SPECIAL ASSESSMENTS IN AMERICAN CITIES: A STATISTICAL STUDY IN MUNICIPAL FINANCE

by

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SPECIAL ASSESSMENTS IN AMERICAN CITIES

A Statistical Study
in
Municipal Finance

CHAPTER I

INTRODUCTORY

I Definition of Special Assessments

It is perhaps proper to introduce the subject by definition. Special assessments have been defined in various ways by different writers on public finance. The difference is rather one of phraseology than of substance. Thus Professor E. R. A. Seligman puts it this way: "A special assessment may be defined as a compulsory contribution, levied in proportion to the special benefits derived, to defray the cost of a specific improvement to property, undertaken in the public interest."[1] The Bureau of the Census in the Financial Statistics of Cities defines the special assessments as "Compulsory contributions levied under the taxing or police power to defray the costs of specific public improvements or public service undertaken primarily in the interest of the public."[2] Professor Jens P. Jensen has defined the special assessments in a similar manner, as follows: "Special assessments are proportional contributions paid by the owners of land on the occasion of certain types of improvements made by the public authorities which have increased the value of the land."[3] In whatever manner the

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1 "Essays in Taxation: 7th edition, p. 283.
2 Financial Statistics of Cities: 1923.
3 Problems of Public Finance: p. 158.

special assessments are defined, the description is essentially the same. Such words as "specific" or "special benefit", "apportioned" or "in proportion to", "local" or "public improvements" etc. are usually employed to indicate the characteristics of the special assessments.

II Importance of the Subject

The shifting of population to the cities during the past few decades, with the resultant increase of cities and their population, have placed new burdens on the municipal corporation and created new problems in municipal finance. Means have to be sought to raise additional revenues to defray the costs of local improvement and public construction. While the general property tax has been and is the chief source of municipal revenue, special assessments have steadily maintained the place as an important source of income of the cities for the past twenty years, and are even gaining popularity in the municipal financing, especially with the newer cities in the middle west and west. Of all the revenues received by 184 cities having a population of over 30,000 in 1910, which amounted to $759,942,445, $66,395,107 were obtained from special assessments and special charges for outlays, constituting 8.7 per cent of the total revenue and $2.43 per capita.[1] In 1925, the amount of special assessments collected by the 247 cities

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1 Financial Statistics of Cities: 1910.

increased to $184,347,377, an increase of 178.9 per cent over 1910, making $4.52 per capita.[1] Not only does the general tendency of increased use of special assessments as a reliable source of municipal revenue make the fact that "No American who treats of public finance as a whole can fail to be struck with the importance of the special assessments in actual operation,"[2] but the principles and doctrines that have been evolved and developed through the numerous litigations in the various courts in the United States have placed much importance of the subject in the domain of public finance.

III History of Special Assessments

A. Origin

The origin of special assessments has been traced back to England. The principle of assessment for benefit was found to have been first embodied in the act of 1662, which was passed to authorize the widening of certain streets in Westminster.[3] The commission to lay out the streets was empowered to charge the owner of the property in proportion to the benefits received in case the voluntary subscriptions were insufficient to meet the expense

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1 Financial Statistics of Cities: 1925.
2 Seligman, E. R. A., op. cit., p. 283.
3 Ibid., p. 241.

of widening the streets designated. The clause read:

> And whereas, the houses that remain standing...will receive much advantage in the value of their rents by the liberty of ayr and free recourse for trade and other conveniences by such enlargement, it is enacted...that...a jury,...shall judge and assess upon the owners and occupiers of such houses, such competent sum of money or amend rent, in consideration of such improvement and renovation as in reason and good conscience they shall judge and think fit.[1]

Five years later in an act providing for the rebuilding of the city of London after the great fire, the word "benefit" was specifically used and the uses to be made of the contributions were also mentioned. Witness one of the significant clauses:

> For the better effecting thereof, it shall...be lawful...to impose any reasonable tax upon all houses within the said city or liberties thereof, in proportion to the benefit they shall receive thereby, for and towards the new making, cutting, altering, enlarging, amending, cleansing and scouring all and singular the said vaults, drains, sewers, pavements and pitching aforesaid.[2]

B. Early Historic Development in the United States

The history of the system of special assessments in this country has been well treated by Victor Rosewater in his work Special Assessments--A Study in Municipal Finance. He traced the origin of the system to the time of colonial New York and analyzed its subsequent developments in the various other commonwealths. In his introduction he wrote:

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1 13 and 14 Chas. II., chap. 2, sec. 29. Quoted by Seligman, E. R. A., op. cit., p. 342.
2 19 Chas. II., chap. 3, sec. 20. Quoted by Seligman, E. R. A., op. cit., p. 342.

> This method of raising revenue for local improvements long remained peculiar to New York. No noteworthy headway seems to have been made in gaining a foot-hold in the other commonwealths until after the people began to recover from the effect of the war of 1812. The first development of the system, then, corresponds roughly with the movement for the construction of internal improvements covering the years just before and after 1830, and dying out with the crises of 1837. Another tendency to spread to the newer commonwealths displayed itself along the later forties and early fifties, coinciding to a great extent with the era of premature railway building. The final movement began immediately upon the close of the late civil war; it is a more general phenomenon than the earlier ones, and has not yet quite ceased its victorious march over the far-western portions of the country. It has even made some headway in crossing the Canadian border.[1]

But as a revenue system, special assessments were first developed in New York. Thus continued Rosewater: "In New York it has been longest in continuous operation; in New York it has achieved its greatest and most extensive results."[2] It may not involve too much repetition to review briefly the historic development of the system in New York as outlined by Dr. Rosewater in order to have a more comprehensive view of its early development in this country.

C. Historic Development in New York

"Taxation by special assessment for benefits traces its origin in this country back to the period of colonial New York."[3] The first act providing for special assessment was passed in September, 1691 by the assembly of the Province of New York. This act, entitled "an act for regulating the

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1 Rosewater, V., op. cit., p. 21.
2 Ibid., p. 22.
3 Ibid., p. 22.

buildings, streets, and lanes, wharffs, docks and allyes of the city of New York," authorized the mayor and aldermen to appoint surveyors and supervisors to see that the streets and other places be conveniently regulated; to obstruct buildings which might narrow the street; and to exercise the right of eminent domain under certain prescribed conditions.[1] The effective clause of this act was copied almost literally from the twentieth section of the English act passed in 1667 and reenacted in 1670, to regulate the rebuilding of London after the great fire.[2] Witness the similarities of the clauses:

> And for the better effecting whereof, it shall and may be lawful to and for the said Mayor, Aldermen and Common Council,...to impose any reasonable Tax upon all Houses within the said City, in proportion to the benefit they shall receive thereby, for and towards the making, cutting, altering, enlarging, amending, cleansing and scouring all and singular the said Vaults, Drains, Shoars, Pavement and Pitching aforesaid.[3]

While it is probable that only little actual use was made of this law, yet it remained in force in 1772 and was practically reenacted after the revolution by the new commonwealth government in 1787.[4] After that date, the various acts passed in 1793, in 1795, in 1796, in 1801, and in 1807 were simply to re-affirm the power of the Mayor and Aldermen in the particular municipal improvement.[5] But in 1846, when convention was called to frame the constitution, the system of special assessments encountered some opposition.

1 Rosewater, V., op. cit., p. 22.
2 Compare with the quotation on page 4.
3 Rosewater, V., op. cit., p. 23.
4 Ibid., p. 23.
5 Ibid., p. 25.

The small element among the delegates which was hostile to the continuation of the system introduced, through Mr. Henry F. Murphy, a New York lawyer, to the committee on special assessments, two propositions in the attempt to restrict the future use of the system. The propositions were:[1]

> Sec. 2. "No local assessment for any improvement in any city or village shall be laid unless a majority of all the owners of the lands to be assessed shall apply for such improvement, nor unless such improvement shall be ordered by a vote of two-thirds of the common council or board of trustees of such city or village."
>
> Sec. 2. "No assessment for any improvement in any city or village shall be laid otherwise than by general tax upon the taxable property of such city or village, levied and collected with an annual tax for other expenses."

Neither of these propositions was reported back to the convention by the committee. "Had the one been incorporated into the constitution," wrote Dr. Rosewater, "the system of special assessment for benefit would have come to an untimely end; had the other been adopted, its usefulness would have been forever restricted."[2]

It is interesting to note the arguments presented by Mr. Murphy in his opposition to the system of special assessments.[3] He believed the practice of assessing in any form for special benefit for any public improvement to be unsound in principle, because it introduced an arbitrary

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1 Rosewater, V., op. cit., p. 27.
2 Ibid., p. 27.
3 Ibid., pp. 27-28.

of
method as a substitute, the fixed rule of taxation. Special assessment, he maintained, is taxation; and taxation, to be just, should be equal. No public improvement can be made without accruing some special advantage to some locality; consequently the assumption that there is in particular instances, a special local benefit, is false. It follows that the improvements which the municipal corporations are continually making, involving the taking of property and taxation for the purpose of advancing the interests of few individuals are not public improvements, and should not enter into the consideration of this question. The improvements which we are to regard are those in which the public is primarily interested. The sure test of such an improvement being public is, that it may be paid for out of the public treasury; that the necessity for it is such that the whole public is willing to bear the expense of it. This was his line of reasoning, but the argument was barren of result.

Thus there was left the question: Had the new constitution of 1846, notwithstanding all omissions of direct prohibitions, put into force any restrictions upon the legislature, that might be expanded so as to cover special assessments? The question was decided in the negative in the celebrated case of People vs. the Mayor, etc. of Brooklyn in 1851.[1] The masterly logic of Judge Ruggles permanently disposed of all objections on the score of taking private

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1 8 Wend., 85. (Rosewater, V., op. cit., p. 28.)

property without just compensation, and placed the system of special assessments firmly and solidly upon the foundation of legislative power of taxation. The decision in this case settled once and for all times the question of constitutionality of special assessment as far as the commonwealth of New York is concerned. "The courts henceforth had to deal not with the constitutionality of the legislative power but with the interpretation of statutory provisions."[1]

The subsequent legislation of New York after the constitution of 1846 has had to do chiefly with three points in the development of the system of special assessments in New York City, namely (1) The limitation of the corporation in levying the assessment; (2) the distribution of the power of special assessment among the various municipal authorities; and (3) a statutory remedy for the taxpayer for fraud or error.[2]

Though the consolidation act of 1882 made no great innovation, the commonwealth of New York up to that time had not confined its grant of power of special assessment to its metropolis alone, but had extended, one by one, to other local authorities as well, until at the present the system of taxation by special assessment for benefit is the foundation upon which local improvements are erected

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1 Rosewater, V., op. cit., p. 29.
2 Ibid., p. 29.

in every municipal corporation within its jurisdiction.[1]

IV Purpose of the Present Study

Since the work of Dr. Rosewater on special assessments was written, little has appeared on the subject. While Dr. Rosewater's work, with its elaborate and thorough treatment of the subject from the historical, practical, legal, and theoretical points of view, will probably remain for a long time the most valuable reference on special assessments and the authority on the subject, much can be learned of the subject by means of statistical analysis. For through such a study, may we discover the circumstances under which special assessments are most frequently and extensively used as revenue sources. It is the purpose of this study to analyze such statistical data as are fairly complete and representative of the operation of special assessments, and from which we may find something that will help in the interpretation of special assessments as sources of revenue.

Since the principle of special assessments, having been hitherto applied only to a negligible extent by the federal and state government, is essentially a principle of municipal finance, the study will be restricted to the statistics of special assessments of the various municipalities. Inasmuch as the annual statistics available at the present time are limited to those of the cities having a population of

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1 Rosewater, V., op. cit., pp. 33-34. For the development of the system in other commonwealths, see pp. 34-52.

30,000 or over, the analyses will be confined to the special assessments of that class of cities.[1]

It is necessary to select statistical variables, other than those of special assessments as indexes of other factors that may be significant as the determinants of the use of special assessments by the municipalities. Eight other variables were selected, with reference to which, the data of special assessments have been correlated, analyzed, and interpreted. The eight series are as follows: the size of the cities, the rate of growth of population, the wealth of the cities, the rate of growth of municipal wealth, the tax burden of the cities, the rate of growth of tax burden of the citios, the size of the municipal indebtedness, and the rate of growth of the municipal indebtedness. It is not argued that a correlation of the statistics of special assessments with these eight other series of statistics will disclose all the information desired on the subject of special assessments. Nor is it contemplated that the analyses of the statistics of special assessments with reference to population, wealth, taxes, and debts will here be complete. But with due recognition of the limitations of time required and the material available, it is thought that the results of the analyses justify the study.

A word as to the method of procedure may be offered here.

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1 Unless otherwise explained, the term "cities" is used to mean those having a population of 30,000 or over.

With the exceptions of Chapters I, II and III, the method followed is statistical correlation. The variable representing the special assessments is compared through simple correlation with each of the eight other variables mentioned. The correlation tables are appended at the end of the manuscript. The formula used in the calculation of the Pearsonian coefficient is adopted from Professor Edmund E. Day.[1] The data used for our variables are obtained from Financial Statistics of Cities.[2] The period covered by the data is 1910-1920.[3]

It is pertinent to mention here that the statistics on receipts from special assessments are, for various reasons, defective. In the first place, the work of local improvement is sometimes performed directly on the initiative and at the expense of the owner of the abutting property, and the item of special assessment is not entered in the public revenue. Secondly, the contractor is sometimes paid by assessment bills to be collected by him, and the amounts assessed are frequently entirely omitted from the treasurer's books. And thirdly, where the city received by dedication new streets in suburban districts, it may have required as a condition precedent to acceptance that the cost of constructing the new roadway be defrayed

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1 Statistical Analysis: pp. 193-199.
2 Published annually, except for certain years, by the Bureau of the Census.
3 The data for the years, 1913, 1914, and 1920 are not published so as to be available for comparison.

by the property owners benefited, in which case the sum expended would not enter the municipal budget.[1] Despite the irregularities of procedure, it is believed that the data used are sufficiently comprehensive to overcome any disturbing effects.

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1 Rosewater, V., op. cit., p. 80.

CHAPTER II

HISTORIC DEVELOPMENT, USES, AND CHARACTERISTICS

I Legal Development

In the discussion of the history of the system of special assessments, it is pertinent also to mention its development in the legal interpretation and court decisions. The most important question seems to be that by what authority can the government constitutionally compel a class of citizens to pay for an improvement which, though it may confer perceptible benefits, is neither demanded nor desired by them? To this question, Dr. Rosewater had, through a review of the judicial decisions of the several commonwealths, reached a somewhat definite conclusion. He found that the judicial interpretations have passed through three stages of development--stages separate and distinct in spite of broad over-lapping and frequent confusion, namely:[1]

A. Under the Police Power

The principle of special assessments was first supported by the courts of the country on the ground of the police power of the state. This was natural in the early days, since the earliest objects for which special assessments were levied were analogous to sanitary regulations.

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1 Rosewater, V., op. cit., pp. 34-52.

The requirement of a property owner to drain his lot or to lay a sidewalk in front of it by the municipal authority came clearly under the police power to abate nuisance; and should the owner fail to follow the regulation, the assessment of the expenses for work undertaken by the municipal authority upon the property benefited could easily be regarded as a penalty for neglect to carry out the orders of the public officials.

B. Under the Power of Eminent Domain

The application of the police power theory to the justification of levying special assessments has its limitations. It assumes that the interference of private property by the state is necessary only when there is a clear case of default on the part of the property owners in their upkeep or maintenance of sanitation for public convenience. The principle of special assessment for benefit must have broader basis than the police power in the face of the necessity of certain public improvements for the expenses of which the assessments against the property owners could not be very well justified on the ground of police power.

Thus another theory was gradually developed. This theory, like the first, was conditioned by the purpose for which the system was applied. It was developed out of the process of opening new streets in the larger cities. The taking of private property for the construction of new

street involves the exercise of the right of eminent domain, and if there were injuries being inflicted upon the property owners as a result of such an operation, due compensation must be made to the injured party. On the other hand, every new throughfare usually greatly enhances the value of the abutting properties. Thus the owners by the enhanced value of their properties, may not be damaged at all, to say nothing of being positively benefited by such operation. The question arose as to the justification of paying damages to one who has not been injured. The only way to arrive at a just result, it was said, is to deduct the value of benefits accrued to the property owners from that of the properties taken from them, and to award the remainder, if any, as compensation. "This process," wrote Rosewater, "was apparently nothing more than the exercise of the power of eminent domain; and by extending its application, that power was invoked to support a compulsory contribution when the benefits conferred exceeded in value the property taken for the new street."[1]

"This fact," continued Rosewater, in supporting his assumption, "must account for and explain the statement frequently met with in the early reports, that a special assessment is not a tax. A tax is burden imposed by law, here we have no burden and hence not a tax."[2] The eminent domain theory of special assessment, however, soon

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1 Rosewater, V., op. cit., p. 87.
2 Ibid., p. 87.

encountered insurmountable difficulties. All the ingenuity of the lawyer, it was said, was needed in order to make it to cover impositions for benefit upon person from whom no real property was taken, and with the inauguration of special assessments for paving, parking, grading etc., it broke down entirely.[1]

C. Under the Taxing Power

With the failure of the eminent domain theory as a ground for special assessments to cover the more recently developed municipal functions in the nature of public improvement, the courts had yet to develop another theory in order to justify this particular form of compulsory contribution. Thus the whole system of special assessment was on the verge of destruction when a New York court in the famous case of the People vs. the Mayor of Brooklyn,[2] held that special assessment, being an exercise of the power of eminent domain without adequate compensation for the property taken, was unconstitutional and void.

Marking the beginning of another theory of special assessments, the reversal of the decision later by a higher court of the same commonwealth was very significant. In reversing the decision of the inferior court, Judge Ruggles of the highest appellate court of New York had to show

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1 Rosewater, V., op. cit., p. 87.
2 4 N. Y., 419. Reversing case of same title, 6 Barb., 209.

reason why special assessments are not included in the power of eminent domain but are levied under the power of taxation. In pointing out the distinction between the contributions made under these two powers, he said that the contributions in the form of taxation are demanded of the citizens only as his share of a public burden which is to be borne by him in conjunction with all other taxable citizens, while contributions demanded under the power of eminent domain are special exactions in addition to his share of the public burden. The fact that the imposition does not reach all subjects within the political district does not brand it as a special exaction within the scope of eminent domain, nor does it make it the less a tax. In Judge Ruggles' words:[1]

> The people have not ordained that taxation shall be general so as to embrace all persons or all taxable persons within the state or within any district or territorial division of the state; nor that it shall or shall not be numerically equal as in the case of capitation tax; nor that it must be in the ratio of the value of each man's land, or of his goods, or of both combined; nor that a tax 'must be co-extensive with the district or upon all the property in a district which has the character of and is known to the law as a local sovereignty;' nor have they ordained or forbidden that a tax shall be apportioned according to benefit which each taxpayer is supposed to receive from the object on which the tax is expended. In all these particular, the power of taxation is unrestricted.

Thus, with this reversal of the judicial interpretation, the system of special assessments was first given the recognition as a constitutional exercise of the taxing power.

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1 People vs. The Mayor of Brooklyn, 4 N. Y., 427.

and placed clearly and distinctly upon the theory of the power of taxation. Courts thereafter were not burdened with the task of looking for all kinds of refinement under the police power or the power of eminent domain for its jurisdiction, but simply proceed on the lines Judge Ruggles laid down in this celebrated case.[1]

D. Court Attitude Towards the System

Notwithstanding the fact that several judges of high authority have unreservedly denounced the principle of special assessment, such as Chief Justice Church of New York court of appeals, who charged that the system operates unequally and unjustly and leads to oppression and confiscation, the number of judges who have commended the principle of special assessment for benefit exceeds that of those who have denounced it.[2] The general good will of the judiciary not only has been shown in words of approval, such as expressed by Chief Justice Crozier of Kansas, that not only is there "a justice in this arrangement which commends itself to the approbation of any right thinking man, but the injustice of assessing property all over the city for the improvement of single street must be apparent at a glance,"[3] and that pronounced by Judge Nevius that he could see "nothing unfair or unequal, retrospective or

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1 Seligman, E. R. A., op. cit., p. 284.
2 Rosewater, V., op. cit., p. 125.
3 Hines vs. Leavenworth, Kansas: 3 Kan. 186., p. 202.

unconstitutional in the law of this kind,"[1] but also manifested in the ingeneous interpretations of the terms "taxation" and "assessment", solely for the purpose of establishing the validity of laws for special assessments.

For instance, when the constitution demands equal and uniform taxation according to a just property valuation, the impositions for benefits from local improvement is interpreted as not a tax within the meaning of such provision; if however, the legislative exercise of the power of special assessments be attacked, then it is regarded as sufficiently in the nature of a tax to come under the power of taxation. To use Rosewater's words: "To escape statutory exemption of charitable institutions from the burdens of taxation, a special assessment is not a tax, but in the levy and collection a special assessment is so far a tax as to come within the essential limitations as to apportionment and public purpose. It is held now to be a tax, now not to be a tax, just as constitutional limitations further or restrict its application. The trend of legal interpretation has been, and still is, favorable to the extension of the system of special assessment for benefit."[2]

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1 State vs. Dean: 23 N. J. L., 335.
2 Rosewater, V., op. cit., p. 126.

II The Uses of Special Assessments

The uses to which the special assessments may be put may be listed under the following headings:

A. Street Improvement

Special assessments may be used to finance the opening of new streets and the widening, extending and straighting of old ones; also grading, leveling, pitching and draining, providing them with pavements, guttering and sidewalks, beautifying them with shade-trees by day and lighting them by night.[1]

B. Betterment of Water-ways

Special assessments are employed for the removal of obstructions. The construction of embankment and piers is also included.[2]

C. Construction of Municipal Utilities

There are various monopolies of service whose cost of construction, when they are owned by the municipality, has often been defrayed in part by assessment for benefit against the property owners upon whose lots the pipes and wires have been laid--pipes of the sewers, water-works, gas-works, electric plant, and wire conduits.[3]

D. Sanitary Improvement

The building of levees and draining of swamps undertaken by the public authority have been effected under the

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1 Rosewater, V., op. cit., p. 105, and Seligman, E. R. A., op. cit., p. 284.
2 Rosewater, V., op. cit., p. 105.
3 Ibid.,,p. 105, and Seligman, E. R. A., op. cit., p. 284.

power of special assessment, and assessed in the ratio of benefit conferred upon the individual.[1]

E. Other Public Constructions

Cities have by means of special assessments, secured, improved, and developed public parks, squares and drives. Many commonwealths sanction the construction of turnpikes by assessment against abutting farm lands.[2] In Pennsylvania, such impositions have been objected to by the courts on the ground that agricultural lands cannot possibly reap any definite benefit from such undertakings. Thus the system of special assessment for benefit was restricted to the municipal improvements only.[3]

F. The Re-Pavement of Streets

The question whether or not the expense of re-paving of a street by the municipality can justly be met by special assessment has been a point of varied legal opinion. In a far-famed Pennsylvania case, Justice Sharwood expressed the opinion that the re-pavement of an old street is a part of the regular functions of a municipality. Therefore its expense should be met with the general funds:

> The original paving of a street brings the property bounding upon it into the market as building lots. Before that it was a road, not a street. It is therefore a local improvement with benefits almost exclusively peculiar to the adjoining properties. Such a case is clearly within the principle of assessing the cost on the lot lying upon it. Perhaps no fairer rule can be adopted than the proposition

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1 Rosewater, V., op. cit., p. 105.
2 Ibid., p. 105.
3 Ibid., p. 105.

> of feet front, although there must be some inequalities of the lots differ in situation and in depth....But when a street is once opended and paved, thus assimilated with the rest of city and made a part of it, all the particular benefits to the locality derived from the improvements have been received and enjoyed. Repairing streets is as much a part of the ordinary duties of the municipality--for general good--as cleansing, watching, and lighting. It would lead to monstrous injustice and inequality should such general expenses be provided for by local assessments.[1]

On the other hand, Justice Lindsay believed that there is no substantial difference between the construction and reconstruction of a street, thus the expense for re-paving may justly be met by special assessments. His argument is equally, if not more convincing than that of Justice Sharwood. In the words of Justice Lindsay:

> It is certainly well settled in this state that the cost of the original construction of the streets of a city may be imposed upon the owners of real estate alone without violating the constitutional limitations upon the legislative power of taxation. We can perceive no sufficient reason why the cost of the reconstruction of such streets may not also be assessed against the owners of the same character of property. In proportion as the trade and population of a city increase, the value of real estate advances. The owners of such estate receive and enjoy very nearly the sole permanent advantages accruing to the city from the construction, repairs, and reconstruction of the streets upon which their property may be situated. The general public certainly received incidental benefits from such improvements; but the benefits to the owners of real estate are direct, appreciable and permanent. The original improvement enhances the value of lots adjacent to the street improved by making it accessible to the public and attracting trade and population. This enhanced value can be preserved in no other way than by keeping the street in repair and by its reconstruction when too

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1 Hammit vs. Philadelphia: 65 Pa. St. 146, p. 155

> much worn to be longer repaired. Hence, so far as the right to impose this local taxation depends upon the enjoyment by the persons taxed of peculiar local benefits arising therefrom, it seems to us that there is no substantial difference between the reconstruction and the original pavement of the street.[1]

III Characteristics of Special Assessments

A. Distinguished from General Tax

Although special assessment is a form of tax, that is, a form of compulsory contribution imposed for public purpose under the taxing power of the state, it is to be distinguished from the general tax proper in many respects.

In the first place, the purpose of imposition is different. A general tax is levied to meet the running expenses of the government from which taxpayers receive in return no specific and measurable benefits, while the special assessment is levied to pay the cost of some positive service rendered by the government for a certain group who receives in return the equivalent amount of benefits.

Secondly, the principle upon which general taxation and special assessment are based is also different. The theory behind the special assessment has for its justification the idea of an equivalent. Thus it was stated in one case: "The principle upon which a corporation tax for the improvement of real estate is founded is quite

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1 Broadway Baptist Church vs. McAtee: 8 Bush., 508, p. 511.

familiar and understood. It is based upon the theory that the owner of the property assessed is to receive a benefit corresponding with the amount assessed, and that this to be paid to meet the cost and expense of the improvement. It is, therefore, of no consequence what the value of the lots may be, provided the enhanced benefit is equal to the assessment."[1] "The payment of a special assessment for benefit, then, is nothing more than an exchange," wrote Dr. Rosewater, "The improvement effects an enhancement in the value of adjacent real property for which the owner pays its market value."[2] On the other hand, the principle by which the general tax is imposed has not for its consideration the idea of equivalent or exchange. It is a forced contribution, while special assessment is a forced exchange.

Thirdly, the basis of contribution is again different. For taxation, the state takes as its test of ability to pay the various criterions, such as property, income, expenditure etc., while special assessments are necessarily apportioned in proportion to the ascertained benefits accruing to the owners of the real property.

Fourthly, the usefulness of the system of special assessment and that of the general tax have their respective fields; the former being confined largely to the field of

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1 Matter of Mead: 74 N. Y., 216, p. 221.
2 Op. cit., p. 86.

local finance, while the latter finds a scope of action throughout the whole realm of public revenue.

Other minor differences between these two forms of public contribution may be summarized as follows: Special assessments are almost exclusively exacted on the real property, while the general taxes are not so limited; the proceeds from the special assessments must be spent for the purpose with which it is levied, while that of the general taxes, being levied without any definite purpose, have no such limitation; and finally the power to impose special assessment by a municipality must be expressely granted by the legislative provisions while that to impose the general taxes is somewhat discretionary to the municipal authorities.

B. Distinguished from Special Tax

Special assessment and special tax have many points in common. They are both compulsory contributions, imposed under the taxing power of the state. They are both imposed by separate levy and upon certain class or group of taxable subjects. They are both imposed with special reference to the benefits supposed to flow from their expenditure. And the revenue derived from both of these forms of public contributions are expended upon objects which are calculated to be particularly advantageous to their contributors. What, then, are the precise distinctions between a special

assessment and a special tax? The fundamental distinction seems to lie in their different basis of contribution. As between the taxpayers within the district, created for the levy, a special tax is levied not according to the amount of specific benefit accrued to the contributors as is the case of special assessment, but according to evidence of their ability to pay. The levy of a special tax may in some case far exceed the benefits to be conferred, while that of a special assessment may be equal to, but never in excess of the benefits.

In summing up the three-fold distinction between the general taxation, special taxation and special assessment, we may use Dr. Rosewater's words: "Where the imposition is levied according to general ability to pay, it constitutes general taxation. Where it is thus levied, but upon a district determined with reference to benefits, it constitutes special taxation. Only where it is levied according to individual benefits accruing to the owners of real property, does it become a special assessment."[1]

C. Legal Limitations of Special Assessments

(1) Public Purpose

Special assessment may be authorized for public purpose only. Private benefit may be involved--in fact not only

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1 Rosewater, V., op. cit., p. 130.

be involved but capable of being realized within a reasonable and convenient time--but their object must be one in which the public is primarily interested.[1] The doctrine that the power of taxation can not be exercised for other than public purpose is most authoritatively set forth in the case of the Loan Association vs. Topeka, in which the opinion expressed by Justice Miller is worth noting. He said:

> To lay with one hand the power of government on the property of the citizen and with the other to bestow it upon favored individuals to aid private enterprises and build up private fortunes, is none the less a robbery, because it is done under the forms of law and is called taxation. This is not legislation. It is a decree under legislative forms. Nor is it taxation....There can be no lawful tax which is not laid for a public purpose.[2]

(2) Apportionment

Special assessment, in order to conform to the principle of equality and uniformity to its contributors, must be levied according to definite rule and apportioned within a fixed district. This power of apportionment belongs to legislature, though it may be delegated to the municipal authorities, or commissioners who estimate the benefits.[3] The power to fix the district, whether resting in the legislature or delegated to the municipal authorities, is discretionary and judicial in its nature. "The levying of the assessment," said Judge Currier, "was an exercise of

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1 Rosewater, V., op. cit., pp. 90-91.
2 20 Wallace, 664.
3 Rosewater, V., op. cit., pp. 95-96.

the taxing power. That is conceded. The legislature, therefore, in the exercise of this power, was at liberty in its discretion to impose the whole burden of the cost of proposed improvement upon the neighboring proprietors to be benefited thereby; and so it might in its discretion limit or extend the district to be taxed, and thus increase or diminish the sum to be paid by any particular proprietor."[1]

(3) Not to Exceed Benefits

A special assessment must not exceed in amount the estimated value of the benefit accruing from the improvement of which it is levied. This principle was first formulated by a careful writer on constitutional law in the following words:

> The conclusion, to be drawn from the main current of decisions may therefore be said to be that, notwithstanding some apparent exceptions, local assessments are constitutional only when imposed to pay for local improvements, clearly conferring local benefits on the property so assessed and to the extent of those benefits. They can not be imposed when the improvement is for general good, without an excess of local benefit to justify the charge.[2]

Thus, for the same reason that lands outside of the district and not benefited by the improvement, are not to be included in the assessment list, so property to which benefits do accrue ought not to be assessed over and above the value of those benefits. If special assessment is based on the principle of equivalent, then nothing more

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1 Uhrig vs. City of St. Louis: 44 Mo. 458.
2 Hall, James P., American Constitutional Law: vol. 1, p. 130.

than an equivalent can justly be taken from the taxpayer. Such a sum, it is argued, would so far as it exceeds actual benefit be clearly the taking of private property without due compensation; it would be an arbitrary act of confiscation, not taxation.

CHAPTER III

PRESENT PRACTICES

Before proceeding to the discussion of the statistical correlations of special assessments and the various other factors in the municipal finance, it is well to present a general survey of existing practices. In this chapter, is presented briefly the general trend of the use of special assessments and the variations in their uses by the differ- municipalities. Explanations are given where practicable; in other cases they are deferred to later parts of the study.

I General Trend

A. Absolute Increase

An examination of the annual reports on the financial statistics of the cities, published by the Bureau of the Census, reveals clearly that there has been a general increased use of special assessments. It will be noticed in Table I that in 1910, the 184 cities reporting received over 66 million dollars of local revenues in the form of special assessments, and in 1919, the 227 cities reporting collected over 69 million dollars, while in 1925, the amount received from the same source by the 247 cities increased to 184 million dollars. The increase for the period 1910-

TABLE I

Revenue Receipts from Specified Sources by Cities Having a Population of 30,000 or Over: 1910-1925*

Year	Number of Cities	Total Revenue in $1,000	General Property Tax			Special Assessments and Special Charges for Outlays		
			Amount in $1,000	Per Capita	Percentage to Total Revenue	Amount in $1,000	Per Capita	Percentage to Total Revenue
1910	184	$ 759,942	$ 474,531	$17.37	62.4 %	$ 66,395	$ 2.43	8.7 %
1911	193	805,720	485,066	17.38	61.6	68,510	2.40	8.5
1912	195	849,037	513,290	17.90	61.8	71,685	2.45	8.4
**1913	...	.....	.....	.....	....	.....	....	...
**1914	...	.....	.....	.....	....	.....	....	...
1915	204	940,385	570,831	18.72	62.0	79,890	2.56	8.5
1916	213	994,710	623,301	19.74	64.0	74,010	2.29	7.4
1917	219	1,065,537	666,403	20.48	63.0	83,196	2.50	7.8
1918	227	1,124,095	705,723	21.03	64.2	72,674	2.12	6.5
1919	227	1,224,113	784,903	23.13	65.5	69,006	1.99	5.6
**1920	...	.....	.....	.....	....	.....	....	...
1921	...	1,279,919	832,817	28.84	65.1	64,866	2.25	5.1
1922	261	2,007,009	1,337,784	34.54	66.7	103,135	2.66	5.1
1923	248	2,132,310	1,375,725	35.12	64.5	122,273	3.12	5.7
1924	248	2,322,578	1,491,234	37.30	64.2	147,780	3.70	6.4
1925	247	2,508,924	1,597,490	39.20	63.7	148,347	4.52	7.3

* Financial Statistics of Cities: 1910-1925

** Figures for 1913, 1914, and 1920 are not published so as to be available for comparison.

1925 was 178.9 per cent. While the increase for the period 1910-1919 was only 7 per cent, that for the period 1919-1925 was 167.1 per cent.

B. Per Capita Increase

Not only has there been an increase in the amount of special assessments collected by all the cities reporting during the period 1910 and 1925, but there is also a positive and significant tendency to increase in the per capita receipts of special assessments by the cities during the same period. Except for the years 1916, 1918, and 1919, shown in Table I, the per capita increase for the period 1910-1925 is fairly regular and constant. While the decreases during the three years mentioned are quite noticeable, the tendency to increase is quite evident. The abnormal war conditions abroad as well as at home during these years go far to account for the delays in the local improvements by the various cities, as reflected in the decreased expenditures made for outlays during these years. In 1911, 34.2 per cent of the net governmental cost payments was spent for various outlays. In 1917, this percentage dropped to 26.1 per cent and in 1919, it reached 21.1 per cent, the lowest percentage that has ever been reached during the entire period of 1903-1925.[1]

Two reasons for the delays stand out clearly. The

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1 Financial Statistics of Cities; 1925, Table VII, p. 40.

first is political. The patriotism of the war period made it necessary for the municipal governments to refrain from initiating local improvement projects in order not to hinder the national government in the industrial mobilization for war and in its war finance. The other reason was one of economy. During the years of advancing prices in 1918 and 1919, business prudence demanded that expenditures for permanent improvements by the municipal corporations be curtailed, or at least be postponed to the later date. Not only the high cost of materials and labor during such a time served as a check to extensive municipal construction, but the consideration of the heavy interest charges during the subsequent years worked as a factor to delay improvement projects.

But the postponement of municipal improvement was not possible indefinitely. Activities in the public construction and local improvements were resumed. And by the end of 1925, the per capita assessment for such expenses has increased 177.3 per cent since 1919. When contrasted with the decrease of 18.1 per cent from 1910 to 1919, the rate of increase during the period 1919-1925 indicates that the decreased per capita receipts from special assessments for certain years referred to were due to abnormal conditions during the war, and not as a part of natural trend in the use of special assessments.

C. Ratio to Total Revenue Receipts

While the tendency to increase in the use of special assessments is well indicated in the increased amount of the absolute as well as the per capita receipts from this form of municipal revenue during the period under consideration, the relative position of the receipts from special assessments to the total revenue receipts shows no such increase. In fact, the figures in Table I rather appear to show a gradually declining use of this method of municipal financing, as suggested by the smaller per cent receipts of special assessments to the total revenues in 1925 than that in 1910, 7.3 per cent for the former, and 8.7 per cent for the latter year. However, these tables should be studied in the light of other considerations.

In the first place, there is a wide difference between the rate of increase of receipts from the total revenue and that of receipts from special assessments. During the period 1910-1925, the rate of increase of the former was 230.1 per cent, while that of the latter was only 178.9 per cent. The difference in these rates of increase is inherent in the nature of the functions for which the respective revenues are spent. The general functions of a municipal government increase more rapidly in scope as well as in variety than its functions in local improvements. For instance, in the field of education, the function of the municipal governments have been vastly increased during

the past decade. The expenditures made by the various cities have increased from 28.6 per cent of the net general departmental expenses in 1911 to 38.7 per cent in 1924.[1] At the same time, their functions in the field of public constructions have been relatively decreased. The expenditures for outlays have decreased from 34.2 per cent of the net governmental expenses in 1911 to 30.9 per cent in 1924.[2] The increase in the aggregate of all public functions, in excess of the increase of the functions that can be financed from special assessments, is partly responsible for causing the latter to appear smaller and smaller in its annual relative positions.

Secondly, during the past decade there has been lessened occasions for the use of special assessments by the various municipalities, as a result of the advent of the motor-vehicle as means of transportation. The advent of motor-vehicle has created a vast volume of through traffic that did not exist before, and which requires wider, heavier, more durable, and therefore more expensive roads and streets. Besides, the heavier traffic deteriorates the roads and streets more rapidly than the strictly local traffic, thus requiring earlier reconstruction which means greater cost. But the expenses for constructing and maintaining such through traffic cannot justly be paid

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1 Financial Statistics of Cities: 1925, p. 51.
2 Ibid., p. 51.

by the municipalities alone, and particularly by the proceeds from special assessments. The specific local benefit of a new street or highway was and is that it makes that street accessible from the city generally. The through traffic is of no local benefit to abutting property owners. On the contrary, it is now recognized as a nuisance in many ways, as far as local traffic is concerned. It is decidedly unfair to saddle the abutting property owners with the cost involved in the through traffic.

That this fact is recognized may be seen in the striking increases in the expenditures made by the federal and state governments in the construction of local roads during the period 1914-1924. In 1914, only 24 millions of dollars were spent under the supervision of the state highway department for the building of rural highways; in 1921, it increased to 413 millions of dollars; and in 1924, it reached 605 million dollars.[1] For the period 1914-1924, the increase was 2402.8 per cent.

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1 Statistical Abstract of United States: 1925, p. 359.

Expenditures for Rural Highways by or under Supervision of State Highway Department, Including Federal Aid*
(In Millions of Dollars)

	1924	1921	1919
United States	605	413	24
New England	38	26	3
Middle Atlantic	112	101	12
East North Central	116	68	4
West North Central	82	47	2
South Atlantic	100	51	2**
East South Central	37	16	1**
West South Central	52	34	..
Mountains	30	24	2
Pacific	38	39	1

*Data from Statistical Abstract of United States: 1925, p. 359.
**1916 figures.

The recognition of this fact is also shown in the states' method of distribution of the receipts from motor-vehicle registration fees and gasoline-taxes. 24 out of 48 states contributed part of their receipts from motor-vehicle license fees in 1925, and 18 states, part of their gasoline-tax receipts.[1] Over 19 per cent of all the available funds from motor-vehicle registration fees was devoted directly to the purpose of constructing and maintaining the local roads by the various states, while over 22 per cent of the gasoline-tax receipts was also so used during the same year.[2] Through this method of disposition of the two revenues by the various states, it may be seen that the municipalities have been

1 Public Roads; vol. 7, no. 11, p. 211.
2 Ibid., p. 211

aided in the construction and maintenance of the local through traffic, whose expenses would have otherwise been financed by the proceeds from special assessments, even though the larger share of revenue thus distributed went for county roads rather than urban streets.

Thirdly, it may be mentioned that while the percentage of the receipts from special assessments to the total revenue has decreased from 8.6 in 1910 to 7.3 in 1925, the percentage of the expenses for highway department to the total departmental expenses for the period has also decreased from 11.6 in 1911 to 8.6 in 1925.[1] The rate of decrease in the highway expenditures was 25.9 per cent, while that of the receipts from special assessments was only 15.1 per cent. This lower rate of decrease in the use of special assessments than that of the expenses of the highway department during the period strongly indicated that the decreasing percentage of the receipts from special assessments to the total revenue receipts was due to the relatively lessened occasions for its use rather than to its undesirability.

With the foregoing explanation in view, the tendency, as suggested by the decreasing annual percentage of the receipts from special assessments to the total revenues, of the declining uses of special assessments seems to be more apparent than real. There is little basis for the

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1 Financial Statistics of Cities; 1925, p. 51.

idea that the system of special assessments is gradually falling into disuse because of the smaller annual percentages. On the other hand, the positive increase in the absolute as well as the per capita receipts from this source of municipal revenue during the period of our consideration warrants the belief that the trend of use of special assessments is still upward, within its limited field of usefulness.

II Variations in the Use of Special Assessments among Cities

A brief examination of Table II, exhibiting the relative extent of the use of special assessments by the ten selected large cities during the period 1910-1925, would readily show that there is a varied degree of use of special assessments. The receipts from special assessments vary very notably, not in the absolute amounts alone, but also in the per capita receipts and in their percentage to the total revenues as well. The city of New York, being the largest of all the cities listed, shows the greatest amount of special assessments received, usually exceeding 10 million dollars each year, while Boston never received more than $700,000 annually during the period.

Of all the cities listed, Seattle shows the highest degree of use of special assessments. Over 40 per cent of the total revenue received in 1910 and 1911 was from special assessments, the per capita amount being $21.16 and $21.28 respectively. On the other hand, Philadelphia

Table II

Receipts from Special Assessments in Selected Cities

TABLE

Receipts from Special Assessments in Selected Cities, Total,

City	New York			Chicago			Philadelphia		
Year	Amount in $1,000	Per Capita	% to Total Revenue	Amount in $1,000	Per Capita	% to Total Revenue	Amount in $1,000	Per Capita	% to Total Revenue
1910	$12,459	$ 2.61	6.3%	$ 5,785	$ 2.65	9.1%	$ 719	$ .46	1.9%
1911	12,279	2.48	6.3	5,632	2.51	8.5	765	.48	1.9
1912	10,839	2.14	5.3	5,807	2.53	7.8	551	.33	1.3
1915	12,203	2.29	5.9	6,292	2.62	7.8	1,036	.62	2.3
1916	10,012	1.83	4.5	6,161	2.52	7.6	1,142	.68	2.5
1917	14,800	2.64	6.3	9,246	3.70	10.5	698	.41	1.5
1918	8,875	1.55	3.7	9,265	3.64	10.0	774	.45	1.4
1919	6,788	1.24	2.6	12,563	4.79	12.7	377	.21	.6
1921	9,414	1.66	3.1	10,565	3.87	9.5	1,010	.55	1.2
1922	9,284	1.59	2.3	13,708	4.84	8.9	991	.52	1.1
1923	10,245	1.73	2.5	11,705	4.05	7.2	1,228	.64	1.3
1924	11,031	1.89	2.6	14,339	4.87	8.2	1,167	.60	1.1
1925	13,240	2.37	3.0	28,075	9.37	13.7	1,021	.52	.9

City	Seattle			St. Louis			Boston		
Year	Amount in $1,000	Per Capita	% to Total Revenue	Amount in $1,000	Per Capita	% to Total Revenue	Amount in $1,000	Per Capita	% to Total Revenue
1910	$ 5,019	$21.16	43.3%	$ 1,774	$ 2.58	9.1%	$ 675	$ 1.01	2.1%
1911	5,525	21.28	41.3	1,967	2.81	9.7	272	.39	.8
1912	4,016	14.47	35.2	2,297	3.23	10.8	557	.78	1.6
1915	3,646	11.65	24.4	2,860	3.88	12.3	291	.40	.8
1916	3,075	9.30	21.7	2,710	3.62	11.5	233	.31	.6
1917	2,755	7.90	17.8	2,676	3.52	10.2	365	.48	1.0
1918	2,548	6.95	16.1	1,549	2.01	6.3	264	.34	.7
1919	2,304	7.59	12.2	1,450	1.90	5.7	336	.46	.8
1921	2,200	6.80	7.5	1,553	1.99	5.0	343	.46	.6
1922	.....	6.43	6.9	1,384	2.33	5.2	287	.38	.5
1923	6,775	21.49	19.8	1,809	2.27	4.9	348	.45	.6
1924	4,367	.....	13.0	3,468	4.30	8.7	564	.73	.9
1925	4,253	.....	12.3	2,860	3.51	7.2	551	.70	.8

* Financial Statistics of Cities, 1910-1925. Figures for 1913, 1914, and 1920

II

Per Capita and Percentage to Total Revenue for Specified Years*

City	Detroit			San Francisco			Buffalo		
Year	Amount in $1,000	Per Capita	% to Total Revenue	Amount in $1,000	Per Capita	% to Total Revenue	Amount in $1,000	Per Capita	% to Total Revenue
1910	$ 942	$ 2.02	8.3%	$ 1,577	$ 3.78	12.9%	$ 1,369	$ 3.23	12.6%
1911	877	1.78	7.3	1,416	3.32	11.3	670	1.54	5.6
1912	875	1.74	6.9	1,474	3.40	10.8	592	1.35	4.8
1915	1,525	2.79	8.7	2,843	6.29	14.4	795	1.74	5.2
1916	2,347	4.22	11.1	2,327	5.06	11.7	1,009	2.17	6.1
1917	2,101	3.48	8.9	2,555	5.47	12.7	1,239	2.63	6.5
1918	2,134	3.39	8.1	1,651	3.48	8.2	1,234	2.57	6.4
1919	2,448	3.39	7.4	534	1.07	2.7	1,096	2.20	5.0
1921	.....	....	...	1,024	1.89	3.8	1,024	1.99	3.6
1922	4,760	4.79	7.3	926	1.76	3.1	1,117	2.13	4.0
1923	6,400	6.43	7.3	1,332	2.49	4.2	1,688	3.17	4.4
1924	7,538	6.43	7.6	1,831	1.83	3.0	1,831	3.46	5.6
1925	8,400	6.90	7.8	1,726	3.12	4.9	2,103	3.93	5.8

City	Cleveland		
Year	Amount in $1,000	Per Capita	% to Total Revenue
1910	$ 1,452	$ 2.59	9.9%
1911	1,181	2.04	7.9
1912	934	1.56	6.2
1915	1,356	2.12	7.5
1916	1,452	2.21	7.4
1917	1,877	2.79	8.4
1918	1,780	2.57	7.4
1919	1,687	2.21	6.3
1921	.....	....	...
1922	2,516	2.94	4.7
1923	4,512	5.08	7.6
1924	6,090	6.67	9.7
1925	5,325	5.69	8.5

are not published so as to be available for comparison.

seems to be the only city of its size that shows only a negligible use of this form of municipal revenue. The percentage of special assessments to the total revenues received by that city during this period seldom was greater than 2.5 per cent, while the per capita amount never exceeded $.70.

These wide variations of use of special assessments between cities show that the adaptability of the system of special assessments to each city is affected by one or more conditions. The causes for such variations must be deferred to the later analysis.

III Variations from Year to Year

Not only is there wide variation in the extent of use of special assessments by the different cities, but there are also quite noticeable fluctuations during the different years within a period for the same city. For instance, the city of Seattle, as already noted, collected from the special assessments over 40 per cent of its total revenues in 1910 and 1911, while it received only 7.5 and 6.9 per cent in 1921 and 1922 respectively. Again, the city of New York obtained over 14 million dollars from the special assessments in 1917, while it received only about 6 millions in 1919. Though such extreme fluctuations are not typical, being largely caused by the abnormal conditions created by such as world war in 1919 and economic crisis in 1922, the variations of the use of special assessments from year to year

are quite significant. It goes to indicate that the use of special assessments is affected by economic conditions in general and the relative position of any particular municipality.

IV Variations Among Cities of Different States

Table III exhibits the fact that there are as many different degrees of use of special assessments as there are number of states in which the reporting cities are located. The average for the period 1910-1920 for the cities in each state range all from 26.2 per cent to .1 per cent of the total revenue received by the cities within the state. Of the 41 states shown in the table, Oregon, with its one large city, shows the highest average of 26.2 per cent. Washington, with its five largest cities, has an average of 25.5 per cent which is second highest among the states. Idaho and Kansas followed with 21.5 and 20.9 per cent respectively, constituting the next two states which show high averages in the use of special assessments. Then followed Arkansas, Utah, Montana, and other states, as shown in Table III, down to New Hampshire which, with the average of the special assessments receipts of only .1 per cent, is the state making the least use of this particular form of municipal revenue.

TABLE III

Variation in Use of Special Assessments by Cities, Classified by States : 1910-1920

State	Number of Cities	Average Percentage for All Cities	Highest Average of Any City	Lowest Average of Any City	Highest in Any Year	Lowest in Any Year
Oregon	1	26.2%	26.2%	....%	35.2%	19.1%
Wash.	5	25.5	33.0	17.0	41.3	7.7
Idaho	1	21.5	21.5	.....	25.1	17.4
Kans.	3	20.9	31.8	15.4	49.1	9.9
Ark.	1	20.8	20.8	....	35.0	3.2
Utah	1	18.1	18.1	....	22.3	13.8
Montana	1	16.8	16.8	....	24.4	10.4
Mo.	5	16.7	22.3	9.5	37.3	3.9
Ind.	6	16.7	26.7	5.6	42.0	.5
Okla.	3	16.2	19.8	12.0	57.2	.**
Ala.	3	15.5	17.5	12.6	29.8	6.7
Calif.	10	14.8	21.8	10.3	35.8	1.2
W. Va.	3	13.9	23.5	.6	44.3	.2
Iowa	7	13.9	18.0	10.4	30.6	.8
Nebr.	2	13.4	14.0	12.8	17.7	10.1
Minn.	3	13.3	14.1	12.3	19.0	8.6
Ill.	10	12.2	19.6	5.0	31.5	1.2
Ohio	13	11.7	15.8	3.2	17.9	2.1
Wis.	8	10.1	17.8	2.4	27.5	.4
Mich.	9	9.3	13.7	5.3	21.2	2.5
Colo.	3	9.1	15.9	4.1	18.9	1.3
N. Y.	19	7.9	15.4	4.0	21.0	1.6
Ky.	4	7.2	13.1	5.1	17.8	.4
N. C.	3	7.1	9.4	3.3	14.2	.1
La.	2	6.3	10.7	1.9	29.6	.9
Tenn.	4	6.0	8.2	3.6	15.0	1.4
Pa.	18	5.9	11.6	.3	22.2	.**
Ga.	4	5.9	10.0	2.1	14.6	.9
N. J.	14	5.3	9.5	.2	14.1	.**
Fla.	2	5.3	6.7	4.0	19.2	.9
Tex.	8	4.0	11.8	.2	30.7	.**
Del.	1	3.9	3.9	....	8.1	1.3
Conn.	6	2.9	3.9	1.7	5.8	1.2
S. C.	2	2.9	4.0	1.9	9.7	.1
Mass.	24	2.2	4.4	.6	5.0	.2
Wash. D.C.	1	2.0	2.0	....	3.3	1.3
Me.	1	1.9	1.9	....	2.6	1.4
Md.	1	1.5	1.5	....	2.1	.4
Va.	4	1.2	2.0	....	3.9	.1
R. I.	3	1.1	2.5	.8	3.3	.3
N. H.	1	.1	....	....	.2	.1

** Less than one-twentieth of 1 per cent.

V Variations Among Cities within Each State

The variation of the averages of the percent receipts of special assessments to the total revenue by the cities of different states being very noticeable, the variation of receipts in certain years by the different cities within a state is still more pronounced. For instance, in the state of West Virginia, the relative extent of use of special assessments by its three largest cities, when expressed in the averages for the period, ranges from 23.5 to .6 per cent of their respective total revenue receipts, but when expressed in terms of the highest and lowest years of use of special assessments by any of these three cities, the range was from 44.3 to .2 per cent. In the state of Illinois, with the 10 larger cities, some received from special assessments, during the period 1910-1920, an average of 19 per cent of their total revenue receipts, while others received, an average of 5.0 per cent only. During the same period, the highest degree of the use of special assessments by any city at any year was 31.5 per cent of the total revenue, while the lowest degree of the use was .2 per cent. In Ohio, the range of variations in the averages is from 15.8 to .3 per cent, while that of the high and low points of use was from 17.9 to 2.1 per cent. Among all the states, the cities in West Virginia showed the widest range of variations in the averages in the use of special assessments, being from 23.5 to .6 per cent for

the period, while the cities in Oklahoma showed the widest range of the highest and the lowest points of use during the same period, being from 57.2 per cent in one year and less than one-twentieth of 1 per cent in another.

VI Variations Among Geographical Divisions

It would be, perhaps, still more significant to show the relative extent of use of special assessments by arranging the states into geographical divisions. A glance at Table IV reveals many points of interest in this connection. The New England states, comprising Maine, New Hampshire, Massachusetts, Rhode Island, and Connecticut, show a decidedly limited use of special assessments. The median of the averages of the percentage receipts of this form of revenue by all the cities in that section of the country for the period 1910-1920 is only 1.9 per cent.

The cities in the Middle Atlantic section of the country which is occupied by the three states, New York, New Jersey, and Pennsylvania, show a somewhat higher use of special assessments. The median of their average percentage receipts from special assessments is 5.3 per cent. The South Atlantic group of states consisting of Delaware, Maryland, District of Columbia, Virginia, West Virginia, North Carolina, South Carolina, Georgia, and

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1 The classification of the states is adopted from the Bureau of the Census in Financial Statistics of States.

TABLE IV

Variation in Use of Special Assessments in Cities of States Grouped by Geographical Divisions

Geographical Divisions	States	Average Percentage Of the State*	Median of Averages
New England	Me.	1.9%	1.9%
	N. H.	.1	
	Mass.	2.2	
	R. I.	1.1	
	Conn.	2.9	
Middle Atlantic	N. Y.	7.9	5.3
	N. J.	5.3	
	Pa.	5.9	
South Atlantic	Del.	3.9	3.9
	Md.	1.5	
	D. C.	2.0	
	Va.	1.2	
	W. Va.	13.9	
	N. C.	7.1	
	S. C.	2,9	
	Ga.	5.9	
	Fla.	5.3	
North East	Ohio	11.7	11.7
	Ind.	16.7	
	Ill.	12.2	
	Mich.	9.3	
	Wis.	10.1	
East South Central	Ky.	7.2	7.2
	Tenn.	6.0	
	Ala.	15.5	
West North Central	Minn.	13.3	13.9
	Iowa	13.9	
	Mo.	16.7	
	Nebr.	13.4	
	Kan.	20.9	
West South Central	Ark.	20.8	11.2
	La.	6.3	
	Okla.		
	Tex.		
Mountains	Mont.	16.7	17.4
	Idaho	21.5	
	Colo.	9.1	
	Utah	18.1	
Pacific	Wash.	25.5	25.5
	Oreg.	26.2	
	Calif.	14.8	

* Based on the averages of the cities within each state, 1910-1920.

Florida, show a relatively lower average percentage than the Middle Atlantic states. The median of the averages of all the cities in this group of the states is 3.9 per cent.

The cities in the East North Central section of the country, represented by the states of Ohio, Indiana, Illinois, Michgan, and Wisconsin, have a median of 11.7 per cent which represents a rather high degree of use of the special assessments. The East South Central section of the country which is occupied by the three states, Kentucky, Tennessee, and Alabama, with a median of only 7.2 per cent, shows a much lower degree of use of special assessments than the East North Central section of the country.

The four Mountain states, Montana, Idaho, Colorado, and Utah followed with a much higher use of the system. Their median is 17.4 per cent. However, it is with the states in the Pacific coast that the highest degree of use of special assessments is particularly observed. The median of the averages of all the cities in the three states, California, Oregon, and Washington, is 25.5 per cent, constituting the highest average of all groups. Not only is the average of these states the highest among those of all groups, but the individual states that comprise this group are the ones that show decidedly high percentages.

The popularity of the system of special assessments as a means of raising a part of municipal revenues has been spreading. With the Eastern part of the country as its starting point, the direction of the movement of the use of special assessments is westward. The farther west, the more enthusiastically the system seems to be employed.

The reasons for this tendency probably are as follows: In the western states, the cities are relatively young. Their urgent need of extensive local improvements required heavy expenditures. With the increased recognition of the merit of the system of special assessments as a reliable means of raising that part of local revenue, coupled with the realization of the defects of the general property tax as the sole source of municipal finance, it is not surprising that the use of special assessments should have been met with such favor by the comparatively young cities in the West that they champion the whole country as the most extensive users of this source of municipal revenue.

CHAPTER IV

SPECIAL ASSESSMENTS AND POPULATION

I Extent of Use and Population

A. Statement of Problem

We may first inquire into the relationship of the extent of use of special assessments and the size of the municipal corporations. Do the larger cities tend to have a relatively greater need of this particular form of revenue than the smaller ones? As a source of municipal revenue, are special assessments more adaptable to the cities with larger population, or to those with smaller populations? Or is the usefulness of the system not affected by the size of the city at all? The result of the study on these questions will be presented in the correlation Table I in the appendix of this manuscript.

B. The Data Employed

As mentioned in the previous chapter, the method followed in the study of the relationship between the use of the system of special assessments and the various determining factors of a municipality is the process of statistical correlation of the variables under consideration. It is necessary to explain here only the nature of the

variables involved in this particular problem. The extent of the use of special assessments by the several municipalities is expressed by the ratio of revenue receipts obtained from special assessments and special charges for outlays to their respective total revenue receipts. The composite figure of special assessments and special charges for outlays is used rather than the separate data of special assessments because the two are not conveniently separable.[1] Since their difference is chiefly technical, and since the special charges for outlays represent but small amounts, the combination of the two series is not appreciably objectionable for our purpose.[2]

The per cent of revenue receipts from special assessments to the total revenue is used to represent the extent of use of the system rather than either the absolute amount collected or the per capita amount assessed. The absolute amount collected is obviously not admissible to show the relative extent of use of the system, owing to the difference in the size of the cities. New York, for instance, which collected more than $13,000,000 in

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1 A special charge for outlays differs somewhat from a special assessment in that such a charge is made where the cost of a public improvement, the payment for which is classified as an outlay, is made a charge against the benefited person or property, and the amount of the charge is the amount of the actual cost to the city of an improvement, such as the construction of a sidewalk, the charge being made against the owner of property without any levy against others. Financial Statistics of Cities: 1923, p. 17.

2 Unless otherwise stated, the term "special assessments" is used to include the special charges for outlays.

special assessments in 1925, would show a far greater use of the system than, for example, Seattle which, during the same year, collected only a little over 4 million dollars form the same source. When expressed in the relative position with their respective total revenues, the former city obtained only 3.0 per cent, while the latter city, 12.3 per cent, showing decidedly less use relatively of special assessments in New York than in Seattle.

When compared with the absolute amount the per capita assessments would be preferable, since it is expressed in terms of a definite unit common to all cities. However, it has theoretical objections. While it is expressed on the basis of a comparable unit, it fails to show the relative importance of special assessments to the total revenue. Given two cities of same size that show a relatively the same degree of the use of special assessments, the city whose population is growing fast will show a smaller per capita amount than that of the city whose population remains relatively the same. The tendency has the effect of either exaggerating the greater extent of the use of the system by the latter or overstating the less extent of use by the former. In other words, with the same degree of use of special assessments by the various cities, the per capita amount tends to be relatively higher in the case of smaller cities than in that of larger cities.

On the other hand, the percentage of the receipts from

special assessments to the total revenue, though not claimed to be the perfect measurement of the extent of use of special assessments by any given city, seems to be the most accetable measure. It is expressed with reference to neither the size of the population nor the number of dollars collected, but rather to the relative position to the total revenue receipts, thus giving a truer index to its importance in the municipal finance.

The figures representing the variables are the averages of each of the 195 cities considered for the period 1910-1920, rather than that of a particular year. This is necessary in order to avoid the effects of unusual fluctuation from year to year. For instance, the city of Huntington, West Virginia, obtained only .1 per cent special assessments in 1911, while it obtained 44.3 per cent in 1925, and 5.1 per cent in 1919.[1] If any one of these years were taken as a basis to measure the extent of use of the system of special assessments by the said city, it would lead to much misrepresentation of the real situation. Yet, although the figures stand for the average of the ten years, actually only seven years' average is taken, because the figures for the 1913, 1914, and 1920 are not available.

For the variable representing the size of population during this period, the average is calculated from the

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1 Financial Statistics of Cities: 1911, 1915, and 1919.

figures for the years 1910 and 1920 only. This is permissible since the change of population from year to year is not often violent. Nor are the figures for the remainder of the years available.

C. The Result and Its Interpretation

A brief examination of the correlation Table I in the appendix will reveal that there is no perceptible degree of correlation between the two variables. The larger group of the cases are gathered in the first two vertical arrays representing the population between 25,000 and 75,000, but are widely scattered among the several horizontal arrays representing the various extent of the use of special assessments, ranging from 0.9 per cent to 31.9 per cent. The majority of the cities are comparatively small in their population, but vary widely in their use of special assessments. There are as many cities in this group that use special assessments much as there are those that use it only a little. The relative extent of the use of special assessments does not seem to be characteristic of any size of the city. There appears to exist no correlation between the use of special assessments and population. At least, the coefficient of correlation does not disclose any. The coefficient found is —.05. The result is probably what should be expected.

In the first place, there seems to be little reason

to assume that a city, because it is larger in population, should accordingly resort to a relatively greater extent of use of the special assessments. It is true that a large city, because of its size in area as well as in population, would have more occasion for for local improvement, and thus require more revenue absolutely in the form of special assessments. But this is meaningless for purpose of our inquiry.

Further, if there would be any relationship between the size of a city and the relative extent of the use of special assessments at all, the relationship would be negative rather than positive. That is, the larger cities would tend to show a relatively less use than the smaller ones. This, the diminutive negative coefficient seems to show us, although it is so small as not to be entitled to much weight. It will be remembered that the larger cities are in general the older cities. They have expended much for public improvements and outlays such as construction of streets, establishment of public parks, and pavement of sidewalks, in the years past. The period 1910-1920 which our data cover is relatively recent. To the older cities, this period does not represent the period of their heavy expenditures for public improvements. Their heavy initial costs for outlays which are required in the building up of a city have been met before this period. Their time of urgent need of special assessments may be regarded as

having passed. It is rather the younger cities, presumably smaller cities, whose initial costs for public improvements are heavy and whose needs for revenues are great, that would tend to resort to the system of special assessments more urgently and consistently than the older and larger cities, whose expenses for public improvements are more largely for the purpose of replacement and maintenance only.

However, since there is no appreciable correlation between the extent of use of special assessments and the size of the various municipalities, although there is suggested a negative correlation at most, one step further in the inquiry of the relationship between special assessments and population may be taken by considering the rate of growth of a city in population and the relative extent of the use of special assessments. Here we have more reason to expect a positive correlation than in the case just considered. The figures representing the rate of growth of population are more significant than those of the absolute number of the population.

II Extent of Use and the Rate of Growth of Population

A. Statement of Problem

In the study of the relationship between the extent of use of special assessments and the rate of growth of

population, the logical questions to be asked would be: First, is there any relationship at all between the extent of use of special assessments by a municipality and the rate of growth of population? Secondly, if so, is it the city that has a rapid rate of growth that tends to show a greater extent of the use of special assessments, or is it the city that has a slow rate of growth? And thirdly, what are the reasons for the existence of such correlation? Before proceeding to examine the results of the analysis, a brief explanation of the variables involved in this part of the study is offered.

B. The Data Employed

The extent of the relative use of special assessments by various municipalities is expressed by the variable used in our previous analysis. The rates of growth of the various cities are expressed by the percentage increase or decrease of their population during the period between 1910 and 1920. The rate of growth is represented by this percentage, positive (+) signs showing increases and (—) signs, decreases.

C. The Result and Its Interpretation

Table II in the appendix shows a noticeable degree of positive correlation. The general arrangement of the cases tends to show the tendency that the cities having a higher

rate of growth of population also make greater use of special assessments. The coefficient of correlation found is .32. This is rather significant considering that the figures used in the variables are the averages for the period, which must necessarily have had smoothed out many outstanding cases which would otherwise have caused a higher degree of correlation, had it been based on the data of a single year. Thus, the fact that the coefficient is as high as .32 indicates that there is clearly perceptible relationship between the different rate of growth of population and the relative extent of use of special assessments. What, then, are the causes for this positive correlation?

First, it may be asked, what are the forces working to make a city grow rapidly in population? What factors are significant in making some cities grow faster than others? What are the cities that do normally show a higher rate of growth of population? This done, they may appear reasons why such cities should show a relatively greater use of special assessments.

It is known that a city grows for certain definite reasons. It may be because of its favorable location for commercial purposes, such as convenience in transportation and distribution; it may be because of its advantageous position for manufacturing enterprises, such as closeness to the source of raw material and accessibility to cheap

power or labor; or it may be because of its desirability for residential purposes, such as natural beauty in scenery and favorable climatic conditions. The concentration of rubber industry in Akron, Ohio, must largely account for the tremendous increase of its population of 201.4 per cent during the period 1910-1920. The 223.5 per cent increase of population in Gary, Indiana, during the same period can easily be explained by the localization of steel industry there. Again, the development of oil industry in Oklahoma will give much weight to the explanation of the 42.2 per cent increase of population in Oklahoma City, and 300.0 per cent, in Tulsa. The rapid increase of populations in the various western cities, particularly those in California, such as Los Angeles, San Diego, Fresno, Stockton etc., during the past decade, can largely be accounted for by their nearness to Pacific for foreign commerce and their favorable climatic conditions for residence.

As indicated by the positive correlation in our present study, it is found that these cities, which represent those of high rate of increase in population, are as a class those cities whose use of special assessments is markedly high. The averages of their percent receipts from special assessments to total revenue in these various cities for the period under consideration were well over 14 per cent; that of Stockton, California, was 21.8 per

cent, while that of Gary Indiana, was 26.7 per cent.

Not only is it characteristic that the rapidly growing cities generally show a high degree of use of special assessments, but also that they are as a class the younger and smaller cities. All the cities studied that show a noticeable high rate of increase in population during the period, with few exceptions, belong to the class of cities whose populations were well below 100,000, and whose dates of incorporation were later than 1850. Of the two cities that showed the highest rates of increase of population during 1910 and 1920, Tulsa, Oklahoma, had an average population of 50,000 and Gary, Indiana, 30,000. The date of their incorporation was 1903 and 1909 respectively, as contrasted with those of the older cities such as New York and Philadelphia, whose populations were well over millions and whose rate of increase for the period was only 16 per cent respectively.

But why should the smaller and younger cities have a higher rate of increase in population than the larger and older cities? Besides the fact that the small and young cities, because of their advantageous position for industry or their favorable location for commerce as already mentioned, offer stronger attraction for commercial adventure than the over-grown cities, it must be acknowledged that, other things being equal, the smaller cities are subjected to a higher rate of growth than the larger cities. With a

given increase of population, the rate of increase would be higher in the case of a city with smaller population than in that of a city with larger population. An increase of 50,000 inhabitants to a city with a population of 50,000, the rate of increase would be 100 per cent, while the same increase to a city with a population of 100,000, the rate would become only 50 per cent.

Assuming that the younger and smaller cities have a higher rate of increase of population than the older and larger cities, what reasons do we have in expecting that they also show a greater extent of the use of special assessments as a means of raising municipal revenue? In the first place, as noted in our last analysis of the relationship between the size of the city and the relative extent of the use of the system, it is rather the smaller cities that would tend to show a higher degree of use of the system than the larger ones, and since, as found in our present study, that it is the smaller cities that tend to have a higher rate of increase in population than the larger cities, we can reasonably believe that the smaller cities would show a higher degree of the use of the system.

In the second place, we know that it is with the younger but more rapidly growing cities that the needs for public expenditures for construction purposes such as the erection of public buildings, establishment of public parks and squares, opening of new streets and paving of sidewalks

are greater and more urgent than with the older and more slowly growing cities. Since every expenditure represents heavy initial cost for the younger cities, their need for revenue for such purposes would be unusually great. It is then reasonable to expect that they should resort more frequently and intensively to the system of special assessments than the older cities, and cities with relatively stationary populations.

Finally, it must be remembered that the extent of the use of special assessments by each city is represented by its percentage to the total revenue of a given city. The size of the value of this percentage is then dependent upon the size of the amount of the total revenue receipts; the larger the total revenue, the smaller would be the value of the percentage, vice versa. With a city whose total revenue receipts are unusually large, a given amount of special assessments received would show a smaller percentage, suggesting a relatively less extent of the use of the system; on the other hand, with a city whose revenue is comparatively small, the same amount of special assessments collected would show a larger percentage, suggesting a relatively greater extent of its use. Since it is plainly the larger cities whose functions are multitudinous and whose general administrative expenses are high that would show a relatively larger total revenue receipts than the smaller cities whose functions are limited and whose administrative expenses are

thus relatively low, we can reasonably see that the revenue received from special assessments by the smaller cities would show a relatively higher percentage to the total revenue receipts than that by the larger cities.

CHAPTER V

SPECIAL ASSESSMENTS AND WEALTH

I Extent of Use and Relative Wealth

A. Statement of Problem

Having considered the use of special assessments by municipalities with reference to their population, we may next inquire into the relationship between the extent of such use and the general wealth of a city. Is there any direct relationship between the extent of use of special assessments by the various municipalities and their relative wealth? If so, do the more wealthy cities resort to special assessments to a greater extent than the less wealthy ones, or vice versa? If either is true, what are the reasons therefor? Is it the richer cities or the poorer ones that can rely more dependably upon special assessments as sources of municipal revenue? or to say it in another way, is the adaptability of the system of special assessments as a means of realizing local revenue for improvement purposes greater in the cities of great wealth than in those of relatively small wealth?

B. The Data Employed

The variable representing the relative extent of the

use of special assessments by the different cities is the same as that used in our previous problems. Explanation is needed only with respect to the other variable, representing the wealth of the cities. To represent the general wealth of a city, we have the choice between two indexes. One is the assessed valuation of the general properties within the municipal corporation, the other being its estimated true value.

The estimated true value is preferred to the assessed valuation for the reason that the latter is not disturbed by the difference in the rate of assessment as adopted by the different municipalities, some on the basis of 100 per cent of the true value, while others on the basis of 50 per cent or 60 per cent or often even less. If the assessed valuation were used as the index to the value of the property, the cities with a higher rate of assessment would appear more wealthy than those with a lower rate. Such an index would inevitably lead to erroneous result.

Of course, it is not claimed that the estimated true is a correct and perfect index of the wealth of a city,[1] but, compared with the assessed valuation, it is far

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1 In many cases it is in fact obviously erroneous; and almost always in such cases the error is one of underestimation. Generally the public officials whose estimates of the true value of taxable property is used instead the assessed valuation are the ones charged with assessing property at its full value. Despite the fact that it is a matter of common knowledge that property is seldom assessed at its full value, assessing officials seldom have the courage of their conviction to admit it.

superior. It eliminates the disturbance of the different basis of assessment and tends to approximate more closely to the market value. In order to obtain the relative position of the wealth of the various municipalities on a comparable basis, the per capita wealth is used. The data are obtained from the Financial Statistics of Cities as were those used in our last problem, but instead of those covering the period 1910-1920, those covering the years from 1916 and 1923 are used, for the reason that the figures for many of the 223 cities studied during the period 1910-1915 are not available. It may be mentioned also that, for reasons mentioned elsewhere, the average of the per capita estimated true value during the period is used rather than that of a single year.

C. The Result and Its Interpretation

A glance at the Table III in the appendix immediately shows that there is a perceptible degree of positive correlation existing between the two variables under consideration. The greater number of the cases seems to "move" away from the upper left-hand corner of the table towards its lower right-hand corner, indicating that, as the cities' per capita wealth becomes larger, their extent of the use of system of special assessments also becomes greater. The coefficient of correlation found is .10. Though it is rather low, it is sufficiently high to be

regarded as not merely accidental.

It must be borne in mind that the figures used for our variables are the averages for the period. The tendency to understate the significance of many accentuating cases that would otherwise work to effect a higher correlation can be examplified with the case of Seattle, Washington. Seattle is conspicuously noticeable as a city that makes free use of the system. In 1910 and 1911, its revenue received from special assessments constituted more than 40 per cent of its total revenue, and in 1915 and 1916, more than 20 per cent. But considering the unusually restricted use of the system in 1921 to only 7.5 per cent, the significance of its consistently high degree of use is greatly reduced when the average for the period is taken. This same tendency is traceable also in the variable representing the wealth of a city, when it is expressed on the per capita basis. Much of the significance of the wealth of a city must necessarily be reduced when it is expressed to include the residents in its so-called slum district--a characteristic of a modern city.

There are other reasons leading us to expect that a richer city would show a greater extent of the use of special assessments. A city whose inhabitants are more wealthy is much more at ease in raising the revenue for improvement in the form of special assessments than one whose residents are comparatively poor. Not only does

the greater wealth possessed by an individual generally indicate his better ability to pay for what has been assessed against him, but also his greater willingness to effect the local improvement to be made which is particularly beneficial to him. We may also be reminded here of the fact that, since every local improvement greatly enhances the value of the properties benefited, the expenditures made in the form of special assessments represent a form of investment to the property owners. Inasmuch as the sum contributed by them is generally taken out of their current earnings, the effect of this particular form of contribution is to further the increase of their individual wealth--in the form of enhanced property value.

Thus we see the relationship between the wealth and the use of special assessments is mutual; by enabling the contributors to be better able and more willing to pay for local improvements, the greater wealth tends to facilitate the system of special assessments, and by enhancing the property value of its contributors, the system of special assessments tends to operate for the further increase of the wealth of the contributors.

II Extent of Use and the Rate of Growth of Municipal Wealth

A. Statement of Problem

The foregoing analysis showed us the fact that a more

wealthy city tended to use the system of special assessments to a greater degree than the less wealthy ones. It is purposed in this part of the study to see whether there is a similar relationship between the rate of growth of municipal wealth and the relative degree of the use of the system. Do the cities whose wealth is more rapidly growing than others' also show a relatively greater use of special assessments? Or do they rather show a relatively less use? If the latter case is true, what relation does it bear to our findings in the foregoing analysis? What are the explanations? After a word of explanation of the materials used we shall proceed to interpret the result.

B. The Data Employed

The variable representing the relative extent of the use of special assessments is unchanged. The rate of growth of wealth of individual city is based on the data used in our problem. The per capita estimated true value in 1916 is used as the basis. The percentage increase or decrease of 1923 over the basic year is taken to represent the rate of growth during the period. The method used in the calculation of the percentage increase is practically the same as that used in our calculation of the rate growth of the population.

C. The Result and Its Interpretation

Table IV in the appendix shows a noticeable degree of inverse correlation between the variables considered. The coefficient of correlation found is —.14. The inverse correlation suggests that the cities showing a higher rate of growth in per capita wealth tend to resort to a relatively less extent the system of special assessments than those with lower rate of growth in wealth. This finding appears to be in direct conflict with the finding noticed in our last analysis that the greater wealth the cities have, the greater extent the system of special assessments is used. We shall endeavor to find reasons why such is the case.

In the first place, it must be understood that the terms "wealth" and "rate of growth of wealth" are not synonomous. The great wealth does not necessarily mean high rate of growth of wealth. The fact that a city's per capita wealth is greater than that of another does not imply that its rate of increase in per capita wealth would also be higher than that of the other. In fact, other things being equal, the opposite would be true. A given increase of wealth to a city with a greater per capita wealth would show a lower rate of increase than to a city with a smaller per capita wealth. With an increase of $1,000 to a per capita wealth of $2,000, the rate of increase would be only 50 per cent, while with

the same increase to a per capita wealth of $1,000, the rate of increase would become 100 per cent, or doubled. If this is true, we have no reason to suspect that there is a real conflict between the two findings mentioned. On the contrary, we find reasonable ground for their reconciliation.

Cities with greater per capita wealth made more use of special assessments than others. This, the positive correlation in our last problem showed us to be true. They show a lower rate of growth of wealth than others with a given increase of the wealth. This, we assume to be true in our present discussion. Since the more wealthy cities show greater use of special assessments, and since they, with a given amount of increase in per capita wealth, show a lower rate of increase, it seems logical, then, that the cities showing lower rate of increase in wealth should show a relatively higher degree of use of special assessments.

However, the foregoing discussion is rather an attempt reconcile the two seemingly conflicting findings than to explain the case. To find the real cause we must look further into the conditions that may have influenced the distribution of wealth during the period in which the change took place. It will be remembered that the period upon which our data of per capita municipal wealth are based was 1916-1923. The period 1916-1923 was one in which the

dominant factor influencing the distribution of wealth was the World War. Those cities that grew wealthy during the war were probably those in which concentration of war activities took place, and that class of cities was chiefly in the East. Thus we find through study of individual cities that, out of 219 cities covered, 64 cities had an increase in per capita wealth of over 50 per cent during the period 1916-1923. Out of these 64 cities, 32, or half of the cities that showed a high rate of increase in municipal wealth, were located in the eastern part of the country, while 23 were located in the north central part, with the remainder scattered in the southern and other parts on the country. The distribution of these cities in the East and in the north central states was as follows: New York, 7; Pennsylvania, 7; New Jersey, 5; Connecticut, 5; Rhode Island, 4; Massachusetts, 4; Wisconsin, 4; Ohio, 4; Michigan, 3; Illinois, 2; and Indiana, 2. Of all the cities, Scranton, Pennsylvania, showed the highest rate of increase in per capita wealth, which was 181.7 per cent.

On the other hand, out of 21 cities that showed a decrease in the per capita wealth during the period, 7 or one-third of the cities were located in the far West with others scattered in other parts on the country. In the West, California alone had four cities that showed a decrease in the per capita wealth, namely: San Francisco, Oakland, Stockton, and San Diego. Salt Lake City and Ogden,

Utah, showed a decrease of 8.3 per cent and 12.6 per cent respectively. Portland, Oregon, also showed a decrease of 1.0 per cent. Kansas City, Missouri, showed a greater decrease of 5.4 per cent. While Denver, Colorado, and Seattle, Washington, did not show positive decrease, their increase was very negligible, being 0.9 per cent and 0.4 per cent respectively. Of all the cities, San Diego, California, showed the greatest decrease of 37.1 per cent during the period.

If it will be remembered that the cities which showed the highest increase in per capita wealth are mostly located in the East where the use of special assessments is least, and those that showed the least increase and greatest decrease are chiefly located in the West where the use of special assessments is greatest, we can readily see why there was a tendency to effect an inverse correlation in our present problem. While the rate of growth of per capita wealth of a city may be subjected to many causes, the influence of war conditions upon the distribution of wealth during the particular period of our consideration can easily be felt, and this fact must go far to explain why the cities of rapidly growing wealth were concentrated chiefly in the East. In so far as this circumstance explain the coefficient of correlation, the effect is to explain its significance away.

We may offer another explanation for whatever remains

of a truly inverse correlation in our present problem. In our study of the relationship between the rate of growth of population and the relative extent of the use of special assessments, we have noticed that the more rapidly growing cities tended to show a higher degree of the use. The effect of the rapid growth of population of a city upon its per capita wealth, other things being equal, is to lower the rate of growth of the latter, in as far as the relative position of wealth of a city is expressed on the per capita basis. Much of the immigration to the city is prompted by the motive of economic adventure. The newcomers to the city are mostly without much capital. Their per capita wealth would yet have to be created through their labor and saving. It is true that the increase of population of a city tends to enhance the value of the real properties, thus increasing the total wealth of the city. But where the rate of increase of wealth of a city lags behind the rate of growth of its population, the ultimate effect is that the per capita wealth is relatively decreased, even though the real properties have increased considerably in their absolute value. It is assumed here, that in the face of tremendous increase of population within a short period, the rate of growth of municipal wealth through the increase of real property value tends to lag behind that of population, thus causing a relative decrease of municipal wealth when it is expressed in term of per capita

distribution.

That there is some degree of validity to this assumption may be indicated by the fact that the cities which showed a considerable decrease of per capita wealth during the period of our study showed a rather high degree of increase in population, and that those showed a tremendous increase in per capita wealth showed but little increase in population. For example, Shreveport, Louisiana, which showed a decrease in per capita wealth of 0.6 per cent, showed an increase of 57.1 per cent in population; Stockton, California, which showed a decrease in per capita wealth of 26.2 per cent, showed an increase in population of 73.9 per cent; while San Diego, California, whose 37.1 per cent decrease in per capita wealth is the greatest among all the cities studied, showed a still higher rate of increase in population of 87.5 per cent. On the other hand, Woonsocket, Rhode Island, whose increase in per capita wealth is 109.2 per cent, showed an increase in population of 13.2 per cent; Lexington, Kentucky, showed an increase of per capita wealth of 129.6 per cent, had an increase of population of 17.1 per cent; while Scranton, Pennsylvania, whose 181.7 per cent increase in per capita wealth is the highest among all the cities studied during the period, showed an increase of only 6.1 per cent in population.

The foregoing explanation seems to be reasonable only

in so far as there is a definite inverse correlation. But whether the inverse correlation observed in our study is bona fide or merely accidental is still a question of doubt. The influence of the war conditions upon the distribution of wealth among the different sections of the country is too strong during the period. Had the manufacturing centers of the country been situated in the western part of the country where the use of special assessments is high, the increase of municipal wealth would probably have been much higher there than in the East as a result of the concentration of war activities, and the inverse correlation between the rate of growth of municipal wealth and the use of special assessments as found in our study would probably been reversed. Our explanation in such a case would have been totally different in respect to the underlying facts.

Inasmuch as we lack the facts to the contrary of our findings, and inasmuch as we find no other explanations than those given, we shall leave the subject with the present interpretation. However, since our explanations are conditioned with many reservations and assumptions, no definite conclusions should be drawn from their contention. A better understanding of the case must be obtained through the light of further investigation.

CHAPTER VI

SPECIAL ASSESSMENTS AND GENERAL TAXATION

I Extent of Use and the Relative Tax Burden

A. Statement of Problem

Having considered the relative extent of the use of special assessments by the various municipalities with reference to their population and their wealth, we may now inquire into the relationship between the extent of the use of special assessments and their relative tax burden. How is the use of special assessments affected by the weight of general taxation? Does a relatively heavier tax burden tend to restrict the use of special assessments, or does it, on the contrary, lead to heavier use? Is the system resorted to as an alternative source of heavy local revenue, or rather is it called for only as a supplementary means of municipal taxation?

B. The Data Employed

The relative extent of the use of special assessments is represented by the same variable as in the previous analysis. The tax burden of the cities is represented by the aggregate of three forms of taxes, namely: property tax, poll tax, and business and non-business license.

The revenues received from these sources are classified by the Bureau of the Census as receipts from general taxation.[1] The aggregate of these taxes is a better index to the general tax burden than any one tax. In order to be comparable, the relative tax burden of the various cities are expressed on the per capita basis. The average for the period is taken for each of the 191 cities studied so as to avoid the influence of unusual fluctuation of any particular year. The data upon which the computations of municipal tax burdens and their respective averages for the period are based are obtained from the Financial Statistics of Cities for the respective years 1910 to 1920. The method followed in the calculation of the coefficient of correlation is the same as that formerly used.

C. The Result and Its Interpretation

Table V in the appendix exhibits a perceptible degree of inverse correlation. The cities with relatively larger per capita taxes are shown to be located on the section of the table which represents the relatively smaller percentage of special assessments. The coefficient of correlation found is —.10. For the reasons already stated elsewhere, that the averages used in our problems have the tendency

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1 Financial Statistics of Cities: 1911; and this definition is generally adhered to.

to lower the degree of a correlation, this seemingly small coefficient is in this case probably significant.

The negative rather than the positive correlation indicates the tendency that the cities imposing a relatively heavier tax burden make a less extensive use of the system of special assessments than those imposing a relatively lighter tax burden. Such a tendency seems to suggest that the desirability of the system of special assessments as a means of raising local revenue is adversely affected by the abundance of revenue from general taxation. This is to be expected since, if the expense of improvements can be easily met with the general fund, there is little need for raising the revenue from special assessments. It is only when the general fund is not sufficient to meet these expenses, that a system such as special assessments is called for. Thus the system of special assessments serves more as an alternative source rather than as a supplementary source of revenue in the municipal finance.

II Extent of Use and the Rate of Growth of Tax Burden

A. Statement of Problem

Having noticed the effect of the general tax burden upon the use of special assessments, we may also look into the effect of the rate of growth of tax burden upon the

relative extent of the use of the system. Does the increasing tax burden tend to exert a restricting influence upon the use of special assessments, or does it, on the contrary, tend to reflect an increased demand of its use? Or rather that they have no relationship at all? If the latter is the case, what are the possible explanations?

B. The Data Employed

The rate of growth of general tax burden is represented by the percentage increase, or decrease as the case may be, during the period under consideration. The calculation of the percentage is based upon the data used for our last analysis. The per capita tax burden of each city for the year 1911 is used as the base with which the difference between the figures representing the tax burden for the years 1911 and 1919 is divided. The value obtained is then multiplied by 100 in order to show its percentage increase or decrease as the signs (+) or (—) may designate. It may be mentioned in passing that the year 1919, being a post-war year, is somewhat abnormal. The increase of per capita tax burden of this year over that of 1911 may be expected to be somewhat lower than if the year had been more normal. However, since this factor is common presumably to all the cities considered, the validity of the relative increase is not affected, though, if it were used to indicate the rate of increase of tax burden as

such, it would be open to criticism.

C. The Result and Its Interpretation

At the first glance, Table VI in the appendix seems to show a perceptible degree of inverse correlation, but a closer examination soon reveals that the arrangement of the cases is so irregular and incoherent that if there is any degree of correlation, it is not at all significant. Thus the coefficient of correlation found is only —.04, which indicates that there is no definite relationship existing between the two variables in question. The relative extent of use of special assessments by the various municipalities, according to this coefficient, are not influenced by the different rate of growth of their respective general taxation. So far as a system of raising necessary local revenue for improvement purpose is concerned, special assessments are resorted to without regard to the fact that the municipal tax burden is rapidly increasing or slowly decreasing.

This is probably so since, as noted in our discussion of the distinction between the special assessments and the general taxation that the general taxes are used for the purpose of meeting the general expenses of the municipal government whereas the special assessments are used to defray the cost of some specific improvements, these two forms of contributions represent entirely different

functions. Inasmuch as we have no apparent reason for believing that the needs of municipal improvements for which the special assessments are used should vary in any high degree of coordination with the increase of the general functions of a municipal corporation, as suggested by the rapidity of increase in the tax burden, we should not be surprised to see that there is not any significant degree of correlation between the rate of increase of municipal tax burden and the extent of use of special assessment.

CHAPTER VII

SPECIAL ASSESSMENTS AND MUNICIPAL INDEBTEDNESS

I Extent of Use and Municipal Indebtedness

A. Statement of Problem

Lastly, we may study the relative extent of the use of special assessments with reference to the municipal indebtedness. Does heavy indebtedness of a city tend to restrict the use of special assessments, or does it cause added reliance upon that source?

B. The Data Employed

The variable representing the relative extent of use of special assessments is not changed. For our variable representing the municipal indebtedness, the face value of the per capita net debts of the various cities is used. Since the net debt represents the funded and floating debts less sinking fund assets, it is more desirable as an index of the true position of municipal indebtedness than the gross debts, which does not take into consideration the sinking fund assets. To avoid the possible influence of yearly fluctuation, the average for the period is taken. All the data are obtained from the Financial Statistics of Cities. Due to the lack of data for many

cities for the year 1911, only 191 out of 220 cities reporting in 1919 are used in this analysis

C. The Result and Its Interpretation

A brief examination of Table VII in the appendix shows no apparent correlation between the two variables under consideration. This is later indicated by the coefficient of correlation found which is —.02. according to the coefficient, the use of the system of special assessments by a municipality is not dependent upon the size of its debts. It seems to be as much used by a city with heavy indebtedness as by that with relatively less indebtedness. So far as the size of the net debt is concerned, it exhibits no definite relationship with the use of special assessments, though, as will be seen later, when the rate of growth of the net debt is considered, it shows a more definite correlation. Why is there no correlation between the size of municipal debt and the use of special assessments?

In the first place, the data used in the variable representing the relative size of the municipal debts of the various cities, being based on the absolute value of per capita net debt for a particular period, may be somewhat defective. Inasmuch as the municipal debts are incurred and liquidated periodically, its size during one particular period of years may vary from that during

another period. A city which may have floated a large amount of municipal bonds just before the period under our consideration, may show an unduly large amount of net indebtedness, while another, which may have freshly retired a series of its outstanding obligations, may show a relatively much smaller amount. The fact that the size of the net debts of the different cities for one particular period is influenced by the different conditions in the preceding period tends to make our data somewhat incomparable, thus hindering a possible exhibition of definite relationship when correlated with another variable.

Secondly, the fact that the revenue from special assessments may either be collected in the aggregate or serially through the amortization of the special assessment bonds, depending on the magnitude of the undertakings and the policy adopted by the municipal authorities, may have exerted some influence in preventing a possible correlation in so far as the size of the municipal debts is concerned. A city, whose greater part of revenue receipts from special assessments is collected currently, has no necessity of issuing much special assessment bonds which would otherwise go to swell the size of its total indebtedness, while another, whose revenue receipts from that source necessitate the floating of long time security, would show a relatively larger net debt, even though the respective extent of their use of special assessments may be practically the same.

Thus, the fact that a given degree of use of special assessments by the different cities may, in one case, influence the magnitude of the total indebtedness, while, in another, not, may account to some extent for the absence of a definite correlation between the two variables considered.

II Extent of Use and the Rate of Growth of Municipal Indebtedness

A. Statement of Problem

Having found no relationship between municipal indebtedness and special assessments through the variable of relative size of the net debts of the various cities, we may further the study with the use of another variable, which is the relative rate of growth of municipal indebtedness of the various cities. We shall inquire here whether the rate of growth of municipal debts may be correlated with the relative extent of use of special assessments? If so, is it the cities with higher rate of growth in their net indebtedness that show a greater extent of use of special assessments, or is it those with less rapidly growing indebtedness? If either is the case, what are the explanations?

B. The Data Employed

The variable for special assessments is unchanged;

the procedure followed in the calculation of the rate of growth of municipal indebtedness is practically the same as that with which the rate of growth of population, wealth, and tax burden are calculated; and the general method of treatment of previous problem is here again followed.

C. The Result and Its Interpretation

Table VIII in the appendix shows a perceptible degree of correlation. The coefficient of correlation found is .14 which is fairly indicative of a measurable degree of correlation between the two variables in question. The positive correlation seems to indicate that the cities with higher rate of growth in their indebtedness show also a higher degree of use of special assessments than those with a lower rate of growth. What, then, are the explanations of such a case?

In the first place, the very fact that a city shows an extensive use of special assessments proves that it is busily engaged in the activities of local improvements, which, in turn, means the issuance of municipal bonds and the rapid growth in its indebtedness. Thus, the cities noted for their extensive use of special assessments during the period under consideration all showed great increase in their net indebtedness. Denver, Colorado, for instance, which was noted for its high degree of use of special

assessments, showed an increase in its per capita net debts of 1114.6 per cent during the period 1910-1920. Springfield, Missouri, which, until 1918, was noted for its heavy resort to the system of special assessments, had an increase in its per capita net debts of 230.5 per cent, while Akron, Ohio, showed an increase of 206.4 per cent during the same period. Where the use of special assessments is extensive, the public function of the municipal improvements is also active; and where the public improvement function is active, the increase in the municipal indebtedness is rapid. Thus the existence of a positive correlation between the relative extent of use of special assessments and the rate of growth of municipal indebtedness is primarily due to the relative activities in the municipal improvements by the various cities rather than by any other factor.

Secondly, the fact that a city has to resort heavily to long time borrowing as indicated by its rapidly increasing indebtedness may be due to the insufficiency of revenue from general taxation within the tax limit for improvement purposes. But as the debt limit is about to be reached, the city must look for some other source of revenue, or slow down in its improvement projects. Special assessments, being the alternative source of revenue for improvement purposes, are therefore more extensively used.

To whatever reasons it may be due, the fact remains

that there is a noticeable positive correlation existing between the rate of growth of municipal indebtedness and the use of special assessments by a municipal corporation. The more rapidly the city's debts increase, the more extensively the system of special assessments seems to be used, or vice versa.

CHAPTER VIII

CONCLUSIONS

Our statistical study has brought us to some tangible conclusions. The use of special assessments as a source of municipal revenue seems to be still growing in popularity and importance in the American public finance. From the East to the West, the system of special assessments has been developed from its incidental use for street repair to a regular system of raising the municipal revenue to cover all kinds of public improvements.

To the cities in the West, for the reason that they are relatively new and young, special assessments become so vital a source of the necessary revenue for the extensive improvement purposes, that their average annual receipts from this particualr form of taxation usually exceed 20 per cent of their total revenue receipts. On the other hand, to most of the cities in the East, being relatively older cities, the use of special assessments is comparatively less important in their revenue system. Their use of the system still appears to be very much a matter of habit. The laws that permit or compel the use of this source of revenue apparently can not be changed except by overcoming a great deal of inertia.

The wide variations in the relative extent of use

of special assessments as noticed among the various cities within the states as well as between the different states further suggest that the use of special assessments is not only influenced by the habitual method of municipal financing of an individual city, but also somewhat determined by the relative position of its population, wealth, indebtedness etc.

In our attempt to discover the general relationship between the relative extent of use of special assessments and the various factors considered, certain tendencies were seen to be quite noticeable. Among our findings is the fact that the expediency of the use of special assessments is not affected so far as the size of population is concerned. The system is as much useful and applicable to the city with a small population as to that of a large population. However, when the rate of growth of population of a city is considered, the use of special assessments seems to be more expedient and useful to the city with a higher rate of growth than that with a relatively lower rate of growth in its population. Thus, the city whose immigration is active will find the system of special assessments particularly useful in raising that part of municipal revenue which is required for the extensive improvement purposes.

So far as the relationship between the wealth of a city and the relative reliability of the use of special assessments

is concerned, it is expected that the more wealthy cities would be in a better position to exact such a taxation than the less wealthy one. The greater wealth the taxable subjects within the municipal corporation possess, the better able and more willing are they to pay for extensive local improvements. This, our analysis of the positive correlation between the use of special assessments and the relative size of per capita wealth indicated to be true, in spite of the fact that when the rate of growth of per capita wealth is used to correlated with the use of special assessments, the tendency seems to be that the cities with more rapidly growing per capita wealth show a relatively less use of the system. However, due to the predominant influence of the abnormal conditions of the World War during the period upon the distribution of wealth among the different cities, the latter correlation observed must be regarded as more or less inconclusive, in so far as the relationship between the use of special assessments and the normal rate of growth of municipal wealth is concerned.

It is of particular interest to note that the usefulness of the system of special assessments is adversely affected by the heavy degree of tax burden of a municipality. The city whose imposition of the general tax burden is heavy finds the use of special assessments less expedient than if its tax burdens are relatively light. The inverse correlation noticed in our study of these two variables

points to the fact that the urgent need and extensive use of special assessments are called for only when the revenues from general taxation are not sufficient to meet the expenses of improvements. Where the burden of general taxation is heavy, and where the revenue therefrom is abundant, only to a relatively small extent is the system of special assessments used. However, when the rate of growth of tax burden is studied, its relationship with the relative extent of use of special assessments is not so apparent. The absence of any degree of correlation shows that the use of special assessments is not significantly affected by the rate of increase of the tax burdens of a city, even though the negative coefficient of correlation seems to suggest that where the imposition of municipal tax burden is too heavy, the successful use of special assessments may be somewhat impaired.

With regard to the relative degree of municipal indebtedness, the use of special assessments showed no definite correlation. The extent of use of the system is not affected, so far as the size of the municipal debts is concerned. However, when the rate of growth of municipal indebtedness is studied with the relative use of special assessments, the findings are different. The existence of positive correlation seems to indicate that the faster a city's debts grow, the more urgent is the system of special assessments needed to furnish that part

of municipal revenue which can not well be raised by the general taxation. Thus to a city whose revenue receipts from general taxation are insufficient and whose debts are rapidly increasing, the system of special assessments will serve particularly well as a reliable source of local revenue for meeting the expenses of public improvements. Also, an extensive improvement program means greater use of special assessments, and consequently leads to an expanding debts.

APPENDIX

TABLE I SPECIAL ASSESSMENTS AND POPULATION

Average Population of 215 Cities in 1,000**

Special Assessments*	50 26 –	75 51 –	100 76 –	125 101 –	150 126 –	175 151 –	200 176 –	225 201 –	250 226 –	275 251 –	300 276 –	325 308 –	350 326 –	375 351 –	400 376 –	425 401 –	450 426 –	475 451 –	500 476 –	525 501 –	550 526 –	575 551 –	600 576 –	625 601 –	650 626 –	675 651 –	700 676 –	725 701 –	750 726 –	775 751 –	800 776 –	2,450 2,426 –	5,175 5151 –	fy	dy	fdy	fdy²	Ss	Ssy
0- 0.9%	4	4	1	2	1																									1			13	-11	-143	1573	7	-77
1- 1.9	8	2		5	1	1			1		1		1												1								21	-10	-210	2100	12	-120
2- 2.9	8		3		1										1							1											14	-9	-126	1134	3	-27
3- 3.9	5	2	2	3		1									1																		14	-8	-112	896	-1	64
4- 4.9	9	4			1																											1	15	-7	-105	735	168	-1176
5- 5.9	4	6		1				1																									12	-6	-72	432	-19	114
6- 6.9	5	3													1																		9	-5	-45	225	-10	50
7- 7.9	4	2	2		1											1																	10	-4	-40	160	-6	24
8- 8.9	7	1	3	1	1																					1							14	-3	-42	126	-2	6
9- 9.9	6			1	1																						1				1		10	-2	-20	40	100	-200
10- 10.9	2	2	1				1											1															7	-1	-7	7	6	-6
11- 11.9	1	1	1	1				1																									5	0				
12- 12.9	2	2		1		2		1			1																						9	1	9	9	5	5
13- 13.9	5	3		1			1						1																				11	2	22	44	-9	-18
14- 14.9	8	1	1		1																												11	3	33	99	-26	-78
15- 15.9	2	2	1	1					2																								8	4	32	128	1	4
16- 16.9	3		1																														4	5	20	100	-10	-50
17- 17.9	5		1		1																												7	6	42	252	-14	-84
18- 18.9	3	1		1					1																								6	7	42	294	-5	-35
19- 19.9	2	1																															3	8	24	192	-8	-64
20- 20.9	1	1	1																														3	9	27	243	-6	-54
21- 21.9																																		10				
22- 22.9										1																							1	11	11	121	7	77
23- 23.9	1	1		1																													3	12	36	432	-5	-60
24- 24.9										1																							1	13	13	143	6	78
25- 25.9																																		14				
26- 26.9	1								1																								2	15	30	450	2	30
27- 27.9																																		16				
28- 28.9																																		17				
29- 29.9	1																																1	18	18	324	3	-54
30- 30.9																																		19				
31- 31.9		1																															1	20	20	400	-2	-40
																																	215		-543	10659	-186	-1691

** 1910-1920. Financial Statistics of Cities.

* Percentage to total revenue receipts by 215 cities.
Average for 1910-1920, including special charges for outlays

fx	97	40	18	19	8	5	2	2	3	4	3		2		3	1		1			1		1	1		1	1	1	1	215								
dx	-3	-2	-1	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	93	202						
fdx	291	-80	-18		8	10	6	8	15	24	21		18		33	12		14			18				21		23	24			27	93	202	188					
fd²x	873	160	18		8	20	18	32	75	144	147		162		363	132		196			324				231		529	576			729	8649	4080	54190					
Ss	-219	-97	45		-43	10	1	1	-1	28	2		-8		-22	-4		-1			-9				10		-3	-2			-11	-2	-7						
Ssx	657	194	45		-43	-20	3	4	-5	168	14		-72		-242	-48		-14			-162				210		-69	-48			-297	-186	-1414	-2830					

Formula

$$C_y = \frac{\Sigma f dy}{N} = \frac{-543}{215} = -2.5255$$

$$\sigma_y^2 = \frac{\Sigma f dy^2}{N} - C_y^2 =$$

$$\frac{10659}{215} - (-2.5255)^2 = 43.1486$$

$$\sigma_y \sqrt{\frac{\Sigma f C_y}{N} - C_y^2} =$$

$$\sqrt{43.1486} = 6.572$$

$$C_x = \frac{\Sigma f dx}{N} = \frac{188}{215} = .8744$$

$$\sigma_x^2 = \frac{\Sigma f d^2 x}{N} - C_x^2 =$$

$$\frac{54190}{215} - (.8744)^2 = 251.2819$$

$$\sigma_x \sqrt{\frac{\Sigma f dx}{N} - C_x^2} =$$

$$\sqrt{251.2819} = 15.883$$

$$\frac{\Sigma xy}{N} = \frac{S_{sy}}{N} = \frac{-1691}{215} = -7.8651$$

$$C_x C_y = -2.2083$$

$$\sigma_x \sigma_y = 104.3831$$

$$r = \left(\frac{1}{\sigma_x \sigma_y}\right)\left(\frac{\Sigma xy}{N} - C_x C_y\right) =$$

$$\left(\frac{1}{104.383}\right)(-7.8651 - 2.2083) =$$

$$\left(\frac{1}{104.383}\right)(-5.6568) = -.054$$

TABLE II
SPECIAL ASSESSMENTS AND RATE OF GROWTH OF POPULATION

Rate of Growth of Population 1910-1920**

Special Assessments*	-9.9%	-4.9	0	4.9	9.9	14.9	19.9	24.9	29.9	34.9	39.9	44.9	49.9	54.9	59.9	64.9	69.9	74.9	79.9	84.9	89.9	94.9	99.9	104.9	109.9	114.9	119.9	144.9	204.9	304.9	fy	dy	fdy	fd²y	s	sy
	-5-	-1-	1 –	5 –	10 –	15 –	20 –	25 –	30 –	35 –	40 –	45 –	50 –	55 –	60 –	65 –	70 –	75 –	80 –	85 –	90 –	95 –	100 –	105 –	110 –	115 –	140 –	200 –	300 –							
0- .9%	1		2		4	1	2			1						1	2														14	-7	-98	686	-5	35
1- 1.9	1		2	2	4	4	3		2	1		2																			21	-6	-126	756	-36	216
2- 2.9				3	4		2	2	2		1																				14	-5	-70	350	-21	105
3- 3.9				1	3	2	2	2	1	1	1		1																		14	-4	-56	224	-8	32
4- 4.9	1	1	1	2	2	1	1	1	1		1	2	1																		15	-3	-45	135	-17	51
5- 5.9	1			2	1	2	2				2												1	1						12	-2	-24	48	13	-26
6- 6.9			1	1		1	1	2		2	1																				9	-1	-9	9	1	-1
7- 7.9			1	1	1		2	1		1	2		1																		10	0	0			
8- 8.9		1	2		1		2	3	2											1			1	1							14	1	14	14	23	23
9- 9.9				1	2	1	2	1	1	1												1									10	2	20	40	2	4
10- 10.9			1			1	2	2						1																	7	3	21	63	-3	-9
11- 11.9											1	2	1				1														5	4	20	80	25	100
12- 12.9				1	1	1	1	1	1			1	1	1																	9	5	45	225	6	30
13- 13.9					1	1	2		1		2	1	1																1		10	6	60	360	28	168
14- 14.9			1				2	1	1	1	1		1			1		1											1		11	7	77	539	66	462
15- 15.9				1		2	1		1						1		1		1												8	8	64	512	27	216
16- 16.9				1	1		1				1																				9	9	36	324	-5	-45
17- 17.9		1				1	1		1		1		1				1														7	10	70	700	9	90
18- 18.9				1	1	1	2	1																							6	11	66	726	-5	55
19- 19.9					1														1										1		3	12	36	432	64	768
20- 20.9			1							1																					2	13	26	338	-2	-26
21- 21.9																	1														1	14	14	196	9	126
22- 22.9									1																						1	15	15	225	1	15
23- 23.9		1							1					1																	3	16	48	768	2	32
24- 24.9									1																						1	17	17	289	1	17
25- 25.9																																18				
26- 26.9							1																					1			2	19	38	722	35	665
27- 27.9																																20				
28- 28.9																																21				
29- 29.9																															1	22	22	484	12	264
30- 30.9																																23				
31- 31.9										1																					1	24	24	576	2	48
																															215		305	9821	224	3305

** Ratio calculated from data for TABLE I.
* Same as in TABLE I.

f_x	4 4 12 15 27 18 29 21 17 12 14 9 5 4 1 2 6 1 3 2 1	2 2	1	2	1	215
dx	-7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16		23	35	55	
fdx	-28 -24 -60 -60 81 -36 -29 17 24 42 36 25 24 7 16 42 10 33 24 13	30 32	23	70	55	205
fd^2x	196 144 300 240 243 72 29 17 48 126 144 125 144 49 128 486 100 363 288 169	450 512	529	2450	3025	10377
Ss	-18 24 -5 -26 48 2 17 6 23 4 33 8 15 12 16 0 21 8 20 30 2	-1 -1	6	26	12	249
Ssx	126 144 25 104 144 -4 -17 6 2 6 8 9 9 32 75 72 112 189 80 220 360 26	-15 16	138	910	12	2690

Formula

$$C_y = \frac{\Sigma f dy}{N} = \frac{305}{215} = 1.42$$

$$\sigma_y^2 = \frac{\Sigma f d^2 y}{N} - C^2 y = \frac{8921}{215} - (1.42)^2 = 39.47$$

$$\sigma_y = \sqrt{\frac{\Sigma f d^2 y}{N} - C^2 y} = \sqrt{39.47} = 6.27$$

$$C_x = \frac{\Sigma f dx}{N} = \frac{205}{215} = .95$$

$$\sigma_x^2 = \frac{\Sigma f d^2 y}{N} - C^2 x = \frac{10377}{215} - (.95)^2 = 47.36$$

$$\sigma_x = \sqrt{\frac{\Sigma f d^2 x}{N} - C^2 x} = \sqrt{47.36} = 6.88$$

$$\frac{\Sigma xy}{N} = \frac{Ssy}{N} = \frac{3305}{215} = 15.37$$

$$r = \left(\frac{1}{\sigma x \sigma y}\right)\left(\frac{\Sigma xy}{N} - C_x C_y\right) = \left(\frac{1}{6.88 \times 6.27}\right)(15.37 - (1.42 \times .95)) =$$

$$\frac{1}{43.14} \times 14.2 = .32$$

TABLE III SPECIAL ASSESSMENTS AND RELATIVE WEALTH

Per Capita Wealth of 223 Cities: 1916-1923**

Special Assessments*	$ 500–549.9	550–599.9	600–649.9	650–699.9	700–749.9	750–799.9	800–849.9	850–899.9	900–949.9	950–999.9	1,000–1,049.9	1,050–1,099.9	1,100–1,149.9	1,150–1,199.9
0– .9%					1			1			1	2	2	
1–1.9							2	1	1	2		1		3
2–2.9							1			3	1	1	1	
3–3.9						1	1	1	2	1	1			1
4–4.9							1	2		1	3	1		2
5–5.9				1		1	1	1	1		1	2		2
6–6.9					1	1			1			1	1	2
7–7.9				1						1	2		2	
8–8.9				1			1	4			1		1	1
9–9.9			1							1		2	1	
10–10.9								1			1	1	1	
11–11.9							1					1		
12–12.9								1	1		1	1		
13–13.9									1					1
14–14.9										1		1		
15–15.9										1				1
16–16.9												1	1	
17–17.9									1		1		1	1
18–18.9						1					1		1	
19–19.9						1								1
20–20.9														
21–21.9								1						
22–22.9														
23–23.9														
24–24.9														
25–25.9														
26–26.9														
27–27.9														
28–28.9														
29–29.9														
30–30.9								1						
31–31.9														1
32–32.9														
33–33.9									1					

Special Assessments*	1,200–1,249.9	1,250–1,299.9	1,300–1,349.9	1,350–1,399.9	1,400–1,449.9	1,450–1,499.9	1,500–1,549.9	1,550–1,599.9	1,600–1,649.9	1,650–1,699.9	1,700–1,749.9	1,750–1,799.9	1,800–1,849.9	1,850–1,899.9
0– .9%	3		2							1				
1–1.9	1	1		1		1	1	1	1		2	1		
2–2.9		2	1		1		1		1					
3–3.9	1		1					2			1			1
4–4.9			1					2					1	
5–5.9	1				1						1			
6–6.9			1											1
7–7.9						2	1			1				
8–8.9		1			1			2			1			
9–9.9		1					1	1	1					
10–10.9			1						1		1			
11–11.9					1				1					
12–12.9	1		1		1				2		1			
13–13.9		4	1		1	1								1
14–14.9	1	1			1	1		1		1		1		
15–15.9			1			1	1	1						1
16–16.9							2							
17–17.9	1									1				
18–18.9				1					2					
19–19.9	1													
20–20.9			1				1							
21–21.9									1					
22–22.9									1					
23–23.9	1			1	1									
24–24.9						1								
25–25.9														
26–26.9										1		1		
27–27.9														
28–28.9														
29–29.9														
30–30.9														
31–31.9														
32–32.9														
33–33.9														

Special Assessments*	1,900–1,949.9	1,950–1,999.9	2,000–2,049.9	2,050–2,099.9	2,100–2,149.9	2,150–2,199.9	2,200–2,249.9	2,250–2,299.9	2,300–2,349.9	3,100–3,149.9	fy	dy	fdy	fd²y	Ss	Ssy
0– .9%	1		1				1				16	-6	-96	576	128	-768
1–1.9				1						1	22	-5	-110	550	205	-1025
2–2.9						1					14	-4	-56	224	93	-372
3–3.9											14	-3	-42	126	77	-231
4–4.9											14	-2	-28	56	68	-136
5–5.9											13	-1	-13	13	34	-39
6–6.9											9	0			37	
7–7.9											10	1	10	10	57	57
8–8.9											14	2	28	56	59	118
9–9.9	1										10	3	30	90	71	213
10–10.9									1		8	4	32	128	74	296
11–11.9					1						5	5	25	125	49	245
12–12.9		1									11	6	66	396	93	558
13–13.9											10	7	70	490	81	567
14–14.9		1	1								11	8	88	704	126	1008
15–15.9	1										8	9	72	648	89	801
16–16.9											4	10	40	400	31	310
17–17.9					1						7	11	77	847	56	616
18–18.9											6	12	72	864	40	480
19–19.9											3	13	39	507	8	104
20–20.9											2	14	28	392	20	280
21–21.9											2	15	10	450	13	195
22–22.9											1	16	16	256	14	224
23–23.9											3	17	51	867	25	425
24–24.9											1	18	18	324	11	198
25–25.9																
26–26.9											2	20	40	800	32	640
27–27.9																
28–28.9																
29–29.9																
30–30.9											1	24	24	576	-1	24
31–31.9											1	25	25	625	5	125
32–32.9																
33–33.9											1	27	27	729	0	0
											223		516	11929		4865

** Financial Statistics of Cities. Estimated true value of property

* Percentage to total revenue receipts by 223 cities: 1910-1920.

	600–649.9	650–699.9	700–749.9	750–799.9	800–849.9	850–899.9	900–949.9	950–999.9	1,000–1,049.9	1,050–1,099.9	1,100–1,149.9	1,150–1,199.9	1,200–1,249.9	1,250–1,299.9	1,300–1,349.9	1,350–1,399.9	1,400–1,449.9	1,450–1,499.9
fx	1	3	2	5	8	14	9	11	14	15	12	16	11	10	11	3	8	7
dx	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7	8	9	10	11
fdx	-6	-15	-8	-15	-16	-14		11	28	45	48	80	66	70	88	27	80	77
fd²x	36	75	32	45	32	14		11	56	135	192	400	396	490	704	243	800	847
Ss	3	2	-6	21	-13	38	30	-6	17	14	28	43	28	28	19	24	39	39
Ssx	-18	-10	24	-63	26	38		-6	34	42	112	215	168	196	152	216	390	429

	1,500–1,549.9	1,550–1,599.9	1,600–1,649.9	1,650–1,699.9	1,700–1,749.9	1,750–1,799.9	1,800–1,849.9	1,850–1,899.9	1,900–1,949.9	1,950–1,999.9	2,000–2,049.9	2,050–2,099.9	2,100–2,149.9	2,150–2,199.9	2,200–2,249.9	2,250–2,299.9	2,300–2,349.9	3,100–3,149.9	
fx	8	10	11	5	7	3	1	4	3	2	2	1	2	1	1		1	1	223
dx	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	44	
fdx	96	130	154	75	112	51	18	76	60	42	44	23	48	25	26		28	44	1598
fd²x	1152	1690	2156	1125	1792	867	324	1444	1200	882	924	299	1152	625	676		784	1936	23536
Ss	28	9	70	34	-2	23	-2	13	6	14	2	-5	17	-4	-6		4	-5	
Ssx	336	117	980	510	-23	391	-36	247	120	294	44	-115	408	-100	-156		112	-220	4769

Formula

$c_y = \frac{\Sigma f d_y}{N} = \frac{516}{223} = 2.3139$

$\sigma_y^2 = \frac{\Sigma f d^2 y}{N} - c_y^2 =$

$\frac{11829}{223} - (2.3139)^2 = 47.6907$

$\sigma_y = \sqrt{\frac{\Sigma f d^2 y}{N} - c_y^2} =$

$\sqrt{47.6907} = 6.9058$

$c_x = \frac{\Sigma f d_x}{N} = \frac{1598}{223} = 7.1659$

$\sigma_x^2 = \frac{\Sigma f d^2 x}{N} - c_x^2 =$

$\frac{23536}{223} - (7.1659)^2 = 54.1925$

$\sigma_x = \sqrt{54.1925} = 7.3615$

$\frac{\Sigma xy}{N} = \frac{4865}{223} = 21.8161$

$c_x c_y = 7.1659 \times 2.3139 = 16.5812$

$r = \left(\frac{1}{\sigma_x \sigma_y}\right)\left(\frac{\Sigma xy}{N} - c_x c_y\right) =$

$\left(\frac{1}{50.8370}\right)(21.8161 - 16.5812) =$

$\frac{5.2349}{50.8370} = +.1029$

TABLE IV
SPECIAL ASSESSMENTS AND RATE OF GROWTH OF MUNICIPAL WEALTH

Rate of Growth of Per Capita Wealth of 219 Cities.
(1916-1923) **

Special Assessments*	-35--39.9	-30-34.9	-25--29.9	-20--24.9	-15--19.9	-10--14.9	-5--9.9	-1--4.9%	0	1-4.9%	5-9.9	10-14.9	15-19.9	20-24.9	25-29.9	30-34.9	35-39.9	40-44.9	45-49.9	50-54.9	55-59.9	60-64.9	65-69.9	70-74.9	75-79.9	80-84.9	85-89.9	90-94.9	95-99.9	100-104.9	105-109.9	110-114.9	115-119.9	120-124.9	125-129.9	130-134.9	135-139.9	140-144.9	145-149.9	180-184.9	fy	dy	fdy	fd^2y	Ss	Ssy
0- .9%							1			1	1		1		2	1		1	1			1	1	1	2		1		1												16	-9	-144	1296	155	-1395
1-1.9			1				1	1		1		1		1	2	2		3	2	1	2	1	1						1									1			22	-8	-176	1408	184	-1472
2-2.9											1			1	1	1	1	1	2			1		1	2	2					1										15	-7	-105	735	172	-1204
3-3.9										1	1	3	2		2	2									1			1			1										14	-6	-84	504	103	-618
4-4.9						1				1	1		1	2		3			2	1			1						1												14	-5	-70	350	100	-500
5-5.9							1			1	2			3			1			1		1		2																	12	-4	-48	192	80	-320
6-6.9								1						1	1	2			1				1	1													1				9	-3	-27	81	91	-273
7-7.9												1		1		2	1	1		1		2																		1	10	-2	-20	40	113	-226
8-8.9								1			1			1	1	4	1			1		1		2						1											14	-1	-14	14	123	-123
9-9.9										1	1		1			1	4		1					1																	10	0			71	
10-10.9								2					2		2							1																			7	1	7	7	31	31
11-11.9														1		1		1					1					1													5	2	10	20	54	108
12-12.9										1			1	1	1		1	1	1		1	1																			9	3	27	81	68	204
13-13.9								2				1		1			2					1		2											1						10	4	40	160	91	364
14-14.9												1	1	1	1	1	1	1	1		1			1	1																11	5	55	275	95	475
15-15.9	1									1	1				1	1			1							1	1														8	6	48	288	53	318
16-16.9								1		1									1								1														4	7	28	196	28	196
17-17.9							1			1	1			1		1	1			1																					7	8	56	448	32	256
18-18.9						2	1						1					2																					1		7	9	63	567	44	396
19-19.9				1														1	1																						3	10	30	300	14	140
20-20.9										1											1																				2	11	22	242	13	143
21-21.9			1																																						1	12	12	144	-6	-72
22-22.9							1																																		1	13	13	169	-2	-26
23-23.9											1											1				1															3	14	42	588	32	448
24-24.9											1																														1	15	15	225	2	30
25-25.9																																									0	16				
26-26.9								1										1																							2	17	34	578	8	136
27-27.9																																										18				
28-28.9																																										19				
29-29.9					1																																				1	20	20	400	-4	-80
30-30.9																																										21				
31-31.9																																1									1	22	22	484	23	506
																																									219		-144	9792		-2558

** Ratio calculated from data for TABLE III
* Same as in TABLE I

	-35--39.9	-30-34.9	-25--29.9	-20--24.9	-15--19.9	-10--14.9	-5--9.9	-1--4.9%	0	1-4.9%	5-9.9	10-14.9	15-19.9	20-24.9	25-29.9	30-34.9	35-39.9	40-44.9	45-49.9	50-54.9	55-59.9	60-64.9	65-69.9	70-74.9	75-79.9	80-84.9	85-89.9	90-94.9	95-99.9	100-104.9	105-109.9	110-114.9	115-119.9	120-124.9	125-129.9	130-134.9	135-139.9	140-144.9	145-149.9	180-184.9	
fx	1		2	1	1	3	6	9	0	11	12	7	10	15	14	22	13	13	14	6	5	11	5	11	6	4	3	2	3	1	2	1			1		1	1	1	1	219
dx	-8	-7	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	37	
fdx	-8		-12	-5	-4	-9	-12	-9		11	24	21	40	75	84	154	104	117	140	66	60	143	70	1[illegible]5	96	68	54	38	60	21	44	23			26		28	29	30	37	1769
fd^2x	64		72	25	16	27	24	9		11	48	63	160	375	504	1078	832	1053	1400	726	720	1859	980	2[illegible]75	1536	1156	972	361	1200	441	968	529			676		784	841	900	1369	24254
Ss	6		4	10	20	13	9	24		3	7	-19	-9	-21	-41	-52	10	13	-21	-12	3	-11	-23	[illegible]	-33	6	4	-4	-22	-1	-13	22			4		-3	-8	9	-2	
Ssx	-48		-24	-50	-80	-39	-18	-24		3	14	-57	-36	-105	-246	364	80	117	-210	-132	36	-143	-322	-[illegible]0	-528	102	72	-76	-440	-21	-286	506			104		-84	-232	270	-74	-2575

$C_y = \frac{\Sigma f d y}{N} = \frac{-144}{219} = -.6575$

$\sigma_y^2 = \frac{\Sigma f d^2 y}{N} - C_y^2 = \frac{9792}{219} - (-.6575)^2 = 44.2800$

$\sigma_y = \sqrt{\frac{\Sigma f d^2 y}{N} - C_y^2} = \sqrt{44.2800} = 6.6543$

$C_x = \frac{\Sigma f d x}{N} = \frac{1769}{219} = 8.0776$

$\sigma_x^2 = \frac{\Sigma f d^2 x}{N} - C_x^2 = \frac{24254}{219} - (8.0776)^2 = 45.5112$

$\sigma_x = \sqrt{\frac{\Sigma f d^2 x}{N} - C_x^2} = \sqrt{45.5112} = 6.7460$

$\frac{\Sigma xy}{N} = \frac{S_{sy}}{N} = \frac{-2558}{219} = -11.6804$

$r = \left(\frac{1}{\sigma_x \sigma_y}\right)\left(\frac{\Sigma xy}{N} - C_x C_y\right) = \left(\frac{1}{44.8899}\right)(-11.6804 + 5.3110) = -.1418$

TAVLE V

SPECIAL ASSESSMENTS AND TAX BURDEN

Per Capita Tax Burden of 191 Cities: 1910-1920**

Special Assessments*	5-5.9	6-6.9	7-7.9	8-8.9	9-9.9	10-10.9	11-11.9	12-12.9	13-13.9	14-14.9	15-15.9	16-16.9	17-17.9	18-18.9	19-19.9	20-20.9	21-21.9	22-22.9	23-23.9	24-24.9	25-25.9	26-26.9	27-27.9	28-28.9	29-29.9	30-30.9	31-31.9	32-32.9	33-33.9	34-34.9	35-35.9	36-36.9	42-42.9	fy	dy	fdy	fd²y	Ss	Ssy
0-.9%				2				1	1	2		2	1	1		2																	1	12	-6	-72	432	36	-216
1-1.9			1						1	1	1			3	3	3	2		1			1	1	1										19	-5	-95	475	102	-510
2-2.9								1		1		1	2	1	2	2									1									11	-4	-44	176	48	-192
3-3.9							1	2			1		1	1	1	1	1				2		1							1				13	-3	-39	117	75	-225
4-4.9							2	2	2	1				1		1				1								1						11	-2	-22	44	27	-54
5-5.9			1	1	1	4			1	2					1							1												12	-1	-12	12	-8	-8
6-6.9					1	1	1	2	1											1					1									8	0			21	
7-7.9					1	1	2	2		1							1		1	1														10	1	10	10	14	14
8-8.9					1	3		1	1	2	1	1	1				1						1											13	2	26	52	17	34
9-9.9			1		1	1		2		1						1		2																9	3	27	81	8	24
10-10.9				.	1			1	1			1										2												6	4	24	96	20	80
11-11.9				1				1	1	1		1																						5	5	25	125	-2	-10
12-12.9			1					2	2	1		2				1	1	1																11	6	66	396	20	120
13-13.9					2		1			2	2		2					1																10	7	70	490	12	84
14-14.9								1	1	1		2	1			1	1							2										10	8	80	640	51	408
15-15.9						1	3				1					1	1						1											8	9	72	648	24	216
16-16.9					1			1	1				1																					4	10	40	400	0	0
17-17.9			1			1				2																								4	11	44	484	-4	-44
18-18.9					1	1		1	1				1																					5	12	60	720	1	12
19-19.9								1																										1	13	13	169	-1	-13
20-20.9					1					1																								2	14	28	392	-2	-28
21-21.9																																			15				
22-22.9																		1																1	16	16	256	8	128
23-23.9					1		1			1																								3	17	51	867	-4	-68
24-24.9																						1												1	18	18	324	12	216
25-25.9																																			19				
26-26.9																								1										1	20	20	400	15	300
31-31.9											1																							1	25	25	625	1	25
																																		195		406	8431		293

**Composite of general property tax, poll tax, and business and non-business license. Financial Statistics of Cities, 1910-1920.

* Same as in TABLE I.

fx	6 3 10 14 14 20 16 15 10 12 11 9 13 8 5 2 3 2 5 4 3 1 2	1	1	1	191
dx	-6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16	19	21	28	
fdx	36 15 40 42 28 20 0 15 20 36 44 45 78 56 40 18 30 22 60 52 42 15 32	19	21	28	492
fd²x	216 75 160 126 56 20 15 40 108 176 225 468 392 320 162 300 1331 720 676 588 225 512	361	441	784	8497
Ss	7 -1 64 11 38 74 29 63 53 31 -6 -5 -14 13 35 -4 -1 -6 20 3 11 20 -4	-2	-3	-6	
Ssx	-42 5 256 -33 -76 74 63 106 93 -24 -25 -84 91 280 -36 -10 -66 240 39 154 300 -64	-38	-63	-168	824

Formula

$C_y = \frac{\Sigma f dy}{N} = \frac{416}{191} = 2.1256$

$\sigma_y^2 = \frac{\Sigma f d^2 y}{N} - c_y^2 =$

$\frac{8431}{191} - (2.1256)^2 =$

39.6232

$\sigma_y = \sqrt{\frac{\Sigma f d^2 y}{N} - c_y^2} =$

$\sqrt{39.6232} = 6.2946$

$C_x = \frac{\Sigma f dx}{N} = \frac{492}{191} = 2.5759$

$\sigma_x^2 = \frac{\Sigma f d^2 x}{N} - C_x^2 =$

$\frac{8497}{191} - (2.5759)^2 =$

37.8516

$\sigma_x = \sqrt{\frac{\Sigma f d^2 x}{N} - C_x^2} =$

$\sqrt{37.8516} = 6.1523$

$\frac{\Sigma xy}{N} = \frac{S_{sy}}{N} = \frac{293}{191} = 1.5340$

$r = \left(\frac{1}{\sigma_x \sigma_y}\right)\left(\frac{\Sigma xy}{N} - C_x C_y\right) =$

$\left(\frac{1}{6.1523 \times 6.2946}\right)(1.5340 - 5.4753) =$

$\frac{-3.9413}{38.7263} = -.1017$

TABLE VI

SPECIAL ASSESSMENTS AND RATE OF GROW OF TAX BURDEN

Rate of Growth of Per Capita Tax Burden of 192 Cities: (1910-1920)**

Special Assessments*	-15 – -19.9%	-10 – -14.9	-5 – -9.9	-1 – -4.9	0	1 – 4.9%	5 – 9.9	10 – 14.9	15 – 19.9	20 – 24.9	25 – 29.9	30 – 34.9	35 – 39.9	40 – 44.9	45 – 49.9	50 – 54.9	55 – 59.9	60 – 64.9	65 – 69.9	70 – 74.9	75 – 79.9	80 – 84.9	85 – 89.9	90 – 94.9	95 – 99.9	100 – 104.9	105 – 109.9	110 – 114.9	115 – 119.9	120 – 124.9	125 – 129.9	135 – 139.9	150 – 154.9	195 – 199.9	Fy	dy	Fdy	Fd²y	Ss	Ssy
0– .9%										1	1	4		1	2	1	1	1				1													13	-6	-78	468	121	-726
1–1.9						1		2	2	2	1	2	2	1	2	1	1		1								1								19	-5	-95	475	149	-745
2–2.9							1		1			1	2		2	3	1																	1	12	-4	-48	192	134	-536
3–3.9								1		2	1	2		2	3				1										1						13	-3	-39	117	119	-357
4–4.9									1	2	1	1	2	2						1							1								11	-2	-22	44	99	-198
5–5.9								2		1	1	1	2		1			1		1		1													12	-1	-12	12	92	-92
6–6.9										1			1		1			1	1	1	1			1											8	0			100	
7–7.9								1	2			2	1		1	1	1			1															10	1	10	10	81	81
8–8.9			1				1			1		3	1		1		1				1		3												13	2	26	52	126	252
9–9.9	1						1		1	1		1	1		1				1	1															9	3	27	81	61	183
10–10.9				1					1	1		1										1											1		6	4	24	96	63	252
11–11.9							2		1			1					1																		5	5	25	125	27	135
12–12.9						2		1	1	1		1	1		2																				10	6	60	360	74	444
13–13.9				1		1	1		1		2		1	1			1		1											1					10	7	70	490	61	427
14–14.9						1		2				1	2		1				1	2															10	8	80	640	84	672
15–15.9		1				1	1				1		1		1	1	1																		8	9	72	648	47	423
16–16.9						1							1									1							1						4	10	40	400	50	500
17–17.9				1				1			1	1																							4	11	44	484	15	165
18–18.9								1		1		2			1																				5	12	60	720	32	384
19–19.9										1																									1	13	13	169	5	65
20–20.9						1								1																					2	14	28	392	10	140
21–21.9																																			0	15				
22–22.9																				1															1	16	16	256	15	240
23–23.9								1			1																					1			3	17	51	867	37	629
24–24.9																			1																1	18	18	324	14	252
25–25.9																																			0	19				
26–26.9																1																			1	20	20	400	11	220
																																			0					
31–31.9													1																						1	25	25	625	8	200
																																			192		390	8447	1527	3010
Fx	1	2	1	3	0	8	7	12	11	15	10	24	19	8	19	8	8	3	7	8	2	4	3	1			2		2	1		1	1	1	192					
dx	-4	-3	-2	-1	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19			22		24	25		28	31	40						
Fdx	-4	-6	-2	-3		8	14	36	44	75	60	168	152	72	190	88	96	39	98	120	32	68	54	19			44		48	25		28	31	40	1626					
Fd²x	16	18	4	3		8	28	108	176	375	360	1176	1216	729	1900	968	1152	507	1372	1800	512	1156	972	361			968		1152	625		784	961	1600	20943					
Ss	3	8	2	22		55	27	48	11	13	34	22	55	0	7	7	9	-7	28	33	2	7	6	0			-7		7	6		17	4	-4	390					
Ssx	-12	-24	-4	-22		55	54	144	44	65	204	154	440		70	77	108	-91	392	495	32	119	108				-154		168	150		476	124	-160	2812					

** Ratio calculated from data for TABLE V.
* Same as in Table I.

Formula

$$C_y = \frac{\Sigma f d_y}{N} = \frac{390}{192} = 2.0312$$

$$\sigma_y^2 = \frac{\Sigma f d^2_y}{N} - C_y^2 = \frac{8447}{192} - (2.0312)^2 = 39.8689$$

$$\sigma_y = \sqrt{\frac{\Sigma f d^2_y}{N} - C_y^2} = \sqrt{39.8689} = 6.3141$$

$$C_x = \frac{\Sigma f d_x}{N} = \frac{1626}{192} = 8.4687$$

$$\sigma_x^2 = \frac{\Sigma f d^2_x}{N} - C_x^2 = \frac{20943}{192} - (8.4687)^2 = 37.3592$$

$$\sigma_x = \sqrt{\frac{\Sigma f d^2_x}{N} - C_x^2} = \sqrt{37.3592} = 6.1113$$

$$\frac{\Sigma xy}{N} = \frac{S_{sy}}{N} = \frac{3010}{192} = 15.6771$$

$$r = \left(\frac{1}{\sigma_x \sigma_y}\right)\left(\frac{\Sigma xy}{N} - C_x C_y\right) = \left(\frac{1}{38.5873}\right)(-1.5245) = -.039$$

TABLE VII

SPECIAL ASSESSMENTS AND MUNICIPAL INDEBTEDNESS

Per Capita Net Debt of 191 Cities: 1910-1920**

Special Assessments*	1- 4.90	5- 9.90	10- 14.90	15- 19.90	20- 24.90	25- 29.90	30- 34.90	35- 39.90	40- 44.90	45- 49.90	50- 54.90	55- 59.90	60- 64.90	65- 69.90	70- 74.90	75- 79.90	80- 84.90	85- 89.90	90- 94.90	95- 99.90	100- 104.90	105- 109.90	110- 114.90	115- 119.90	120- 124.90	125- 129.90	130- 134.90	135- 139.90	140- 144.90	145- 149.90	150- 154.90	155- 159.90	160- 164.90	165- 169.90	fy	dy	fdy	fd²y	Ss	Ssy
0-9.9				1	1	2			1	3				1			1	1	1				1											13	-7	-91	637	60	-420
1-1.9				1	1	1	1		2	1	2		3	1			2	1					1		2									19	-6	-114	684	119	-714
2-2.9				1			2	1	1			2		1	1			1																10	-5	-50	250	36	-180
3-3.9				1		1		1	1	1	2	2	2		1														1					13	-4	-52	208	64	-256
4-4.9			1	2	1		1			2	1	2																					1	11	-3	-33	99	8	-24
5-5.9			1	1	1			2	2	2	1	.		1			1																	12	-2	-24	48	24	-48
6-6.9				1		1		1	1	1			1					1	1															8	-1	-8	8	31	-31
7-7.9				1	2	2	1	1				1					1		1															10	0			19	
8-8.9		1		1	3	3	1	1	1								1	1																13	1	+13	13	7	7
9-9.9			1	1		3		1	1	2																								9	2	18	36	-1	-2
10-10.9					1	1	1	1		1																								6	3	18	54	9	27
11-11.9			1			1			1		1		1																					5	4	20	80	7	28
12-12.9			1	1					3	1	1	1	1	1		1																		11	5	55	275	33	165
13-13.9			1			6	1		1	1																								10	6	60	360	-5	-30
14-14.9		1		1	1	2		1			1					1	2																	10	7	70	490	22	154
15-15.9							1	2	1		2		1										1											8	8	64	512	34	272
16-16.9				1	1								1	1																				4	9	36	324	8	72
17-17.9				1		1		1											1															4	10	40	400	10	100
18-18.9		1		2	1								1																					5	11	55	605	-8	-88
19-19.9					1																													1	12	12	144	-2	-24
20-20.9				1		1																												2	13	26	338	-3	-39
21-21.9																																							
22-22.9								1																										1	15	15	225	1	15
23-23.9			1		1									1																				3	16	48	768	3	48
24-24.9									1																									1	17	17	289	2	34
25-25.9																																							
26-26.9															1																			1	19	19	361	7	133
31-31.9							1																											1	24	24	576	0	0
																																		191		238	7784		-801

** Financial Statistics of Cities: 1910-1920.

* Same as in TABLE I.

fx	1	2	7	18	14	25	11	14	17	15	11	8	11	8	3	2	8	5	3	1		3		2		1		1		191										
dx	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7	8	9	10	11	12	13		16		19		24		27														
fdx	-6	-10	-28	-54	-28	-25		14	34	45	44	40	66	56	24	18	80	55	36	13		48		38		24		27		511										
fd²x	36	50	112	162	56	25		14	68	135	176	200	396	392	192	162	800	605	432	169		768		722		576		729		6977										
Ss	11	8	3	3	8	27	6	7	3	6	4	0	20	-24	7	-19	10	16	7	12	-6	-18	-8	10		-5		-12		-4		-3								
Ssx	-66	-40	-132	-114	-54	-67		40	40	-72	28	-95	60	112	56	108	-60	-198	-96	130		-80		-228		-96		-81		-905										

Formula

$$C_y = \frac{\Sigma f d_y}{N} = \frac{238}{191} = 1.2460$$

$$\sigma_y^2 = \frac{\Sigma f d_y^2}{N} - C_y^2 =$$

$$\frac{7784}{191} - (1.246)^2 = 39.2014$$

$$\sigma_y = \sqrt{\frac{\Sigma f d_y^2}{N} - C_y^2} =$$

$$\sqrt{39.2014} = 6.2611$$

$$C_x = \frac{\Sigma f d_x}{N} = \frac{511}{191} = 2.6754$$

$$\sigma_x^2 = \frac{\Sigma f d_x^2}{N} - C_x^2 =$$

$$\frac{6977}{191} - (2.6754)^2 = 29.3710$$

$$\sigma_x = \sqrt{\frac{\Sigma f d_x^2}{N} - C_x^2} =$$

$$\sqrt{29.3710} = 5.4195$$

$$\frac{\Sigma x y}{N} = \frac{Ssy}{N} = \frac{-801}{191} = 4.1937$$

$$C_x C_y = 2.6754 \times 1.2460 = 3.3335$$

$$r = \left(\frac{1}{\sigma_x \sigma_y}\right)\left(\frac{\Sigma x y}{N} - C_x C_y\right)$$

$$= \left(\frac{1}{33.9320}\right)(-.8602) = -.025$$

TABLE VIII

SPECIAL ASSESSMENTS AND RATE OF GROW OF MUNICIPAL INDEBTEDNESS

Rate of Growth of Per Capita Net Debt of 195 Cities: (1910-1920)**

Special Assessments*	-70 – -79.9%	-60 – -69.9	-50 – -59.9	-40 – -49.9	-30 – -39.9	-20 – -29.9	-10 – -19.9	-1 – -9.9	0	+1 – 9.9%	10 – 19.9	20 – 29.9	30 – 39.9	40 – 49.9	50 – 59.9	60 – 69.9	70 – 79.9	80 – 89.9	90 – 99.9	100 – 109.9	110 – 119.9	120 – 129.9	130 – 139.9	140 – 149.9	150 – 159.9	160 – 169.9	170 – 179.9	180 – 189.9	190 – 199.9	200 – 209.9	210 – 219.9	220 – 229.9	230 – 239.9	240 – 249.9	250 – 259.9	320 – 329.9	1110 – 1119.9		fy	dy	fdy	fd^2y	Ss	Ssy
0- .9%					1			3		3		1	1		1	2	1																							13	-7	-91	637	31	-217
1-1.9		1				3	1	3		1	5	3	1					1						1														20	-6	-120	720	18	-108
2-2.9	1					1				3	2			1	1	2	1																			1			13	-5	-65	325	70	-350
3-3.9				1			4	2		1		3				1																						12	-4	-48	192	2	-8
4-4.9						1		3		3		1			1		1					1																11	-3	-33	99	27	-81
5-5.9			1			1		2		2	2			1	1				1				1															12	-2	-24	48	30	-60
6-6.9					1			1			1	2	1								1								1									8	-1	-8	8	39	-39
7-7.9							1	1			2	1	3							1															1			10	0			53	0
8-8.9				1	1		1				3	4		1						1						1													13	1	13	13	38	38
9-9.9				1			1			1	2		3	1										1														10	2	20	40	30	60
10-10.9					1	2								1	1				1																			6	3	18	54	11	33
11-11.9							1	1		1	1		1																									5	4	20	80	4	16
12-12.9			1					2		2				1	1		2	1																				10	5	50	250	30	150
13-13.9						2				1	2	1	2							1	1						1											11	6	66	396	49	294
14-14.9					1	3		1			1		2			1														1								10	7	70	490	24	168
15-15.9							1	1						1						1	3																1		8	8	64	512	161	1288
16-16.9						1				2										1																		4	9	36	324	10	90
17-17.9							1	1							2																						4	10	40	400	9	90
18-18.9								1		1	1						1																1					5	11	55	605	34	374
19-19.9																1																					1	12	12	144	7	84
20-20.9							1														1																2	13	26	338	11	143
21-21.9																																						0	14	0	0		
22-22.9													1																									1	15	15	225	4	60
23-23.9										1		2																										3	16	48	768	7	112
24-24.9																		1																			1	17	17	289	9	153
25-25.9																																						0					
26-26.9															1																						1	19	19	361	6	114
																																						0					
31-31.9					1																																		1	24	24	576	-4	-96
																																						195		200	7894		2308
fx	1	1	2	3	6	14	12	22	0	22	22	18	15	7	9	7	6	3	3	4	5	2	1	2	1		1		1	1			1		1	1	1	195						
dx	-8	-7	-6	-5	-4	-3	-2	-1		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		18		20	21			24		26	33	112	712						
fdx	-8	-8	-12	-15	-24	-42	-24	-22		22	44	54	60	35	54	49	48	27	30	44	60	26	14	30	16		18		20	21			24		26	33	112							
fd^2x	64	49	720	750	960	126	48	22		22	44	162	240	176	324	343	384	243	300	484	720	338	196	450	256		324		400	441			576		676	1089	12544	23471						
Ss	-5	-6	3	-1	27	20	16	-11		8	-4	0	37	12	30	-9	6	16	2	23	29	10	-2	-4	1		6		-1	7			11		0	-5	8							
Ssx	40	42	-18	5	-108	-60	-32	11		8	-8	0	148	60	180	-63	48	144	20	253	348	130	-28	-60	16		144		20	147			264		0	-165	896	2342						

** Ratio calculated from data for TABLE VII, with a few more cities added.

* Same as in TABLE I.

Formula

$C_y = \frac{\Sigma f d y}{N} = \frac{200}{195} = 1.0256$

$\sigma_y^2 = \frac{\Sigma f d^2 y}{N} - C_y^2 =$

$\frac{7894}{195} - (1.0256)^2 = 39.4302$

$\sigma_y = \sqrt{\frac{\Sigma f d^2 y}{N} - C_y^2} =$

$\sqrt{39.4302} = 6.2793$

$C_x = \frac{\Sigma f d x}{N} = \frac{712}{195} = 3.6512$

$\sigma_x^2 = \frac{\Sigma f d^2 x}{N} - C_x^2 =$

$\frac{23471}{195} - (3.6512)^2 = 1070328$

$\sigma_x = \sqrt{\frac{\Sigma f d^2 x}{N} - C_x^2} =$

$\sqrt{107.0328} = 10.3442$

$\frac{\Sigma xy}{N} = \frac{Ssy}{N} = \frac{2308}{195} = 11.8358$

$r = \left(\frac{1}{\sigma_x \sigma_y}\right)\left(\frac{\Sigma xy}{N} - C_x C_y\right) =$

$\left(\frac{1}{10.3442 \times 6.2793}\right)$
$(11.8358 - (3.6512 \times 1.025)) =$

$\left(\frac{1}{64.9543}\right)(11.8358 - 3.7446) =$

$.124$

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