSAS COUNTIES PROVIDING SELECTED SERVICES, 1915-1956<sup>a</sup>

Service	1915	1920	1930	1940	1950	1956
County unit road systems	0	2	20	25	51	53
Fire protection	0	0	0	0	1 <sup>c</sup>	4
Hospitals	b	1 <sup>c</sup>	3 <sup>c</sup>	5 <sup>c</sup>	18 <sup>c</sup>	39
Full-time public health programs	0	4	11	7	16	19
Libraries	0	0	5	10	11 <sup>c</sup>	19
County administered welfare programs	b	2 <sup>c</sup>	16 <sup>c</sup>	105	105	105
Airports	0	0	0	0	b	5
Zoning	0	0	0	0	3 <sup>c</sup>	10

<sup>a</sup>Source: Clarence J. Hein, "Kansas Counties Grow in Importance," National Municipal Review, XLV, No. 2 (February, 1956), 82.

<sup>b</sup>Data not available.

<sup>c</sup>Complete data unavailable.

boundaries. If county government operates on an uneconomic scale, it seems that the multiplication of functions without consolidation would result in increasing waste of tax funds.

A further important change for county governments, and all rural local governments, is the national trend toward out-migration from rural areas, which means a decrease in the population base for many counties in predominately agricultural areas. In Figure 1, population changes in Kansas counties from 1951 to 1961 are shown on a percentage basis. It is not easy to make generalizations for geographic areas except in the fifteen-county block in the southeastern corner of the state which has consistently lost population. It is easier to make generalizations according to population size, although they apply in a very broad sense.

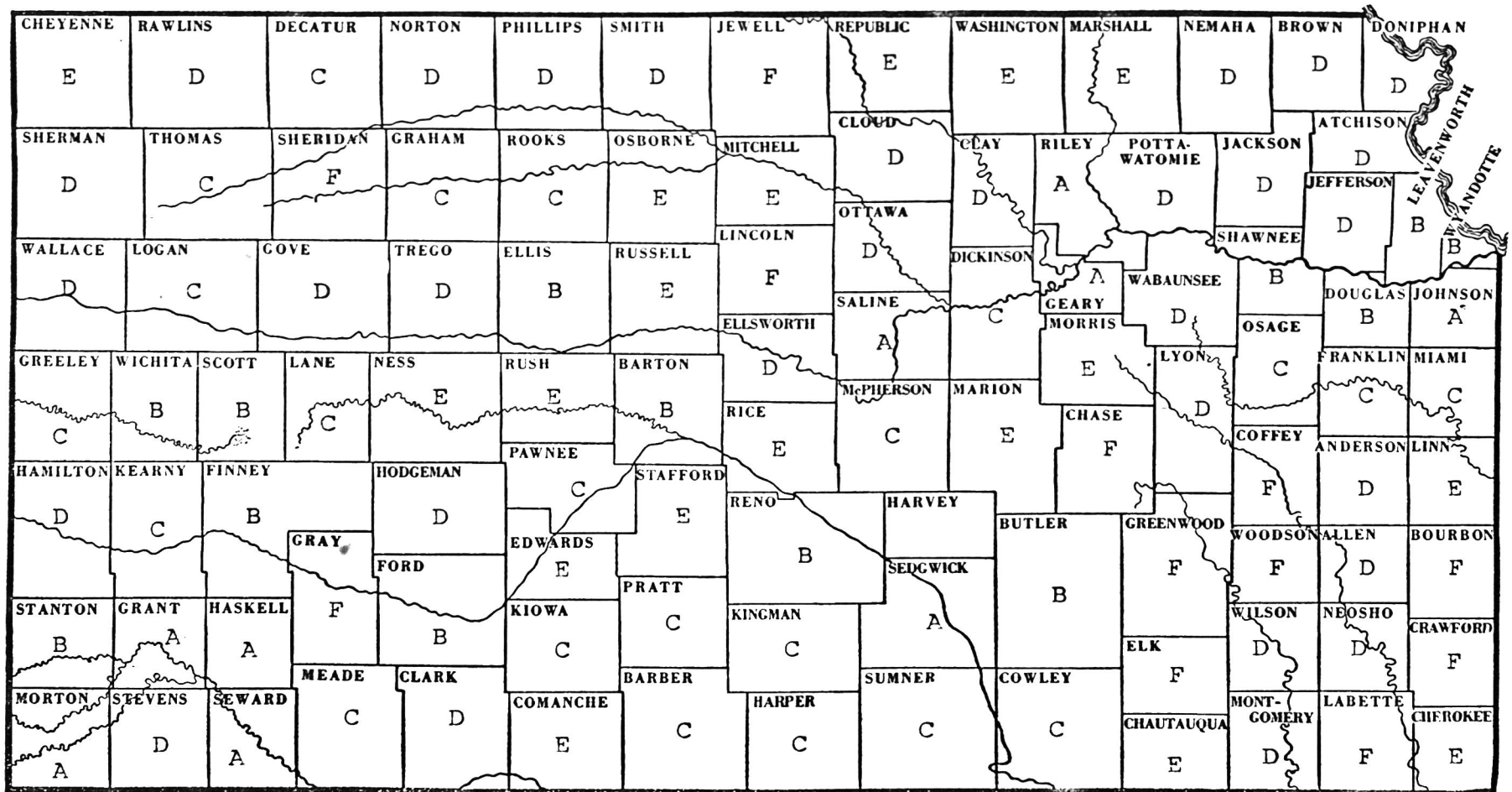
The three counties of over 100,000 people, which are dominated by Kansas' three largest cities, have gained population rapidly, containing 37.7 per cent of the state population in 1961, as opposed to 27.8 per cent in 1951. In the range from 20,000 to 100,000 people, almost two-thirds of the 22 counties have gained; in the range from 10,000 to 20,000, only 29 per cent of 31; in the 5,000 to 10,000 range, only 26.7 per cent of 30; and in the group under 5,000 people, 57.9 per cent of 19 have gained.<sup>16</sup> So, obviously, the larger counties are gaining population relative to the smaller ones.

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<sup>16</sup>"Kansas Population Pattern Shifts," Kansas Government Journal, November, 1961, pp. 529-531.

FIGURE 1

Percentage Changes in Population of Kansas Counties, 1951-1961.<sup>ab</sup>



<sup>a</sup>Source: "Kansas Population Pattern Shifts," *Kansas Government Journal*, XLVII, No. 11 (November, 1961), 529.

<sup>b</sup>Legend: A, increased more than 25 per cent; B, increased 10 to 25 per cent; C, increased less than 10 per cent; D, decreased less than 10 per cent; E, decreased 10 to 15 per cent; and F, decreased more than 15 per cent.

Township Government in Kansas

As the nation expanded westward the policy of Congress was "to supply the as yet sparse or non-existent population with the decentralized machinery of local self-government, then so lauded in New England".<sup>17</sup> The Organic Act establishing the Kansas territory authorized the organization of townships by providing for the appointment of township officials. Later, the territorial and the state legislature provided for the division of counties into townships. The form of township government found in Kansas, as opposed to the town government of New England, has been confined mainly to the Middle West. The traditional township functions in most other states have been performed by the counties. Instead of holding the famed town meetings, as in New England, Kansas townships have been governed by a representative township board made up of the trustee, clerk, and treasurer.

The number of townships in Kansas grew from 365 in 1870 to 1,002 in 1880, and then to 1,509 in 1890, after which the number has remained near 1500 with boundaries virtually unchanged despite population, social, and technological changes.<sup>18</sup> Except for cities of the first and second classes, all of Kansas is divided into townships. Township boundaries in Kansas, and in neighboring states, generally followed the lines of the federal

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<sup>17</sup>James W. Drury, Township Government in Kansas, Governmental Research Series No. 10, Governmental Research Center (Lawrence: University of Kansas, 1954), p. 1.

<sup>18</sup>Ibid., p. 2.



public lands survey, comprising areas six sections wide by six sections long. Consequently, the median size is approximately 36 square miles, although they average larger in the southwestern part and smaller in the northeast and north central parts of the state.<sup>19</sup> The average population is 389 and the total township population decreased 11 per cent between 1951 and 1961.<sup>20</sup>

Townships were initially established at such a size as was expected to insure maximum citizen participation and local political autonomy, and were thus considered to be more democratic than other units--a "training school of democracy". Although defenders of township government have been willing to admit that larger units might be more efficient in the execution of certain functions, they argue that this disadvantage is more than offset by the greater amount of citizen participation which townships allegedly produce. However, interest in township government has declined over the last two or three decades, placing this argument on a weak basis.<sup>21</sup>

The traditional township functions have been law enforcement by the township constable, administration of justice by the familiar justice of the peace courts, administration of local health and welfare programs, assessment of property, and highway

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<sup>19</sup>Ibid., pp. 9-11.

<sup>20</sup>"Kansas Population Pattern Shifts," op. cit., p. 630.

<sup>21</sup>Arthur W. Bromage, Recommendations on Township Government, Supplement to the National Municipal Review, XXIII, No. 2 (February, 1934), 143.

administration.<sup>22</sup> Certain Kansas townships have traditionally performed such functions as providing and maintaining libraries, cemeteries, and parks, fire protection, and various other miscellaneous services.<sup>23</sup>

The trend in several states has been toward the elimination of townships. The national total has decreased from 20,262 (see Table 1) in 1930 to 17,144 in 1962. In Oklahoma and Iowa, townships have been abolished as units of government. The net reduction in other states, however, has been only 389.<sup>24</sup> In Kansas, and in other states where townships still exist, the tendency has been toward a reduction in functions.

In the past, the construction and maintenance of roads has easily been the most important function of townships. Gradually this function has been transferred to other levels of government, with a consequent weakening of the position of townships. In 1917 the State Highway Commission was established with general supervisory powers over construction and maintenance of "state" roads. Also in 1917, the county road unit option was authorized; and, in 1929 and 1947, the procedure for its adoption was modified, so that today the board of commissioners may adopt the system by resolution, or is required to adopt it if petitioned by 10 per cent of the voters. An election is required only if 10 per cent

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<sup>22</sup>Paul W. Wager, "Townships on Way Out," National Municipal Review, XLVI, No. 9 (October, 1957), 457.

<sup>23</sup>Drury, op. cit., p. 35.

<sup>24</sup>Wager, op. cit., p. 456.

or more of the voters protest. Then, in 1928, the state entered directly into construction and maintenance after the ratification of two constitutional amendments enabling the state to establish, maintain, and finance a state highway system.<sup>25</sup>

Therefore, in the 57 counties which have adopted the county road unit option, the townships have lost their most important function. In the remaining townships, they have lost some of the control over local roads and have lost other roads to the state highway system. As will be shown later, the townships which do not function as road units usually have only nominal expenditures.

The functions of law enforcement and administration of justice, as in other states which have townships, have also declined greatly. The title of constable has become a joke and the position is frequently unfilled.<sup>26</sup> Administration of justice is being shifted to higher levels of government and the number of justices of the peace is declining. In view of today's transportation and communication facilities, there seems to be little justification for a law enforcement officer and a magistrate in the rural neighborhood.

The development of the extensive federal programs during the Great Depression and the selection of the county as the local administrative unit relieved the townships of their rudimentary welfare activities. And it became apparent rapidly that public

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<sup>25</sup>Drury, op. cit., pp. 39-45.

<sup>26</sup>Ibid., p. 63.

health and hospital services are not technically or economically feasible at the township level. Health services, however, had been minimal at the township level in Kansas.<sup>27</sup>

Townships now perform only a limited role in property assessment. House Bill 236, passed by the 1955 legislature reaffirms that the county is the "governmental unit charged with the primary responsibility" in assessment. The County Clerk or where applicable, the appointed county assessor is the ultimately responsible official, the township trustee being ex officio a deputy assessor. In the past, assessment at the township level has resulted in serious inequalities over the state. Recognition of this seems to be favoring greater centralization to provide for uniformity.<sup>28</sup>

These evidences of decreased responsibilities point out the growing belief that the township is too small for efficient administration of even its traditional functions. As early as 1934, Professor Arthur Bromage saw the township as an artificial area that was inadequate in size and called for a number of changes. These included: (1) replacement of justices of the peace by county trial judges; (2) administration of health and welfare activities by a single department at the county or multi-county level instead of attempting them at the township level; (3) transfer of the township road systems to county road units;

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<sup>27</sup>Drury, op. cit., pp. 35-36, 53.

<sup>28</sup>Marcene Grimes, "The 1955 Property Assessment Law," Your Government, XI, No. 7 (March 15, 1956), 2-4.

(4) transfer of the functions of property assessment and record keeping, where attempted by townships, to a county department of finance; (5) administration of elections by the county, with a system of electoral precincts instead of by townships; and (6) the ultimate elimination of townships by legislative direction, permissive legislation by the states for abolishment or consolidation of individual townships, or by county option, depending upon the existing or attainable legal provisions in the particular state.<sup>29</sup>

Kansas law provides for mandatory disorganization of townships by the county commissioners when the number of electors becomes less than 10. If the number is less than 25 and a majority submits a petition favoring disorganization, the board of county commissioners must disorganize the township. If the township has less than 100 electors, the township may be dissolved if 25 per cent of the voters submit a petition favoring it. The proposal must then carry in both the township to be disorganized and the one to which the disorganized territory is to be annexed. Another provision allows the county commissioners to abolish existing townships in the county and to establish new ones if petitioned by 25 per cent of the voters and the measure is subsequently voted in by a county referendum. This latter provision is not applicable for townships with over 3,000 people and townships with indebtedness, and, where it is applicable, must be approved by 25 per cent of the petitioners in both the township

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<sup>29</sup>Bromage, op. cit., pp. 139-145.

to be dissolved and the township to which it is to be annexed.<sup>30</sup>

But thirty years after Bromage made his recommendations, the number of townships in Kansas is virtually unchanged. Recommendations 1, 2, 3, and 4 have, however, met with varying degrees of success.

### Municipal Government in Kansas

There are three classifications of Kansas cities: (1) cities of the first class, of which there are 15; (2) cities of the second class, of which there are 90; and (3) cities of the third class, of which there are 509, making a total of 618.<sup>31</sup> A community of 100 or more persons may initiate incorporation procedures by submitting a petition signed by the majority of voters to the county commissioners. After holding a public hearing, the commissioners determine whether to issue a proclamation of incorporation. To become a city of the second class, a city of the third class must attain a population of 2,000, although it may remain a city of the third class until its population reaches 5,000. A third class city may remain incorporated although its population falls below 100.

Once a city attains the designation of a city of the second class, it must reach a population of 15,000 before it may become a city of the first class. However, it may remain in the

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<sup>30</sup>Drury, op. cit., p. 4.

<sup>31</sup>Interview with the Director of Post-Audits of the State of Kansas, June 7, 1963.

second classification until reaching a population of 25,000; or, if its population becomes less than 2,000, it may drop to a lower classification. Once it becomes a city of the first class, there are no provisions for reverting to a lower classification.<sup>32</sup> The cities are permitted, required, or refused the right or obligation to take certain actions, according to their classification. It is not within the scope of this study to present the legislation which specifies these rights and obligations.

It is impossible to definitely determine a city's classification based upon population size alone, as examination of Figures 2, 3, and 4 reveals. The first class cities range in size from 9,296 people (Fort Scott) to 244,500 (Wichita). Wichita, Topeka, and Kansas City are much larger than the fourth largest city (Salina).

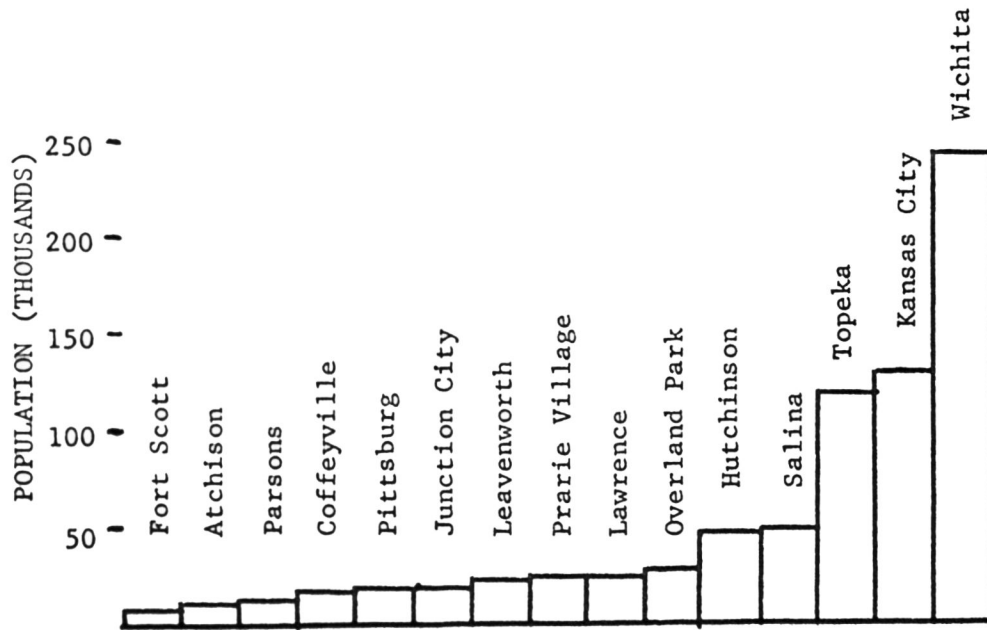
Most of the second class cities are found in the range of 685 (Mulberry) to 6,000 people. As is shown in Figure 3, eight are under the population size required for becoming a city of the second class. Almost three-fourths of the cities of the third class are in the population range of 34 to 600. Thirty-six are below the population required for initiating incorporation procedures. Two of these cities, Freeport and Wellsford, have only 34 people.<sup>33</sup>

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<sup>32</sup>Doris S. Pierce, Forms of City Government in Kansas, Citizen's Pamphlet Series No. 21, Governmental Research Center (Lawrence: University of Kansas, 1957), pp. 10-11.

<sup>33</sup>Kansas, Kansas State Board of Agriculture, Population of Kansas, March 1, 1960 (Topeka: Kansas State Board of Agriculture, 1960), pp. 2-5.

Figure 2  
Population of Kansas Cities of the First Class.<sup>a</sup>

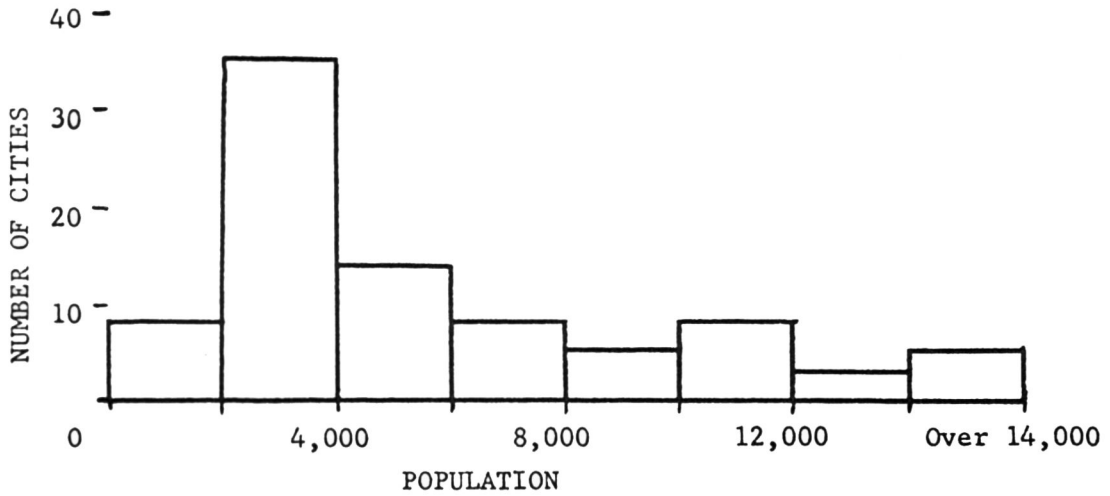


a. Calculated from Population of Kansas March 1, 1960.  
(Topeka: Kansas State Board of Agriculture, 1960). pp.2-5.



Figure 3

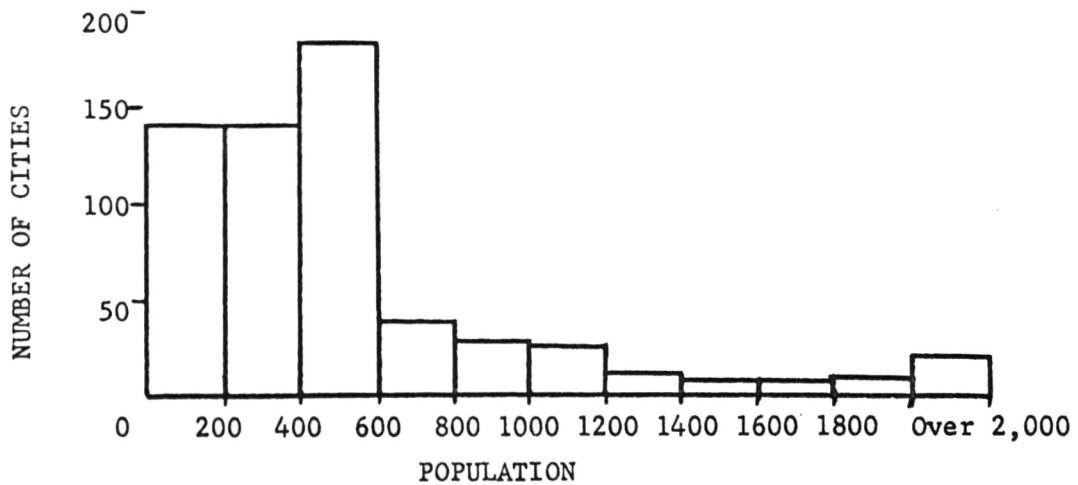
Population Distribution of Kansas Cities of the Second Class.<sup>a</sup>



a. Calculated from Population of Kansas March 1, 1960. (Topeka: Kansas State Board of Agriculture, 1960). pp.2-5.

Figure 4

Population Distribution of Kansas Cities of the Third Class.<sup>a</sup>



a. Calculated from Population of Kansas March 1, 1960. (Topeka: Kansas State Board of Agriculture, 1960). pp.2-5.

Obviously, such population differentials result in both different problems and in different opportunities. For example, Mulberry, with 685 people, cannot afford as adequate fire fighting equipment as Wichita, with 244,500 people. There are unique problems and opportunities associated with each population size and with each individual city.

Table 4 shows that cities in the upper population ranges have been gaining in population relative to those in the lower ranges, which have generally lost population. Among the cities of more than 1,000 people, a much larger percentage have gained than have lost, while in the 500-1,000 range almost as many have lost as have gained and in the cities of 500 or less, a much larger percentage has lost population.

In 1951, 65.2 per cent of the state population resided in cities as opposed to 72 per cent in 1961. The percentage of the state population residing in cities of over 10,000 people increased from 38.7 per cent to 45.4 per cent. Clearly, the national trend toward urbanization is operative in Kansas, with all its implications applying to Kansas cities.<sup>34</sup>

The cities which continue to lose population may find it difficult to maintain services and service levels, with a smaller scale of operation and a smaller tax base. The cities which continue to grow will be faced with financing extending services both intensively and extensively.

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<sup>34</sup>"Kansas Population Pattern Shifts," op. cit., pp. 530-531.

TABLE 4

POPULATION CHANGES FOR KANSAS CITIES BY POPULATION CLASS, 1951-61<sup>a</sup>

Population Class	No. in Class 1951	No. Losing and Gaining Population 1951-1961		Percent Losing and Gaining Population 1951-1961	
		<u>Lost</u>	<u>Gained</u>	<u>Lost</u>	<u>Gained</u>
Over 10,000	24	6	18	25.0	75.0
5,001 - 10,000	15	2	13	13.3	86.7
2,001 - 5,000	54	18	36	33.3	66.7
1,001 - 2,000	64	22	42	34.4	65.6
501 - 1,000	118	55	63	46.6	53.4
201 - 500	213	122	91	57.3	42.7
Under 200	<u>117</u>	<u>81</u>	<u>36</u>	<u>69.2</u>	<u>30.8</u>
Total	605	306	299	50.6	49.4

<sup>a</sup>Source: "Kansas Population Pattern Shifts," Kansas Government Journal, XLVII, No. 11 (November, 1961), 530.

## II. OBJECTIVES AND SCOPE OF STUDY

The review just presented of the present situation of the local governmental units of Kansas--especially the extreme number and, hence, the small size of these units--points up the question of the economic efficiency of the present structure. Therefore, the objectives of this study are to determine what, if any, economies of scale are obtainable in providing local public services and to make certain policy suggestions which may be justified from the analysis.

The specific types of units chosen for study are those discussed in the introduction: counties, townships, and cities of all three classes. School districts and special districts were not studied so as to restrict the scope of the analysis to within reasonable bounds. The special districts are so varied in nature and function that they would constitute a separate study of considerable scope. And Wright and Pine have examined some of the most important factors affecting the costs of school districts.<sup>35</sup>

In a period in which there is considerable speculation concerning the optimum size and level of government, in both an economic and a political sense, for the performance of certain

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<sup>35</sup>Willard A. Wright and Wilfred H. Pine, Costs of Rural High Schools in Central Kansas 1956-1957 (Manhattan: Kansas State University Agricultural Experiment Station, 1961), 23 pages.

public services, it seems expedient to study those units which are generalized in functions and which perform many of the same functions for their inhabitants. It is hoped that this study may be useful in determining the optimum structure of local government.

Accordingly, the overall hypothesis to be tested is that the per capita cost of providing local governmental services will decline as the size of the local unit of government increases. The size of the unit will be measured by whatever criterion seems applicable to the particular service. For most of the services, the criterion used is population size.

To restrict the scope of the analysis further, certain functions performed by local governments were excluded. The total cost of all governmental services was studied for each type of unit. The expenditure for general government (i.e., those costs which are basically administrative overhead) were also studied for each type of unit.

In the expenditure analysis of county governments, the additional expenditure categories of roads and bridges, welfare, and agricultural extension service were studied. In that of township governments, the only additional expenditure category included was roads and bridges. And, in that of the cities, the additional categories included were different for the different classes of cities.

For the first class cities the expenditure categories of streets and sewers, police protection, and fire protection were

added. Those categories studied among those of the second class cities were the same except that street expenditures were not included with sewer expenditures. Sewer expenditures were included for the cities of the first class only because the expenditures for these items were not separable in the accounting records. It is likely, however, that much the same correlation exists between sewer expenditures and population as exists between street expenditures and population, resulting in only an upward shift in the expenditure function. However, this does destroy comparability between cities of the first class and the cities of the other two classes.

Because many cities of the third class do not provide fire and police protection, and because those which did provide them did so at widely varying service levels, the expenditures of these cities for these two functions were not analyzed individually. The only expenditure category studied besides total expenditures and general government expenditures was streets and bridges.

### III. METHODOLOGY

#### Sampling Techniques

The statistical population for each type of unit studied was the total number of such units in Kansas. Kansas is an ideal laboratory for such a study because of the number of each type of unit studied, a wide range of population sizes existing for each type. No attempt was made to separate one area of the state from the other, although certain factors may affect expenditures to a limited degree in certain areas of the state and not in another. Any such tendencies will tend to be averaged, making such inferences as may be made applicable to the entire state.

Since there are only 105 counties, all of them were studied. However, they were separated into two groups: those with and those without county road unit systems. There are, as previously stated 57 in the former group and 48 in the latter one. Obviously, those counties which construct and maintain all local roads would be expected to have higher per capita road expenditures, on the average. This, in turn, would be reflected in the total expenditures and, to a certain extent, in the general government expenditures. Since the counties were separated into two groups for the analysis of these expenditure categories, they were also separated for the analysis of the remaining categories. There being only 15 cities of the first class, all of

these were likewise included. But for the other types of units, a sample was taken from among the entire statistical population, the individual units being numbered in alphabetical order and the sample observations being chosen by random numbers. Of the 87 cities of the second class then in existence, forty were chosen; and of the 512 cities of the third class, 50 were initially chosen, but records were not available for one of these, bringing the sample number to 49.<sup>36</sup>

The townships, like the counties, were divided into two groups: those in counties with and those in counties without road unit systems. A random sample of approximately 10 per cent of each group resulted in 85 observations from the former group and 71 from the latter group. Since road expenditures are the largest single category for those townships with road systems, one could not validly study the two groups together.

Any time that one of the units in the sample had no expenditures for a particular category or that complete information was not available, the observation was not replaced. For this reason, the sample number will be different for some expenditure categories than for others within the same group of units.

In obtaining a sample, no attempt was made to control the service level (i.e., the quality of the service). Therefore, in certain instances, it may become apparent that much of the variation in per capita expenditures results from this fact.

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<sup>36</sup>The number of cities of the second class is now 90, and the number of cities of the third class is 509.



Attempts will be made to keep this fact in mind and to point out such variation as appears to result from it.

Those who have attempted to measure service levels have not yet found a satisfactory method of doing so. Those proposed have usually been too costly and too complex to obtain wide use. Professors Schmandt and Stephens have attempted to construct an index for municipalities which measures each municipal function (e.g., police protection) by adding the number of subfunctions (e.g., patrolling, operating traffic lights, and criminal investigations) performed.<sup>37</sup> Its authors readily admit that such a measure is only a crude quantitative measure of municipal output as it provides no weights by which the quality of the subfunction may be measured or by which each subfunction may be assigned an appropriate value. Therefore, it results in equating "maintenance of a detective squad . . . with the furnishing of emergency ambulance service".<sup>38</sup>

After testing their index in the 19 cities and villages of Milwaukee County, Wisconsin, Professors Schmandt and Stephens conclude that this index does help to prevent variation in service level from obscuring any economies of scale which may exist. They feel, however, that further refinements are needed.<sup>39</sup>

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<sup>37</sup>Henry J. Schmandt and G. Ross Stephens, "Measuring Municipal Output," National Tax Journal, XIII, No. 4 (December, 1960), 369-375.

<sup>38</sup>Ibid., pp. 370-371.

<sup>39</sup>Ibid., p. 375.

Shapiro has applied an adapted version of the Schmandt-Stephens index to a study of Wisconsin counties. But his results were much less promising than the results obtained by its originators at the municipal level.<sup>40</sup>

So presently there exists no satisfactory method of handling the problem of service levels, even if control of service levels were included in the scope of this analysis. A first approximation to measuring economies of scale may be accomplished by ignoring service levels in the statistical analysis, although being aware of any appearances of variation in service levels while interpreting the results.

If a satisfactory index were developed, it would be interesting and helpful to apply it to local government in Kansas. Perhaps, a sample could then be taken from among those units of approximately equal service level, thus showing the exact relationship between per capita expenditures and the size of the unit.

#### Sources of Information

The source of information for the enumeration and sampling of governmental units for this study is the Directory of Kansas Public Officials for 1962, published by the League of Kansas Municipalities. This annual publication is in two parts. Part II, pages 21-56, has a listing of all Kansas counties and

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<sup>40</sup>Harvey Shapiro, "Measuring Local Government Output: A Comment," National Tax Journal, XIV, No. 4 (December, 1961), 394-397.

townships with certain information about each unit. Part I has a similar list of Kansas cities on pages 1-86.

The source of expenditure data is the compilation of annual budgets for each type of governmental unit in Kansas by the Department of Post-Audits of the State Auditor Office. Within these budgets are listed the expenditures of each governmental unit with varying degrees of detail.

To eliminate part of the problem of annual variation in expenditures and thereby obtain a more nearly normal expenditure figure for each unit, a three-year average was used. The study centers upon the fiscal year 1960. Averaged with 1960 expenditures were the expenditures for 1959 and the expected expenditures for 1961. Since the budget for fiscal year 1962 was submitted prior to the expiration of fiscal year 1961, this was necessary to make the analysis more current. Little was sacrificed in the accuracy of this year's expenditures as the expected expenditures figure submitted in one year's budget is always very close to the actual expenditure figure announced in the next year's budget.

Thus, 1959 expenditures were taken from the 1961 budgets, and the expenditures for 1960 and 1961 are from the 1962 budgets. In certain instances, some expenditure items were subtracted from the total reported so as to obtain comparability between units. This was done systematically by detailed analysis of the items under each expenditure category. For example, certain counties maintain a sinking fund for the replacement of road

machinery. Double counting would result if both the initial transfer to the fund and the purchase of machinery from the fund were counted as expenditures. In this case, only the purchase of equipment was counted.

Since the expenditure analysis centers on the year 1960, population enumerations for that year were used, also. There were only minor variations for individual units over the three-year period, the 1960 enumeration being near the average for the period. Bureau of the Census data was available for the same year, but for convenience of reference, the mimeographed publication, Population of Kansas March 1, 1960, of the Kansas State Board of Agriculture was used. There do not seem to be any significant differences between the two sources, and time was saved by using this source since a personal copy was obtained, making copying of the Bureau of Census data unnecessary. The Board obtains its census from an enumeration made by the county assessor in each county.

The number of farms by county, used in the analysis of expenditures for agricultural extension services, was obtained from Farm Facts 1961-62, pages 14 and 15. This enumeration was made by the Statistical Division of the Kansas State Board of Agriculture cooperating with the Agricultural Marketing Service of the United States Department of Agriculture. The enumeration was made in 1959 and published by the State Board in this publication.

The number of recipients of welfare aid per county, used

in the analysis of welfare expenditures, was obtained from the State Board of Welfare. This information is prepared monthly by the Board's Division of Research and Statistics. There seemed to be little accuracy gained from averaging these figures over the three-year period, so the monthly report for June, 1960, the mid-point of the period, was used.

### Methods of Analysis

Since the basic objective of this analysis is to determine the economies of scale obtainable for the local government of Kansas, a correlation and regression analysis was performed, relating the expenditures in each category to some measure of the size of unit, depending on the particular expenditure category.

First a simple correlation and regression analysis was tried. Then a multiple correlation and regression analysis was attempted. However, only one independent variable was used in any case, the multiple correlation and regression analysis being used to obtain a curvilinear regression equation where necessary to obtain a better fit. The second regression term, then, was only the square of the single independent variable.

Thus, the mathematical model varies from the linear equation

$$Y_T = a + b_1X$$

where  $Y_T$  represents the total expenditure of the unit for any expenditure category,  $a$  represents the fixed cost,  $b_1$  is the variable cost, and  $X$  is the independent variable, always some

measure of the size of the unit, to the quadratic equation

$$Y_T = a + b_1X + b_2X^2$$

where  $b_2$  the only new term becomes a part of the marginal cost,  $b_1 + b_2X$ . In the quadratic equation,  $b_2$  either is a positive or a negative addition to marginal cost, tending to make the curve either turn up or down as the size of the unit increases.

Since both the linear and the quadratic forms of equations were obtained, the quadratic form was generally used. The quadratic form generally was used, even where the  $b_2$  term was not statistically significant, if it produced a better fit, which it often tended to do in the upper size ranges. But the linear form is sometimes used, when it seems reasonable for reasons which will be given in the expenditure analysis.

Figure 5 shows the closeness of fit of one particular total expenditure function. This is one of the cases in which population is not the criterion of size. Since welfare expenditures are comprised largely of direct payments to aid recipients, it seems obvious that they should be more closely related to the number of recipients. Therefore, the number of recipients was used as the independent variable for this function. An attempt to correlate welfare expenditures with population produced a considerably smaller correlation coefficient (.81), indicating that the argument was valid.

The fixed cost as determined by this analysis is \$35,399 and the marginal cost is  $(739.68 - .02588X)$  dollars. The next step, since we are primarily interested in how per capita cost

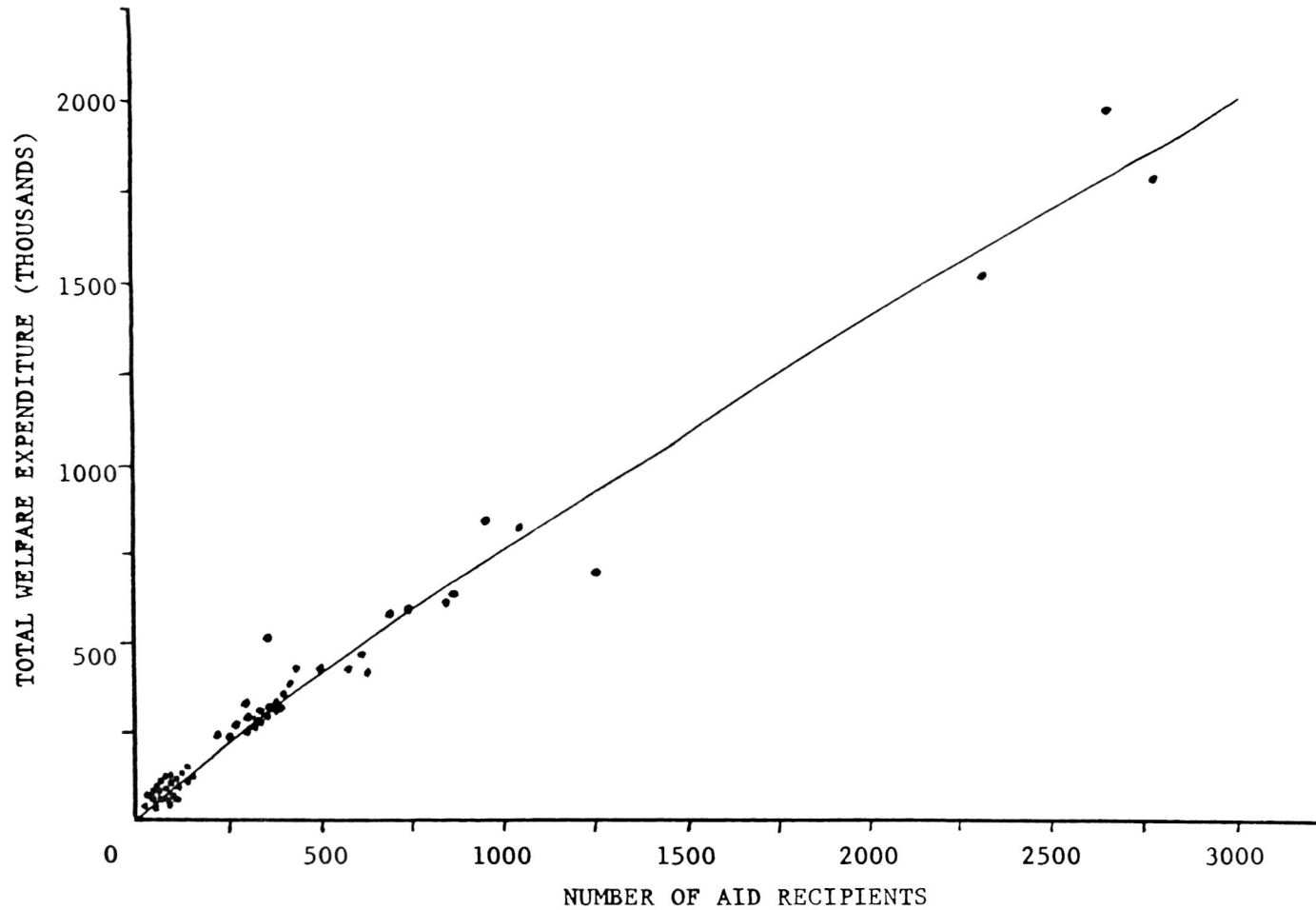


Figure 5. Total welfare expenditure in relation to number of aid recipients for Kansas counties without road unit systems, 1959-61 average ( $R^2 = .99$ ).

$$\begin{aligned}
 Y_T &= 35,398.52 + 739.68415X - .02588X^2 \\
 (s_{y \cdot x} = 57,666.10) & \quad (s_{b_1} = 41.0, t_1 = 18.039) \quad (s_{b_2} = .0160, t_2 = -1.617)
 \end{aligned}$$

behaves as size of the unit increases, is to determine the average or per capita expenditure curve and plot it against the scatter diagram of observed per capita costs. This is determined by dividing the total expenditure function by different values of the independent variable throughout the observed range.

Thus, the method of this study is to develop the total cost equation by correlation and regression analysis, and then to accept this equation with whatever statistical and mathematical properties it may possess as the basis of calculating the average cost equation. Obviously, the correlation coefficients and the standard errors of the total cost equations are not applicable to the per capita cost equation. Therefore, for the per capita expenditure analysis, only the regression equations are of direct interest, although the higher the correlation coefficients and the lower the standard errors, the more readily the total cost equation can be accepted and the per capita cost equation derived from it.

Had this study been less comprehensive, a more detailed study of the individual units which have the greatest deviation from regression would have been in order. Perhaps, more attention could then have been given to service levels for explanatory purposes, although, as we have seen, no satisfactory method of handling the problem of service levels within the framework of the correlation and regression analysis. However, the comprehensiveness of this study is justified by the lack of knowledge of the economies of scale obtainable in Kansas local government



and the need for such knowledge as a policy guide.

Several scholars have despaired because of inability to obtain a significant correlation between per capita expenditures and population size of certain local governments. Hawley concludes from a study of 76 central cities that per capita costs of these governments are more closely related to population of the outlying urban areas ( $r = .55$ ) than to the population of the city itself ( $r = .40$ ). In addition, he found that both population density and housing density were more closely related to per capita expenditures than was population per se, and that population appeared to be of importance only when other variables are omitted.<sup>41</sup>

Brazer made the most comprehensive survey of city governments, studying the 462 American cities of 25,000 people or more. He found the association between population and per capita expenditures to be statistically significant only for police protection when other variables (density of population, median family income, intergovernmental revenue per capita, etc.) are considered. Density of population was found to be a significant determinant of the level of expenditures for all categories considered except recreation.<sup>42</sup>

Scott and Feder, in a study of 192 California cities of

<sup>41</sup>Amos H. Hawley, "Metropolitan Population and Municipal Government Expenditures in Central Cities," Journal of Social Issues, VII, Nos. 1 and 2 (1951), 100-108.

<sup>42</sup>Harvey E. Brazer, City Expenditures in the United States, Occasional Paper 66 (New York: National Bureau of Economic Research, Inc., 1959), 82 pages.

2,500 or more population, found significant regression coefficients for property valuations, retail sales per capita, rate of population growth from 1940 to 1950, and median number of persons per occupied dwelling unit, but found those for population size and density not to be significantly different from zero.<sup>43</sup>

Hirsch has asserted that the net relationships between per capita expenditures and population found in these studies might have been different had they included service level as a dependent variable. He attempted to do this in a survey of 149 governmental units in the St. Louis metropolitan area by constructing an index of service levels which used such items as training and experience of personnel, amount and kind of equipment, ratio of personnel to population, and subjective ratings by experts. But his results generally confirmed those which had already found per capita expenditure to be little affected by population size, regardless of service levels.<sup>44</sup>

Schmandt and Stephens used the index of service levels mentioned previously to test the hypothesis that population size is unrelated to per capita municipal expenditures even when considering service levels.<sup>45</sup> This index is much simpler and less costly to use than that employed by Hirsch. They found high rank

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<sup>43</sup>Stanley Scott and Edward L. Feder, Factors Associated with Variations in Municipal Expenditure Levels (Bureau of Public Administration, University of California, 1957).

<sup>44</sup>Werner Z. Hirsch, "Expenditure Implications of Metropolitan Growth and Consolidation," Review of Economics and Statistics, XLI, No. 3 (August, 1959), 232-241.

<sup>45</sup>Schmandt and Stephens, op. cit., pp. 369-375.

correlations between the number of subfunctions performed (the basis of their index of service level), age of municipality, and total expenditures per capits, indicating that their index had some validity and usability. They concluded that there was a "distinct possibility that economies of scale exist for at least some municipal functions when service level are considered".<sup>46</sup>

Shapiro applied an adaptation of the Schmandt-Stephens index to an analysis of county expenditures in Wisconsin, but the results were considerably weaker than those obtained by Schmandt and Stephens when applying the index to municipal expenditures. He did find the number of activities (the criterion of service levels) to be significantly and positively related to population size and area.<sup>47</sup>

In a later analysis, using the 1957 Census of Governments as a source of data, Shapiro analyzed county expenditures for all counties in the nation. This study showed that counties within the smallest and largest population classes in the different states tend to have the highest per capita expenditures. Table 5 is a frequency distribution of the states with their highest and lowest total expenditures per capita according to population size class. This study, although indicating economies of scale, did not consider service levels.<sup>48</sup>

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<sup>46</sup>Ibid., p. 375.

<sup>47</sup>Shapiro, op. cit., pp. 394-397.

<sup>48</sup>Harvey Shapiro, "Economies of Scale and Local Government Finance," Land Economics, XXXIX, No. 2 (May, 1963), 175-186.

TABLE 5

FREQUENCY DISTRIBUTIONS OF STATES WITH HIGHEST AND LOWEST PER  
CAPITA COUNTY GOVERNMENT EXPENDITURES IN DIFFERENT  
POPULATION SIZE GROUPS<sup>a</sup>

County Population Size Group	Highest	Lowest
Less than 5,000	20	1
5,000 to 9,999	7	1
10,000 to 14,999	2	3
15,000 to 19,999	3	4
20,000 to 24,999	1	8
25,000 to 49,999	2	7
50,000 to 99,999	0	15
100,000 to 249,999	3	9
More than 250,000	10	0
Total	48	48

<sup>a</sup>Source: Harvey Shapiro, "Economies of Scale and Local Government Finance," Land Economics, XXXIX, No. 2 (May, 1963), 176.

So although some studies have been able to find conclusive evidence of correlation between population size and per capita expenditures, this is perhaps due in part to their lack of considering service levels. At least one municipal expenditure study has concluded that when service levels are considered there is a distinct possibility of economies of scale. And, in addition to the latter analysis of Shapiro and one by Wessel in Iowa,<sup>49</sup> there appear to be significant economies of scale in county government. This study will attempt to relate per capita expenditures to certain measures of size (usually population) for Kansas cities, counties, and townships.

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<sup>49</sup>Robert I. Wessel, Iowa Rural Government Since 1900. (Ames, Iowa: Agricultural Extension Service Special Report No. 32, April, 1963), p. 27.

#### IV. EXPENDITURE ANALYSIS

##### Counties

Expenditures of Kansas' 105 counties have increased from nearly \$81 million in 1950 to an expected \$146 million in 1962. The percentage distribution is as follows: welfare, 40.7; roads and bridges, 29.6; general operation, 16.3; debit service, 3.7; and other, 9.7.<sup>50</sup> Obviously, it is worthwhile to examine the possibility of economies of scale, whether any possible economies are used to reduce taxes or to increase the quality and quantity of service.

##### Total Expenditures

A study by Wessel of Iowa counties has shown by regression analysis that as the county population increases from approximately 7,000 to 100,000, the per capita cost of government tends to decrease from \$70 to \$25. The study also shows that the cost differential between these extremes of size has increased considerably from 1920 to 1959. By dividing the counties into groups according to the population trend of the previous 60 years, the study further shows that the counties experiencing the greatest losses have also experienced the greatest increases in

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<sup>50</sup>Wilfred H. Pine, "Public Services and Finance Situation." State and Local Public Finance in Kansas, (Topeka: Citizens Advisory Committee, 1963), p. 16.

per capita costs. There was about a \$60 differential between the counties with the greatest gain and those with the greatest loss.<sup>51</sup>

Table 6 summarizes the findings for the four groups of counties grouped by population trend. Group A includes the seven counties which grew rapidly and which are metropolitan in nature. Group B contains 11 counties which grew steadily and which have a large urban population. Group C contains 62 counties for which the population remained constant or declined slightly. Finally, Group D contains 19 counties which lost population steadily.<sup>52</sup> Wessel explains this by the fact that service levels which have been developed over time tend to be maintained and new services to be added in most counties. As the population declines, this obviously results in higher per capita costs.<sup>53</sup>

Shapiro has shown that there is a tendency for the counties with the smallest population and the largest populations in their states to have among the highest per capita expenditures in their respective states. He explains this by saying that the larger units offer more urban-type services at higher service levels, while the smallest units experience diseconomies of scale resulting in not only higher costs but fewer services at

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<sup>51</sup>Wessel, Iowa Rural Government Since 1900, op. cit., p. 27.

<sup>52</sup>Ibid., p. 4.

<sup>53</sup>Ibid., p. 27.

TABLE 6

PER CAPITA EXPENDITURES OF IOWA COUNTIES, 1920 TO 1959,  
GROUPED ACCORDING TO POPULATION CHANGE.<sup>a</sup>

Group	1920	1930	1940	1950	1960
A	\$ 8.60	\$17.50	\$14.53	\$19.72	\$30.52
B	12.07	21.44	14.66	25.90	37.96
C	14.76	33.66	19.40	43.41	66.93
D	15.03	34.30	21.51	56.92	91.05

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<sup>a</sup>Source: Robert I. Wessel, Iowa Rural Government Since 1900 (Ames, Iowa: Agricultural Extension Service Special Report No. 32, April, 1963).



lower service levels.<sup>54</sup>

The 57 Kansas counties with road unit systems have an average population of 10,310 and an average total expenditure of \$975,000. The per capita expenditure curve for all services is shown in Figure 6. The regression equation for total expenditures from which this per capita expenditure curve was derived and the statistical properties of the curve is shown in Table 7, as are those for all county expenditure categories analyzed. The per capita curve shows that per capita expenditures tend to decrease from \$158 to \$56 as the county population increased from 2,000 to 50,000. Obviously, there is considerable variation between counties of the same population, but the general tendency is clearly toward decreasing costs.

According to the constant term in Table 7, the annual fixed cost for counties with road unit systems is almost \$140,000. Actually, the smallest total expenditure for any county was \$312,000. This was Wallace County which has the smallest population, 2,141. Some costs are obviously of a fixed nature in all expenditure categories, and these tend to make per capita costs high in the small counties. Some of these items will be brought out in dealing with individual expenditure categories.

The per capita regression equation for counties without road unit systems is not presented graphically, but it is easily

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<sup>54</sup>Shapiro, "Economies of Scale and Local Government Finance," loc. cit.

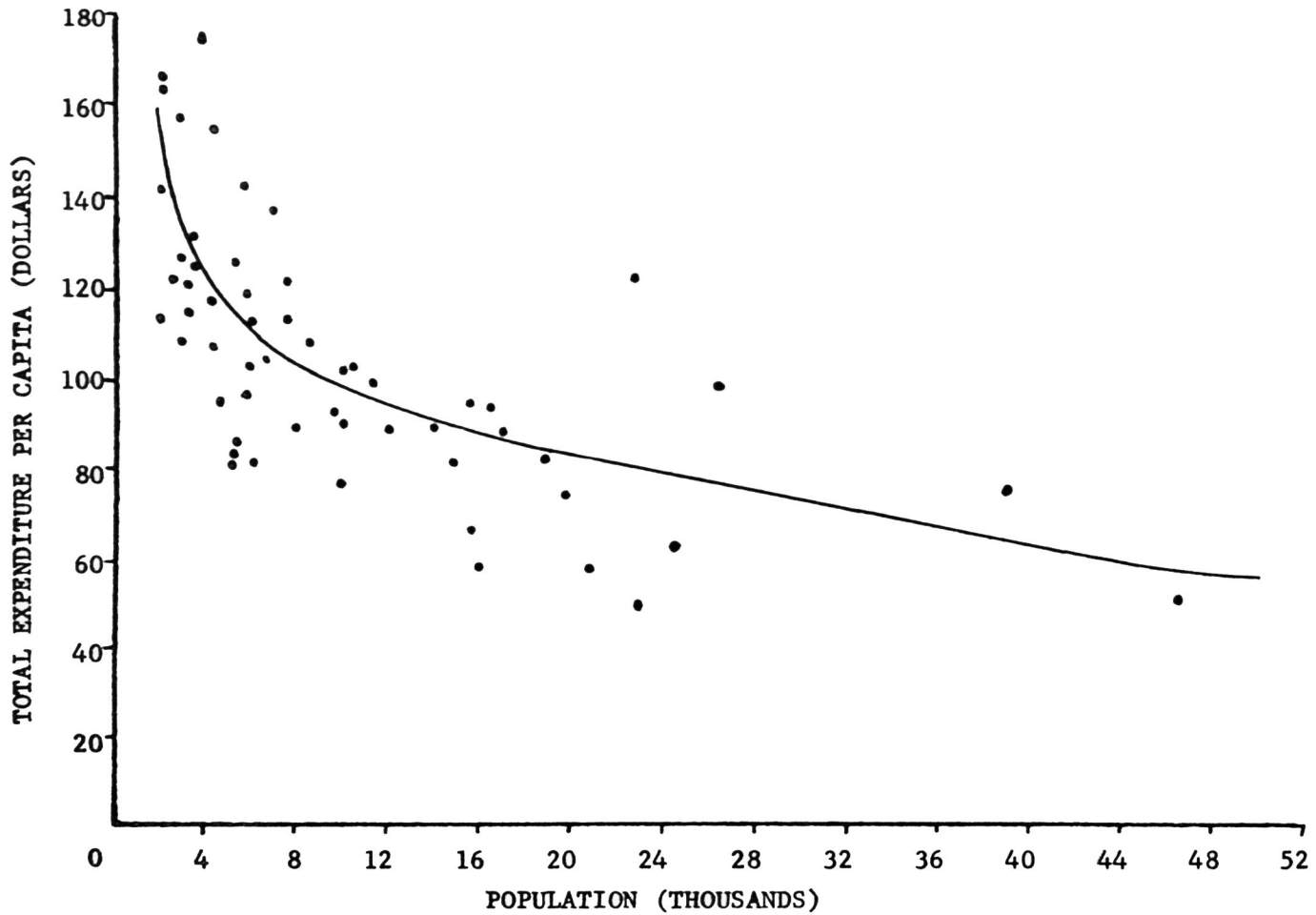


Figure 6 . Total expenditure per capita in relation to population for Kansas counties with road unit systems, 1959-61 average.

$$(Y = 89.61 + \frac{139,577}{X} - .000730475X)$$

TABLE 7

RESULTS OF CORRELATION AND REGRESSION ANALYSIS OF TOTAL EXPENDITURES FOR ALL SERVICES COMBINED, GENERAL GOVERNMENT, AND ROADS AND BRIDGES AS RELATED TO POPULATION; FOR WELFARE AS RELATED TO THE NUMBER OF AID RECIPIENTS; AND FOR AGRICULTURAL EXTENSION AS RELATED TO THE NUMBER OF FARMS FOR KANSAS COUNTIES.<sup>a</sup>

	Constant Term (a)	$b_1$	$s_{b_1}$	$t_1$	$b_2$	$s_{b_2}$	$t_2$	$s_{y \cdot x}$	$r^2$ (or $r^2$ )
Counties with road unit systems									
Total Exps.	139,577	89.61	10.42	8.60	-.00730	.00026	2.84	245,463	.85
Gen. Govt. Exp.	55,379	5.99	2.45	2.44				23,609	.84
Road and Bridge Exps.	117,279	16.66	3.36	4.95	-.00011	.00008	-1.33	79,269	.68
Welfare Exps.	35,399	739.68	41.00	18.04	-.02588	.01600	-1.62	57,666	.98
Agricultural Extension Exps.	13,018	-.27	4.66	-.06	.00253	.00249	1.02	3,249	.27
Counties without road unit systems									
Total Exps.	726,560	16.37	3.86	4.24	.00010	.00001	8.15	488,855	.97
Gen. Govt. Exps.	25,748	7.42	1.17	6.34				45,625	.98
Road and Bridge Exps.	215,663	.92	.92	1.00	.00001	.00000	5.66	117,439	.90
Welfare Exps.	111,307	635.11	35.62	17.83	.00170	.00335	.51	142,975	.99
Agricultural Extension Exps.	20,063	-12.88	14.14	-.91	.01019	.00547	1.86	8,581	.37

<sup>a</sup>Sources: Expenditure data are from county budgets in the Department of Post-Audits of the State Auditor's Office. Population data are from Population of Kansas, March 1, 1960 (Topeka: Kansas State Board of Agriculture, 1960), p. 1. The number of welfare recipients by county is from State Board of Social Welfare. The number of farms is from Farm Facts 1961-62, (Topeka: Kansas State Board of Agriculture, 1962), pp. 14-15.

obtained by dividing the total cost equation in Table 7 for these counties by X. Thus it is:

$$Y = 16.37 + \frac{726,560}{X} + .00010X$$

Per capita costs, as estimated by this equation, decline from almost \$200 for counties with a population of 4,000 to \$34 for counties with a population of 100,000. Then, although the number of observations beyond this point is insufficient to warrant unqualified assertions, the tendency shown is toward an increase to \$52 for counties with a population of 330,000. This finding concurs with Hirsch's conclusion that "economic efficiency may be greatest in medium-sized communities of 50,000 to 100,000 residents."<sup>55</sup> The counties of more than 100,000 inhabitants contain the three largest cities and, therefore, tend to perform more urban-type services at a higher level of service for their citizens.

#### General Government Expenditures

The category of general government comprises mainly the traditional administrative function of county government. It includes salaries of county officers, deputy officers, clerks, custodians, maintenance workers for county buildings, and travel expenses of county officers. It further includes office furniture and equipment, office and other supplies, utilities, insurance, building repairs, and such miscellaneous items as jail expenses, election expense, legal fees, etc. They are the cost

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<sup>55</sup>Hirsch, op. cit., p. 140.

items which anyone familiar with his county courthouse is most familiar with.

Most of the traditional county officers are required explicitly or implicitly by the state. The Kansas Constitution requires explicitly the offices of superintendent of public instruction, clerk of the district court, and probate judge. By indirection, it envisions the offices of sheriff and county treasurer by stating limitations on successive terms of office. Somewhat by implication, it provides for a county clerk by providing that the "clerks of the board of canvassers of the several counties" shall have certain duties.

The Kansas legislature may provide for such county officers as may be necessary, and it has provided for the elective offices of county attorney, register of deeds, coroner, county assessor, and in some instances a county assessor. The Constitution requires a three-man board of county commissioners, which is required to meet a certain number of times annually, depending on the county population. The county commissioners may, then, appoint such officers as a weed supervisor, a welfare director, a health officer, and a county engineer.<sup>56</sup> The salaries of most of the county officers is fixed by statute as a function of the county population. See Appendix VII for the salary scales of these officers.

An examination of the cost items other than salaries reveals several other obvious costs that are fixed such as items

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<sup>56</sup>Cape, op. cit., pp. 15-18.

relating to county building, furniture, and equipment. Besides the spreading of these costs, other possible economies of scale would include specialization of workers, centralized purchasing of supplies in larger volumes, attraction of more efficient workers, etc. Many counties use obsolete office equipment and procedures, while if they were larger they could incorporate modern machine methods. Without county consolidation such changes can be accomplished only to a limited degree by consolidating offices or by adopting the county-manager form of government (which would usually require legislative action or a constitutional amendment). Then, most of the counties would still be too small to allow efficient use of modern machine methods.

The average county operating under the road unit plan spends almost \$120,000 for general government, while the average county not under the plan spends over \$260,000. This difference is accounted for primarily by the difference in the average population of the counties in these groups--10,310 for the former, and 32,056 for the latter.

The per capita general government expenditure function of the counties with road unit systems is shown in Figure 7. An obvious tendency toward economies of scale is shown here despite variation around the regression curve. Per capita expenditures tend to decrease from almost \$34 for counties with 2,000 people to \$7 for those with 50,000. However, little decrease in costs is shown beyond a population of 20,000, the per capita cost at that point being \$8.75. The predicted fixed cost is shown to be

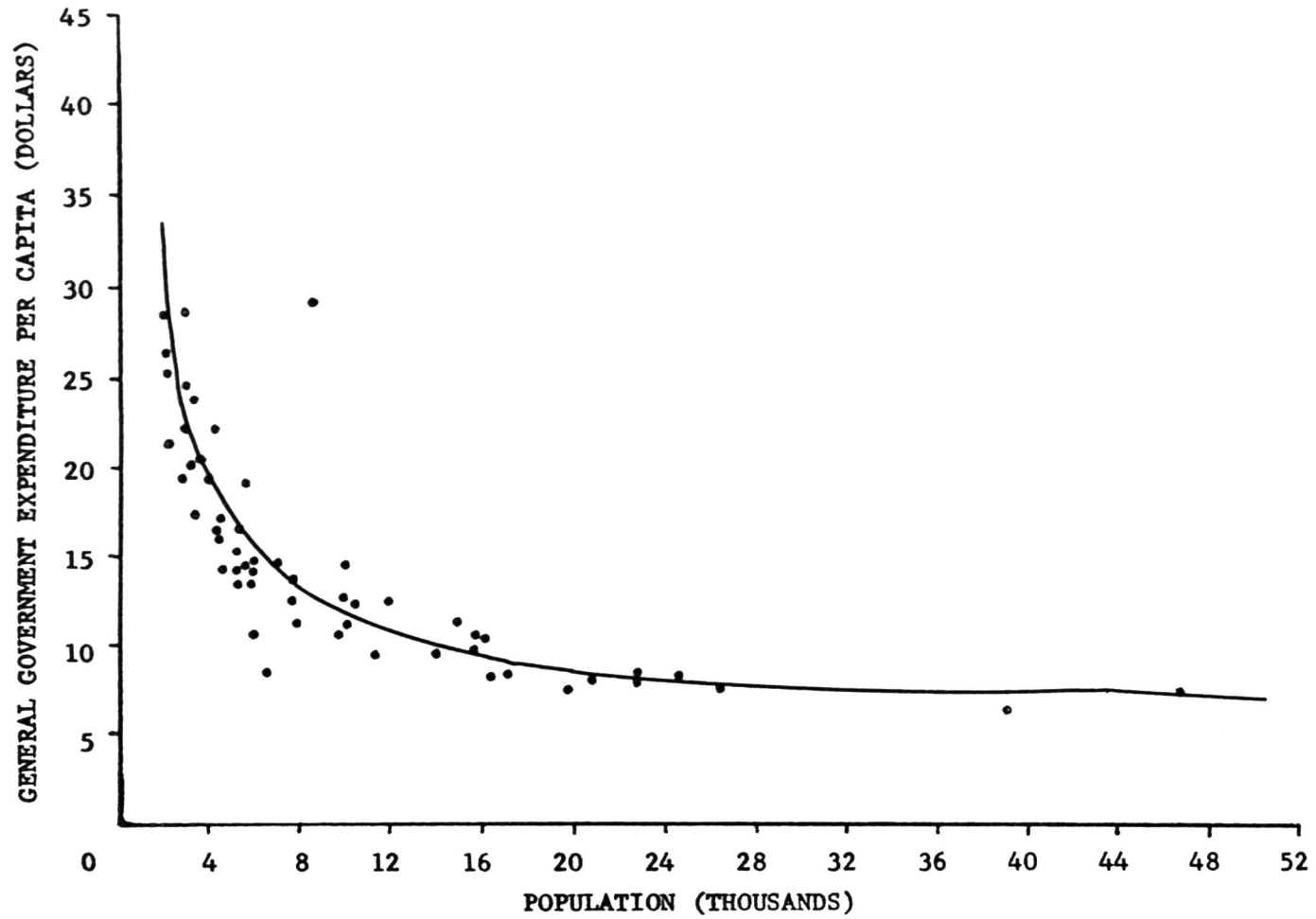


Figure 7. General government expenditure per capita in relation to population for Kansas counties with road unit systems, 1959-61 average.

$$(Y = 5.99 + \frac{55,379}{X})$$

over \$55,000, annually, in Table 7. A very low  $t_2$  value for the quadratic model and the obvious closeness of fit of the simpler linear equation justify use of the linear model in this case.

The comparable function for the counties without road unit systems is:

$$Y = 7.24 + \frac{25,750}{X}$$

Thus, the estimated fixed cost is \$25,750. The per capita cost tends to be lower for comparably sized units in this group of counties, as it decreases from \$14 for counties with a population of 4,000 to \$7.50 for counties with a population of 330,000. However, there is scarcely a difference of \$1.25 in the per capita costs of a county with 20,000 and a county with 330,000 inhabitants, although the total saving is still very great.

#### Road and Bridge Expenditures

Krausz and Swanson found, in an Illinois study, that road costs per mile decrease as the mileage maintained by the road unit increases, but at a decreasing rate. By multiple correlation and regression analysis which included as independent variables the highway mileage by type (i.e., concrete, bituminous, gravel, earth, etc.) and assessed valuation, they were able to explain 36 to 86 per cent of the variation in maintenance costs of road units.

They were also able to explain 49 to 96 per cent of the variation in construction costs by using as independent variables



length of project, width of surface, and depth of surface.<sup>57</sup> This study did not attempt to determine the relationship between population and road expenditures per capita, but it seems likely that road mileage and population are rather closely correlated, although quality does vary considerably between units.

The average county with the road unit system maintained a total road mileage of 1,032 miles as opposed to 281 miles maintained by the average county without the road unit system. The total mileage of the two groups is roughly 61,000 and 13,500 respectively.<sup>58</sup> The average county in the former group spent almost \$270,000 for roads and bridges, and the average county in the latter group spent over 320,000. The average figure of the latter group is increased considerably by the presence of the three largest counties, making the average somewhat misleading. The larger populations of this group of counties would be expected to increase the usage and, hence, the maintenance cost of roads.

The per capita expenditure function for roads and bridges of the counties with road unit system is shown in Figure 8. This figure shows a definite tendency toward economies of scale, although there is a considerable amount of the variation that is

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<sup>57</sup> Krausz, N. G. P. and Swanson, Earl R., An Analysis of Local Road Unit Costs in Illinois (Urbana: University of Illinois Agricultural Experiment Station, 1957), 23 pages.

<sup>58</sup> Calculated by adding together the road mileage of all the counties as reported in the Directory of Kansas Public Officials, (Topeka: League of Kansas Municipalities, 1962), Part II, pp. 21-56.

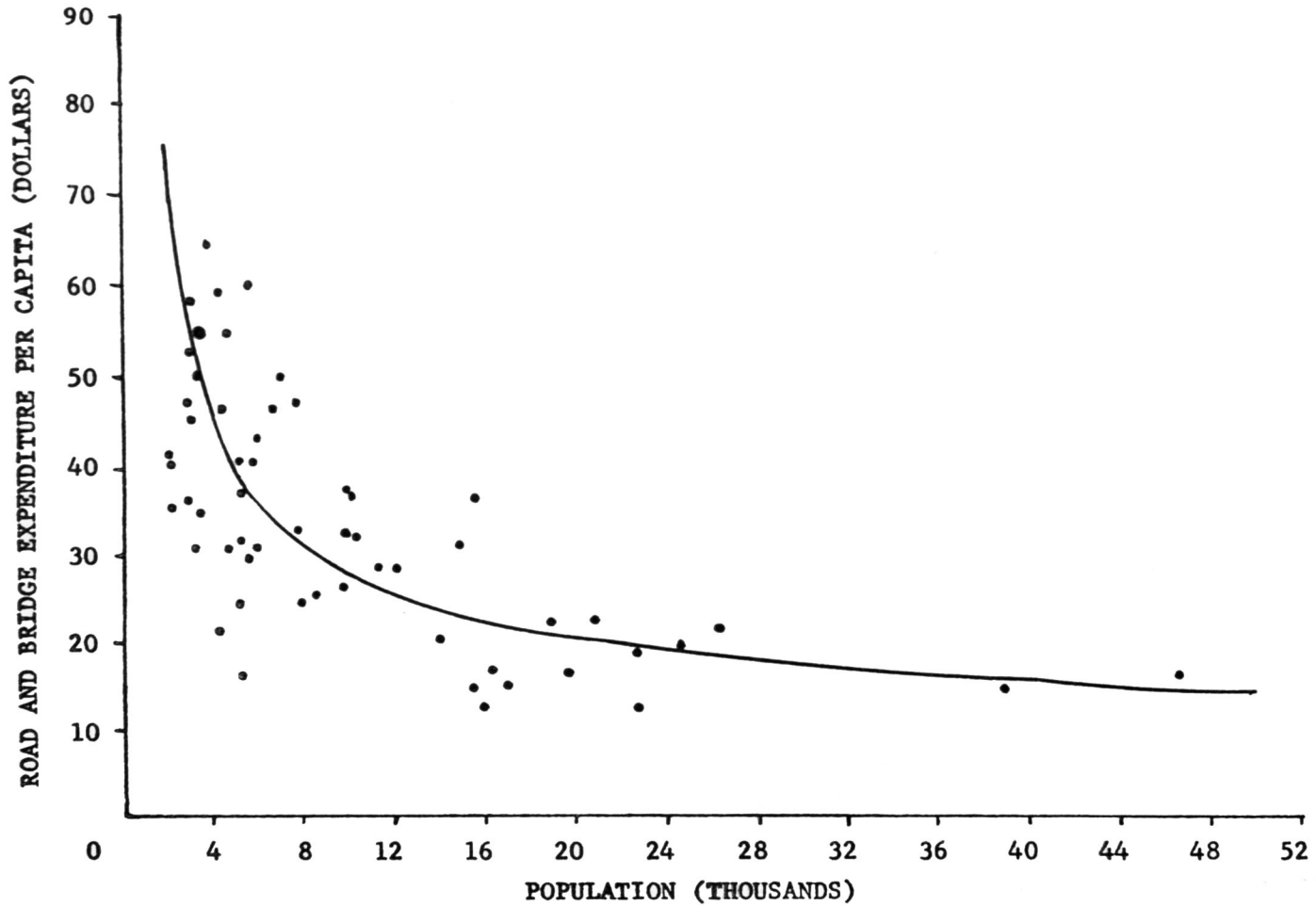


Figure 8. Road and bridge expenditure per capita in relation to population for Kansas counties with road unit systems, 1959-61 average.

$$(Y = 16.66290 + \frac{117,278.53}{X} - .0011X)$$

not accounted for by population. Indeed, some of this is caused by differences in the quality of the roads, differences in rainfall, and differences in use by non-inhabitants. There appears to be less variation in the higher population ranges which is perhaps due, in part, to greater uniformity of quality. Roads used heavily require a certain minimum of quality.

Figure 8 shows a predicted decrease in per capita expenditures from \$75 for counties with a population of 2,000 to under \$14 for counties with a population of 50,000, most of the economies occurring before a population of 20,000 is reached. The comparable function for the counties without road unit systems is:

$$Y = .92 + \frac{215,663}{X} + .00001X$$

The per capita expenditures of these counties tend to be less, expectedly, showing a decrease from \$55 for counties with a population of 4,000 to \$3.90 for counties with a population of 175,000, and then increasing to almost \$5.00 for counties with a population of 330,000. Although there are perhaps several diseconomies of scale, one possibility is higher labor costs in population concentrations. Other suggested causes are increased quality and heavier use by non-inhabitants.

The estimated fixed costs for the two groups is \$118,000 for counties under the road unit plan and \$216,000 for the other counties. Much of the fixed cost for a road unit is the cost of machinery. Since road equipment is specialized, certain equipment is necessary for any size of road unit. Large road units can purchase more efficient and more specialized equipment and

use it at capacity and maintain it more efficiently. In addition to these economies, larger units can obtain economies from volume purchasing, specialization of labor, and more efficient administrative procedures.

### Welfare Expenditures

The hypothesis to be tested in the welfare expenditure analysis is that welfare expenditures per welfare recipient will decline as the number of recipients per county increases. This seemed necessary in that, since the number of welfare recipients is, at least, imperfectly correlated with population, the number of welfare recipients seems a better measure of the size of the administrative unit. Only the number of persons receiving aid in the population determines welfare expenditures. The proportion that recipients bear to the population is dependent on local economic conditions and the proportion of the elderly in the population, which vary considerably, etc. There are four categories of welfare aid: old age assistance, aid to dependent children, aid to the blind, and aid to the disabled. The first two categories account for the bulk of the expenditures.

Three levels of government finance the Kansas social welfare program: the federal government, the state, and the county. In 1957, 47 per cent of the revenues expended came from the federal government, 31 per cent from the state, and 22 per cent

from the counties.<sup>59</sup> The average county with the road unit system had 431 persons receiving aid for a total amount of over \$340,000, while the average county without the road unit system had 861 persons receiving a total of \$665,000.

The curve relating expenditure per recipient to the number of recipients for counties without road unit systems is shown in Figure 9. Obviously, there are economies of scale as the administrative unit increases in size from 100 to 2,000 recipients, as the predicted per capita cost decreases from almost \$1740 to \$690. Beyond this point, little decrease in expenditures occurs, the per capita expenditure being \$665 for counties with 12,000 recipients. But it may be seen from inspecting Figure 9, that only three counties have more than 2,000 recipients. Thus almost all counties appear to operate on an uneconomic scale.

The function developed for the counties with road unit systems ( $Y = 739.68 + \frac{35,399}{X} - .02588X$ ), which is not shown graphically, shows a decrease in expenditures per recipient from \$2,500 to \$675 as the number of recipients increases from 20 (Stanton county had only 13) to 3,000. It, too, shows that most economies occur before the number of recipients reaches 2,000.

Obviously, much of the decrease in per capita expenditures is produced by the spreading of fixed costs. A welfare director and certain equipment is essential irrespective of the number of

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<sup>59</sup>John D. Bradley, "Social Welfare Services in Kansas," Your Government, XIII, No. 9 (June 15, 1958), 1-3.

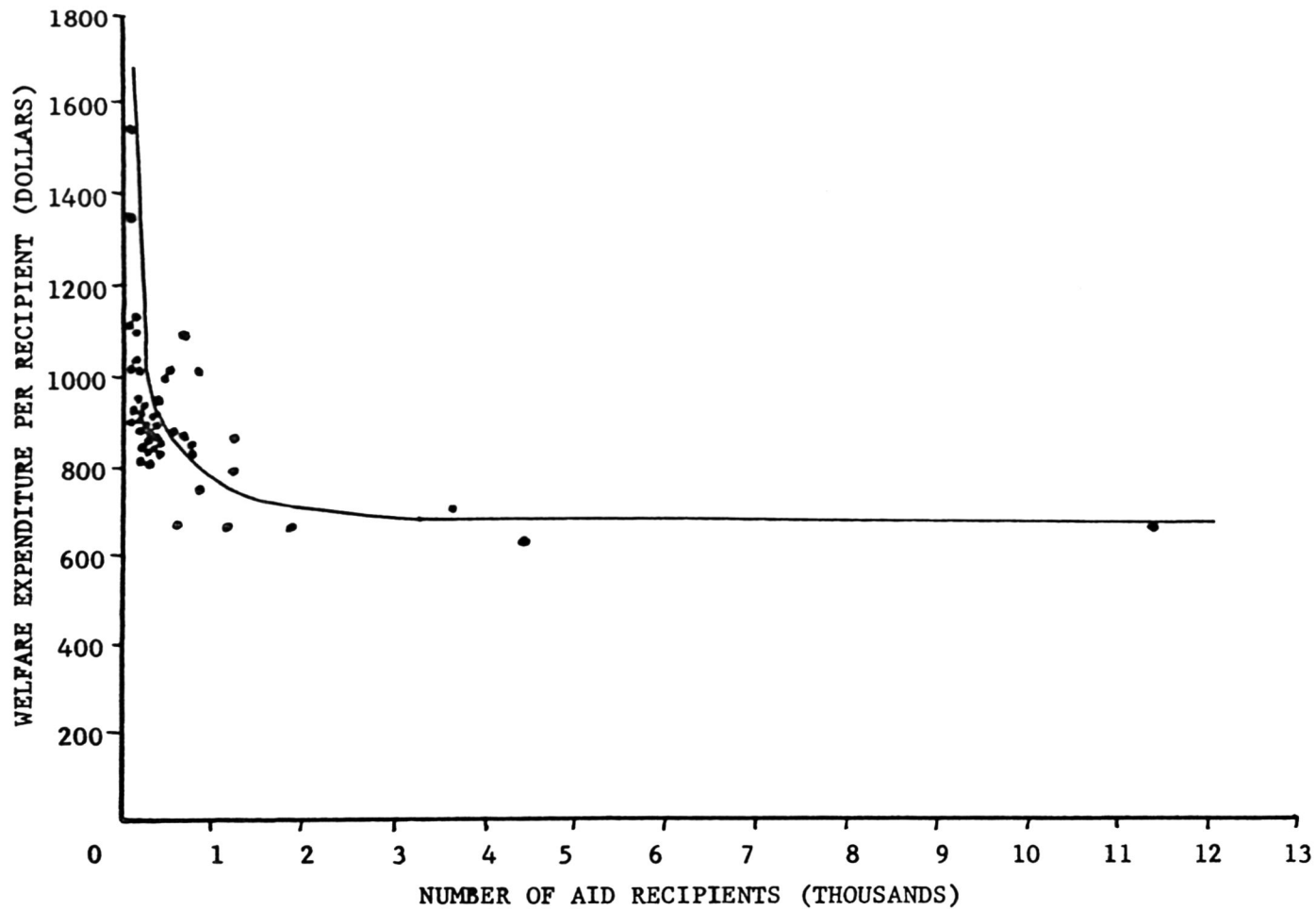


Figure 9. Welfare expenditure per recipient in relation to the number of aid recipients in Kansas Counties without road unit systems, 1959-61 average.

$$(Y = 635.11 + \frac{111,307}{X} + .00170X)$$

recipients served. As most of the expenditures are costs of administration, most of the economies are administrative savings. The estimated fixed cost of counties without road unit systems (the constant term shown in Table 7) is over \$110,000. The estimated fixed cost of the other group of counties is slightly over \$35,000.

#### Agricultural Extension Expenditures

Agricultural extension expenditures are relative minor in comparison to the other categories analyzed. The average county with the road unit system had 1177 farms and spent \$21,134 for agricultural extension services. The average county in the other group had 840 farms and spent slightly over \$15,000.

There is a certain element of danger in attempting to measure economies of scale for agricultural extension. Most importantly, a large proportion of the expenditures are for salaries of extension agents. Since an agent must allocate his time over the entire county, perhaps much of the supposed economies of scale are, rather, lower service levels (i.e., fewer visits per farm per year, less agricultural leadership, etc.). The service level problem affects the analysis of other expenditures, but it seems that there are smaller limits of toleration for other services and less chance for willful reduction in service levels.

Recognizing this danger, expenditures per farm were calculated and related to the number of farms. The number of farms

was felt to be a more appropriate measure of size for administration of agricultural extension services because most of the services required of agents is directly related to agricultural activity in the county. Population and agricultural activity are certainly not very highly correlated

Figure 10 relates expenditure per farm to the number of farms for counties with road unit systems. There is a definite trend toward decreasing expenditures as the number of farms increases. Per farm expenditures are predicted to decrease from \$65 for counties with 200 farms to slightly over \$11 for counties with 1800 farms.

The comparable expenditure function for counties without road unit systems is:

$$Y = -12.88 + \frac{20,063}{X} + .01019X,$$

predicting a decrease from \$58 for counties with 300 farms to \$24 for counties with 3,000 farms. Thus, the estimated fixed cost of these counties is \$20,063 as opposed to \$13,018 for the other group. For both groups, costs tend to decrease as the number of farms increases whether this is because of economies of scale or lower service levels. However, much of it must be attributed to the former as there seems not to be a great amount of variation between counties with the same number of farms.

#### Townships

The townships in counties with road unit systems have only very minor expenditures, as only minor functions remain for



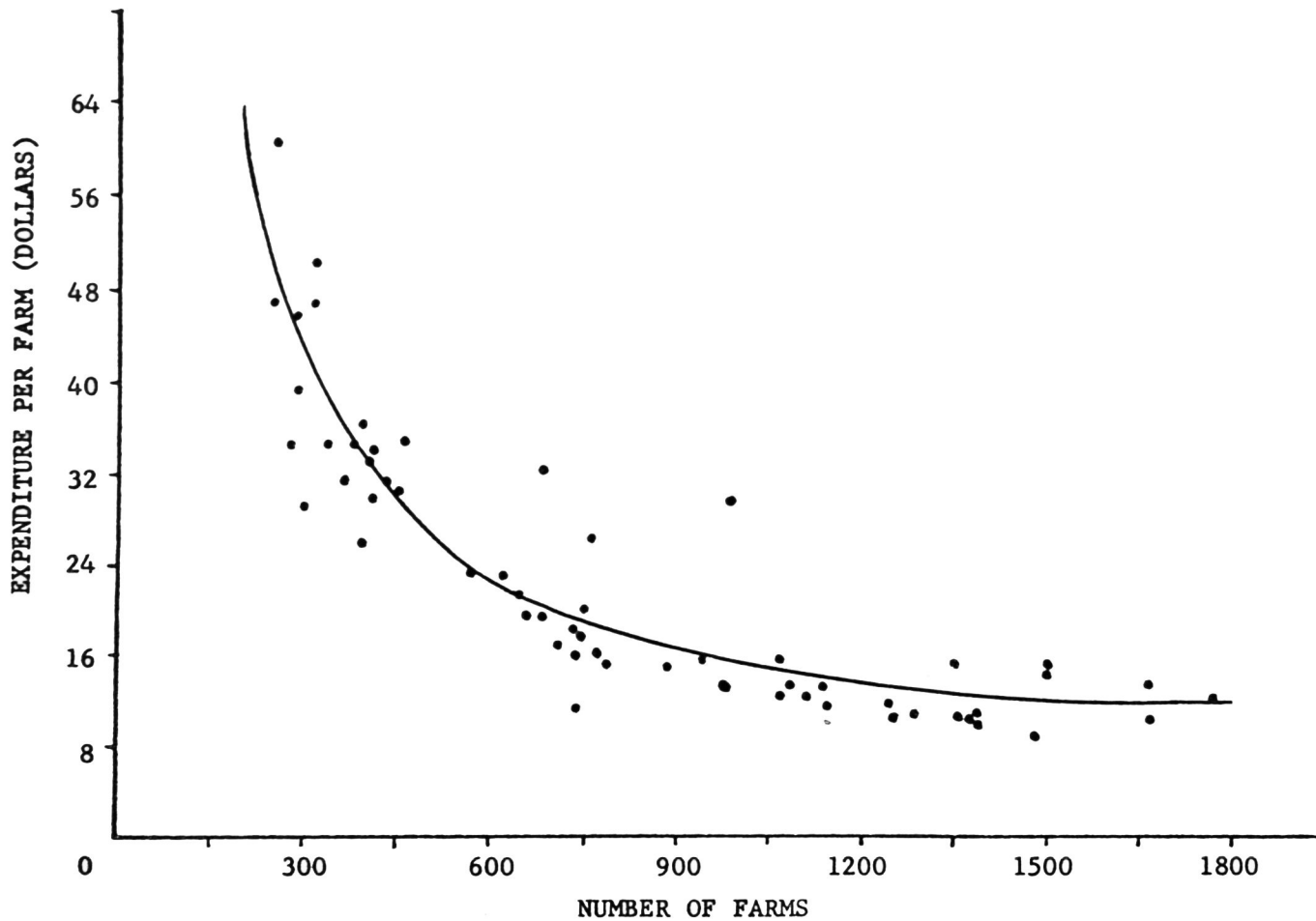


Figure 10. Agricultural extension council expenditure per farm in relation to the number of farms for Kansas counties with road unit systems, 1959-1961 average.

$$(Y = - .26763 + \frac{13,018}{X} + .00253X)$$

them to perform. However, those which still have responsibility for some local roads have considerably large per capita expenditures. In view of this, the primary emphasis in the analysis of township expenditures is upon the latter group of townships. Some people may feel that townships are obviously antiquated, and, thus, that little can be gained from examining the possible economies of scale for them. However, if township governments are inefficient, this is a very good way to show it. Table 8 contains the total expenditure equation coefficients for the townships and the statistical properties of those equations.

#### Total Expenditures

In 1962, Kansas townships were expected to spend almost \$10.5 million--almost \$3 million more than in 1950. Of this total, all but \$.5 million was expected to be spent by townships in counties without road unit systems.<sup>60</sup> In this analysis, the 85 townships that were observed in counties without road unit systems had an average population of 466 and an average expenditure of \$11,564, as opposed to the 71 townships in the other group's average population of 256 and average expenditure of \$430.

Figure 11 shows the per capita cost function for total expenditures of those townships which maintain some local roads. Although there is much variation in per capita costs in the lower ranges of population, all of the highest per capita costs occur

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<sup>60</sup>Pine, loc. cit.

TABLE 3

RESULTS OF CORRELATION AND REGRESSION ANALYSIS OF TOTAL EXPENDITURES AS RELATED TO POPULATION FOR SELECTED EXPENDITURE CATEGORIES OF KANSAS TOWNSHIPS.<sup>a</sup>

Townships in Counties	Constant Term (a)	$b_1$	$s_{b_1}$	$t_1$	$b_2$	$s_{b_2}$	$t_2$	$s_{Y \cdot X}$	$R^2$ (or $r^2$ )
Without Road Units									
Total Expenditures	6,665	10.55	.78	13.56				6,318	.63
Gen. Govt. Exp.	91	.55	.03	18.54				678	.28
Road & Bridge Exp.	6,063	10.45	2.72	3.85	.00042	.00065	-.66	5,935	.58
With Road Units									
Total Expenditures	303	-.52	.83	.63	.00278	.00085	3.24	425	.44
Gen. Govt. Exp.	364	-1.94	.37	-5.27	.00363	.00038	9.54	188	.74

<sup>a</sup>Source: Expenditure data was obtained from the township budgets in the Department of Post Audits of the State Auditor's Office. Population data is from: Population of Kansas, March 1, 1960 (Topeka: Kansas State Board of Agriculture, 1960), p. 1.

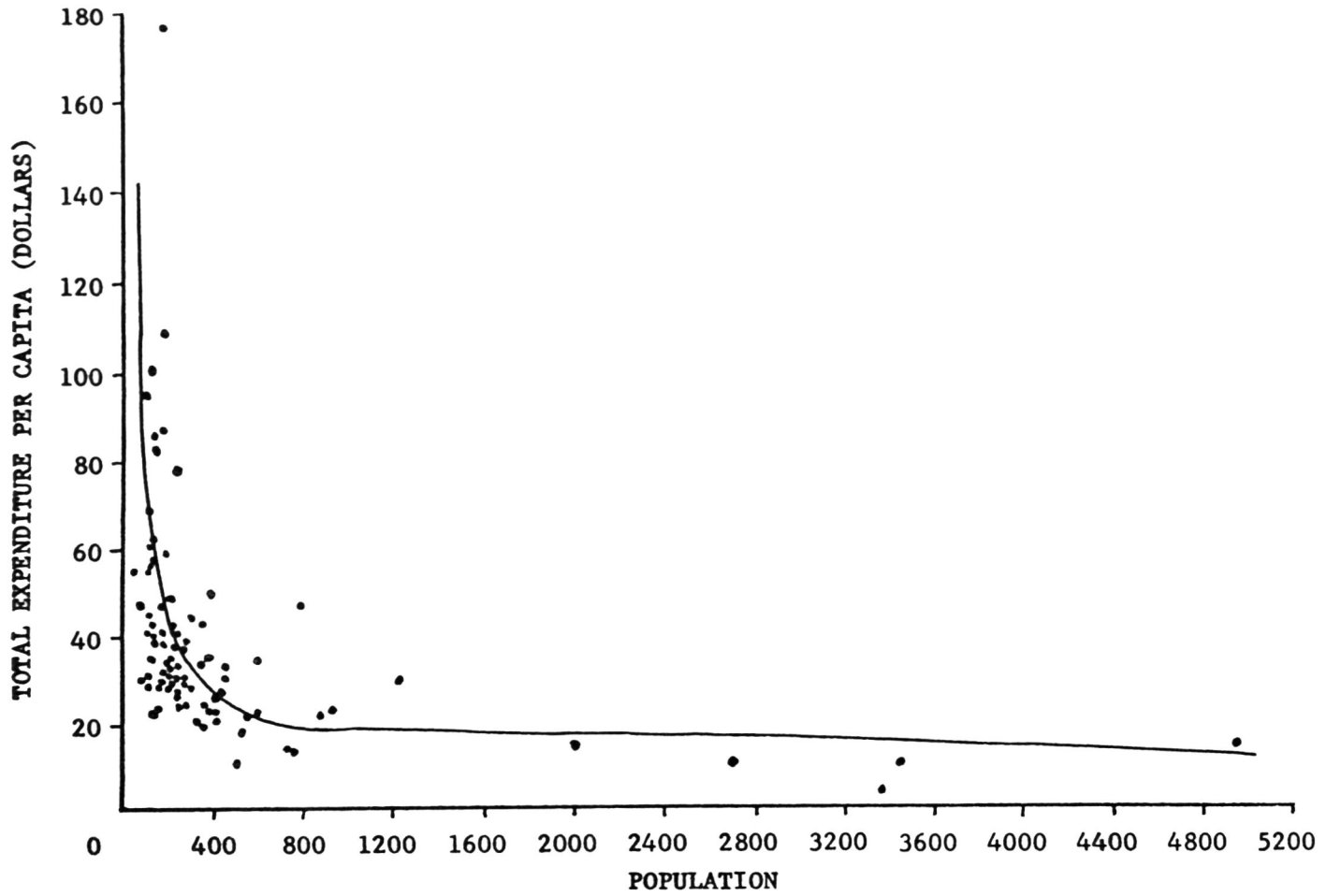


Figure 11. Total expenditure per capita in relation to population for Kansas townships in counties without road unit systems, 1959-61 average.

$$(Y = 10.55 + \frac{6,665}{X})$$

in the range of 250 or less, and as the curve shows, per capita expenditures tend to decrease rapidly until a population of approximately 800 is reached. The regression equation estimates that a township with 50 inhabitants will have a per capita cost of \$144, while one with 800 will have one of almost \$19 and one with 5,000 will have one of less than \$12.

The per capita regression equation of total expenditures of the other group of townships is:

$$Y = -.52 + \frac{303}{X} + .00278X.$$

Plotting this equation would show that a township in this group with 71 people would have a per capita expenditure of almost \$15, the per capita cost decreasing to \$1.35 for a township with 400 and increasing to \$2.80 for a township with 1100 people (the largest observed).

#### General Government Expenditures

The general government expenditures of townships are similar in nature to those of counties, although they contain fewer items. The main items are office supplies, maintenance of the township hall, surety bond premiums, per diem of the township auditing board, and publication expense. None of these items require large expenditures per capita. The average township in the sample of counties with road unit systems spent only \$349, and the average township in the other group \$430 for these items.

As in the case of the counties, the general government expenditures per capita tend to decline rapidly in the smaller

population ranges as Figure 12 demonstrates for townships in counties without road unit systems. Although some townships have a per capita expenditure of almost \$6, the regression equation estimates that a township with 40 inhabitants will have an expenditure of \$2.84 per capita, while one with 500 will have an expenditure of \$.57 per capita. Although there is obvious variation, especially for townships with less than 500 people, the general tendency toward decreasing costs is clear.

The townships in counties with road unit systems have higher per capita expenditures for townships of comparable size. The regression equation is:

$$Y = -1.94 + \frac{364}{X} + .00363X$$

This equation estimates that expenditure per capita will decline from over \$16 for townships with only 20 inhabitants to \$.85 for those with 600 and then increase to \$2.40 for townships with 1100 inhabitants. Thus, although neither group has very large expenditures for general government, both give evidence of decreases in per capita costs as population increases.

#### • Road and Bridge Expenditures

Of course, only townships in counties without road unit systems have road and bridge expenditures. This expenditure category is by far the largest for these townships, making up approximately 85 per cent, or \$8.5 million, of the almost \$10 million that these townships spend on a statewide basis.<sup>61</sup> The

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<sup>61</sup>Pine, loc. cit.

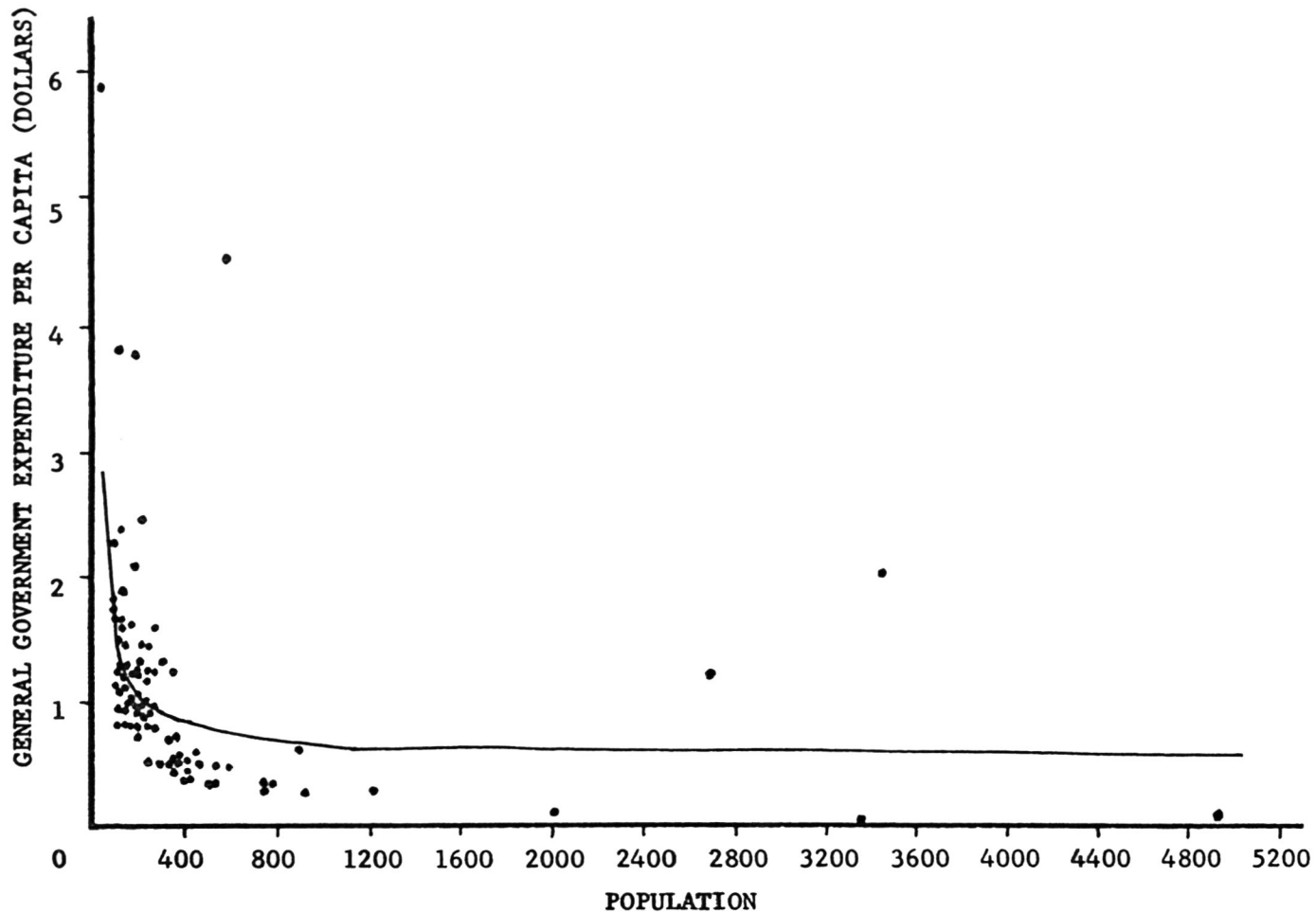


Figure 12. General government expenditure per capita in relation to population for Kansas townships in counties without road unit systems, 1959-61 average.

$$(Y = .55 + \frac{91.36}{X})$$

average township in the sample of 85 spent almost \$10,600 for roads and bridges. Townships are responsible for roughly 40,000 miles of roads.<sup>62</sup>

Figure 13 includes the per capita expenditure curve for roads and bridges. Although, there is much variation between townships of comparable sizes in the range of less than 1200 people, there is clearly a general tendency toward economies of scale. The curve shows that per capita expenditures tend to decrease from \$162 for townships of only 40 people to \$9.60 for townships of 5,000 people. At a population of only 500, the per capita expenditure is only slightly over \$22.

A study of the 20 townships of Vernon County, Missouri, indicated that a saving of \$12,170 on road equipment, alone, would result by transferring the road function to the county. Other savings would include reduced maintenance cost of a better quality of roads, increased labor efficiency of full-time employees, centralization of purchasing, and centralization of equipment maintenance.<sup>63</sup>

### Cities

Since the cities were analyzed by class, proceeding from

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<sup>62</sup>Obtained by summing the road mileage of each county as reported in the Directory of Kansas Public Officials, (Topeka: League of Kansas Municipalities, 1962), Part II, pp. 21-56, and subtracting this total from the total county and township road mileage as given in Pine, op. cit., p. 21.

<sup>63</sup>Missouri Public Expenditure Survey, A Pilot Study of Township Government in Vernon County, Missouri, (Jefferson City: Missouri Public Expenditure Survey, 1960), pp. 1-2.



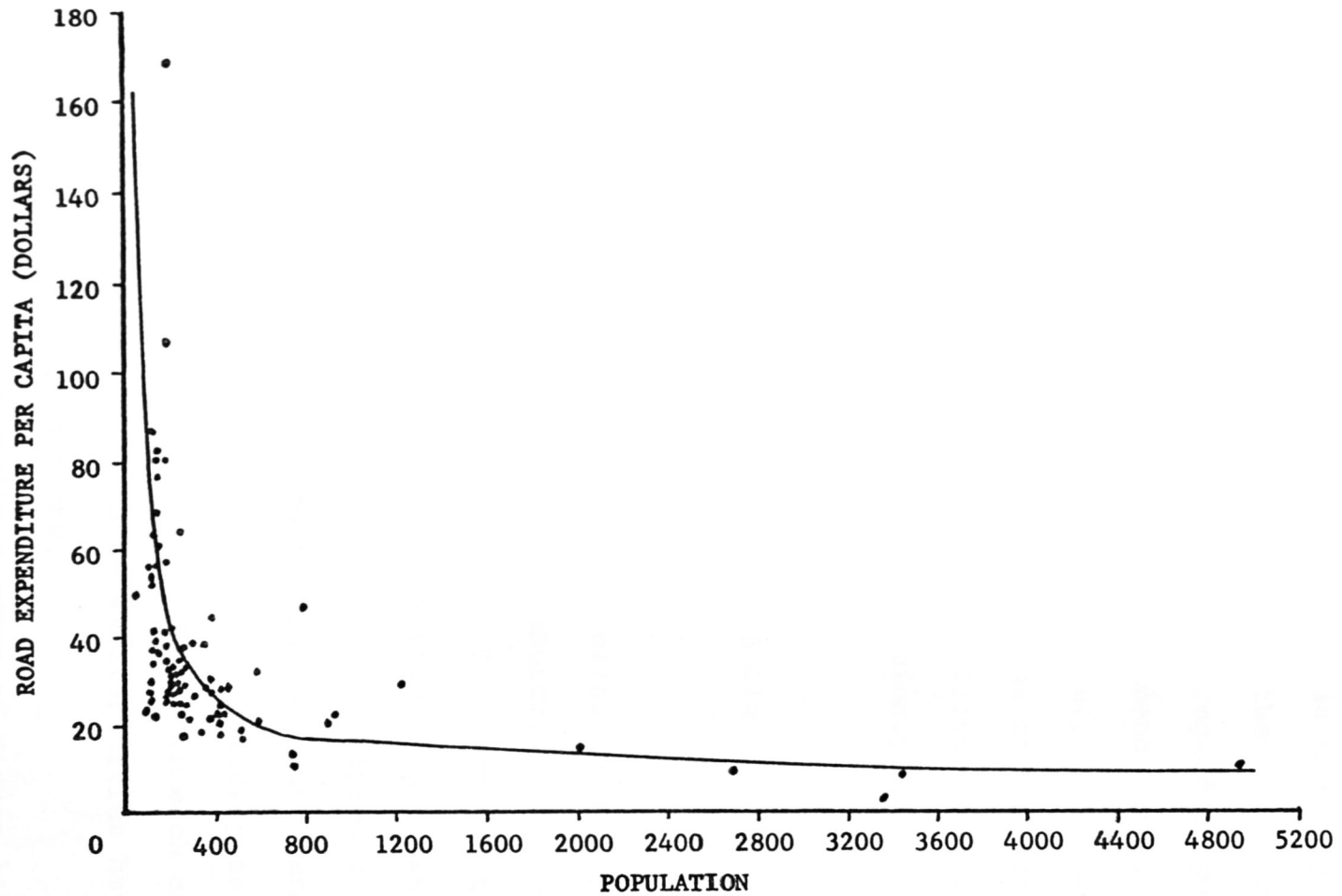


Figure 13. Road expenditure per capita in relation to population for Kansas townships in counties without road unit systems, 1959-61 average.

$$(Y = 10.45 + \frac{6,063}{X} - .00042X)$$

the cities of the third class up to cities of the first class allows easier comparison between classes as the city size (population) increases. As previously noted, there is a certain amount of overlapping between classes in regard to population size. Throughout the analysis of city expenditures, population is used as the criterion of city size (i.e., the independent variable). The expenditures of all Kansas cities, excluding utilities, increased from almost \$39 million in 1950 to almost \$87 million in 1961.<sup>64</sup> Obviously, efficiency in the use of so vast an amount of revenue is important.

#### Cities of the Third Class

##### Total expenditures

The average city of the third class among the 49 sampled had a population of 563 and total expenditures of almost \$30,000-- a per capita expenditure of over \$52. The terms of the total expenditure equations and their statistical properties are given in Table 9, for each expenditure category analyzed of each class of city. The estimated fixed costs (the constant terms) for the cities of the third class have little validity as a very small positive or negative amount is shown for each category. It is apparent, however, that these smaller cities have very few fixed costs for certain functions.

The per capita expenditure curve of Figure 14 shows that, although the coefficient of correlation between total expenditures

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<sup>64</sup>Pine, op. cit., p. 19.

TABLE 9

RESULTS OF CORRELATION AND REGRESSION ANALYSIS OF TOTAL EXPENDITURES AS RELATED TO POPULATION FOR SELECTED EXPENDITURE CATEGORIES OF KANSAS CITIES.<sup>a</sup>

Class of Cities	Constant Term (a)	$b_1$	$s_{b_1}$	$t_1$	$b_2$	$s_{b_2}$	$t_2$	$s_{y \cdot x}$	$R^2$ (or $r^2$ )
Third Class									
Total Exps.	-3,461	44.93	22.43	2.00	.01134	.00937	1.21	25,910	.74
Gen. Govt. Exps.	-831	9.95	2.27	4.21	-.00172	.00094	1.81	2,620	.65
Street & Bridge Exps.	931	2.28	2.14	1.06	.00232	.00089	2.60	2,414	.81
Second Class									
Total Exps.	-179,238	191.05	5.14	3.72	-.00567	.00269	2.10	387,751	.55
Gen. Govt. Exps.	-3,608	5.62	1.58	3.56	-.00013	.00008	1.55	11,926	.63
Street & Bridge Exps.	6,929	6.17	1.92	3.20	-.00002	.00010	-.22	14,531	.78
Police Protection Exps.	-936	5.93	1.42	4.18	.00004	.00007	.56	10,698	.90
Fire Protection Exps.	-2,338	2.28	1.95	1.17	.00017	.00010	1.73	14,529	.76
First Class									
Total Exps.	812,450	37.23	17.60	2.12	.00019	.00007		1,123,619	.96
Gen. Govt. Exps.	13,024	4.11	.15	27.40				37,220	.98
Street & Sewer Exps.	13,058	4.17	.13	32.08				31,073	.99
Police Protection Exps.	-60,007	8.87	.17	51.10				43,747	1.00
Fire Protection Exps.	-31,402	6.88	.43	16.00				109,261	.95

<sup>a</sup>Sources: Expenditure data are from city budgets in the Department of Post-Audits of the State Auditor's Office. Population data are from Population of Kansas, March 1, 1960, (Topeka: Kansas State Board of Agriculture, 1960), pp. 2-5.

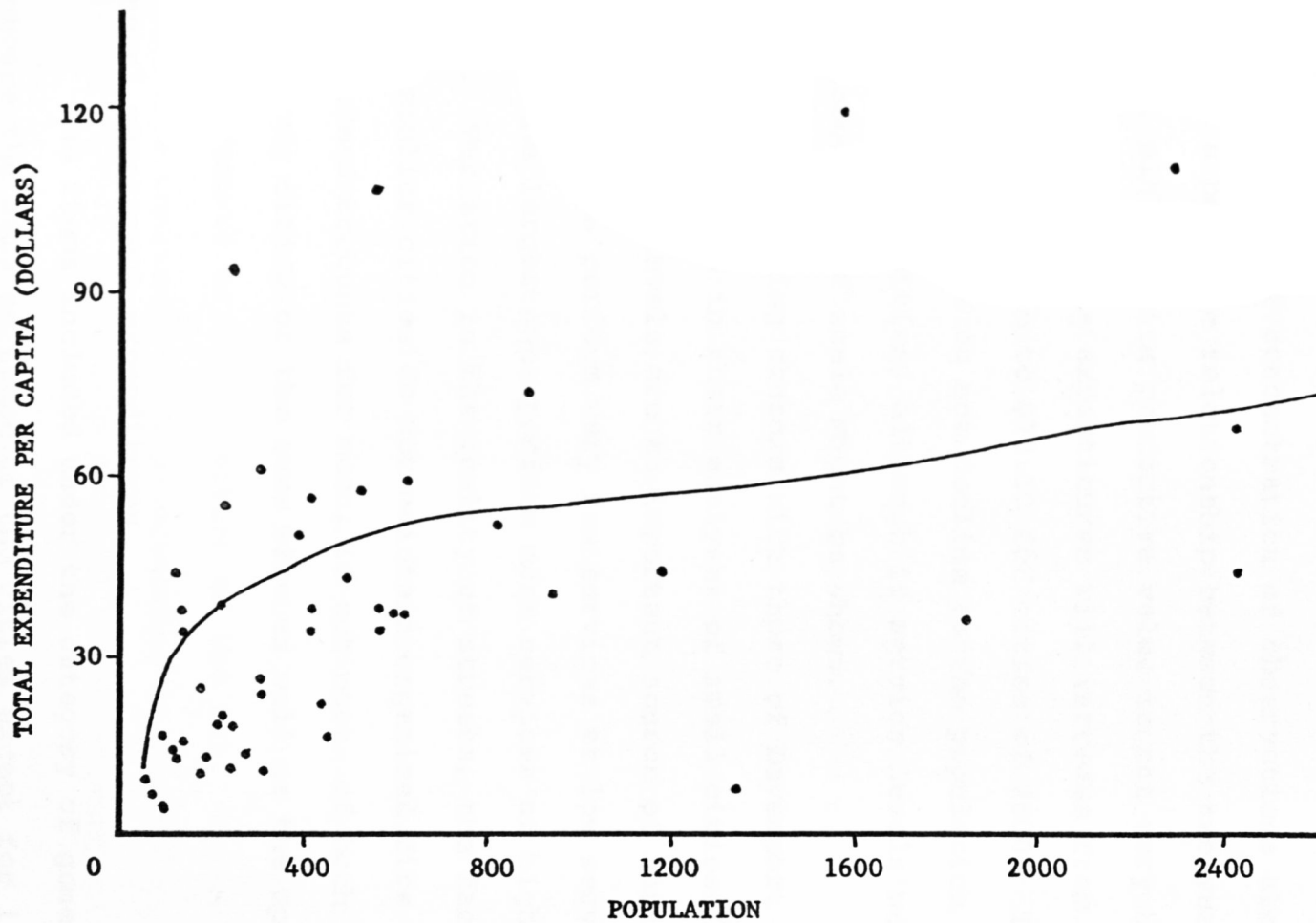


Figure 14. Total expenditure per capita in relation to population for Kansas cities of the third class, 1959-61 average.

$$(Y = 44.93 - \frac{3,461}{X} + .01134X)$$

and population is high (.86), there is not a high degree of correlation between per capita expenditures and population. However, the amount of concentration of observations about the curve does show a positive relationship between the two variables. The equation, although its predictive value is not very high, estimates the per capita expenditures will increase from \$11.45 for cities of 100 people to \$73.10 for cities of 2600. Thus, per capita expenditures do not decline as the population increases for third class cities, although if service levels were comparable, economies of scale might be shown.

This finding concurs with those of Davenport and Walker over 30 years ago in their analyses of small cities.<sup>65</sup> Apparently, service levels are an important source of variation. The smallest cities perform very few services at low service levels, whereas the larger ones perform more services at higher service levels. Variation in the quality of streets, the fact that most of the smaller cities do not maintain organized fire departments, etc., indeed accounts for much, if not most, of both the variation among cities of the same size as well as the upward slope of the curve.

#### General government expenditures

The items included under the category of general government are the same as those of the cities except for insignificant modifications. The average city of the third class spent

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<sup>65</sup>Brazer, op. cit., p. 14.

\$3,375 for general government. The per capita expenditure curve is presented in Figure 15. The same tendency toward increasing per capita expenditures as city size increases is observed in the lower population ranges. But in this case, the curve turns downward at a population of about 800. Per capita costs tend to increase from \$1.06 for cities of 100 people to \$7.14 for cities of 800 and then to decline to \$4.76 for cities of 2600.

As in the case of total expenditure, there is a large amount of variation around the regression curve. The observation which deviates most from the regression curve is Kechi with a population of 239 and a general government expenditure per capita of over \$28. Both the trend shown and much of the variation are explained by differences in quantity and quality of services performed. The cities which perform more services have greater administrative costs per capita up to a point beyond which the quantity and quality of services approaches uniformity and possible economies of scale are not hidden. The smaller cities are unable financially in most cases to provide many services, and those which attempt to have either low service levels or high per capita costs or a combination of the two. Thus, if service levels were constant, perhaps economies of scale would be observable throughout the entire range of observed population sizes.

#### Street and bridge expenditures

Two of the 47 cities sampled reported no expenditures for streets and bridges. Of the remaining 45 the average expenditure was \$3,275. Figure 16 shows that there is not a high degree of

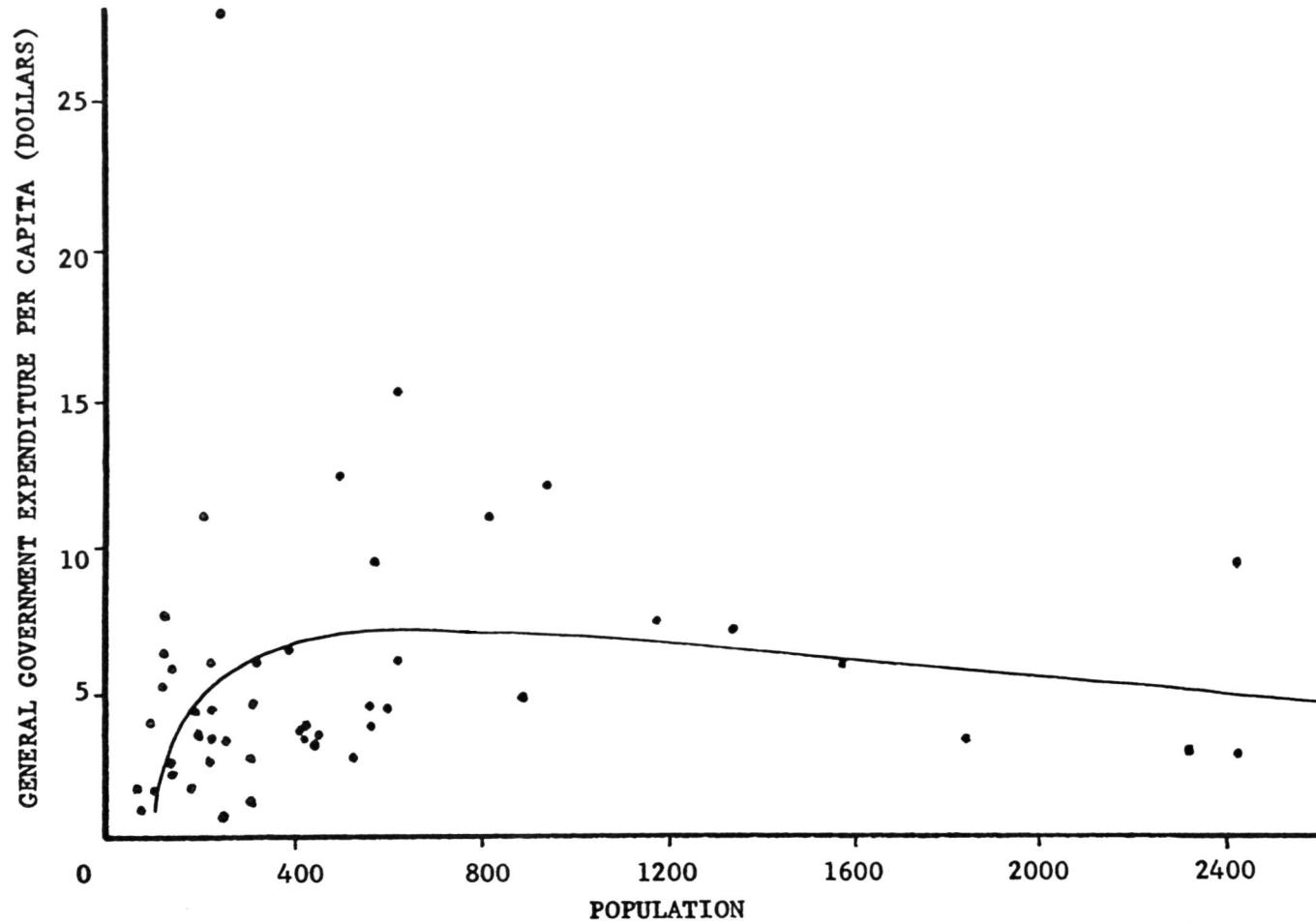


Figure 15. General government expenditure per capita in relation to population for Kansas cities of the third class, 1959-61 average.

$$(Y = 9.55 - \frac{831}{X} - .00172X)$$

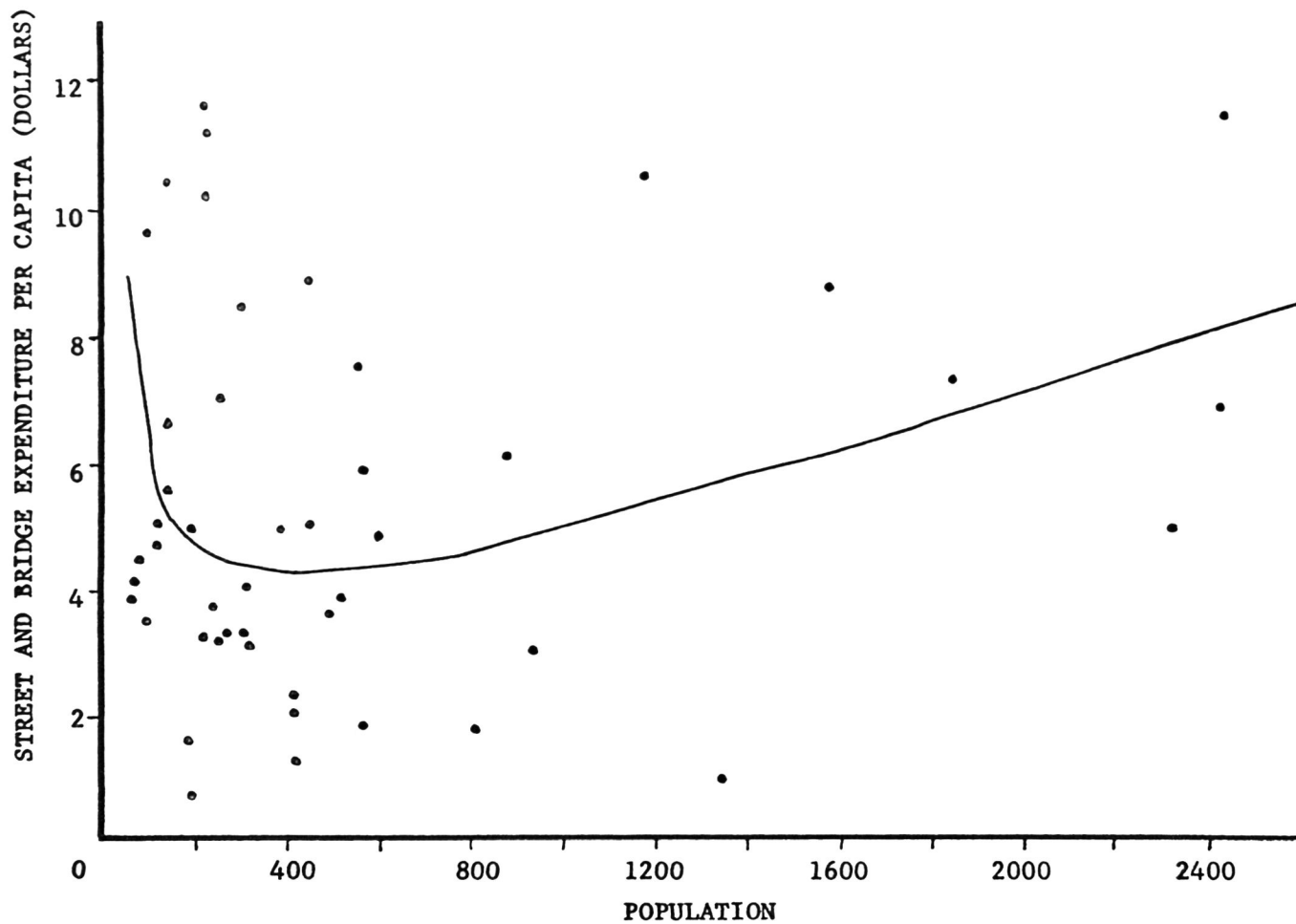


Figure 16. Street and bridge expenditure in relation to population for Kansas cities of the third class, 1959-61 average.

$$(Y = 2.28 + \frac{391}{X} + .00232X)$$



correlation between per capita expenditures for streets and bridges, although that between total expenditures and population is shown to be high (.90) in Table 9. Therefore, the regression curve, although it shows the average relationship between per capita expenditures and population, has very low predictive value. The average tendency is for per capita expenditures to decrease rapidly from almost \$9 to \$4.18 going from a population of 60 to one of 400 and then to increase at an almost constant rate to \$8.50 for cities of 2600.

It is apparent that variables other than population are important in determining per capita costs of streets and bridges. Not the least of these is street quality. Indeed, if quality were uniform throughout the observed range of population, much of this variation would not occur. Perhaps the upward slope of the curve, also, is best explained by the higher quality of streets. There are, further, differences in street mileage among cities of the same size, as all cities of the same size do not have the same incorporated area. As in the case of the other expenditure categories studied, any potential economies of scale are to some degree hidden by variation in service level between cities of the same size and between cities at opposite ends of the population scale.

#### Cities of the Second Class

##### Total expenditures

The average city of the second class among the sample of

40, had a population of 5,861 and total expenditures of over \$630,000, or a per capita expenditure for all services of almost \$108. The estimated annual fixed cost of these cities is almost \$180,000. It may be seen from Figure 17 that as city population increases, per capita expenditures tend to increase at first, going from over \$61 for a population size of 1000 to over \$127 for a population size of 6,000--(almost the average size). Then, per capita expenditures tend to decrease steadily until it reaches \$69 at a population size of 20,000.

For the range of population in which the cities of the second class and third class overlap, the estimated per capita expenditures of the cities of the second class are higher, the difference being approximately \$20 at a population size of 2,000. The trend of both curves in this range, however, is downward.

Figure 17 indicates that population size is not the only determinant of per capita expenditures for cities of the second class. It seems likely that much of the variation shown here is caused by lack of uniformity of service levels. The predictive value of this equation seems to be rather low, although it does have meaning as an average relationship. Beyond a population of 12,000, although there are few observations, they tend to lie closely around the curve. Perhaps at this size the service levels are approaching uniformity. If this is true, economies of scale seem to be operative.

#### General government expenditures

Per capita expenditures for general government are usually

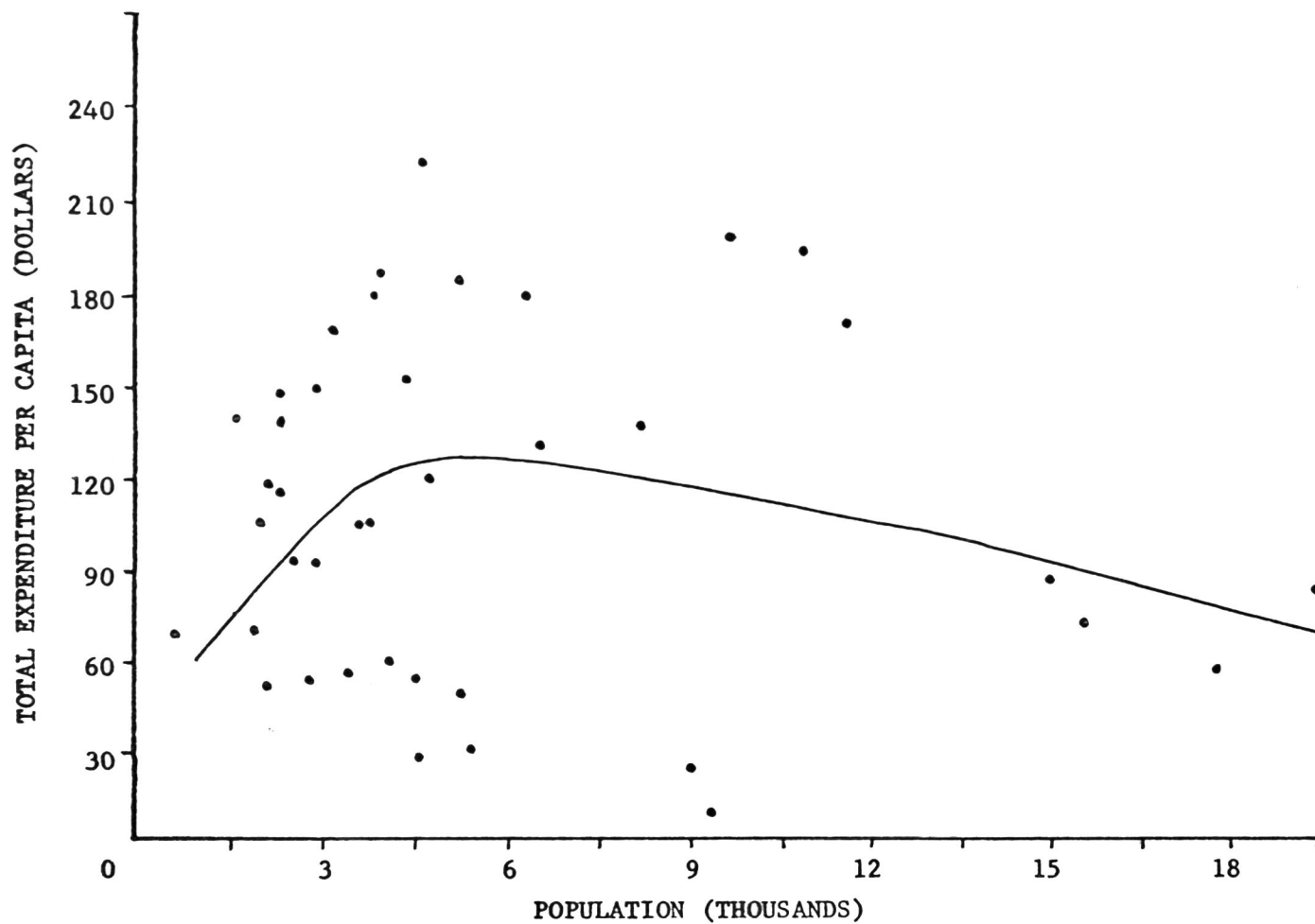


Figure 17. Total expenditure per capita in relation to population for Kansas cities of the second class, 1959-61 average.

$$(Y = 191.05 - \frac{179,238}{X} - .00566532X)$$

relatively small for cities of the second class. The average expenditure of these cities for general government is approximately \$22,300. Figure 18 shows that population again is not the only factor affecting per capita expenditures. In the expenditure analysis of the cities of the third class, there was not a close relationship between either total or general government expenditures per capita and population. This is true for the cities of the second class also. It seems only logical that there would be a high degree of correlation between total and general expenditures per capita, as those cities which spend more for services would tend to have higher costs of administration. Perhaps variation in service levels is one of the main factors affecting the variation around both expenditure functions.

The regression curve shows that the average relationship between per capita expenditures for general government and population is positive in the range of less than 5,000 people and negative for the remainder of the range. However the predictive value of the curve is rather low in the former range. Nevertheless, the estimated per capita expenditure increases from \$1.90 for a city of 1,000 people to \$4.26 for a city of 5,000, and afterward to decline to \$2.90 for a city of 20,000. As in the case of total expenditures, the curve fits the observed per capita expenditures better beyond a population size of 12,000.

For the range of population within which the cities of the second and third classes overlap, per capita expenditures of the second class cities are higher, as estimated by the two

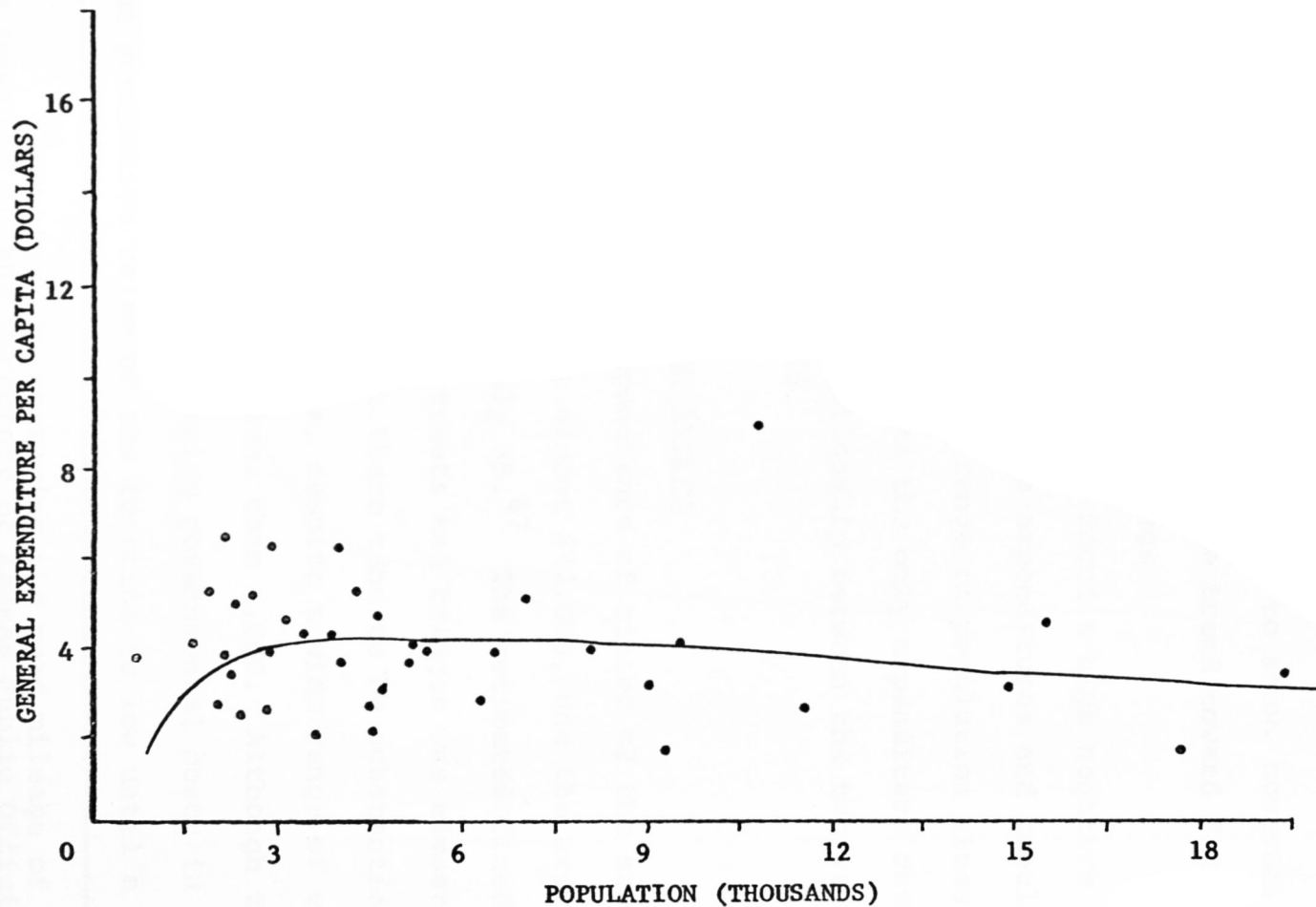


Figure 18. General expenditure per capita in relation to population for Kansas cities of the second class, 1959-61 average.

$$(Y = 5.62 - \frac{3,608}{X} - .000129X)$$

expenditure functions. At a population size of 2,000, the per capita expenditures of a city of the second class is almost \$3.00 higher than that of a city of the third class. The actual observed values in this range tend to show, however, that there is not a significant break in the trend toward declining per capita expenditures in this range.

Schamndt and Stephens found a high negative correlation ( $r = -.83$ ) between per capita expenditures and population. Their study covered a much wider range of population sizes however-- 1,200 to 750,000. This was the only expenditure category for which a significant relationship between the two variables was found in their study.<sup>66</sup>

#### Street and bridge expenditures

The average expenditure of cities of the second class for streets and bridges was almost \$42,000, and the average street mileage was approximately 35.<sup>67</sup> The estimated fixed cost for the function of providing streets and bridges was almost \$7,000. Figure 19 indicates that there tend to be substantial economies of scale for this service, despite a wide range of variation in the population range of less than 6,000. Although the general tendency is toward decreasing governmental costs in this area, the predictive value of the function is low until a population of

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<sup>66</sup>Obtained by averaging the road mileage of these cities as reported in the Directory of Kansas Public Officials (Topeka: Kansas League of Municipalities, 1962), Part I, pp. 1-86.

<sup>67</sup>Schmandt and Stephens, op. cit., p. 373.

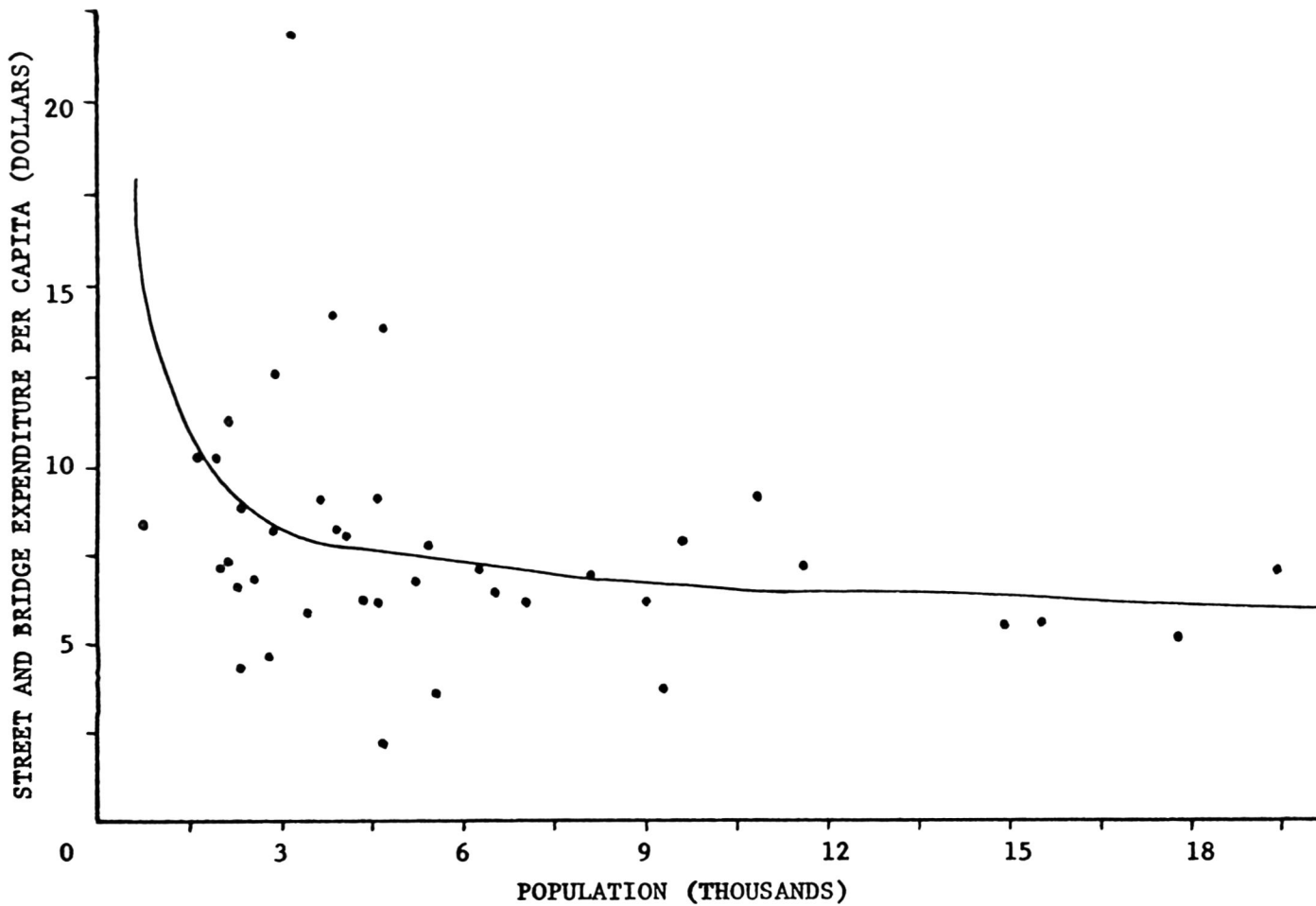


Figure 19. Street and bridge expenditure per capita in relation to population for Kansas cities of the second class, 1959-61 average.

$$(Y = 6.17 + \frac{6,929}{X} - .00002X)$$

6,000 is reached.

The regression equation estimates that per capita expenditures decrease from almost \$18 at a population size of 600 to \$6.10 at a population size of 20,000. Most of this decline occurs short of a population size of 4,000, the per capita expenditure at this point being \$7.80. Perhaps, again in this case, there is considerable variation in service levels among the smaller cities, accounting for the greater variation at the smaller population sizes. Street quality tends to vary widely for small-sized cities. The specific economies of scale expected are the same as those indicated in the analysis of road and bridge expenditures per capita for the counties.

#### Police protection expenditures

The average expenditures of these 40 cities for police protection is over \$36,000. The estimated fixed cost is unreasonable, as it is negative; but it does indicate that fixed costs of police protection are practically nil for these cities. As Figure 20 evidences, the correlation between per capita police expenditures and population is not very high, particularly for cities of less than 10,000 people. Beyond this population size, the correlation appears to be much higher.

The relationship, inasmuch as it exists, tends to be positive, a city of 600 people having a per capita expenditure of \$4.40 while a city of 20,000 has a per capita expenditure of \$6.70, according to the regression curve. Thus, the upward trend in per capita expenditures is very gradual.



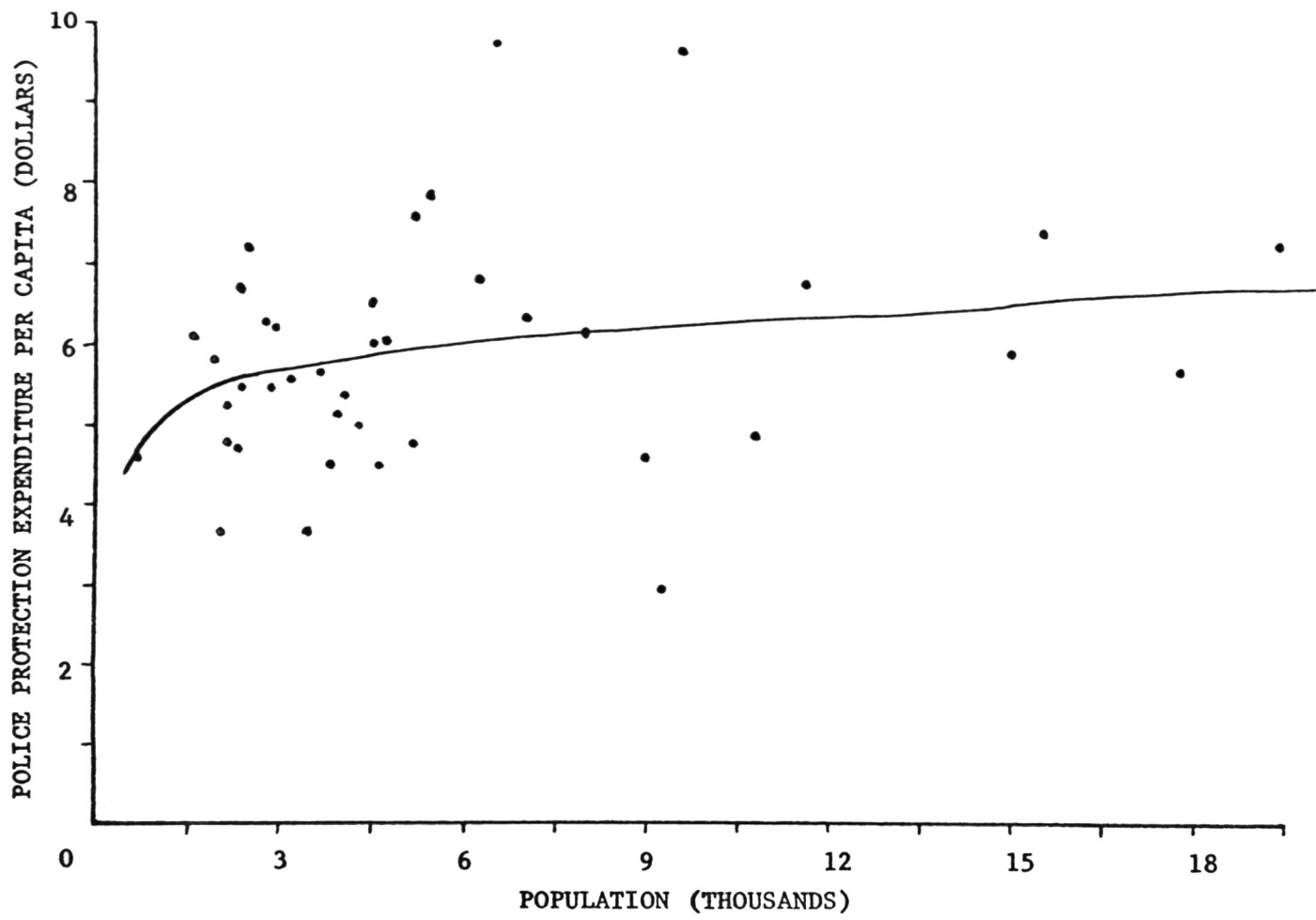


Figure 20. Police protection expenditure per capita in relation to population for Kansas cities of second class, 1959-61 average.

$$(Y = 5.93 - \frac{936}{X} + .00004X)$$

In his St. Louis study, Hirsch found that the relationship between per capita police expenditures and population was not statistically significant, concluding that "relatively poor police services were offered at about equal per capita expenditures regardless of the size of the community, partialling out the effect of other factors".<sup>68</sup> Schmandt and Stephen's study showed the relationship not to be statistically significant, also; but they found a high coefficient of correlation between service levels and population and between per capita expenditures for each police activity and population. He concluded that perhaps variation in service levels obscured any existing relationship between per capita expenditures and population.

This analysis found no close relationship between the two variables, obviously. Certainly no economies of scale are apparent although service levels may be such a function of population that they tend to obscure any economies.

#### Fire protection expenditures

The general findings of the per capita expenditure analysis of fire protection are similar to those for police protection expenditures. The average city spent almost \$21,000 for fire protection. Figure 21 shows that variation around the regression curve is rather great in this case, also. The curve shows, however, that the average tendency is toward increased costs as population increases. The estimated per capita expen-

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<sup>68</sup>Hirsch, op. cit., p. 238.

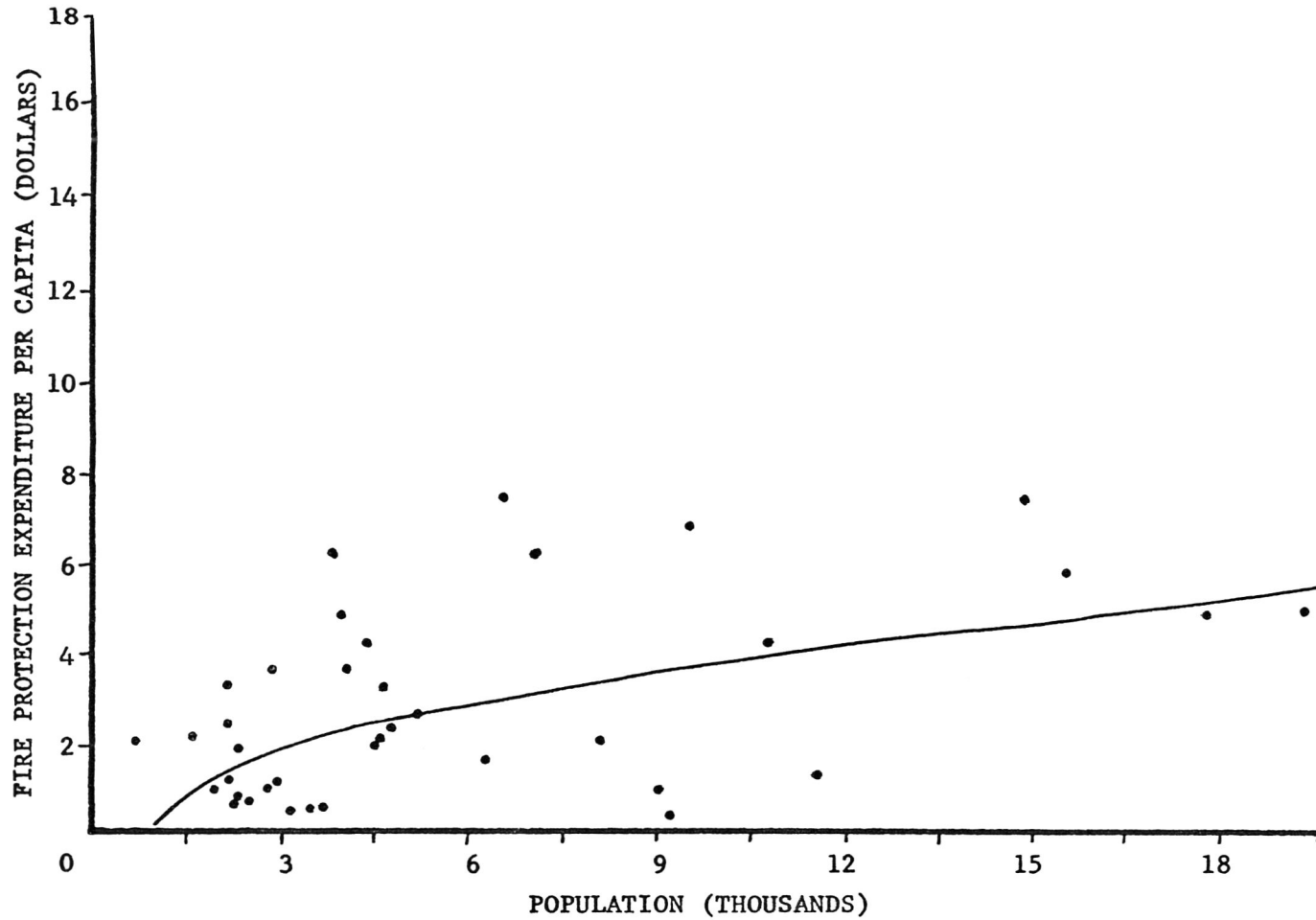


Figure 21. Fire protection expenditure per capita in relation to population for Kansas cities of the second class, 1959-61 average.

$$(Y = 2.28 - \frac{2,338}{X} + .00017X)$$

diture for a city of 1,000 people is \$11.00, and that for a city of 20,000 is \$5.56.

Other factors than population, service levels perhaps being rather important, among them, are obviously important in determining per capita expenditures for this service. Hirsch found a slight decrease in per capita expenditures (\$1.24) as city population size increased from 1,000 to 110,000. He felt that this was caused partly by the larger area protected by fire station in a small city.<sup>69</sup> Schmandt and Stephens found the relationship not to be statistically significant, but as in the case of police protection expenditures per capita, there was a high coefficient of correlation between service levels and population and between per capita per activity expenditures and population. This, again, suggests that service levels may vary so as to obscure the relationship between per capita expenditures and population.<sup>70</sup>

#### Cities of the First Class

The total expenditure functions developed for the cities of the first class are linear, except for the category of total city expenditures. The curvilinear function has generally been used up to this point. However, for all expenditure categories except total city expenditures, the  $b_2$  term was zero when carried to five decimal places. In none of these cases was this term

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<sup>69</sup>Ibid.

<sup>70</sup>Schmandt and Stephens, loc. cit.

significant at a five per cent significance level, although it was for total city expenditures. As may be observed in Table 9, the correlation coefficient for the total expenditure functions of all expenditure categories was very high.

#### Total expenditures

The expenditures of cities of the first class are, on the average, the highest of any governmental unit studied. The average city in this class spent almost four million dollars for all services. The average population, also the highest of any unit, is almost 50,800, resulting in an average expenditure per capita of over \$78. The estimated annual fixed cost for one of these cities is \$812,450.

The regression curve relating total expenditures per capita to population is shown in Figure 22. There is substantial variation about this curve for cities with population of less than 40,000. However, as the curve estimates, per capita expenditures tend to decline from \$140 for a city with a population of 8,000 to \$62 for a city with a population of 60,000. Then, they tend to increase gradually to \$88 for a city with a population of 250,000. This finding concurs with Hirsch's suggestion that per capita costs of government tend to be lowest for communities of 50,000 to 100,000 residents.<sup>71</sup> The areas in which these economies occur must await the analysis of the individual expenditure categories.

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<sup>71</sup>Hirsch, op. cit., p. 240.

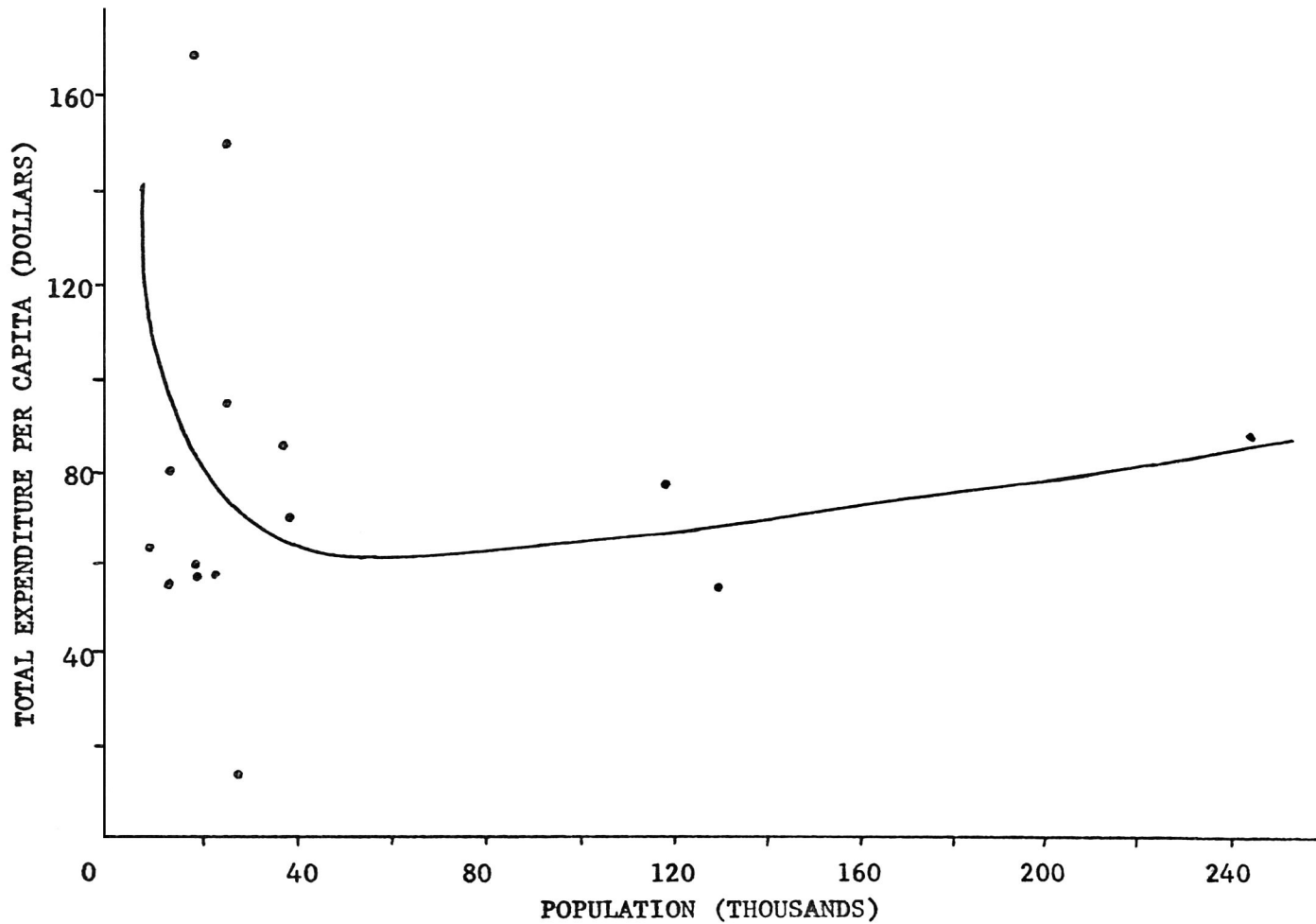


Figure 22. Total expenditure per capita in relation to population for Kansas cities of the first class, 1959-61 average.

$$(Y = 37.23 + \frac{812,450}{X} + .00019X)$$

There may be some danger in drawing unqualified inferences from the extreme ranges of population for each of the expenditure functions developed, as only three observations lie in the population range of 40,000 to 140,000. However, all cities of the first class were included and this point must be kept in mind in analyzing all expenditure categories.

Comparing per capita expenditures of the cities of the first and second classes over their comparable population ranges shows that differences between cities of the same population size in the two classes are not substantial. The relationship between per capita expenditures and population is negative for both classes throughout this range.

Brazer has found that population was not a statistically significant factor in the determination of per capita expenditures for "common functions", a category including police and fire protection, general control, and sanitation. Variables which were positively related to per capita expenditures to a statistically significant degree were population density, median family income, employment per 100 of the population employed in manufacturing, trades, and services, and intergovernmental revenue per capita. The coefficient of multiple correlation for these four variables was .50.<sup>72</sup>

Hawley, found that population density and housing density within both the central city and the satellite area, size of population, number of white collar workers, per cent of the area

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<sup>72</sup>Brazer, op. cit., p. 25.

incorporated, and per cent of total district population were significant.<sup>73</sup>

#### General government expenditures

This category is comparable to the category of general government for the cities of the second class and the counties. General government expenditures are rather important for cities of the first class, the average being \$195,000. The estimated annual fixed cost is over \$13,000. Per capita expenditures vary, roughly, between \$2.00 and \$6.00, as Figure 23 shows.

The predictive value of the per capita expenditure curve is not very high for cities with a population of less than 40,000 as the range of variation indicates. Even though the curve estimates that per capita expenditures will decrease from \$5.73 for a city with a population of 8,000 to \$4.43 for a city with a population of 40,000, this estimate cannot be heavily relied upon. Beyond this point, the curve shows that per capita expenditures tend to decrease until they level out at \$4.16 for a population size of 220,000. Considering the variation in the lower ranges of population, then, it appears that general government expenditures tend to be relatively constant for cities of the first class throughout the entire range. However the larger first class cities perform more services, and would be expected to have a higher general administrative load per capita.

The analysis of cities of the second class showed a

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<sup>73</sup>Hawley, op. cit., p. 106.



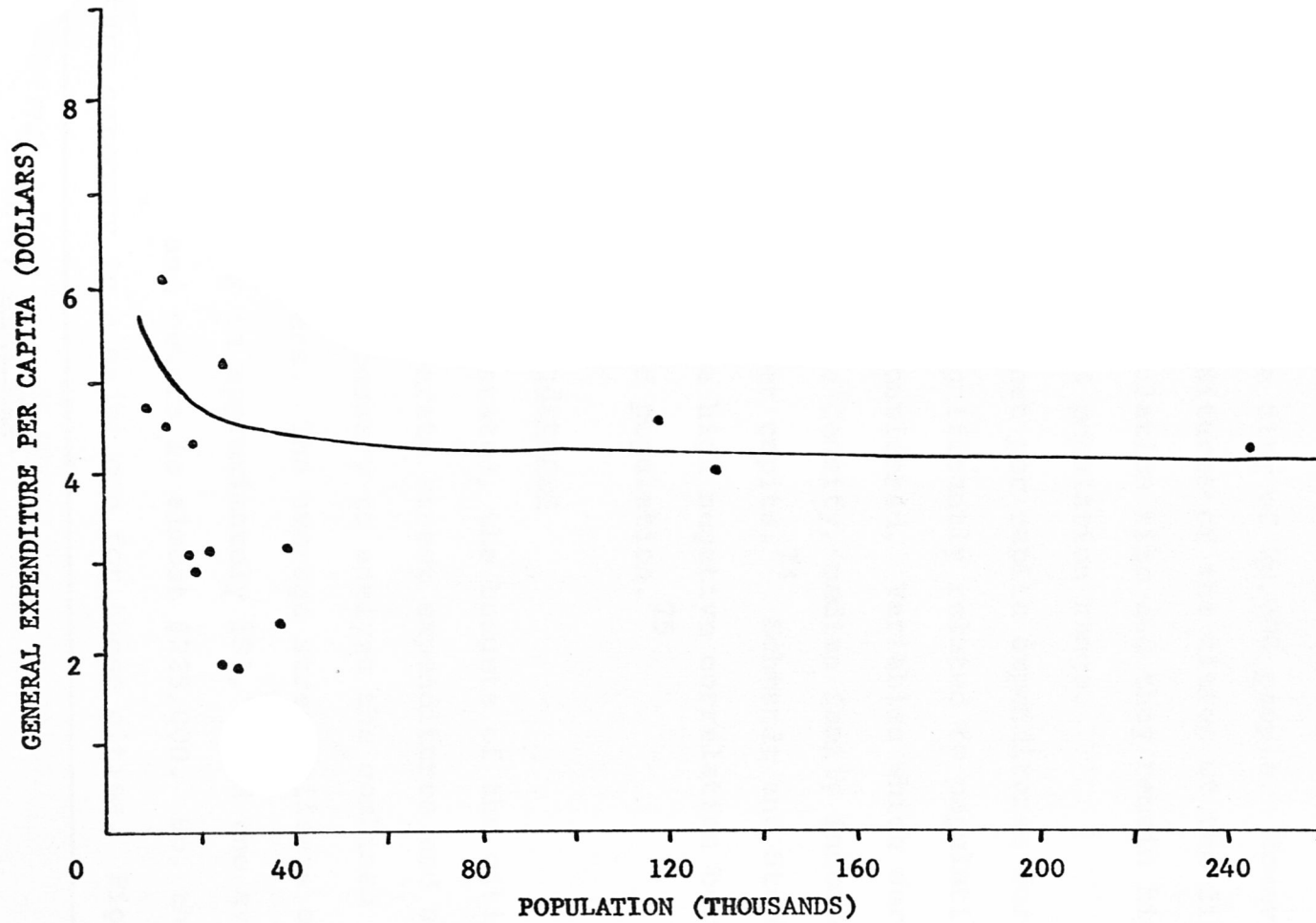


Figure 23. General expenditure per capita in relation to population for Kansas cities of the first class, 1959-61 average.

$$(Y = 4.11 + \frac{13,024}{X})$$

tendency for per capita expenditures to decline gradually beyond a population size of 5,000. Per capita expenditures were estimated to be \$2.87 for a city of 20,000 people. However, estimated per capita expenditures of the cities of the first class are higher at this population size and they remain higher throughout the observed population range.

Brazer found that per capita expenditures for general government were not significantly related to population when other variables were considered. Variables which were positively related were population density, median family income and inter-governmental revenue per capita.<sup>74</sup> Schmandt and Stephens, on the other hand, found a high negative correlation between per capita expenditures and population.<sup>75</sup>

#### Streets and sewer expenditures

As previously stated, the budgets of the cities of the first class do not separate street expenditures and sewer expenditures, making it necessary to analyze the combined expenditures for streets and sewers. The average street mileage of the cities of the first class is approximately 183,<sup>76</sup> and the average expenditures street and sewers is almost \$225,000. So, this expenditure category is a major one for these cities. Figure 24 shows

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<sup>74</sup>Brazer, loc. cit.

<sup>75</sup>Schmandt and Stephens, op. cit., p. 373.

<sup>76</sup>Obtained by summing the mileage for each city as reported in Directory of Kansas Public Officials, op. cit., Part I, pp. 1-86.

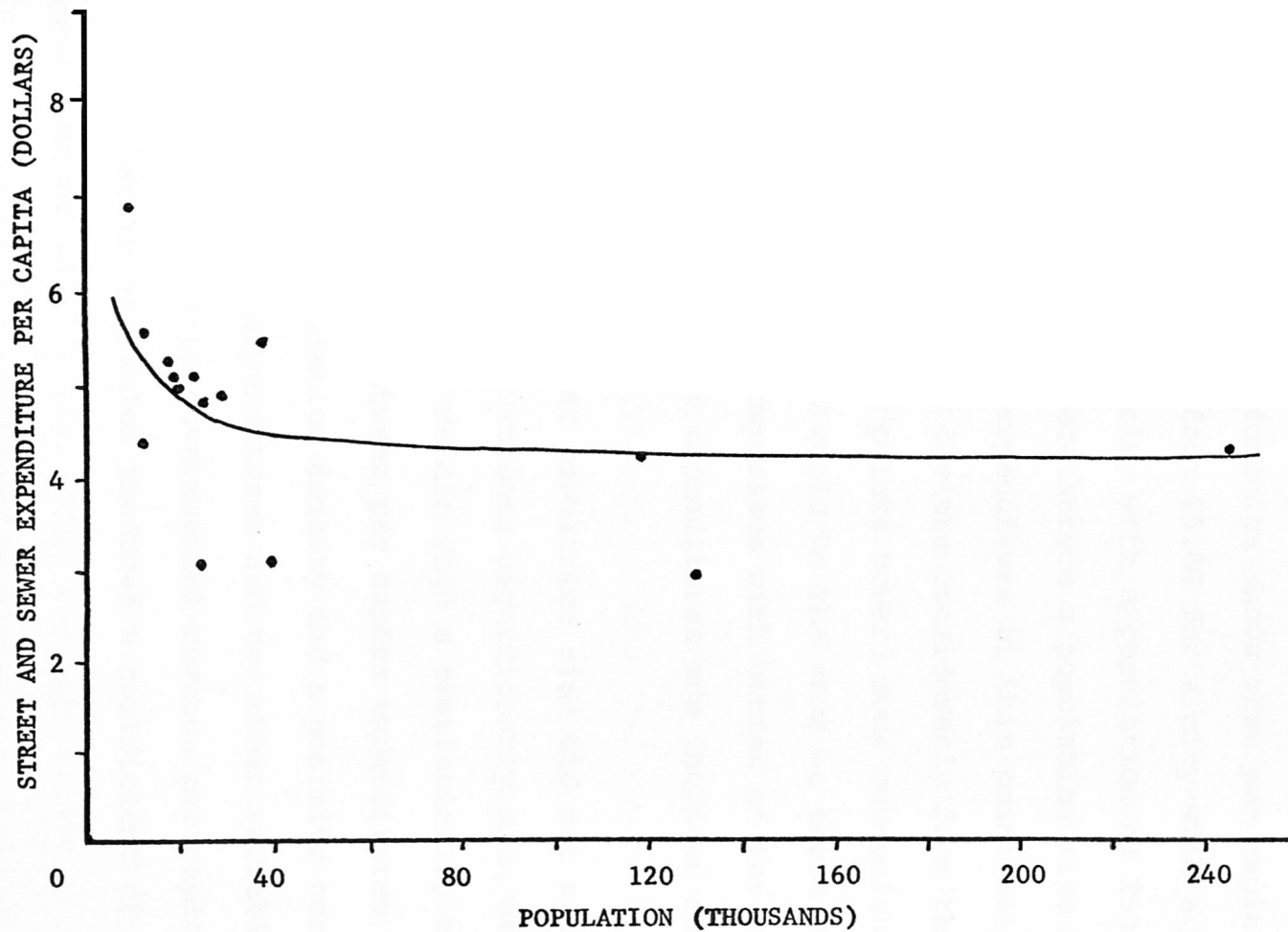


Figure 24. Street and sewer expenditure per capita in relation to population for Kansas cities of the first class, 1959-61 average.

$$(Y = 4.17 + \frac{13,058}{X})$$

that per capita expenditures vary from approximately \$3.00 to \$7.00.

The expenditure function shows that per capita expenditures tend to decline from \$5.80 for a city with a population of 8,000 to \$4.22 for a city with a population of 250,000. Most of this decline takes place before a population size of 40,000 is reached, the per capita expenditure at this point being \$4.50. Some of the observations deviate considerably from the curve, but the general relationship points toward some economies of scale. Any economies that exist would be the same as those given for the counties, earlier. A comparison with cities of the second class is not valid since sewer expenditures are included in this analysis.

Brazer found that population size did not affect per capita expenditures for streets significantly when other variables were considered. He did find a statistically significant negative correlation between per capita expenditures for street maintenance and population density and a positive correlation between per capita expenditures and two other variables: median family income and intergovernmental revenue per capita. Use of the three latter variables produced a coefficient of multiple correlation of .40.<sup>77</sup>

#### Police protection expenditures

Total expenditures of cities of the first class for police

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<sup>77</sup>Brazer, loc. cit.

protection average over \$390,000. Per capita expenditures vary from \$4.30 to almost \$9.00, as may be observed in Figure 25. The per capita expenditure curve shows that per capita expenditures tend to increase rapidly in the lower ranges of population and then to increase at a diminishing rate throughout the remainder of the observed range. The estimated per capita expenditure of a city with a population of 8,000 is \$1.14. However, the lowest observed figure is \$4.30 for Overland Park, which has a population of 28,085. The smallest city, Fort Scott, has 9,296 people and a per capita expenditure of \$6.32. The estimated per capita expenditure reaches \$8.12 for a city with a population of 80,000 and then gradually increases to \$8.63 for a city with a population of 250,000. The curve fits the observations better after a population size of 15,000 is reached.

Cities of the second class which have comparable population sizes to some of the cities of the first class tend to have relatively higher per capita expenditures. The trend of both functions over the comparable range is toward increasing per capita expenditures as city population size increases, if the lower range of the function developed for cities of the first class, which does not fit the observed data, is ignored.

Brazer's analysis, which included cities of comparable population sizes, found that the association between per capita expenditures and population was statistically significant for police protection, only, among the eight expenditure categories

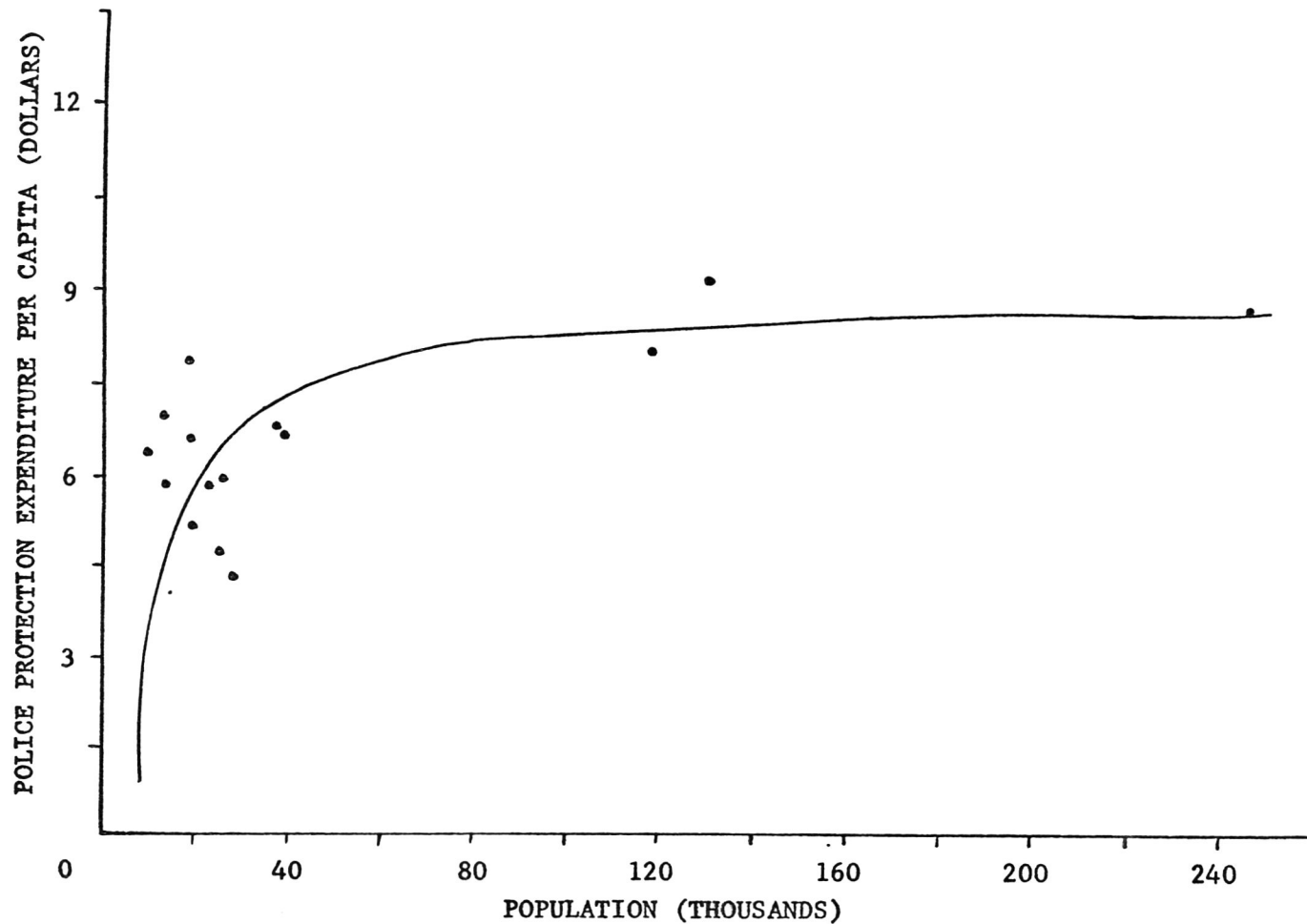


Figure 25. Police protection expenditure per capita in relation to population for Kansas cities of the first class, 1959-61 average.

$$(Y = 8.87 - \frac{60,007}{X})$$

studied.<sup>78</sup> The simple correlation coefficient was .24.<sup>79</sup> However, in the multiple correlation analysis, population was less important than population density, median family income, employment per 100 in manufacturing, trades, and services, and inter-governmental revenue per capita. The relationship indicated between the two variables was almost horizontal, as is true for most of the range in this analysis.<sup>80</sup>

Schmandt and Stephens, who, unlike Brazer, considered service levels, did not find a significant correlation between per capita police protection expenditures and population, but did find a high positive correlation between service levels and population and a very high negative correlation between per capita expenditure per police activity performed and population.<sup>81</sup> This indicates that there may exist economies of scale which are hidden by a tendency for the police department of larger cities to perform more services. Also, crime rates are typically higher for large population centers, particularly those with very high densities of population.

#### Fire protection expenditures

Total expenditures for fire protection are somewhat lower than those for police protection, the average being almost \$318,000 for the former and \$390,000 for the latter. The two

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<sup>78</sup>Ibid., p. 25.

<sup>79</sup>Ibid., p. 76.

<sup>80</sup>Ibid., pp. 25-28.

<sup>81</sup>Schmandt and Stephens, loc. cit.

categories roughly parallel each other.

The predictive value of the per capita fire protection expenditure curve of Figure 26 is not very high as the degree of variation indicates. Overland Park has a population of 28,085 and a per capita expenditure of only \$.82, while Hutchinson has a population of 37,392 and a per capita expenditure of \$9.67. The general tendency, inasmuch as one may be seen, is toward increasing per capita expenditures as city population increases. The curve estimates that per capita expenditures increase from \$2.95 for a city with a population of 8,000 to \$6.75 for a city of 250,000. However, at a population size of 100,000, the per capita expenditure is \$6.56, there being an increase of only \$.19 for the remainder of the range. Thus, per capita expenditures appear to be leveling off to a constant amount.

Over their common range of population the per capita expenditure function of the cities of the first and second classes almost coincide, the cities of the first class then continuing the upward trend beyond this range.

Brazer, finding no significant association between per capita expenditures for fire protection and population, found density of population, median family income, and intergovernmental revenue per capita to be positively correlated, while the rate of population growth was negatively correlated with per capita expenditures for fire protection.<sup>82</sup> Hirsch found that per capita expenditures for fire protection tended to decrease by

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<sup>82</sup>Brazer, loc. cit.



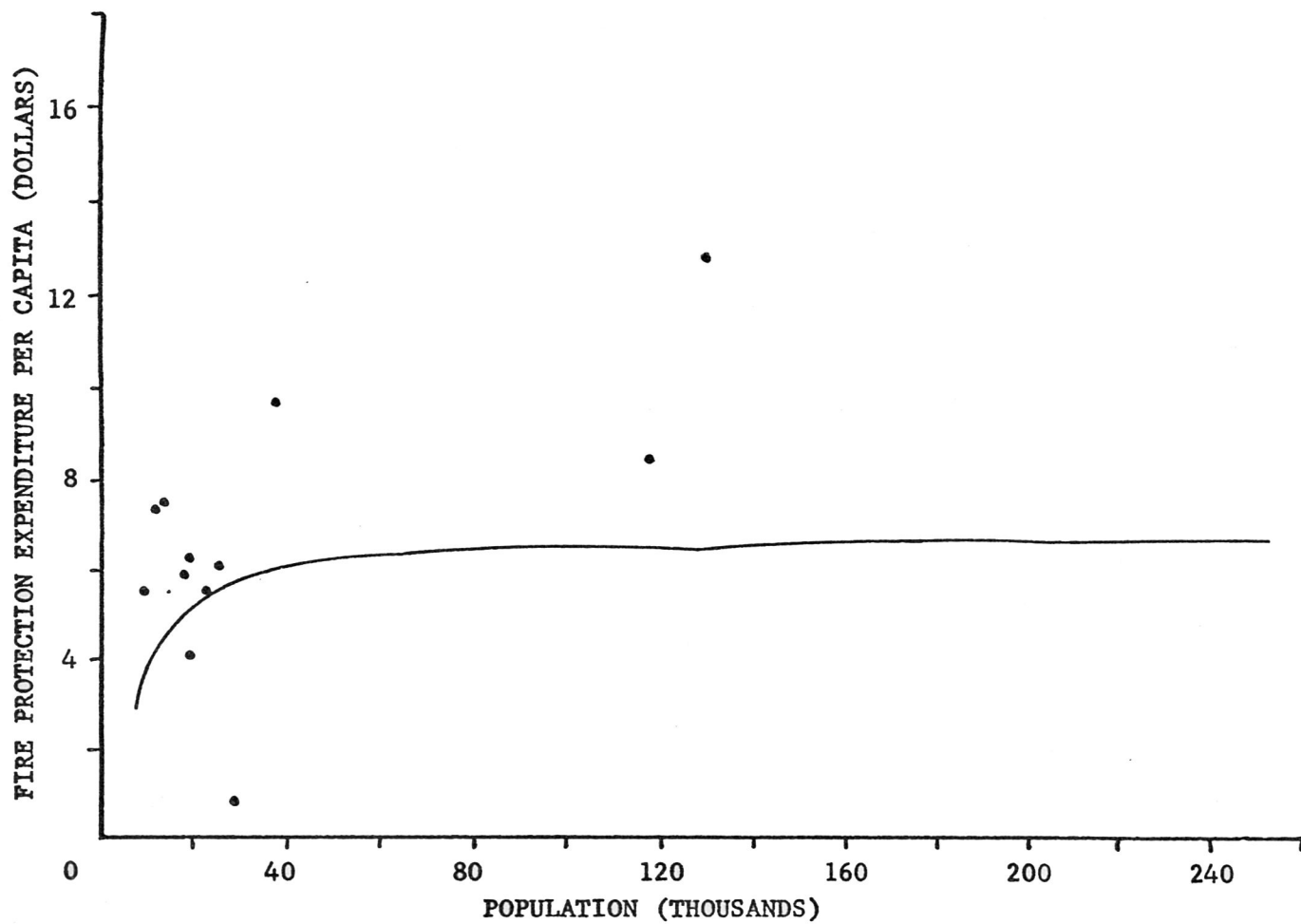


Figure 26. Fire protection expenditure per capita in relation to population for Kansas cities of the first class, 1959-61 average.

$$(Y = 6.88 - \frac{31,402}{X})$$

\$1.24 as population size increased from 1,000 to 110,000 and then to increase by \$3.62 as the population size increased to 300,000.<sup>83</sup>

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<sup>83</sup>Hirsch, op. cit., p. 238.

## V. APPLICATION OF FINDINGS

### Township Government

The analysis of townships in counties without road unit systems reveals that there appear to be very substantial economies of scale for township government. Total expenditures per capita were shown to decline throughout the entire population range studied, the estimated decline amounting to over \$130. Per capita expenditures tended to be particularly high for townships of less than 600 people, which includes the majority.

Practically all of this reduction appeared to be caused by economies of scale in providing local roads, by far the most important function of these townships. This function, alone, accounted for \$10,600 of the \$11,564 spent by the average township in the sample of 85. Much of the remaining decline was in general government expenditures. Expenditures for general government amounted to \$348 of the remaining expenditures of the average township in the group. The decline in per capita expenditures for general government was very pronounced for townships with less than 800 inhabitants, per capita expenditures becoming relatively unimportant for the few townships that were larger.

Those townships in counties with road unit systems perform only a few minor services and have very small expenditures. The average township in the group of 71 spent a total of only

\$430. Per capita expenditures declined rather rapidly for townships of less than 400 inhabitants, after which they increased to a minor degree. General government expenditures made up almost half of the total expenditures for the average township. Per capita expenditures showed a tendency to decrease very rapidly up to a population size of 200. In the fore part of the range, general government expenditures were almost the whole of total expenditures were for general government, and the decline in per capita expenditures was almost the same as that for total expenditures per capita. They tended to increase slowly beyond a population size of 400.

Since there appear to be rather substantial economies of scale which most Kansas townships do not have advantage of, the question arises as to what should be done to take advantage of these economies. The national trend was shown to be toward the elimination of township government and the transfer of its traditional functions to the county. It appears that the elimination of townships in counties with road unit systems would require only minor adjustments, as these units have already lost their most important function to the counties.

The major adjustment which would be required by elimination of townships in counties without road unit systems is, obviously, the transfer of the township roads to the counties. The analysis of per capita road and bridge expenditures per capita of counties revealed that important economies of scale exist far beyond the range of population covered by townships.

It seems economically irrational not to take advantage of them and thereby minimize per capita road and bridge expenditures. The 57 which have adopted the county road unity plan have done so with marked success and satisfaction. Administration of justice and tax assessment could also be done more equitably and efficiently at the county level.

About three decades ago, one student observed in a study of township government in Illinois that "township organization adds to the cost of government without the addition of a commensurate service".<sup>84</sup> In 1934, Bromage called for the elimination of townships by: (1) direct legislative action where constitutionally allowed, (2) permissive legislation for the abolition of individual townships, or (3) legislation allowing abolition by county option.<sup>85</sup> This call has gone unheeded in Kansas, but as Wager stated in 1957, "Every argument advanced twenty-odd years ago for their elimination has become even more cogent with the passage of time."<sup>86</sup> He adds that there is no threat to local government when the enlarged service area is still within the bounds permitted by present transportation and communications, and that local government needs to be defined in twentieth century terms.<sup>87</sup>

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<sup>84</sup>Quoted in Bromage, op. cit., p. 140.

<sup>85</sup>Ibid., p. 144.

<sup>86</sup>Wager, op. cit., p. 459.

<sup>87</sup>Ibid., p. 475.

As interest in township government has declined, it appears that elimination of townships is politically, as well as economically, justified. Conceivably, the only formidable opposition would come from township officials with vested interests in the continuation of township government. Howards has provided an account of how this happened in Illinois.<sup>88</sup>

Although existing law allows boundary changes under specified conditions, it does not allow the elimination of townships. Therefore new legislation which would, preferably, eliminate township government, directly, would be necessary. Were such legislation found politically impractical, perhaps the best alternative would be elimination by county option, although this would materially slow down the attainment of the politically and economically optimum structure of local government.

#### Counties

The analyses of both groups of counties indicated substantial economies of scale for all government activities, combined. Per capita total expenditures of the counties with road unit systems tended to decline by more than \$100 (from \$158 to \$56) as population increased from 2,000 to 50,000. The total expenditures per capita of the counties without road unit systems showed a tendency to decline by more than \$164 (from \$198 to \$34) as population increased from 4,000 to 100,000. Thereafter, they

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<sup>88</sup>Irving Howards, "Rural Progress Step," National Civic Review, XLIX, No. 6 (June, 1960), 286-292.

increased by \$18 as population increased to 330,000. This was caused, perhaps, by a combination of increased service levels and certain diseconomies of scale (e.g., higher wage costs, which are typical for urbanized areas).

An analysis of some individual expenditure categories revealed economies of scale for each category studied. In no case were diseconomies of scale shown for counties with road unit systems, and the economies seemed rather substantial. Economies of scale were shown throughout the population range for all categories of the counties without road unit systems except in the cases of total expenditures per capita, road and bridge expenditures per capita, and agricultural extension expenditures per farm, in which cases the diseconomies came rather late in the range and were fairly minor.

The points of inflection in the per capita expenditure curves were at a population size of approximately 100,000 for total expenditures, a population size of approximately 175,000 for road and bridge expenditures, and approximately 2,000 farms for agricultural extension expenditures. Perhaps much of the increase shown was caused by increased service levels. The most important categories in the achievement of these economies, among those studied, are apparently roads and bridges, public welfare, and general government, in that order.

Apparently, then, most Kansas counties are operating at inefficient sizes. The analysis indicates that the most efficient size of county is one with a population of approximately

100,000, other things remaining equal. However, for most of Kansas, other things are not equal. Particularly the population density of most areas precludes the development of counties of this size, as the area of the new counties would prohibit optimum citizen participation. A county with a population of 50,000 would apparently obtain most of the economies of scale. Such a population size is obtainable over much of Kansas. Perhaps in other areas such as the extreme western part of the state, 25,000 would serve as a goal. The very low population density does not preclude consolidation and does not justify the present county structure, but it does serve as a limit on the attainable population size. The decline in per capita expenditures is most rapid in the lower ranges of population.

This is not the first time that county consolidation has been proposed for Kansas. During the drought and depression years of the 1930's, the burden of local property taxes became oppressive, resulting in widespread tax delinquency and the sale of land for taxes. In 1932, "County taxpayers organizations were being formed . . . at the rate of one a day throughout most of the nation" to propose reforms in county government to reduce expenditures and tax burdens.<sup>89</sup> One type of reform would have altered the internal organization of the counties by consolidation of offices, introduction of county-manager government, introduction of the merit system for selection of county officers, or a

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<sup>89</sup>Howard P. Jones, "Unrest in County Governments," National Municipal Review, XXI, (1932), 510, 514.



combination of these. The other type would have resulted in geographical consolidation.

Although both types of reform would have improved efficiency, neither was adopted. The movement for consolidation produced 10 legislative bills between 1931 and 1933 which would have reduced the number of Kansas counties, and similiar bills were introduced in other states. One such bill would have reduced the number to 45, but none of these were successful, of course.<sup>90</sup> With the return of economic prosperity, the problem was forgotten.

Euler, in 1935, examined some psycho-sociological factors which caused the failure of the Kansas movement. Important among these were: inertia, which "weights citizens and prevents change up to the point of crisis"; local pride, loyalty, jealousy, and tradition, which oppose changes in any type of changes in political boundaries or, particularly, changing the location of the county seat; and the opposition of economic interests which may fear loss of business if the political center of the area is changed.<sup>91</sup>

In addition to these factors are such factors as the opposition of office-holders, who fear loss of jobs and prestige. The local political machine typically resides in the county courthouse. State legislators may be reluctant to eliminate the

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<sup>90</sup>Robb, op. cit., p. 3.

<sup>91</sup>Euler, op. cit., p. 53.

county which they represent. Some citizens fear centralization and loss of government at the grass roots. However, future local government must be flexible enough to meet the demand of its citizens and prevent their appeal to higher levels if needed services are not forthcoming.

There are also practical problems which may hamper efforts toward consolidation. Counties which have a high property valuation per capita and low tax rates may fear increased rates and transfer of revenue to a county with a low valuation per capita, when a consolidation of the two is proposed. Some citizens may fear that old county property will go unused or be sold at a sacrifice price and that construction of new facilities will wipe out any savings caused by increased efficiency in providing services. However, frequently a civic use can be found for the old property. Some suggest that it be used to house some offices of the new county government, but this may be undesirable for economic and political reasons.<sup>92</sup> Further, the estimated savings by consolidating appear to be large enough to pay for new facilities in a very short time. Indebtedness by one county might also discourage consolidation.

These factors are some of the important ones which prevented consolidation in the 1930's and which will hinder it at present. But the main obstacle, or at least the limiting one, is the lack of legal provisions to encourage or bring about consolidation. Article IX, Section 1 of the Kansas constitution

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<sup>92</sup>Robb, op. cit., p. 75.

provides that:

The legislature shall provide for organizing new counties, locating county seats, and changing county lines, but no county seat shall be changed without the consent of a majority of the electors of the county . . .<sup>93</sup>

And article 2, Chapter 18 of the Revised Statutes of 1923 states that one-half of the legal voters in the areas affected by any proposed changes must sign a petition and submit it to the board of county commissioners, indicating what changes that they desire. The board must then order a referendum on the change at the next general election, insure that proper notice is given, and provide for the election procedures. A simple majority enacts the changes. The statutes also provide for the transfer of all officers and records of attached areas to the new county. The liability for all debts of the attached areas is transferred to the new county, the board of commissioners being given guidelines on imposition of a special levy to repay the debt.<sup>94</sup>

These legal provisions preclude county consolidation in the absence of a crisis in county government. The requirement of a petition signed by one-half of the voters is the most formidable problem. Shannon has said, "Only by state-wide action is it possible to give intelligent administrative direction to any rearrangement of county boundaries."<sup>95</sup> A brochure published by

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<sup>93</sup>Quoted in: Ibid., p. 31.

<sup>94</sup>Ibid., pp. 31-32.

<sup>95</sup>J. B. Shannon, "County Consolidation," Annals of the American Academy of Political and Social Sciences, CCVII, (January, 1940), 172.

the National Municipal League entitled Salient Issues of Constitutional Revision states that:

Most students of State-Local Relations are agreed that the legislature should be free to set by general law the rules for the incorporation, alteration of boundaries, merger, consolidation or dissolution of local government. Constitutional home rule, primitive or otherwise, should not stand as an insurmountable obstacle to the adjustment of the structure and boundaries of local governments.<sup>96</sup>

The state government is the only level from which an overall plan can be made and executed intelligently. Perhaps the first step would involve a survey of the entire state considering population, area, per capita property valuation, geographic, sociological and economic factors, etc. Only by doing this can meaningful well integrated county areas to deal with area-wide problems be planned.

If statewide action is impossible, no completely acceptable alternative remains. Permissive legislation, not requiring one-half of the signatures of all qualified voters, would be a step forward, but probably would not produce much, if any, consolidation. Functional consolidation, although perhaps a short run solution for the function involved, is not a permanent solution, because other functions are left to be provided on an uneconomic scale. One possibility is that if functional consolidation were carried far enough, it might reveal the disutility of the present structure of county government. Only county consolidation can result in a final and fundamental cure of the

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<sup>96</sup>Walter E. Sandelius and Frances S. Nelson, County Reorganization and the Kansas Constitution, A Report to the Kansas Commission of Constitutional Revision, p. 49. (Mimeographed)

dilemma. Anything else is only curing the symptoms.

### City Government

The results of the analysis of city expenditures were not so conclusive as those of the analyses of county and township government. In almost every case there was enough variation due to other factors to obscure the relationship between per capita expenditures and city population somewhat. Variation in service levels is undoubtedly one of the major factors affecting the variation in per capita expenditures around the regression curves that were developed. This factor perhaps tended also to hide any tendencies toward economies of scale as larger cities typically offer more services at higher levels of service.

Whatever trends were discernible by regression analysis varied from function to function. Total expenditures per capita of cities of the third class tended to increase as population increased. The estimated increase was over \$60 as the city size increased from 100 to 2,600. General expenditures per capita also increased up to population size of 800, after which a gradual decline was shown. Road expenditure per capita declined up to a population size of 400, after which they tended to increase appreciably. The entire analysis of the expenditures of cities of the first class prompted the suspicion that the increases in per capita expenditures was caused mainly by increased quantity and quality of services.

The increase that was shown in per capita total expenditures continued up to a population size of approximately 6,000

for cities of the second class, after which a decline occurred. Per capita expenditures for general government of these cities followed roughly this same pattern. However, a decrease in per capita expenditures for street and bridges was shown to occur. Police and fire expenditures tended to increase throughout the entire range of population, although the increase was rather slow and not very sizeable. Variation in service levels was, obviously, a complicating factor here, also.

The analysis of cities of the first class more clearly indicated that economies of scale tended to occur up to a population size of 60,000, although the variation about the regression curve still left much to be desired. Beyond this point, a gradual increase occurred. Analysis of some major functions of these cities failed to indicate completely the source of the decreased per capita expenditures. There was a very slight decrease in per capita expenditures throughout the range for general government and streets and sewers. However, increases occurred throughout the range for the functions of police and fire protection. Beyond a population size of 40,000, the per capita expenditure curve for the two latter functions became almost horizontal. Some substantial economies apparently occurred for services not analyzed.

Considering all three classes of cities together, it appears that the optimum size from the standpoint of economic efficiency of government may be near a population size of 60,000, although it appears that other factors than population size

affect the level of per capita expenditures. Particularly, smaller cities are limited in the services that they can attempt with reasonable efficiency, while larger cities are able to vary the quantity and quality of services in accordance with the willingness of local citizens to pay for them. The cities with highest per capita expenditures were found, generally, in the population range of 2,000 to 8,000, while those with the lowest were those with a population of 500 or less--those which offer the lowest levels of services.

Also considering the three classes together, general government expenditures per capita tended to decline beyond a population size of 600, disregarding the apparently unrealistic part of the estimating curve of second class cities which showed an increase. Street and bridge expenditures per capita also tended to decline throughout the range, although the decline becomes extremely small for the larger cities of the first class.

The trend in per capita expenditures for police protection, considering the cities of the first and second classes together, was a very gradually increasing one. The trend in per capita fire protection expenditures was more pronounced in the lower ranges of population, tending to level out beyond a population size of 40,000. Much of the increase in both of these cases was perhaps a result of relatively higher service levels, although such other factors as the tendency for wage rates to vary directly with the size of cities had some effect.

It is difficult to make definite suggestions, based upon

this analysis, which will solve the economic problems of city governments. First of all, there rarely exists a possibility for consolidation of cities because of distance limitations. Secondly, if such possibilities existed widely, this study fails to provide a good basis for suggesting such mergers because of the inability to show a high correlation between per capita expenditures and population size and because increasing costs tend to occur from some services.

However, there are apparently economies of scale up to a population size of 60,000 for all functions combined and throughout the entire range for streets and bridges and general government. Any suggestions must, in most cases, take the form of either city-county consolidation or city-county cooperation in the provision of specific services. Complete city-county consolidation is hardly feasible except in those cases in which the city and the county are largely coterminous and in which uniform services are provided over the entire area. Otherwise, a uniform tax rate would be inequitable. This applies to very few situations in Kansas, but, where applicable, considerable duplication of facilities and services could be eliminated.

A much more realistic suggestion for most situations in Kansas is city-county cooperation. Kansas cities are already making some steps in this direction. Although there is statutory authority for cooperation on public improvements and specific authority for certain activities, it would be desirable for the legislature to provide for ultimate cooperation or contractual



arrangements in the provision of any public service. This has been suggested by the League of Kansas Municipalities.<sup>97</sup> Such arrangements would appear to be particularly effective for general government and highway activities. The analysis of these functions for counties lends support to this.

A very good example of functional cooperation is that of Greene County, Missouri and the city of Springfield. A saving for the city of \$30,000 was realized in one year by contracting with the county for all collection of city taxes. An estimated annual saving of \$15,000 is made through contracting for use of the county jail facilities. By cooperating in the administration and holding of elections, \$5,000 is saved annually. Other benefits were obtained by common property assessment, the exchange of expensive and specialized road equipment, and cooperation in the provision of a single health department. In the latter case, they were able to hire a professional health administrator, which neither could have afforded independently.<sup>98</sup>

It appears that much duplication of road equipment could be eliminated by a common highway department. Considerable savings could conceivably be obtained by establishing a joint purchasing agency, the costs of this being prorated according to

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<sup>97</sup>League of Kansas Municipalities, The Financial Needs of Kansas Cities (Topeka: League of Kansas Municipalities), p. 15.

<sup>98</sup>Missouri Public Expenditure Survey, Substantial Benefits Available from City-County Co-operation (Jefferson City: Missouri Public Expenditure Survey, 1958), 7 pp.

the volume of purchases of each.<sup>99</sup> Other areas for effective cooperation could be mentioned, also.

In addition to these suggestions, several cities have successfully integrated their police and fire departments into a single public safety department in large cities. Perhaps this would also be feasible for some small- and medium-sized cities. Estimated savings of some cities are: Evanston, Illinois, \$70,000; Oak Park, Michigan, \$56,000; Winston-Salem, North Carolina, \$20,000 (in one district); Chicago Heights, Illinois, \$70,000; and Oakwood, Ohio, \$50,000.<sup>100</sup>

#### The Necessity of Action

"The important question that now faces rural local government is not whether it will change, but how it will be changed," says Clarence Hein.<sup>101</sup> This study shows the need for changes to improve efficiency. It appears that local government would be strengthened greatly by the transfer of the remaining township functions to the county. This alone would provide a greater scale of operation for counties, particularly where roads are

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<sup>99</sup>Missouri Public Expenditure Survey, Possible Areas of Cooperation Between City of St. Joseph, Buchanan County, St. Joseph School District (Jefferson City: Missouri Public Expenditure Survey, 1959), 8 pp.

<sup>100</sup>Missouri Public Expenditure Survey, Combined Police and Fire Services for Medium-Sized and Small Cities (Jefferson City: Missouri Public Expenditure Survey, 1960), 14 pp.

<sup>101</sup>Clarence J. Hein, "Rural Local Government in Sparsely Populated Areas," op. cit., p. 827.

still maintained by townships. The elimination of townships seems ultimately inevitable.

Local government would also be strengthened economically and politically by consolidation of counties. An intelligent general reorganization of county boundaries would strengthen local government in Kansas to the point of making it flexible enough to meet the demands of its citizens for decades.

Cities are limited, by nature, in what they can do to improve efficiency. However, functional cooperation and consolidation would appear to offer important avenues for increased flexibility and efficiency. Integration of police and fire department might provide substantial savings.

Professor William Anderson suggested a "rationalized scheme" of local government in 1949. This allowed for 200 city-counties each having a central city of at least 50,000 people, 2100 rural and part-rural counties, and 15,000 separate incorporated places, for a total of 17,800 contrasting sharply with the present 91,236.

This model would abolish all independent school districts, leaving state-supervised school districts to be administered by general local governments; eliminate most special districts, leaving the general local governments concerned (counties and cities) to establish special assessment districts. Townships would relinquish all active functions to the county, becoming only administrative subdivisions.

The model made the following assumptions: (1) with few

exceptions, the citizen needs only one government between him and the state; (2) fewer local governments would simplify the citizens' task in the placement of responsibility; (3) fewer local governments would bring into closer approximation the resources and responsibilities of governmental units, and states would find it easier to develop shared-tax and grant-in-aid formulas; (4) the reduced number would more clearly correspond with meaningful communities of interrelated social and economic activity, reducing the number of broken areas.<sup>102</sup>

According to the Council of State Governments:

Local descretion is lost largely because of the inadequacy of local areas: because of their inability to act comprehensively and their limited fiscal capacity. Even greater grants of discretion and greater revenue aids from state governments cannot be appropriately utilized under the existing pattern . . . In the end, local government can be achieved and local democracy can have meaning only when the local government is structurally sound, when it serves an area large enough to permit the economical discharge of public functions and when it has sufficient revenue capacity to ensure substantial local responsibility for local services.

In conclusion:

Strong local governments can be achieved only through the enlargement of local units and effective local democracy can be achieved only in strong governments.<sup>103</sup>

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<sup>102</sup>Anderson, op. cit., p. 110.

<sup>103</sup>Council of State Governments, op. cit., p. 203.

## VI. SUMMARY AND CONCLUSIONS

Kansas has an excessive number of small local governmental units from the standpoint of both economic and political efficiency. County and township boundaries were set early in Kansas history when the level of technology did not permit the area of these units to be as large as is feasible today.

The analysis of township expenditures indicated that per capita expenditures of both groups decrease throughout most of the observed population range. The estimated decrease for townships in counties without road unit systems amounted to \$132 (from \$144 to \$12) as the number of inhabitants increased from 50 to 5,000. Most of this decrease was in road and bridge expenditures.

Townships in counties with road unit systems have very small per capita expenditures as they perform few services. However, estimated per capita expenditures decreased from \$15 to \$1.35 as the township population increased from 40 to 400, and then increased to \$2.80 as the population increased to 1100. About half of this decrease was in general government expenditures.

Per capita expenditures of counties with road unit systems decreased by more than \$100 (from \$158 to \$56) as the population increased from 2,000 to 50,000. For counties without road unit systems, the estimated decrease was \$164 (from \$198 to \$34)

as the population increased from 4,000 to 100,000. Then, per capita expenditures increased to \$52 as the population increased to 330,000. The most important economies were apparently in the categories of roads and bridges, public welfare, and general government, respectively. Per capita road and bridge expenditures of counties without road unit systems increased slightly beyond a population size of 175,000, as did agricultural extension expenditures per farm as the number of farms exceeded 2,000.

The results of the analysis of city expenditures were hardly so conclusive as those of the counties and townships. Considerable variation around the regression curves, much of which was caused by variation in service levels, precluded rigid conclusions. However, certain general tendencies were ascertained.

The economically optimum city population size appeared to be approximately 60,000, considering service levels. Although estimated per capita expenditures were as low as \$11.45 for a city of 100 people, the level of services offered by a city of this size is low. Per capita expenditures tend to increase to \$140 for a city of the first class with a population of 8,000, declining to \$62 for a city with a population of 60,000, and increasing to \$88 for a city with a population of 250,000. General government expenditures per capita tended to decline beyond a population size of 600, while street and bridge expenditures tended to decline throughout the entire range. On the other hand, police and fire protection expenditures per capita

exhibited a tendency to increase throughout the range.

These findings, supported by the findings of related studies led to the conclusion that it is economically and politically desirable to reduce the number of local governmental units. Specifically, the townships should have their functions transferred to counties, while counties should be consolidated into units of 25,000 to 100,000 people depending on the population density. Cities could apparently gain considerable economic benefits from city-county cooperation, although consolidation of cities is usually impossible.

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ECONOMIES OF SCALE IN THE LOCAL  
GOVERNMENT OF KANSAS

by

ROBERT EDWIN SHEPHERD

B. S., North Carolina State College, 1962

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AN ABSTRACT OF A MASTER'S THESIS

submitted in partial fulfillment of the

requirements for the degree

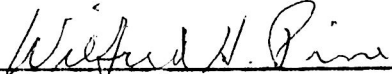
MASTER OF SCIENCE

Department of Economics and Sociology

KANSAS STATE UNIVERSITY  
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Major Professor

America is noted for its extreme number and overlapping of governmental units. Kansas is third in the number of all units of local government and ranks from third to eighth in the number of specific types of local governments. Since 1942 the number of local governments in Kansas has decreased from 11,115 to 5,411 through consolidation of school districts. The number of counties is unchanged while the number of other local governments has increased. The average state had 1,825 local governments in 1962.

County boundaries were set by 1892, the limiting consideration being that any citizen should be able to make a round trip by horse and buggy between the courthouse and his home from sunrise to sunset. Townships were established to maximize citizen participation in local government, the lines generally following the public lands survey. Thus, county and township boundaries are based upon a technology which is extremely outdated. Cities have been incorporated throughout Kansas' history whenever a very small citizenry has wished to be incorporated.

The objectives of this study were to test the hypothesis that average expenditures of counties, cities, and townships decrease as the size of the unit increases and to draw whatever policy conclusions that appear justified. The unit size is expressed in terms of population, except that for counties the number of farms and the number of welfare recipients appear to be better criteria for agricultural extension services and social welfare services, respectively.

The methods were correlation and regression analysis, relating total expenditures for all functions and for specific functions to the unit size. After the total expenditure equation was developed, the average (usually per capita) expenditure equation was derived from it and checked for reasonableness against the observed average expenditures.

The findings were that the hypothesis was true for counties and townships throughout most of the observed size ranges. The findings of the analysis of city expenditures were less conclusive because of considerable variation around the regression curve, which was, perhaps, caused largely by variation in service levels. Most townships appeared to be much smaller than the economically optimum size, and per capita expenditures were still declining at the far extremity of the observed population range.

Substantial economies of scale were discovered for counties for all functions together and for each function studied separately. However, a slight increase occurred in total expenditures per capita beyond a population size of 100,000, in per capita road and bridge expenditures beyond a population size of 175,000, and in agricultural extension expenditures for counties with more than 3,000 farms.

In spite of the amount of variation among cities of the same size, per capita expenditures for all functions appeared to decrease as the city population increased to 60,000, after which a gradual increase occurred. Per capita expenditures for streets

and bridges and for general government tended to decline, while police and fire protection expenditures tended to increase throughout the observed range.

It was concluded that since most townships perform very few services and since those which do perform them do so on an uneconomic scale, their functions should be transferred to the counties by legislative action. As county expenditures per capita declined up to a population size of 100,000, the legislature should consolidate counties. Although area is a limitation on consolidation, a population of 25,000 is feasible for most of Kansas. Cities can infrequently consolidate, but they can frequently reduce duplication of facilities and services by city-county cooperation.