MUNICIPAL EXPENDITURES AND URBAN STRUCTURE: PLANNING IMPLICATIONS FOR MICHIGAN'S CENTRAL CITIES

Thesis for the Degree of M. U. P.

MICHIGAN STATE UNIVERSITY

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1977

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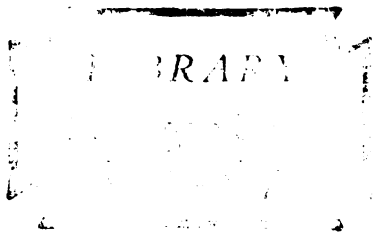

APR 16 '87
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37 K215

OCT 2 '87

C-104C40

ABSTRACT

MUNICIPAL EXPENDITURES AND URBAN STRUCTURE:
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MICHIGAN'S CENTRAL CITIES

By

Paul R. Stuhmer

Problems of urban decline and financial crisis that were once thought to occur primarily in large urban centers have now spread to many of Michigan's medium-sized cities. A necessary step in finding solutions to these problems is integrating studies of municipal expenditures into the urban planning process. This will introduce new areas of concern to planners and increase the feasibility and relevance of many planning activities.

One facet of relating municipal finance to planning is establishing Michigan's central cities as a "client group" that would benefit from advocacy planning. This study seeks to show that:

1. Michigan's central cities have sufficient distinguishing characteristics to allow them to be considered as a class.

2. The characteristics which distinguish the central cities have a significant effect on the structure of municipal costs.
3. Differences in municipal costs can be explained by a limited number of structural and socio-economic variables which cannot be changed over the short run.

If these hypotheses are correct, then the central cities will require programs which would benefit central cities as differentiated from other units of government, and which would provide compensation over the short term while longer term correctives are designed.

The methodology used to investigate the factors explaining expenditure variables was to create two sets of multiple regression equations for a number of specific costs. Observations of cost and explanatory variable were taken from a sample of 202 local governments in southern Michigan. The sample was divided by category of local government and category differences for both structural and cost variables were calculated.

The second set of regressions was used to identify explanations of cost variations within a subsample consisting of cities of over 10,000 population within the sample.

The findings of the study indicate that the central cities do in fact have sufficient differentiating characteristics to consider them a distinct and separate group for finance and planning purposes. Central city means for

variables were compared to those for urban townships, suburban cities, suburban townships, and rural local governments. Only two variables failed to show statistically significant differences.

Several factors were identified which have significant impacts on expenditure variations between local governments. The most important is the density of commercial and industrial value. Second in importance was the age of housing stock, which was felt to be the best available surrogate for age and condition of urban infrastructure. Percent poverty and employment characteristics had a marginal impact.

Significant differences between categories were especially striking in total local tax rates and tax burden related to income.

Recommendations include the establishment of a statewide business property tax to replace local property taxes on businesses, and the investigation of alternatives for "life-cycle" financing for cities. Research recommendations include investigation of patterns of county expenditures, improvements in reporting of municipal expenditures and research into cost patterns in declining urban areas.

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A THESIS

Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of

MASTER OF URBAN PLANNING

School of Urban Planning and
Landscape Architecture

1977

ACKNOWLEDGMENTS

Many individuals have contributed time and expertise to produce this thesis. Foremost among these I wish to thank Dr. Roger Hamin, my advisor, for setting the direction of the research effort and his advice, encouragement, and criticism along the way.

Dr. C. Robert Muth sponsored the research and helped to define many of the issues of municipal and education finance. Mary Guile added both technical expertise and a great deal of effort in tracking down information and formulating the study. Special thanks to Jan Leland for her time and skill in editing and proofreading this manuscript. Thank you one and all.

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I. INTRODUCTION

This study is a test of several hypotheses concerning the structure of local government types and the effect of community structure on local government expenditures. Chapter one presents the background relating the study of expenditures to planning theory and practice, a description of the study design and scope and study limitations. Chapter two describes relevant studies and research. Chapters three and four present the study methodology and data, and Chapter five summarizes findings and relates these to recommendations for policy and further research.

Chapter one provides the context for the expenditure study. The background relates the study of expenditures to fiscal planning and fiscal impacts of planning decisions. The scope and design provide the specific context in which the study was undertaken. The next sections summarize the specific objectives, techniques and limitations of the study.

Background

Among the most prominent and widely publicized trends of the late 1960s and 1970s has been the decline of

the nation's central cities. In problems ranging from financial crisis to physical decay and massive outmigration, the impact of this decline upon the urban planning profession has been profound. Planners as well as most city officials have been unprepared and unable to cope with the demographic and structural changes that have accompanied changing social conditions and preferences. Concern for these problems has typically been directed to the largest urban centers, where civil disorders and other graphic conditions have brought wide public attention.

More recently, many of the same symptoms of decline have become evident in small and medium-sized cities that were once thought to be immune to such problems. Although this situation has been exacerbated in Michigan as a result of declines in auto and related industries, it is obvious that the decline of cities reflects a more basic pattern that is being replicated in many areas across the country. As outmigration to the suburbs has spread from the largest metropolises to smaller cities and regional centers, it has taken the leading edge of society with it, leaving many of the poor and less fortunate to deal with the complex problems of urban management.

The consistent movement away from central cities seems to be qualitatively different from individual city declines due to changes in industrial location and production.

Thus the problem may merit special attention, as well as having different solutions or alternatives.

Attempts by the planning profession to deal with this crisis have not met with any substantial degree of success. Part of the problem seems to stem from a bais lack of knowledge of the processes by which economic growth and revitalization can be encouraged. A specific aspect of this lack is that little has been done in the State of Michigan to analyze the root causes of specific increases in municipal expenditures. This research is of direct importance to the ability of planners and city officials to estimate the feasibility, costs and requirements for changes in public services. The determination of the causes for expenditure trends may enable planners to increase their lead time in developing and implementing more effective programs to deal with problems of rising costs and deteriorating services:

> . . .Planning for public service requirements in smaller cities is an essential, but often neglected part of the process of encouraging economic growth. Many smaller cities will serve as growth centers for multi-county development regions and these cities are likely to experience large increases in population. At the same time, other cities may continue their decline in population. It is, however, essential for both of these groups of cities to maintain adequate levels of governmental services. In the growth centers, inadequate levels of government may retard the region's growth by discouraging new industry or new residents from locating in the area. In declining cities, inadequate service levels may accelerate the population outflow, and produce unnecessary hardships for the people who remain (Stinson, 1970, p. 134).

Finance has long remained on the periphery of urban planning, appearing perhaps most frequently in relation to

capital improvements planning. But the pattern of municipal expenditures has a direct relationship to many facets of urban planning. The requirement for public services and the ability to support them will directly affect the ability to carry out such programs as neighborhood restoration and housing rehabilitation. In the past, many of these programs have failed because of the city's inability to provide the necessary level of support in related services. Planners for such activities must have an adequate knowledge of the likely changes in expenditures that result from demographic and structural changes. These will have both budgetary and policy implications in the city and its planning activities:

> Current public financial planning relies heavily on the extrapolation of existing trends. This technique, while adequate for most marginal increases in population, may prove misleading both for rapidly growing and declining cities. In these cities, economies and diseconomies of scale, fixed capacity levels and changes in both the quantity and quality of public services can no longer be ignored. In addition, some revenue sources, such as the property tax, may not increase at the same rate as expenditure needs, forcing increased reliance on other sources of revenue. Consequently, projections of future service requirements and revenue estimates may need to be based on something more than the previous year's trend (Stinson, 1970, p. 135).

Many planning activities now require the submission of detailed plans covering both program cost and eligibility for specific programs. This type of plan in many programs is a condition for state or federal aid. The creation of detailed information of this type requires a background in both physical and financial planning. Agencies without this capability will be at a disadvantage in applying for such programs.

The analysis of expenditures may also shed some light on planning--related issues, particularly those related to planning for public services. It has long been held that increasing the scale of operations of many municipal services will lower per capita costs. However, some recent evidence indicates that this is not always the case. Some large cities may in fact experience diseconomies of scale (Muller, 1975, p. 95). It is not the purpose here to debate this issue, but to illustrate areas where expenditure analysis is essential to developing sound planning strategies.

A growing use of the financial aspect of planning is for what is termed fiscal impact analysis. The basic purpose of fiscal impact analysis is to determine what costs will be created by a proposed activity and whether revenues generated by the activity will cover projected costs. The most common use to date is to predict the impact of land development projects, and its use for that purpose is increasing rapidly (Muller, 1975, p. 1).

Fiscal impact analysis is a new but rapidly growing planning activity. Its growth has taken place at about the same time and is roughly analogous to, the growth in environmental impact analysis. The number of fiscal impact studies during 1973 and 1974 was greater than all such studies during the previous five years (Muller, 1975, p. 1). Additionally, at least two states, Florida and Vermont, have legislation requiring fiscal impact studies for some classes or projects.

As the scale of projects or proposed activities changes, the tools of impact analysis also change. Three types of studies normally undertaken are: development project studies, community-wide studies and regional impact studies. Project or subcommunity level (termed microlevel) analysis generally relies on data developed at the local level. Community and larger studies (termed macrolevel) tend to rely on aggregated local state and national data.

The analysis of municipal expenditures across communities is used in fiscal impact analysis for several purposes. It serves to establish a range of expenditure levels for particular government services. When different community types are adequately represented, it may be used to develop a trend in expenditures across community types. This trend may then be used to predict likely changes in expenditure levels as community characteristics change.

Planners have also traditionally not been involved with the issue of local tax levels. But as public expenditures and tax levels have risen, planning activities have become more directly linked to the financial condition of the city.

Recent Michigan legislation, notably the Industrial Facilities Tax Act of 1974 and the Downtown Development Authority Act of 1975, directly relate development activities to the city's financial condition and taxing powers. If the powers authorized in these and similar acts are to be used effectively, it is imperative that urban planners understand

both the nature of municipal expenditures and the implications of the resulting tax burden. Planners must be much more knowledgeable about the workings and incidence of local taxes, especially the property tax.

As institutions engaged in the revitalization of cities turn more toward economic development incentives and financial tools, they are increasingly turning to other experts rather than urban planners to formulate development plans. Urban planners who are unable to understand and work with the city's finances may be left out of the most critical decisions concerning the city's future. If this is to be avoided, fiscal strategies must become part and parcel of the urban planner's tools.

Study Design and Scope

One of the public services most dramatically affected by the increasing cost of urban government has been public education. Many educational planners have recognized that support for other governmental services directly affects financing for local education. The specific effect of the local government's tax level on local school district revenue has been termed "municipal overburden." This term was originally used in New York to explain expenditure variations between school districts (Polley, 1961).

Arguments over the existence of municipal overburden were instrumental in the development of municipal expenditure analysis. Initially, the attempt was to delineate types

of communities where overburden was thought to occur. Compensation was then recommended communities on the basis of community type, or specific characteristics such as density or total population. Many of the same arguments are being offered today for more general programs of aid to the cities.

In 1974 the Ford Foundation funded a study to develop similar information for cities in the state of Michigan. Although much of the study was concerned with purely educational activities, an important segment dealt with differences in specific governmental costs between central cities, suburban and rural governments. Of specific interest was the idea of applying the "municipal overburden" theory to Michigan cities. In order to do this it was necessary to compare the expenditure patterns for a large number of Michigan's local governments to determine what expenditure levels were and the most important factors in determining them.

The original intent of this thesis was to examine the effect and importance of conflicting political boundaries, especially those between school districts and associated minor civil divisions. This involved methods of ascertaining boundaries and allocating tax base and costs between minor civil divisions. However, as the study progressed, it became evident that this was not suitable.

Most planning tasks do not involve the calculation of this type of information. The problem, as originally stated, did not deal with the creation of boundaries, or

with methods of changing them. The problem is at best a limited one involving the allocation of costs and benefits of special purpose districts. Allocation methodology for these has long been established with little controversy through the use of tax code districts and special assessment districts, and the use of tax code districts did not prove suitable for expenditure analysis between minor civil divisions.

At the same it was noted that there is a lack of original research in Michigan relating the cost structure and determinants of municipal finance to urban planning functions. As the research for the Ford Foundation study proceeded along these lines, it became evident that analysis of the substance of municipal expenditures would prove more beneficial, and analysis of the substance would provide a greater opportunity to develop and evaluate techniques for analysis for such functions as the preparation of fiscal impact studies. This thesis, then, is an out-growth of that research.

Research Objectives

The thesis examines three major hypotheses covering both the divisions of local governments into categories and the effects of differences between those categories. The hypotheses are:

1. Michigan's central cities are a distinct class of Local Government. That is, they have characteristics which distinguish them from other local governments.
2. The characteristics which distinguish the central cities have a significant effect on the structure of municipal costs.
3. The differences in municipal costs can be explained by a limited number of structural and socio-economic factors which cannot be changed over the short run.

If these statements are true, there are two specific implications for planning in the central cities that will be examined:

1. Central cities should be a viable "client group" for advocate planners. If central cities are a class, then planners may advocate programs and activities which would benefit central cities as distinguished from other units of local government.
2. Since the factors affecting municipal costs cannot be changed over the short run, planners must seek compensation for them in the short run while planing longer term corrective actions.

Research Methodology

The basic methodology of the study integrates three basic types of information for a cross-section sample of Michigan minor civil divisions. The sample consists of 222

minor civil divisions in southern Michigan, and is divided for purposes of analysis into the categories of central city, urban township, suburban city, suburban township, rural municipality, and rural township. A more complete description of the sample is included under the description of the study's methodology.

A major objective in the sample construction was the idea that the comparisons should not include just cities, but those governments in the same area which are nonurban. Conventionally, this is done by the Census divisions of Standard Metropolitan Statistical Areas (SMSA's) into urbanized and nonurbanized sectors. This sample design makes possible the analysis of differences within as well as between those sectors.

A first set of questions concerns expenditures for local public services. The study will attempt to outline major variables that affect costs. This will center around such phenomena as the distribution of income, industrialization, city age, and density.

The methodology for this involves the creation of multiple regression equations using current operating costs for specific municipal functions as dependent variables. The primary reason that current operating costs are used and not capital expenditures is that current operating costs more accurately reflect the local government's financial situation than the capital expenditures for a given year. A characteristic of capital expenditures is that they are

"lumpy" and occur at uneven intervals. There is no assurance that large differences would occur randomly, and the results would distort the financial picture. Current operating expenditures are also typically a much larger portion of the government's budget than are capital expenditures.

Because a regression which includes all types of municipalities will contain variations inherent to or caused by the type of government itself, two sets of regressions are presented. The first covers the entire sample, and deals with variations between as well as within categories. The second set of equations includes a subsample of those cities of over 25,000 population. This is presented as an alternative to the more conventional approach of using a "dummy" variable to incorporate all variation within a single set of equations.

A second set of questions deals with the extent of differences between the categories of local governments. These differences are expressed mainly through measures of the populations of each local government. This section also includes some measures of the difference in selected per capita expenditures by category. The purpose of this is to illustrate the magnitude of differences. Statistical measures may demonstrate the statistical "significance" of differences between groups, but the importance of those

differences is a value judgement. Thus it is necessary to go back to the basic data to determine whether or not important differences do exist.

The method by which these data are presented is that of group mean data, with analysis of variance used where appropriate. This technique allows for examination of the differences between groups compared to the differences within groups, and will be explained more fully in the methodology section.

The third section deals with the ability of local governments to pay for services. One portion of this deals with a unified picture of income and tax burden for each of the categories. The purpose is to assess the tax effort made by each category, and to indicate whether or not there are significant differences in tax effort by category. A significant portion of this lies in separating out the residential portion of the local property tax to determine where the burden of local taxes falls, and what implications this has for urban policy.

The concluding section will draw implications for policy and administration from the data, including recommendations for further research and improvements in data collection. This section will also, where appropriate, indicate measures which have already been taken in both legislation and administration.

Study Limitations

The design of any study imposes upon some inherent limitations, and data availability and usability often impose further restrictions. Some of these affect the validity of finding while others limit the extent to which inferences may be made from the findings.

Because of the desire to provide uniform information regarding state influences on the sample governments, trends and inference from this data set may be applied only to a very limited extent to local governments outside Michigan. The purpose behind this restriction is to provide both a uniformity and a depth is data which is not possible if a multistate sample is used. Many authors have noted the critical weakness of inconsistent data definitions inherent in the multi-state sample, and many have acknowledged the power that the state has in setting the conditions for local finance:

> . . .The states hold power over these important ground rules: they specify the internal workings of urban tax systems; they set conditions that determine cost and use of land; they have a major influence over the internal content of basic services like education, transportation, health care, public safety, and justice (Campbell, 1970, p. 129).

States also set the accounting rules and in many cases specify the level of government and structure within which a function is carried out. Thus the best place for analysis is where the entire sample is located within one consistent set of operating conditions and structure.

Time is another factor which also affects the consistency and validity of data. Accounting methods and categories, areas and even the structure and functions of local government change over time. Because of this, most time-series studies are limited to one variable, population. The cross-section method was selected for this study primarily because within the study, the underlying conditions remain constant. This applies especially to such data as cost categories and methods of counting costs. The cross-section, which is a set of observations at a single point in time also "holds constant" such factors as changes in technology.

The analysis of municipal expenditures in this study has been restricted to current operating expenditures. It was felt that, for a cross-section analysis, this would provide the most valid indicator of relative expenditure levels. Capital flows would certainly be more relevant for many planning purposes. However, even with a state these are very difficult to examine in a uniform fashion. For example, many communities may form semi-autonomous government corporations to carry debts for local projects. This debt, while it may be the financing for a local government function, would not be reported with the local government's debt servicing. Thus that community's debt as reported would be lower than that for a community which financed the same project directly through the local government. This

process does not occur randomly, as some classes of local governments must use this more regularly to avoid debt ceilings. There also remains to be developed an acceptable method of reporting and equalizing for differing loan terms, periods and interest rates.

Other limits are inherent in the regression technique. Of prime importance is that the correlations exhibited by the regression equations do not by themselves establish any causality. This is of special significance when variables such as intergovernmental revenues are discussed. Some studies have found significant correlations between expenditures and intergovernmental revenues, implying that there is a cause and effect relationship. While there is no firm evidence, it seems likely that the relationship may proceed either way. Government aid may be a result of increased expenditures which generate pressure on politicians to seek aid. For this reason, some variables of this type have been excluded.

Relationships among independent variables may also distort the findings. The tendency here is for correlations to be lower and standard errors larger than would be the case if there were no interrelationships. Distortion may also occur where there is significant nonreporting or misreporting among particular cost variables.

These limits confirm that the regression is an imperfect tool for approximating reality. The strength of the regression in the context of this study is that it

indicates which variables may be the most important and the degree to which variation may be explained. The actual value of the regression coefficients is subject to change and may be considered of lesser importance.

The number of variables which may be used with confidence in a regression is limited, and is obviously much less than the number of factors in the real world which affect costs. In many cases, no data exist for these variables and they cannot be included in such a study. The degree to which many variables are still unexplained indicates that there is much yet to be discovered in the field of expenditure analysis.

A severe limitation even within the confines of a single state is the lack of uniform accounting procedures. Analysis of the 1972 Census of Governments data indicate that in many cases local governments have not reported expenditures in categories where they almost certainly occurred. Such nonreporting is most common with very small governments.

A related problem is the lack of uniform definitions for accounting categories. This makes it virtually impossible to make cross-government comparisons of many specific expenditure categories. For this reason, the number of specific expenditure categories considered in this study is quite small. It is limited to those categories which can be considered common to most if not all local governments.

Finally, this study does not deal with many other facets of local, state and federal regulations which affect costs and services. In most cases these do not seem susceptible to the type of analysis conducted here, but require an approach incorporating the political decision making process as well as the dollars-and-cents results.

II. RELATED LITERATURE AND RESEARCH

The analysis of municipal expenditures is not a new activity; many studies have attempted to relate expenditure levels to various demographic, structural and financial variables. The vast majority of those studies have taken place since the Bureau of the Census began consistent collection of municipal finance data. The 1950 designation of Standard Metropolitan Areas and the expanded information provided for those areas also facilitated the growth of such studies.

This section does not attempt to cover all expenditure studies, but only those which have some significance either in establishing techniques or are of special interest to planners. These include some earlier studies which developed the regression approach and several later studies which give the analysis of expenditures a planning focus.

The purpose of the search of related research on municipal expenditures was to establish basic techniques used for expenditure analysis and to examine the extent to which this has been related to planning practices. To

accomplish this, literature in planning, economics, and finance was reviewed, and the relevant studies divided into three categories. These include: (1) Early studies which established the basic techniques for expenditure analysis. These were used not only for methods of analysis, but to determine which variables might prove most useful in explaining expenditure variation; (2) A second category of studies addresses more directly issues of metropolitan fiscal relations and urban-suburban differences. (3) The last category deals with recent direction and special interests in expenditure studies. This yields some measure of progress being made and the flexibility of techniques. It was originally thought that this area might have greater applicability to planning issues.

Early Studies of Municipal Expenditures

Among the earliest and most widely known analyses is Brazer's 1959 study (Brazer, 1959). This study involved the analysis of expenditures of a nationwide sample of 462 cities of over 25,000 population. Data for the study were drawn from the 1940 and 1950 Census and 1952 Census of Governments. Subsamples for analysis were composed of the 40 largest cities, 35 cities in California, 30 in Massachusetts and 32 in Ohio.

Brazer's major focus was to correlate expenditure levels to independent variables describing the city's structure. The basic methodology was to construct regression

equations for each of eight expenditure categories using six "independent" variables. Following is a list of the variables used:

EXPENDITURE VARIABLES	INDEPENDENT VARIABLES
total operating expenses	population
police	density
common functions	population growth
fire	median family income
highway	intergovernmental revenue
recreation	percent employed in manufacturing and services
general control	
sanitation	

The same variables were also used for the subsample analysis. Although some previous attempts to use this format had been made, this was the first successful study using a number of specific expenditure categories in a multiple regression format.

One of Brazer's major findings, though not reported quantitatively, was that state and regional location account for a great deal of the variation in expenditures. This pointed the way toward examination of expenditures within individual states and regions. However, the individual state analyses presented by Brazer did not seem to add significantly to the explanation of expenditure variation, nor did the coefficients of the 40 largest cities differ markedly from the whole sample.

In developing hypotheses of urban interaction, Brazer relied heavily on the earlier work of Amos Hawley. This was one of the earliest studies which found a positive correlation

between central city expenditures and suburban growth. The specific hypothesis was that the expenditures (for the central city) are positively correlated with the percent of population living in the suburban portion of the metropolitan area. Brazer's findings added some support to this.

Brazer attempted to shed some light on the question of optimum city size by including population as one variable. His findings was that, when other sources of variation were taken into account, size alone does not seem to significantly alter the spending pattern. Whether or not this would remain across all city sizes was not clear.

Several weaknesses showed themselves in this early attempt. The selection of variables left many possible areas of causality uncovered. In part, this was undoubtedly due to lack of data for such variables as property valuation and age of structures. While Brazer's study included median income as a variable, it had no measure of those families or individuals living in poverty. Likewise, the distinction between manufacturing and other types of cities applied to the labor force, not the location of facilities.

Brazer concluded that the class of city was also a major factor influencing expenditures. Class in this context referred to the city's structure, i.e., whether the city was a central city of a metropolitan area, an industrial or residential suburb, an independent city or a major resort area. However, little quantitative evidence was offered to

support that conclusion or to indicate the specific manner in which class would influence expenditure levels.

The problem of correlation versus causation in regression studies is illustrated by the findings on intergovernmental revenue. Brazer highlighted his findings on intergovernmental revenue as this was the only variable found to be significant with all expenditure categories. He felt that, given the broad nature of the sample and the strength of the relationship, there would be a cause-effect relationship. However, there are many possible explanations, among them that city governments are most likely to seek aid for those expenditure categories which are highest or increasing most rapidly. This illustrates the danger involved in using this form of analysis without a strong underlying theory.

A study by Adams (1963), utilizing a national sample but with a different construction, yielded somewhat similar results. Adams constructed a sample of 478 county areas by aggregating the expenditures of local governments within those counties. This gave a single set of expenditures for each county unit.

Adams divided his variables into five categories: socioeconomic, physical, income, population, and political. This was a significant increase in the number of variables of previous studies, since each category had several variables. Variables under socioeconomic included density, percent urbanized and per capita hotel, motel, and camping

receipts. Physical included region (of the United States), age of housing and percent multiple-unit housing. Population included percent foreign-born and non-white. Political included percent (of population) recent immigrants to the local area and the number of political units. This last is a variable unique to this type of sample construction.

Those results which differed from Brazer's indicated that political fragmentation affected the per capital expenditures significantly, as did density and urbanization. The finding on political fragmentation was not unexpected or important in itself, but pointed the way towards a more systematic analysis of the costs and benefits of metropolitan government.

One critical aspect of Adams' study which may have influenced the findings lies in the sample construction. The independent as well as cost variables were pooled into county areas, cancelling out much of the urban-suburban variation. In effect higher city costs and lower suburban costs (where they existed) were diluted. Where "urbanization" variables such as density and percent urbanization were used, the results would be weighted by very large metropolitan areas. Thus one would not expect this type of study to show the same kind of results as one which included city and suburban governments as distinct observations.

A different problem with this study and several others lies with variable choice. As many observers have noted, those areas with high expenditure levels also seemed

to have a fairly large percentage of non-white population. This has led many researchers to include non-white as a separate variable, and in some cases to achieve statistically significant result, as Adams did for some categories. The real problem lies with the theory behind this correlation. The general hypothesis is that these people require more services because they are poor or some similar condition. But if this is so, then proverty or some related measure would be much better. The use of variables such as non-white or percent minority, unless accompanied by very specific explanations, creates two problems: The first problem is that it puts the researcher in a position of "blaming the victim". Many researchers move quickly from the correlation to the inference that the minorities actually cause increased expenditures.

The second problem is statistical in nature, but may also damage the credibility of the research. Poverty and race are often highly correlated, for well-known historical reasons. Where these two are used together the result is likely to be highly confounded, obscuring the relationship with each of the variables and possibly reducing the apparent or calculated significance of both. The reason behind this is that multiple regression is based on the assumption that the independent variables are not related, or at least the relationship is not known. With race and income there is a direct and usually significant relationship. It is therefore unwise to use the two together without extreme

safeguards and equally unwise to use a variable such as race unless there is some very good reason for including it.

A major focus in and since Brazer's study has been the separation and identification of "supply" and "demand" components of cost variation. Adams devotes a major portion of his study to developing just such a formulation, with unconvincing results. The idea of the supply and demand functions comes from the conception of public finance as an analog to the private market, with a notion of "supply" and "demand" setting the level of public expenditures:

> . . .The annual cost associated with the operation of local government is argued to be functionally related to various demand factors as well as technologically based supply side factors. To the extent that either are not specified; by default, they will be found within the error term of the determinants equation (Beaton, 1974, p. 251).

This search for the supply and demand functions is expressed somewhat differently in a review of expenditure studies (Weicher, 1970, p. 379). Weicher notes four relationships which are analyzed by most studies: the possible existence of economies of scale, effects of political fragmentation, the effects of intergovernmental aid on local expenditures, and the response of expenditures to changes in fiscal capacity. He indicated that the studies he examined dealt inadequately with "tastes" (demand) and with service conditions (supply). The result, in his opinion, is that these studies fail to account for much variation, especially with regards to highway and sanitation

expenditures. Several later studies have continued the search for supply and demand functions.

However, warnings have been sounded about the applicability of the supply and demand analogy. In particular, the analogy between the supply theory of the firm and municipal expenditures has been severely criticized (Bahl, 1968, p. 24). The use of the firm's supply function in a municipal expenditure context would require that the local government produce its own population. This type of reasoning has led some researchers away from more productive forms of analysis.

During this early period of expenditure analysis, most studies have been directly or indirectly concerned with the problems of growth (Campbell and Sacks, 1967). This is reflected in the attempts to ascertain the dynamic character of hypothesized economies of scale.

Netzer (1969) has focused on this quality, especially the developmental aspects of suburbanizing areas. His central findings have been that smaller municipalities have higher per capital expenditures as a result of high "start-up" costs in both physical development and human services (Beaton, 1974, p. 251). However, this seems to address more the problems of a high rate of growth than size or structure. Netzer may also have surveyed smaller communities (much less than 25,000) than those who have not found economies of scale.

Urban-Suburban Relations and Metropolitan Areas

A major result of the early expenditure studies is that greater direction shows up in later attempts. Two notable trends are those toward the fiscal aspects of metropolitan governments and the effects of suburban growth.

Bahl (1969) presents one of the most complete analyses with regards to variation in metropolitan areas. Bahl concentrated on developing what he termed a "behavioral theory" of municipal expenditures, ignoring for the most part the traditional supply and demand theory. The technique involved both the creation of static regression equations for a national sample of 198 SMSA's and the exploration of the dynamic properties of selected variables.

The results of Bahl's study are among the most convincing and relevant of expenditure studies, in good part because they are oriented toward policy and practice rather than theory. In assessing the implications of his results. Bahl addresses planners and politicians rather than economists. In detailing urban-suburban differences, the study goes to some length to point out the fiscal implications of long-range land use policies:

> . . .The planner must anticipate the general effects of the metropolitan land-use plan on the central city fisc. A plan that does not discourage residential migration to suburbs is almost certain to sap the fiscal resources of the city, but as demonstrated, is not as certain to reduce expenditure requirements (1969, p. 131).

The dynamic qualities of growth and decline explored by Bahl address several issues. These include the changing character of urban-suburban differences, the effects of differing rates of change and the question of whether there is a "life-cycle" pattern to urban structure. Bahl made considerable progress in defining the issues and detailing which variables might be useful in further research. As in most expenditure studies, less progress was made toward highlighting those variables which account for the greatest portion of variation.

A problem in accounting for variation seems to lie in approaches which attempt to maximize the percent of variance accounted for (R^2) rather than isolating single important variables. Bahl's equations included 18 independent variables. Even with the relatively large sample size, this many variables tends to "use up" available variation, obscuring some relationships. Where this happens, other measures must be used to indicate which variables have a singularly important effect for the researcher. Unlike some researchers or theorists, the planner or practitioner is not seeking to account for "variation." The goal is to find out which variables should be manipulated, and in what fashion, to achieve desired impacts. Such research should also demonstrate what side-effects or externatities might be expected when certain variables change.

Despite some methodological problems, Bahl points out some trends of real importance to planners. As noted,

population decline due to residential outmigration will not lower service costs, even when variations due to other factors (such as increased poverty) are accounted for. Population size was significant only for total operating expenditures. In this instance the coefficient was not large, more or less sustaining Brazer's argument that economies of scale are limited at best. The 1950-1960 rate of growth was significant only for highway expenditures, indicating a very weak relationship between growth (of established cities) and costs.

On the other hand, population density was significant for all but highway expenditures. Regression coefficients (the B-value or "slope") tended to be fairly large, although in most cases the R^2 values of the whole equations were low. This means that although the relationship was both significant and important, there remained a great deal of variation to account for. In very few cases (notably fire and police expenditures) were R^2 values above .50.

One very noticeable trait of Bahl's regressions is that in most of the equations, five or six variables account for most of the variation. This leads to the conclusion that careful construction and consideration, not the number of variables, will determine the success of equations.

An example of this is the use of the fringe population ratio. Both planning theory and other studies have indicated that a high fringe (suburban) population imposes costs on the central city. Bahl included this as an

independent variable, yet the results are obscured. Bahl admitted that this is because of the intercorrelations with other, less important variables (1969, p. 80). Removing a number of variables from consideration could have clarified some outstanding relationships.

A later study focused more closely on the urban-suburban population question (Kasarda, 1974). Kasarda began with a much more specific question than most studies. His was an attempt to verify and expand the "urban-suburban exploitation thesis" (Neenan, 1970).

Briefly, the urban-suburban exploitation thesis states that suburban areas "exploit" the central city by characteristically using more public services than they apply for in taxes, charges and transfers. Neenan measured this effect for the Detroit SMSA and found that suburban residents experienced a net gain from Detroit city services. This gain ranged from approximately $1.75 to $12.50 per capita annually. The gain results both from free public services provided by Detroit to nonresidents and subsidizing some regional services.

Kasarda expanded the concept to deal with services rather than net fiscal gain. He created an analysis of 158 SMSA's considering four functions: retail trade, wholesale trade, business and repair service, and public service. This construction is unusual in that the private sector services are not normally thought of as "costs." However, they are very important in establishing the role of suburbs.

Their inclusion is designed to indicate the degree to which the central city acts as a service center for suburban areas. This sets the stage for the relationship between suburban population and central city costs.

The technique used by Kasarda is called path analysis. This is somewhat different from regression in that it separates the direct and indirect effects of each independent variable on the dependent. This is acheived by examining the intercorrelations between independents and comparing these with the direct effects. From these direct effects it is possible to determine which independent causes the greatest change in the dependent. Unlike the regression, the end result is not an equation which calculates the estimated amount of change in the dependent for each change in the independent variables. Thus path analysis is better suited to isolating important variables but not for estimating impacts.

When expenditures are controlled for city age, per capita income and percent non-white, Kasarda finds that

> ". . .The size of the suburban population, rather than the size or composition of the central city population is the most important determinant of central city expenditures for public services (1974, p. 145).

When commuters replace suburban population in the relationship, the results are essentially the same. The relationship between commuters and suburban population is almost perfectly linnear, adding 105 commuters for each 1,000 suburban population. This relationship seems to

indicate that suburbs do not become more "independent" of the central city as they grow larger. On the average, there were 132 commuters for each 1,000 central city residents (1960 data).

One factor which does change is that highway expenditures were not significantly correlated with suburban population. When commuters were substituted for population this relationship was positive and highly significant. This indicates the value of the analysis in isolating direct from indirect effects. This is especially important for this type of urban analysis, where many variables are highly correlated with each other and have both direct and indirect effects.

Kasarda's analysis does serve to strengthen the "exploitation" argument. The relationship described is limited in that the data cover only the ten-year period through 1960. This particular study should be extended through 1970 data to see whether the trends indicated still hold. This would be of particular interest for the private sector variables. The study covers the period when residental outmigration had been substantial, but before massive commercial and industrial relocation had taken place. Neenan's study, using later data, indicated that the fiscal relationship still held. But the pattern of use may be changing toward a trend of the central city providing more public and less private sector service. This should produce drastically different fiscal implications.

The preceding studies have shown that the format of lumped independent variables used indiscriminantly against cost variables will not account for the greatest part of cost variation. Even within states, these commonly leave the majority of variation unaccounted for. As many authors have realized, politics plays an exceedingly important role in the allocation of public funds. While many political consideration are not yet subject to quantitative analysis, attempts have been made to include government structure and organization. This deeply touches many aspects of planning, as it is virtually an article of faith that efficiency in public services can be improved by the restructuring of local government functions. This has been applied to repeated proposals for metropolitan government and regional planning as well as tax-base sharing and multiple-unit service arrangements.

It is possible to include some measures of political structure in a quantitative format. Adams' political fragmentation variable was one simple example. More sophisticated measures would account for structural differences in functional categories within the same political unit. If successful, this might significantly increase our explanation of variation by allowing us to specify different changes or variables for each function in a systematic fashion.

Beaton (1974) attempts to create just such a system for expenditure analysis. He begins by outlining four

general structural conditions: city size, growth, decline, and "fiscally unique functions performed by the different agencies" (1974, p. 250).

There are two differing opinions on the effects of city size on per capita costs. One position, that taken by the Advisory Commission on Intergovernmental Relations (ACIR) is that for most cities there are not significant economies or diseconomies of scale. Diseconomies of scale seem to be present only for cities over 250,000 (ACIR, 1968, p. 52). This general positions is also supported by Gabler (1971). The ACIR reviewed its position in 1976 and found no reason to alter it (ACIR, 1976, p. 58).

Beaton, on the other hand, finds that when costs are disaggregated it is possible to discern size effects. This is because when city size increases, interactions among the population tend to increase exponentially. Therefore those functions relating to human interaction would find their cost increasing faster than the population. Functions which have a production function similar to the private firm's may experience economies of scale. These services would have decreasing costs per capita, at least up to some limit.

As a result of these differences between functions, Beaton aggregates cost into two functional categories. These functions were earlier delineated by Hirsch (1959) on the basis of long term response to increasing municipal size. The two categories used by Beaton are: (1) horizontally integrated functions, in which a single government

unit controls all units performing the same functions, e.g. police department; and (2) circularly integrated functions in which the same unit provides a number of complementary services. Thus, in contrast to most other studies, Beaton has only two cost categories. Circular costs include: general government operating costs, general and financial administration and planning. Horizontal costs include public safety, public works and recreation.

Beaton takes a second major step in disaggregating cities by what he terms "environmental parameters" (1974, p. 256). The total sample of 567 New Jersey municipalities is broken down into 16 subsamples. This is roughly equivalent to a scheme of city classification. The sample is broken into four size groups: (1) 1,000-4,000, (2) 4,000-15,000, (3) 15,000-25,000, and (4) 25,000-383,000. Each size category is divided into growing or declining categories, and each of those is divided into "rich" and "poor" cities. Rich cities are those with a property value of over $8,500 per capita, poor are those below $8,500.

Regression equations are then set up for each subsample and Beta coefficients used to rank the results. With variation already divided into the subsets, the coefficients appear very impressive: in most cases at least 90 percent of the variation is accounted for. However, some very serious flaws present themselves. Because of the sample division, many subsamples are very small; one subsample contained no observations and was deleted. There

were only 46 total declining cities, divided into eight subsamples. Therefore many of the results are statistically invalid. They are not necessarily false, but cannot be relied on even within the context of the sample.

A more serious problem is that the empirical research approach seems inconsistent with Beaton's theoretical approach. The division of the sample by both environmental structure and cost category is designed to allow a choice of variables to be used in accord with theory. For example, Beaton theorizes that horizontal functions are more likely to be explained by socioeconomic variables than circular functions. Since Beaton uses all 16 of his independent variables for every equation, this effect cannot be discerned. The 16 independent variables cover the full spectrum normally used for expenditure regressions, including income, employment, aid, density, crime rate, age and debt. To follow Beaton's theory, variables should have been grouped, those with high intercorrelations omitted or used in separate equations and the success of explanation for each equation noted.

Thus although Beaton's theory makes some significant advances over more traditional approaches, the empirical test falls short of proof. It would appear at this point that the basic techniques are adequate if more sophistication is used in: (1) developing samples and subsample categories; and (2) making regression equations and other statistical techniques accord with theory. More needs to be done to

refine functional categories such that all important cost variables can be categorized. As data improve this will increasingly need to include such functions as housing, which do not easily fit the horizontal-circular dichotomy.

From the planner's point of view, the idea of structurally different types of services offers a chance to realize some improvements in services and more accurate anticipation of trends affecting services. The theoretical improvement is that, for an individual city it is probably too much to ask to formulate a unique set of variables affecting each individual cost function. On the other hand, specifying one set of variables for service functions in general will not be specific enough for planning and budgeting purposes. A refined set of functional categories would allow the isolation of organizational traits which can link the independent variables to specific functions for projections.

Other Recent Directions in Expenditure Studies

More recent studies have given some focus to declining metropolitan areas. Stinson (1970) analyzed both the expenditure and revenue patterns for cities following population shifts. His sample consisted of United State cities outside SMSA's with populations between 25,000 and 50,000. Stinson analyzed sources of revenue, increases in revenue, changes in expenditures by function and allocations (percent of budget) by function.

Stinson did not use any form of multivariate techniques, but pointed out the simple relationships between population change and expenditure and revenue changes. He did this by dividing the sample into two parts: cities reporting a population decline during 1950-1960 and cities with a growth rate between 33 and 100 percent during the same period. Controls for other sources of variation were not included in the statistical analysis. Stinsons basic intention in this was to give a broad picture of expenditures, revenues and debt structure without an overburdening methodology.

The results of expenditure comparisons were not definitive for specific categories, but indicated no substantial shift in the allocation of expenditures between functions. One significant difference was the higher proportion of capital expenditures in growing cities. This is not an unexpected difference, but might indicate that declining cities were not making substantial replacements of infrastructure. The other notable difference was that declining cities had a higher proportion of short-term versus long-term debt.

Although Stinson's research produced few specific results, it marked an early attempt to assess the planning and finance implications for declining cities. Stinson recognized the short-comings of such a broad study and simple technique and urged the development of more sophisticated techniques for revenue and expenditure projections.

His concerns for smaller cities also foreshadowed the spread of outmigration and its attending symptoms of decline from larger metropolitan areas to a more general pattern.

Another recent study (Liebert, 1974) addresses the question of relating municipal expenditures to community decision-making processes and structures. Liebert analyzed a number of comparative studies on municipal structure to determine whether the effects of different power arrangements were reflected in expenditure patterns.

One of the first variables examined by Liebert was the functional scope of local government. In many ways, this more specifically states the objections to multi-state samples: different local governments are responsible for different functions. Most expenditure analyses are organized by local government level, not by function. But the same local government levels in different states do not have the same responsibilities; what is assigned to the municipal level in one state may be found at the county level in another. Much of the higher average expenditures in New England are explainable in this fashion (Liebert, 1974, p. 767). This may be complicated for some functions by the addition of multi-county and multi-state regional agencies and districts.

Liebert's conclusion from this is that the "general municipal expenditure level" is actually a two-dimension variable incorporating both the functional inclusiveness and performance level (1974, p. 770). To study performance

levels, inclusiveness must be controlled. In the planning context, this might be reversed; performance could be controlled for to study the comparative effects of functional inclusiveness.

Two hypotheses or proposals that emerge are that it is possible to create measures for both inclusiveness and decentrization and that these will have an impact on per capita municipal expenditures. Liebert cites a study (1974, p. 777) in which an index of decentralization was positively correlated with per capita expenditures. The tentative explanation for this is that as more people enter the decision-making process, more demands will be made for special programs.

Alternative explanations are possible, particularly that as more people participate in the decision-making process, they will be more willing to pay (taxes) for public services. But whatever the explanations, the relevant point is that measures can be devised to test decision-making alternatives that relate directly to the organization of planning functions. The measures discussed by Liebert directly relate expenditure levels to organization type and structure. Planners attempting to decide where routine decision-making should be carried out and the appropriate governmental levels for specific functions may look directly to this type of empirical information to determine fiscal

consequences. This would be particularly true if per capita expenditures are reasonable measures of public preference.

Other studies have organized expenditure research around variables such as voting. Davies and Haine (1966) suggest that voter interest groups add significantly to the explanation of per capita expenditures. It is noteworthy that social welfare concerns do not even enter into this model, which might be described as a test of pure "interest group" theory. The results were not overwhelming, but indicate there are certainly elements of truth to the theory.

On a somewhat more conservative note, Sharkansky (1967) indicates his preference for previous expenditures as the primary determinant of current (and future) expenditures. This incremental approach is certainly valid for some functions. However, it should be noted that Sharkansky's study was developed before the popularization of PPBS approaches to public budgeting. It is likely that past expenditures will play a decreasing role in future allocations.

At a broader level, Dusansky and Nordell (1975) put forth the possibility of constructing a general model dealing with all aspects of the urban-suburban fiscal situation. However, their model is more closely derived from conventional economic theory and does not rely on decision-making alternatives to impact finances.

What good are these studies? A survey of the progress in expenditure analysis reveals that this branch of

analysis has progressed beyond the "background information" stage and is now an active ingredient in both policy and planning. One of the most important users of these studies is the ACIR. They provide not only recommendations and models for federal legislation, but develop state guidelines and assist other federal agencies in drawing up regulations and administrative policy.

ACIR has taken an interest in the organization, extent and effectiveness of urban and regional planning (ACIR, 1976). Finance is both a measure and means of success in planning. Expenditure studies which point towards more effective levels of government and which relate local expenditures to public decision-making processes enable ACIR to make recommendations for the proper focus of federal legislation and appropriations.

State and regional agencies may also find important uses for expenditure studies. An example is the Michigan State Housing and Development Authority's study of Michigan cities over 10,000 population. This may aid in establishing criteria for statewide programs and determining trends in expenditures (and taxes) affecting the housing stock.

Perhaps the most important contribution expenditure research can make is the inclusion of future finances in the planning process. Linking physical planning to the city budget is difficult and can only be successful if planners understand the critical relationship between finance and the city structure:

". . .The urban finance problem, perhaps the most complex of all urban problems, presents an especially pressing need for the coordination of fiscal and physical planning" (Bahl, 1969, p. 131).

III. METHODOLOGY

The methodology for developing an integrated analysis of municipal expenditures and characteristics consists of several discrete steps. The first is the method of classifying or grouping local governments. The second is the method of analyzing cost data with structural and other community variables. The last is the analysis of a group differences in both cost and community variables.

The first section of this chapter describes the creation and structure of the study sample. This includes the sample's classification system. The second section presents the regression technique used to analyze expenditure levels. The third section describes the analysis of variance that is used in conjunction with the classification system and which identifies differences between community types. The last section contains a description and listing of variables used in the study. Data sources are contained in a separate appendix.

An integral part of the analysis of expenditures and other variables is the attempt to classify or categorize local governments. The basis or rationale for this is that

if different classes of local government have unique expenditure characteristics, these may be measurable and stable enough to constitute the basis for specific government programs, either at local or higher levels. Some criteria must be used to define which are rational dividing points between types of governments, both for purposes of analysis and as a basis for policy decisions.

The regression equations for expenditure, on the other hand, operate independently of the classification system. Therefore any weaknesses in the classification scheme will not affect this portion of the analysis. The relationships thus established may be used to test the classification scheme. This may be of special value where legislation or administration are required to distinguish in some manner between categories of local governments. Thus, what appears to be a separation of techniques in the study is actually the method by which each part is tested and reinforced.

Sample Description

The classification system used in this study is designed around the idea of urban--suburban--rural differences, taking into account the basic differences between forms of government. Many studies have used the concept of separating urban and nonurban communities, but few take the specific form of government into account. The more usual practice, especially when using census data, is to separate

the sample into: Central city of an SMSA (urban) noncentral city area of the SMSA (suburban) and non-SMSA (rural). The lack of differentiation in government types has been noted in political studies (Campbell, 1970, p. 174), but the point is equally valid for expenditure studies where the political or governmental structure must be taken into account. In Michigan, the revenue limitations inherent in township government are especially important in assessing expenditure patterns for basic services.

The selection of school districts for the Finance Study determined the selection of municipalities, but not the number of municipalities in each category. One problem resulting from that approach was that the category of rural municipalities was severely underrepresented. Thus, few conclusions can be drawn about communities in this category.

The selection of school districts was designed to serve essentially the same purposes as the sample of municipalities. That is, it was designed to illustrate expenditure differences and community characteristics of urban, suburban, and rural communities in the same area. Therefore, the methodology for selecting the school districts will be presented first, then the municipal sample selection.

In selecting the sample for the Finance Study, the intent was to achieve a sample of districts which would represent each of several types of districts, based on geographic location, structure and selected financial

criteria. The sample is not intended as a random sample or representative of the state as a whole. Rather, the purpose was to construct a sample that would be useful for examining specific issues relating to differences between urban, sub-urban, and rural districts in lower Michigan. The sample was designed to be representative of this area.

In order to emphasize the structure and problems of medium-sized cities and their surroundings, the selection of districts centered around the 13 districts of the Middle Cities Education Association, 11 of these Cities are also the central cities of SMSA's; two, Benton Harbor and Battle Creek, are regional centers outside of SMSA's. All 13 of these districts are included in the sample, such that the sample consists of the central city district of each area with a sampling of its surrounding suburban and rural districts.

Originally it was decided that the sample would include districts of five categories (of district type) as classified by the Michigan Department of Education. This classification consists of the categories of: metropolitan core, independent city, independent town, urban fringe (suburban) and rural. The system is essentially based on the district's relationship to the nearest central city and the size of the included municipality. However, it was determined that there was an insufficient number of independent cities and towns (categories two and three) to be useful. Also, it was felt that the department of

Education's limit of ten miles is to the nearest central city for consideration as an urban fringe district was too restrictive, since normal commuting activity extended well beyond that range. To deal with this problem, category two and three districts were reclassified into categories one and four on the basis of characteristics of their constituent municipalities.

The reclassification resulted in one category two district (Benton Harbor) being moved to category one and one (St Joseph) being moved to category four. All category three districts were moved to category four. If Benton Harbor is considered on the basis of its historic role as a regional center in Southwestern Michigan, the reclassification agrees more closely with Census definitions of urban and suburban areas, while retaining greater differentiation than would be possible if the categories were based solely on Census criteria.

After preliminary analyses had been conducted, it was determined that the wide variation within the urban fringe (category four) group necessitated the creation of a fourth category. Rather than revert to the Department of Education's independent town or city classification, a category of suburban city was created. This category included all category four districts located with or primarily within the boundaries of incorporated municipalities. This change was made, however, after the selection and

classification of the municipal sample. But the change did bring the school district sample closer to the underlying philosophy and structure of the municipal sample.

One original criterion for school districts was that they would be as nearly as possible coterminous with municipal or minor civil division boundaries. This was dropped since few if any of the districts actually met the criterion. This meant that there was an imperfect, though close matching of municipal and school district boundaries. In practical terms it was partially responsible for the high number of suburban townships in the municipal sample.

As preliminary research had indicated a significant difference in millage rates and tax base between urban, suburban, and rural districts, a set of districts exhibiting both the extremes and central tendencies was desired. Therefore, the sample includes for each central city group: the central city, the low millage-low valuation (SEV) district, the high-millage-low SEV district, and the high millage district. In adding the central tendency, the district nearest the mean values was chosen, unless that district exhibited unusual coterminality problems. Where that occurred, the next district nearest the mean was chosen. Table one indicates the sample size and breakdown by category.

Table 1.--Sample size and breakdown.

Category	No. of Districts	Percent of Category	Percent of Sample
I	13	100	19
II	36	30	53
III	19	32	28

Sample total: 68 districts

Local Government Sample

The sample of local governments consists of those local governments which are included within the boundaries of the sample school districts. For the purpose of the Ford Foundation Finance Study, the object was to include in the sample jurisdictions having the same characteristics as the school district sample, and where relevant to merge school district and local government data.

In creating the sample, an attempt was made to create a sample size that would prove workable, yet large enough to yield meaningful data both for trends and subsamples. While it was possible to set subsample size in the school district sample, the same was not possible with the municipal sample, resulting in the rural municipalities being underrepresented. It was not felt that this was a serious loss, since the total number of communities in this category is very small. The size of categories becomes more critical when dealing with finance data. This is due

not to the nature of the information itself, but to the situation where, unlike Census data, there may be a substantial amount of missing data. Thus the number of observations used for any one calculation may be smaller than the sample total.

The sample was originally constructed using all cities, villages and townships which fell inside the sample school district boundaries as mapped by the Michigan Department of Education. Townships with less then ten percent of their area within the districts were excluded. The results were then rechecked by reference to a similar map from the Municipal Advisory Council of Michigan. The exclusion of townships with less than ten percent of their area within the school district sample served to reduce the categories of suburban township and rural township, which are still large in relation to the total sample.

A final check consisted of adding portions of the state equalized valuation allocated to school districts from the constituent local governments. This total for each school district was compared to the actual valuation reported by the district. Although some minor discrepancies were found, the system proved essentially sound for most purposes. This matching process was carried out to insure the comparability of the two systems. It does not carry any implications for analysis within the municipal sample beyond its use in the classification system.

For purposes of analysis, the 222 local governmental units contained in the sample were classified by both category and type of government. In drawing up the original sample, villages were included as separate units in the categories of suburban cities and rural municipalities.

Local governments were assigned to categories based on the category of the school district in which the majority of the area of the local government was located. The original classification of the sample is given in table two.

Table 2.--Sample classification.

Category	Classification	Number
1	Central City	13
2	Urban Township	18
3	Suburban Municipality	32
4	Suburban Township	77
5	Rural Municipality	20
6	Rural Township	62
Total		222

When data collection began, it soon became apparent the villages should have to be dropped as separate units of government. This is because both the 1970 Census and the state tax records do not use the village as a separate reported category, except for millage rates, population and total housing count. For other data, villages are included

as parts of the townships they are located in. This resulted in the revised sample given in table three.

Table 3.--Revised sample classification.

Category	Classification	Number
1	Central City	13
2	Urban Township	18
3	Suburban Municipality	28
4	Suburban Township	77
5	Rural Municipality	4
6	Rural Township	62
Total		202

As noted previously, the selection of school districts was not a random one. However, within categories the selection of local governments was essentially random since there is no necessary correlation between school districts and local governments for other than population and area. The financial criteria that were used in selecting the school district sample have no direct counterpart in local government although, as mentioned, the relationship between school district and local government finance was a subject of investigation for the Finance Study.

One problem in the sample, especially with regard to central and suburban city classification, arises when approaching the Detroit Metropolitan Area. Many suburban

cities in that area are larger than some central cities in the sample. For example, the smallest central city, Benton Harbor, has a population near 15,000. Several other central cities have populations less than 50,000, yet are undeniably regional centers. By contrast, Ypsilanti is twice Benton Harbor's size and Southfield, the largest suburban city in the sample, exceeds 70,000. This difference in size obviously affects some class differences. This is a major reason why the expenditure analysis must operate independently of the classification system.

Multiple Regression Analysis of Expenditures

The heart of the analysis of municipal expenditures is the multiple linear regression technique. What this technique attempts to do is to quantify the expression, "all other things being equal." That is, it "holds still" certain factors which constantly change in real life while it tests the relationship between each "independent" variable and the "dependent" variable.

In a sense, the theory behind multiple regression is one of implied causation. In simple bivariate regression (correlation), the coefficient merely states the degree to which the two variables are related, or vary together. Multiple regression goes a step further and allows the researcher to specify which variables are "independent", i.e. created by factors outside the system, and which variable is "dependent" or affected by the

"independent" variables. Note that in this construction, causation is implied, while the strength of the relationship is the test hypothesis.

The regression operates by testing the simple relationship of each independent variable with the dependent, with variation created by the relationships to the other variables excluded. This carries with it an important assumption. For each variation to be correctly measured, it is assumed that the independent variables are not in any functional way related to each other. Where this assumption is violated, variation "moves" from one variable to another, causing larger error coefficients and indicating a weaker relationship than may actually be the case. In practice, few independent variables are totally unrelated, so that most regressions suffer to some extent from this problem, which is termed multicollinearity. The relevant question is to what degree this impairs the equation. This question cannot be answered by statistics alone, but requires a working knowledge of the variables and theories being tested.

In a normal multiple regression, a problem may occur due to the other in which variables are introduced into the equation. The first variables entered may "use up" the variation in the dependent variable. The result of this will be that later variables may show up as less important than they actually are. To deal with this problem, this study uses a variation of multiple regression

known as stepwise regression. In this variation, the independent variables are separately tested against the dependent. The independent variable with the strongest relationship is entered first, the second strongest the second, and so on. The strength of the relationship is measured by the degree of correlation and the statistical significance of the correlation.

This stepwise procedures is intended to give the most accurate picture of the relationship between a dependent and several independent variables. It represents the best measure of the linear relationship between variables, although it is entirely possible for the relationship to be much stronger in some non-linear function.

Linear regression is most commonly used in the social sciences because in many cases it represents the "state of the art" in theory. Most theories put forth some direct relationship between two or more variables, without specifying the precise limits of the relationship or the specific rates of change. As social and planning theories improve, non-linear equations may be formed to test those theories. For example, such an equation could eventually be developed to specify limits and reverses to economies of scale when theories are advanced to explain those changes and sufficiently sensitive data are collected. The linear regression, with all its imperfections, remains the best tool at present.

The specific form of regression used for this study is the Statistical Package for the Social Sciences (SPSS) version 6.0 stepwise regression. This is a "packaged" computer program consisting of a basic fixed format with a number of options. One of these, termed pairwise deletion, allows variables with some missing observations. This was sometimes necessary where some local governments did not report specific expenditure items. Its use is indicated by the number of valid cases associated with each variable.

In using data from the smallest as well as the largest communities, some trends are established which extend beyond the urban network. These trends will not be as sensitive to differences within the category of cities. Therefore this study uses two sets of regression equations. These two sets are not designed to answer the same questions, but are complementary in nature. They seek to determine whether trends which account for the differences encountered in the whole sample also account for differences between cities.

The use of a subsample of cities over 10,000 also allows the use of another variable. The average salary for common municipal functions is collected for units of government over 10,000 and can be tested as a determinant of expenditure levels. To do this, however, one cannot simply use dollar expenditure amounts. This is because with the same tasks and employees, higher salaries would result in higher expenditures. This would in effect use the same

variation on both sides of the equation. To get around this, the "city" subsample uses per capita employees for each function rather than dollar amounts. This should indicate changes in gross service levels, rather than just the result of increased cost per employee.

It should be noted that, like the larger sample, the "city" subsample does not differentiate between categories. Both central cities and suburban cities are included. This eliminates complications arising from the classification of cities. For example, several of the suburban cities are larger than the smallest of the central cities. Thus this sample is more likely to indicate differences due to factors inherent in the urban structure and population itself.

Group Means and Analysis of Variance

Not all data describing cities may be entered into regression equations. In some cases, such as with measures of income, variables are too closely related to be used in the same equations. In other cases, the variables within the equation give an inadequate picture of the differences which exist between and within categories.

The group mean breakdown is one device for portraying differences between categories. The form used here displays the group mean, standard deviation and the same information for the sample as a whole. The standard deviation gives a measure of dispersion compared to the mean.

This gives the researcher some indication of how homogeneous the group is with respect to that variable. For example, the mean per capita income of the central city group is approximately $3500, with a standard deviation of $526. This suggests a fairly homogeneous group with respect to income. The mean for urban townships is $5,086, but the standard deviation is $2,013, indicating a much wider dispersion in this group. In the aggregate, such information may help answer the question of how accurate and useful the classification system is. In the example of income, the group standard deviations are below the standard deviation for the whole sample with the exception of urban townships and suburban cities. This suggest a possible need to further refine those categories.

A further test of the homogeneity of groups is the analysis of variance (ANOVA). ANOVA techniques are based on the concept that any result may be achieved by chance, and the probability of that occurring is measurable. The ANOVA measures the dispersion (variance) both within and between groups and compares the two. The test hypothesis is that there is no difference between the groups, and that individual differences are random. The results are given in the form of the probability of the groups being the same. For example, a probability of .05 means that the results could be achieved purely by chance 5 percent of the time. Five percent is a commonly accepted level for statistical significance. To say that a result is

statistically significant means that the result is not likely to be achieved by chance, not that there is anything necessarily important about the results. Confusing statistical significance with importance is a very common error in analysis.

Where it is used in this study, the ANOVA merely indicates group differences as they are constructed. This is a test of the classification system. There are other possibilities; for example, variance of the groups may be "pooled" to test for urban-suburban differences. This would require a separate underlying theory stating which categories should be combined and is outside the scope of this study. If a specific type of difference is suspected (which is not the case here), a "one-way" test of variance may be made to determine not whether there is simply a difference, but whether one category is always larger than another. A test theory or hypothesis of this sort might be that suburbs have higher per capita incomes than central cities. In this case we do not need to test whether or not suburban incomes are lower than central cities, hence the test is "one-way."

Description of Variables

This section presents a list of variables used in the analysis, together with a preliminary hypothesis of the suspected effect of the variable. First listed are the

independent and dependent variables included in the regressions, then those variables used only for breakdowns and analysis of variance.

Independent Variables

1. Value density--Two different measures of value density are used in this study. The first of these, density of business value, is a measure of the amount of industrial and commercial assessed valuation per square mile. This is used in the whole sample regression. The second measure is the total assessed valuation per square mile. The inclusion of value and value density is a relatively recent innovation in cross-section studies, most because until very recently no reliable information has been available on valuation for minor civil divisions. These two measures act as indicators of activity density, a concept designed to indicate the amount of activity in an area requiring municipal services. Population density is a similar measure, but may understate the services required for a downtown area which has a great deal of activity but a low permanent population. One part of the hypothesis is that businesses may require specialized services not needed in residential areas.
2. Population density--As in the case of activity density, population density is a measure of service

needs. In largely undifferentiated areas and over large regions, population density should be a reasonably good measure of activity and required services. However, it does not accurately reflect structural differences between communities, such as sparse population due to lack of settlement and sparse population due to the presence of large industries.

3. Aged and deteriorated housing and infrastructure--Unfortunately, there has never been developed a comprehensive and reliable measure of a community's age and condition. The best currently available measure is the age of housing stock. The inference is that the age of the housing stock will be closely related to the age of roads, utilities and similar facilities, and fairly closely related to business growth. The specific measure used in this study is the percent of housing in the community constructed prior to 1940.

   The hypothesis linking age to municipal expenditures is that cities will incur higher maintenance and operating costs as a result of aging structures. Also, many buildings and facilities are nearing the end of their useful life and will have to be reconstructed or replaced at much higher cost than new facilities constructed in lower density areas.

4. Crowded housing--This variable uses the Bureau of Census definition of living in crowded conditions as those dwelling units with more than one person per room. The specific measure used is the percent of dwelling units in a community with more than one person per room. Crowded housing is seen as a measure of deterioration requiring higher maintenance and operating costs, and for local governments a measure of higher density which may create the need for more social services.
5. Families and persons with low incomes--Two slightly different measures of low income were used. In the full sample regressions, a broader measure of all workers is used; this is the percent of employed persons earning less than $5,000 per year. In the subsample of cities, a more restricted measure to poverty-oriented services, is the percent of families below the federally-designated poverty level in 1970. Note that since welfare payments of any form are not included in the expenditure categories, this is not intended to measure direct costs due to poverty.
6. Percent of professional, technical and managerial workers in the community labor force--Since the size of these occupational groups is a strong indicator of income level and ability to pay, there is an interest in discovering whether any higher

service costs are linked to this variable. In this context, the proportion of professional and technical workers is not used as an indicator of city type or structure, as has been frequently done. It is used rather as a social class indicator. It should be noted that this variable lists workers by place of residence, not place of work; there is often considerable divergence between the two.

7. Salary levels for common municipal functions--Where similar service levels are maintained, differences in salary levels should contribute significantly to cost differences. Data on salary levels for common functions was available only for cities over 10,000; it is therefore used only in the city subsample regressions. There are two common hypotheses offered for salary differentials, each with considerably different implications. The first is that higher salaries are required for some cities to compensate for living costs and conditions. This would indicate that many central cities would have to pay higher salaries. The second hypothesis is that higher salaries are a community or collective luxury item and are offered by communities rich enough to afford them. This should indicate a high correlation with cities with high valuations (per capita) and high per capita incomes.

There is no strong theory at present which expresses the direction and magnitude of net salary effects on expenditures. However, the widespread interest in this variable prompted its inclusion.

Cost Variables

The cost or dependent variables selected are intended to cover the basic services common to most, if not all, local governments. They do not include such services as parks and recreation, libraries or certain specialized activities. Although it would certainly be desirable to include these within the study, consistent data are not available for enough of the study sample to permit their inclusion. In particular, parks and recreation expenditures would be a desirable variable, and it is often included in expenditure analyses. However, as such studies (including this one) do not include county expenditures which often provide services for outlying areas, the data would be badly distorted.

In an attempt to examine the problem particular to cities, three variables are included in the category of services not common to all local governments. This includes sewers, health care and housing and urban development. The category of sanitation was the least useful, with a total of six reported cases out of the sample total of 202. A likely explanation is that for most local governments this was included under the category of general operating expenses.

For variables used in the first regression set, the "cost" is the budgeted expenditure for that item as reported in the 1972 Census of Governments. This includes all current operating expenditures for that item. In the second set of regressions a derivative of cost is created by using the number of personnel per capita assigned to each function. While this has some advantages over straight budget expenditures, it also has some limitations. It excludes expenditures for specialized equipment and would be understated where a local government used contract personnel or a cost-sharing arrangement with another local government.

Group Mean Variables

In addition to those variables used as explanatory variables in the regression analysis, some variables have been used for the group mean breakdown where it was felt that they would shed some light on the structure of the sample. No breakdown is included for salaries, since this was available for only a portion of the sample. Variables added for the group means analysis are listed below:

1. Per capita income
2. Per capita state equalized valuation
3. Per capita residential valuation
4. percent industrial valuation
5. density of industrial valuation
6. density of residential valuation
7. population density

8. percent employed in manufacturing
9. local tax millage
10. ratio of total tax bill to community income
11. ratio of per capita income to per capita local tax
12. per capita local government charges

For convenience, each regression variable, both independent and cost, has been assigned a short name which is used in the analysis section. The short names and full variable names are listed below:

List of Independent Variable Names

VDEN - total assessed valuation per square mile
BUSVAL - business and industrial valuation per square mile
POPDEN - population density
OLDHOUS - percent of housing built before 1940
CROWD - percent of overcrowded housing
LOWINC - percent of workers earning less than $5,000 per year
POV - percent of families below the poverty level
PROF - percent of professional, technical and managerial workers
SALARY - average salary for common municipal functions

List of Cost Variable Names

POLICE - police and public safety
FIRE - fire protection
SEWER - sewer system operations and maintenance

ROADS - local roads and highway-related operations and maintenance

GENAD - general control and financial administration

BLDGS - maintenance and operation of government buildings

DEBT - local government debt service

GOVT - general (not allocated to specific categories)

HUD - housing and urban renewal

HEALTH - health services other than hospitals

IV. ANALYSIS OF DATA

Whole Sample Regression Analysis

One of the factors complicating the analysis of expenditures is that independent variables are likely to have different effects on each cost variable. The same factors most important in explaining highway expenditures will not necessarily suffice for police. However, there may be some variables that will stand out for all costs. Table four presents a simplified summary of all regressions using the full sample.

Table 4.--Regression summary for full sample

Cost Variable	Important Independents	R^2
TOTEXP	BUSVAL	.62
GENAD	BUSVAL	.10
GOVT	BUSVAL, OLDHOUS	.13
DEBT	LOWINC	.03
BLDGS	BUSVAL	.14
HUD	LOWINC, BUSVAL	.39
HEALTH	BUSVAL, OLDHOUS	.39
POLICE	BUSVAL, OLDHOUS	.61
FIRE	BUSVAL, OLDHOUS	.55
SEWER	BUSVAL, OLDHOUS, PROF	.40
ROADS	BUSVAL, OLDHOUS, PROF	.17

The summary of regressions serves to indicate the importance of BUSVAL for all costs except DEBT and HUD. The R^2 for DEBT (.03) indicates that no variable was important, while HUD expenditures were reported for only 15 municipalities. Since this did not include variation for most of the sample, the structure of differences for HUD is likely to be different.

The presence of BUSVAL is most important for TOTEXP, FIRE, and POLICE. In these cases a majority of variation is accounted for by the equations. In all cases BUSVAL has a large and positive value.

The strength of the relationship between BUSVAL and most cost variables indicates clearly the large impact of the physical structure itself on the public cost of servicing the community. It should be noted that the actual measure is density of commercial value, not total value. Thus smaller communities with dense commercial areas (such as suburban malls) also seem to experience this. On the other hand, commercial value for townships would be diluted through the much larger area.

It is important to note that BUSVAL explains by far the greatest variation in TOTEXP. This is an indication of the magnitude of its effects not only on basic services, but on all local government expenditures. Although this does not provide the precise key to the causes of expenditure variation it suggests that commercial and industrial value density is the key to understanding many expenditures.

The second variable of real importance is that of aged housing. The sample includes fairly large newer communities as well as older ones. The importance of OLDHOUS is that it distinguishes expenditures due to age from those due to factors such as poverty and presence of industry. A limiting factor is that OLDHOUS is to some extent intercorrelated with other explanatory variables. Without the presence of BUSVAL, for example, OLDHOUS should have a slightly greater effect. However, the simple correlation between OLDHOUS and BUSVAL is less than .04, so this effect should not be great. The correlation between OLDHOUS and LOWINC is quite high (.53); this may explain why the effect of LOWINC appears very weak when theory seems to indicate a stronger link. Part of this difference lies in the fact that, unlike most studies, this sample includes a number of rural areas. These contain a fair proportion of low-income population, which also has low service expenditures. If rural areas were excluded the effect of LOWINC should be greater.

Although OLDHOUS is not highly correlated with BUSVAL, it seems to be highly associated with central cities. The correlation between OLDHOUS and sanitation expenditures is .81. Sanitation as a separate municipal expense was reported by only six large cities and was therefore not used in the regression analysis. The high correlation between OLDHOUS and central cities may explain the effect of OLDHOUS on some variables not directly related

to structure, such as HEALTH. This is also an expenditure associated with central cities, as counties are likely to assume that function outside of urban areas.

It is interesting to note that OLDHOUS is third in importance for TOTEXP and is significant for GENAD. This finding indicates that OLDHOUS really has a more specific relationship to cost than does BUSVAL.

Table 5.--Regression for dependent variable TOTEXP

Variable	B	Std Error B	F Significance	Beta
Busval	$.14x10^{-4}$	$.9148x10^{-6}$	249.8 .000	.7289
Prof	.1656	.0536	9.536 .002	.1719
Oldhous	.0181	.0292	11.28 .001	.1825
Lowinc	-.1681	.8406	3.950 .048	-.1092
Crowd	.0962	.0548	3.074 .081	.0803
(Constant)	-16.68	21.35	.6105 .436	

Summary Table

Variable	Multiple R	R Square	Simple R	Overall F	Significance
Busval	.7676	.5893	.7676	286.98	.000
Prof	.7760	.6022	.2710	150.65	.000
Oldhous	.7845	.6154	.0747	105.64	0
Lowinc	.7886	.6220	-.0177	81.04	.000
Crowd	.7923	.6278	.0759	66.13	.000

The equation for TOTEXP presents one of the strongest relationships in the study. The final equation accounts for 62 percent of the variation, with BUSVAL

accounting for almost 59 percent. Of the variables, only CROWD is not significant at the 95 percent confidence level.

The level of total expenditures is in a sense the starting point from which individual functions are disaggregated. The analysis of TOTEXP serves to indicate which factors exert the greatest influence on the whole budget. It is therefore much more general than the effects of specific functions. The implications are wider but the causes not as specific.

It is interesting to note that the sign of LOWINC is negative. A common theory is that city expenditures are higher because of increased services to the poor, but this may not be the case. Alternatives possible are that services are diverted from other areas to the poor, or that the influence of the poor on revenues (and thus indirectly on expenditures) is greater than the direct positive influence on expenditures. One test of this is the influence of LOWINC on other costs. A uniformly negative sign would indicate the revenue effect; varied signs would suggest a diversion effect.

Expenditures for general control and financial administration (GENAD) are a more specific cost associated with administering the city. Here most of the variation remains unexplained. Of the independent variables, only BUSVAL has a statistically significant relationship.

Table 6.--Regression for dependent variable GENAD

Variable	B	Std Error B	F Significance	Beta
Busval	$.7900 \times 10^{-6}$	$.2014 \times 10^{-6}$	15.37 .000	.2857
Lowinc	.0260	.0186	1.955 .164	.1214
Prof	.0095	.0118	.6586 .418	.0713
Crowd	-.0031	.0120	.0681 .794	-.0188
Oldhous	.0014	.0064	.0520 .820	.0195
(Constant)	6.651	4.703	2.000 .159	

Summary Table

Variable	Multiple R	R Square	Simple R	Overall F	Significance
Busval	.3103	.0963	.3103	20.46	.000
Lowinc	.3240	.1050	.1194	11.20	.000
Prof	.3295	.1085	.0690	7.715	.000
Crowd	.3301	.1090	.0035	5.780	.000
Oldhous	.3305	.1092	.0613	4.611	.001

The lack of significance of any other than BUSVAL may reflect several alternative explanations. One is that local governments may have a great deal of difficulty in distinguishing costs that belong in this category. Many small governments may lump part of this with unallocated costs (GOVT).

GENAD seems to indicate factors which would generate the most "paperwork" for local governments, given variations in government type and responsibilities. One inference is that cities with more programs (of any type) would experience higher total administrative costs, hence higher GENAD expenditures. In this instance, BUSVAL would be acting as

a surrogate for larger city size. The fairly high positive correlation between TOTEXP and GENAD (.42) lends some support to this hypothesis.

One statistical explanation for the poor performance of all variables for GENAD lies in the strong relationships between the independent variables. If, for example, OLDHOUS and LOWINC are closely related in terms of their own effect on GENAD and their effects on GENAD work in opposite directions, they would to some extent cancel out, leaving a minimum of explanation. This theoretical issue differs from the purely statistical problem of multicollinearity.

A final possible explanation is that GENAD costs may reflect salary differences. Salary does not seem to have a linear relationship to city wealth or structure. The relationship is a more complex one where both rich and poor cities have high salaries. Since salary would be the major component of GENAD costs, this may be the most important factor.

Neither expenditures for DEBT nor GOVT show a significant relationship to the independent variables, although in GOVT the variable BUSVAL is significant and explains some variation. The respective coefficients (R^2) of .03 and .13 indicate that none of the variables contribute a great deal.

The fact that the variation of DEBT is unexplained by major factors in city structure may indicate that

Table 7.--Regression for dependent variable GOVT

Variable	B	Std Error B	F Significance	Beta
Busval	$.8885 \times 10^{-6}$	$.2317 \times 10^{-6}$	14.70 .000	.2947
Oldhous	.0196	.0074	7.031 .009	.2402
Lowinc	-.0152	.0214	.5058 .478	-.0652
Prof	.0060	.0135	.1950 .659	.0409
Crowd	.002	.0138	.0234 .878	.0116
(Constant)	1.617	5.410	.0893 .765	

Summary Table

Variable	Multiple R	R Square	Simple R	Overall F	Significance
Busval	.3074	.0945	.3074	17.54	.000
Oldhous	.3596	.1293	.1978	12.40	.000
Lowinc	.3654	.1335	.0707	8.529	.000
Prof	.3667	.1344	.0192	6.408	.000
Crowd	.3668	.1345	.0196	5.101	.000

suburbs require, and are getting, higher per capita capital investment. That suburbs require this is not unexpected (Netzer, 1969). The negative relationships of LOWINC to DEBT and GOVT may indicate the situation where most programs dealing directly with the poor are handled at the county or state level with minimal effort from local governments. It was for that reason that welfare-related costs were excluded from the analysis.

The operation and maintenance of government buildings (BLDGS) is the last "general" cost considered. All others are more specific functions. Again, the degree of explanation is quite low and BUSVAL is the only significant

Table 8.--Regression for dependent variable DEBT

Variable	B	Std Error B	F Significance	Beta
Lowinc	-.0209	.0197	1.125	-.1302
			.291	
Busval	$.2306 \times 10^{-6}$	$.2132 \times 10^{-6}$	1.170	.1113
			.282	
Crowd	-.0098	.0127	.5883	-.0784
			.445	
Prof	-.0093	.0125	.5594	-.0929
			.456	
Oldhous	-.0045	.0068	.4444	-.0808
			.507	
(Constant)	15.09	4.977	9.194	
			.003	

Summary Table

Variable	Multiple R	R Square	Simple R	Overall F	Significance
Lowinc	.1327	.0176	-.1327	1.90	.171
Busval	.1572	.0247	.0725	1.33	.269
Crowd	.1667	.0278	-.0719	.99	.400
Prof	.1756	.0308	.0487	.81	.516
Oldhous	.1872	.0350	.1060	.74	.594

factor. The correlation between BLDGS and GOVT is quite high (.47), although perhaps not as high as would be expected. It is noteworthy that the correlation with LOWINC is again negative, although the standard error is rather high. This again leads to the suggestion that direct services to the poor do not create large increases in local government expenditures.

The relationship between BLDGS and BUSVAL may be explained by the higher cost of maintaining structures in higher density downtown areas. These same conditions are much less likely to be found in the lower-density townships. With the possible exception of highways, townships

Table 9.--Regression for dependent variable BLDGS

Variable	B	Std Error B	F Significance	Beta
Busval	$.1093 \times 10^{-6}$	$.2858 \times 10^{-6}$	14.63 .000	.3413
Crowd	-.0013	.0017	.6395 .425	-.0708
Lowinc	-.0031	.0026	1.412 .237	-.1264
Oldhous	.0012	.0009	1.850 .176	.1430
Prof	.0004	.0016	.0879 .767	.0319
(Constant)	1.045	.6674	2.454 .120	

Summary Table

Variable	Multiple R	R Square	Simple R	Overall F	Significance
Busval	.3376	.1140	.3376	16.085	.000
Crowd	.3506	.1229	-.0710	8.690	.000
Lowinc	.3561	.1268	-.0477	5.956	.001
Oldhous	.3735	.1395	.0709	4.944	.001
Prof	.3743	.1401	.1144	3.943	.002

should also have fewer functions, hence a much smaller physical plant. Higher maintenance cost would be expected for both rich and poor cities. This could explain the non-significant relationship with factors such as LOWINC. However, one might have expected a stronger relationship with OLDHOUS, which should be a surrogate for older city structures.

Expenditures for HEALTH and HUD are purely urban variables; only 27 cities reported HEALTH expenditures and only 15 HUD. The purpose of their inclusion is to examine those urban variables in the same sample and format as more basic expenditures. This should provide additional

Table 10.--Regression for dependent variable HUD

Variable	B	Std Error B	F Significance	Beta
Lowinc	.0910	.0538	2.855 .125	.5528
Busval	$.5093 \times 10^{-6}$	$.5826 \times 10^{-6}$	.7641 .405	.2398
Prof	-.0133	.0341	.1519 .706	-.1291
Oldhous	-.00757	.0186	.1657 .693	-.1316
Crowd	.0065	.0349	.0353 .855	.0512
(Constant)	1.813	13.58	.0178 .897	

Summary Table

Variable	Multiple R	R Square	Simple R	Overall F	Significance
Lowinc	.5726	.3278	.5726	6.341	.026
Busval	.6101	.3722	.2588	3.558	.061
Prof	.6164	.3800	-.2927	2.247	.140
Oldhous	.6267	.3928	.2338	1.617	.245
Crowd	.6286	.3951	.1860	1.176	.391

information both on the functioning of the structural variables and the urban portion of the sample.

In both cases a substantial portion of the variation (39 percent) is explained by the independent variables. In both cases most of the variation is accounted for by one variable; BUSVAL in the case of HEALTH, LOWINC in the case of HUD. Of the variables, only BUSVAL has a statistically significant relationship.

Given the small number of observations, historical developments should have more influence than any of the structural variables on HUD. Expenditure levels would differ, for example because of changes in federal funding

Table 11.--Regression for dependent variable HEALTH

Variable	B	Std Error B	F Significance	Beta
Busval	$.1488 \times 10^{-6}$	$.4493 \times 10^{-6}$	10.96 .003	.5559
Oldhous	.0017	.0013	1.789 .194	.2476
Prof	.0015	.0024	.4035 .532	-.1201
(Constant)	-.6145	.8632	.0050 .944	

Variable	Partial	Tolerance	Significance
Lowinc	.020	.631	.0083
Crowd	.019	.910	.00843

Summary Table

Variable	Multiple R	R Square	Simple R	Overall F	Significance
Busval	.5401	.2917	.5401	10.29	.004
Oldhous	.6197	.3841	.3238	7.484	.003
Prof	.6282	.3947	-.1188	4.999	.008

formulas and the timing of development. HUD reflects only the city's share of housing and urban development expenditures. It is difficult to tell in this case whether BUSVAL is acting as a surrogate for "central city" or whether the factor itself is influencing the level of HUD; in either case the effect is not large or statistically significant.

In the case of HEALTH, BUSVAL cannot be regarded as the direct causal factor. Rather it seems to represent those areas which developed local health care systems before the counties and state stepped in. The operation of public hospitals is not included in HEALTH, but the two

would to some degree be related so that older areas with local public hospitals should also have higher HEALTH expenditures.

These functions illustrate that, even within uniform state requirements, great variation exists in certain expenditures. This variation cannot be accounted for by variables dealing only with structure or city "type." The explanation probably would not be improved by employment or other similar statistical measures. As indicated by Liebert(1974) and others, political and historical factors also play a large role in present expenditure levels.

Table 12.--Regression for dependent variable POLICE

Variable	B	Std Error B	F Significance	Beta
Busval	$.1571 \times 10^{-5}$	$.1332 \times 10^{-6}$	139.1 0	.6743
Oldhous	.020	.00425	23.15 .000	.3236
Prof	.027	.0078	12.00 .001	.2388
Lowinc	-.0209	.0123	2.87 .092	-.1155
Crowd	.0107	.0079	1.819 .180	.0764
(Constant)	-5.823	3.110	3.506 .063	

Summary Table

Variable	Multiple R	R Square	Simple R	Overall F	Significance
Busval	.7305	.5337	.7305	155.68	0
Oldhous	.7463	.5569	.1795	84.86	.000
Prof	.7767	.6033	.2649	67.92	0
Lowinc	.7814	.6107	.0143	52.16	.000
Crowd	.7848	.6160	.0557	42.34	0

Table 13.--Regression for dependent variable FIRE

Variable	B	Std Error B	F Significance	Beta
Busval	$.9188 \times 10^{-6}$	$.8946 \times 10^{-7}$	105.4 0	.6177
Oldhous	.0136	.0028	22.95 .000	.3393
Prof	.0134	.0051	6.918 .010	.1864
Lowinc	.0075	.0083	.8181 .367	.0652
(Constant)	-4.619	1.971	5.488 .021	

Summary Table

Variable	Multiple R	R Square	Simple R	Overall F	Significance
Busval	.6747	.4553	.6747	114.5	0
Oldhous	.7329	.5371	.3109	78.91	.000
Prof	.7464	.5571	.1273	56.62	0
Lowinc	.7482	.5598	.2108	42.61	.000

POLICE and FIRE are perhaps the most ubiquitous of local government functions. Yet even here some local governments in the sample reported no expenditures in these categories. However, some very good trends can be seen in the equations for these functions.

It is not surprising that BUSVAL figures prominently in both expenditure equations. In FIRE, BUSVAL accounts for 45 percent of the variation and 53 percent in the case of POLICE. The large Beta values in both cases indicate that BUSVAL has a very strong effect on both costs. Both BUSVAL and OLDHOUS directly describe conditions that lead to

demands for more service. As would be expected, the age of structures exerts a stronger influence on FIRE than on POLICE.

Again we see the interesting relationship of poverty-oriented variables. In both equations, neither CROWD nor LOWINC is statistically significant. It is part of the conventional wisdom that low income areas breed crime and require greater expenditures. But this is complicated where poor people cannot effectively demand more services, and suburban areas where the fear of crime may generate higher expenditures than crime itself. LOWINC has a negative sign that suggests this.

Further evidence is given by the positive and significant relationship with PROF. As may be seen from the group means, PROF is a fairly good proxy for suburban areas. The more dense suburban areas also seem to have higher POLICE and FIRE expenditures (density being measured by value, not population).

Since both POLICE and FIRE are labor-intensive services, salary should be an important factor. A test of the "cities only" regressions will be to determine if this is the case. This argument is one directly affecting larger cities such as New York, where high wage levels are alleged to be a major factor in the fiscal crisis. It would be interesting to see whether this trend extends to smaller cities.

Table 14.--Regression for dependent variable SEWER

Variable	B	Std Error B	F Significance	Beta
Busval	$.5118 \times 10^{-5}$	$.7788 \times 10^{-6}$	43.18 .000	.5050
Prof	.1362	.0456	8.897 .004	.2768
Oldhous	.0830	.0248	11.14 .001	.3023
Lowinc	.0794	.0720	1.217 .272	-.1011
Crowd	.0345	.0467	.5455 .462	.0563
(Constant)	-29.26	18.18	2.590 .110	

Summary Table

Variable	Multiple R	R Square	Simple R	Overall F	Significance
Busval	.5691	.3239	.5691	55.58	.000
Prof	.5915	.3498	.2759	30.94	.000
Oldhous	.6330	.4007	.1413	25.40	.000
Lowinc	.6375	.4065	-.0183	19.34	.000
Crowd	.6398	.4093	.0162	15.52	.000

SEWER expenditures reveal several conflicting trends. The most important single variable is BUSVAL, indicating greater per capita costs in denser areas. This tends to refute arguments for economies of scale. This is not to say that economies of scale do not exist, but rather that they are overpowered by such factors as increased pollution from commercial and industrial users.

The positive correlation with OLDHOUS may mean higher operating and maintenance costs associated with older equipment, or simply that many larger cities tend to

be older. However, many rural localities with very low or no sewer expenditures also tend to be old. This would tend to weaken the relationship.

PROF also shows up as a fairly strong positive relationship with SEWER. This suggests higher costs in suburban areas, an effect well described in theory and case studies. However, this trend is not nearly as strong as BUSVAL, indicating perhaps that smaller suburban cities can operate this service most effectively.

Table 15.--Regression for dependent variable ROADS

Variable	B	Std Error B	F Significance	Beta
Busval	$.5962 \times 10^{-6}$	$.260 \times 10^{-6}$	22.36 .000	.3450
Prof	.0114	.0073	2.397 .123	.1364
Oldhous	.0084	.0040	4.381 .038	.1799
Lowinc	-.0119	.0116	1.047 .307	-.0890
Crowd	-.0055	.0075	.5324 .467	-.0528
(Constant)	2.893	2.943	.9662 .327	

Summary Table

Variable	Multiple R	R Square	Simple R	Overall F	Significance
Busval	.3688	.1360	.3688	28.03	.000
Prof	.3838	.1473	.1803	15.28	.000
Oldhous	.4065	.1652	.0803	11.61	.000
Lowinc	.4133	.1708	-.0367	9.01	.000
Crowd	.4164	.1733	-.0714	7.29	.000

Weicher (1970) complained that highway expenditures were poorly explained in relation to other expenditure

variables. Here again this is the case. The implication from the equation is that there is some tendency (BUSVAL) for the denser areas to have higher road maintenance costs. However, the cause of this is not so clear. Cities in Michigan tend to take responsibility for most roads within their borders, even fairly major ones. In outlying jurisdictions these same roads are handled by county or state highway departments. The variable ROADS may describe who pays, not necessarily what it costs.

Conventional theory suggests that suburban areas experience higher highway cost as a result of commuting. The positive sign of PROF offers some support for this, but the effect is not very large or statistically significant. Since the cities also have to deal with the commuters they will also bear a high cost for highways. It seems likely that communities with a high value for PROF also have a high percentage of commuters. These governments would have higher highways costs than communities with fewer commuters.

Cities Regression Analysis

The regression analysis for cities is a more restricted analysis designed to show qualitative differences among the cities. Certain trends and the importance of some variables in the whole sample may have been due to the inclusion of townships. To the extent possible, this is tested by a regression which excludes smaller communities and townships.

By using cost in terms of personnel, this analysis also can test the effect of salaries on cost. This is only possible with a greatly restricted set of variables. For example, TOTEXP cannot be meaningfully translated into personnel without controlling for type of government. This is beyond the scope of this study. A summary of regression results is given in Table 16.

Table 16.--Regression summary for cities

Cost Variable	Important Independents	R^2
Genad	Oldhous, Vden	.31
Police	Pov, Salary, Oldhous	.85
Fire	Oldhous, Vden	.79
Sewers	Oldhous, Pov	.63
Roads	Oldhous, Salary, Pov	.35

The regression summary indicates important differences from the full sample. Changes in coefficients are to be expected for several reasons. The outstanding effect is that among cities, value density is no longer the dominant factor. In most cases, age replaces it. If a city's fiscal health may be measured in terms of rising cost, then age may be a very useful indicator. Note especially that OLDHOUS is the most important variable for all structure-related costs (FIRE, ROADS, and SEWERS) as well as GENAD. This is quite different from the results of the full sample regressions and more in line with recent observations of cities.

POV also plays a more important role than LOWINC did in the full sample results. This may be because the difference in POV is relatively greater than full sample differences in LOWINC. It is also possible that POV is a more sensitive measure of those conditions which create increased service burdens.

The question of the effects of SALARY is left unanswered. SALARY was significant enough to be entered into only two equations. In all cases SALARY was entered in the original equation. Where it had no measurable effect the program dropped the variable and it does not appear in the final equation.

SALARY had a significant relationship only to POLICE expenditures. In ROADS, the relationship is positive but not significant as a result of the large standard error. The relationship is positive, meaning that high expenditure governments tended to have high salaries. This does not indicate the cause of either variation, however, although other factors in the POLICE equation tend to support the "combat pay" hypothesis. This hypothesis is briefly that central cities must pay higher salaries than their suburban counterparts to compensate for poor working and living conditions.

Population density was also entered into this set of regressions as a comparison to value density. In general, value density proved the better explainer. In the case of FIRE, for example, VDEN increased total explanation (R^2)

from .73 to .79 when it was substituted for POPDEN. Only in the case of POLICE did POPDEN prove more significant. Neither density figure added to the equation; POPDEN was slightly more significant but interestingly, the sign is negative; this indicates more police per capita in less dense cities, although the quantitative effect appears negligible.

Table 17.--Regression for dependent variable GENAD

Variable	B	Std Error B	F Significance	Beta
Oldhous	$.9910x10^{-5}$	$.3710x10^{-5}$	7.1321	.4716
Vden	$.1712x10^{-10}$	$.9991x10^{-11}$	2.9371	.3026
			.014	
(Constant)	$.3563x10^{-3}$	$.2698x10^{-3}$	1.7441	
			.101	

Variable	Partial	Tolerance	Significance
Pov	.0165	.3632	.0057
			.940

Summary Table

Variable	Multiple R	R Square	Simple R	Overall F	Significance
Oldhous	.4713	.2222	.4713	6.570	.017
	.5602	.3138	.3022	5.030	.016

Only the variables OLDHOUS and VDEN had a sufficiently significant relationship with GENAD to enable inclusion in the final equation. Of these, only OLDHOUS is significant at the 95 percent confidence level. These two together account for less than a third of the total variation. The clear indication is that more specific variables are needed to determine factors affecting GENAD. The

variables used point in the direction of older, denser cities incurring higher GENAD costs, but the links are very indirect. This may reflect the administrative costs of such programs as urban renewal. This type of program, requiring state and federal coordination (i.e., higher administrative cost) would not be as prevalent in newer suburban cities.

Table 18.--Regression for dependent variable POLICE

Variable	B	Std Error B	F Significance	Beta
Pov	$.8709 \times 10^{-4}$	$.2965 \times 10^{-4}$	8.6230	.4094
			.008	
Salary	$.1667 \times 10^{-5}$	$.2623 \times 10^{-6}$	40.413	.5806
			.000	
Oldhous	$.1014 \times 10^{-4}$	$.4595 \times 10^{-5}$	4.8725	.3073
			.039	
Popden	$-.4300 \times 10^{-7}$	$.3736 \times 10^{-7}$	1.3248	-.1051
			.263	
(Constant)	$-.4445 \times 10^{-3}$	$.2462 \times 10^{-3}$	3.2570	
			.086	

Summary Table

Variable	Multiple R	R Square	Simple R	Overall F	Significance
Pov	.7109	.5055	.7109	23.511	.000
Salary	.8999	.8099	.6346	46.874	.000
Oldhous	.9212	.8486	.7061	39.254	0
Popden	.9263	.8580	.1768	30.227	.000

POLICE provides the best case of the relationship between SALARY and cost variables, and the best support for the "combat pay" argument. POV has a slightly greater addition to the R^2 but the higher Beta value for SALARY indicates a stronger effect. POV, OLDHOUS, and SALARY all have positive correlations with POLICE. POPDEN is negative but not significant. It should be noted that high

population density is not (in this sample) synonymous with larger or older cities. The simple correlation of POPDEN with size (population) is .15, that with OLDHOUS is .06. Even the relationship of POPDEN to VDEN is .80, indicating that while very closely related even these two are somewhat different.

The high correlation between POV and OLDHOUS (.80) undoubtedly cause some problems in the equation. The correlation between LOWINC and OLDHOUS in the full sample is considerably lower (.53), suggesting that when the rural poor are taken out, poverty does mean the older central cities. But this association does not seem to show up strongly in other variables.

The relationship of POV to POLICE cost clearly associates poverty with the perception of crime in cities. Since POV is more uniformly measured than crime, the relationship might prove to be strong enough and consistent enough to use in an aid formula similar to that employed by the federal government for Community Development allocations.

The equation for FIRE provides an excellent example of the close relationship between a cost variable and the suspected structural causes of cost variation. Both OLDHOUS and VDEN are positive and significant; OLDHOUS has by far the greater effect. SALARY did not have a sufficiently high correlation to remain in the equation. POV is positive, but not significant, probably because of its high correlation to OLDHOUS.

Table 19.--Regression for dependent variable FIRE

Variable	B	Std Error B	F Significance	Beta
Oldhous	$.2644 \times 10^{-4}$	$.5348 \times 10^{-5}$	24.422	.8095
Vden	$.2262 \times 10^{-10}$	$.8816 \times 10^{-11}$	.000 6.5853	.2572
Pov	$.1105 \times 10^{-4}$	$.3460 \times 10^{-4}$	.018 .1019	.0525
(Constant)	$.3675 \times 10^{-3}$	$.2383 \times 10^{-3}$	.753 2.376	
			.138	

Summary Table

Variable	Multiple R	R Square	Simple R	Overall F	Significance
Oldhous	.8509	.7240	.8509	60.355	0
Vden	.8903	.7927	.2612	42.076	.000
Pov	.8909	.7937	.7176	26.939	0

The effect of aged structure could affect FIRE costs in several ways. Old structures and lack of fireproof materials would make fires more likely. Lack of sprinkler systems and other automatic firefighting systems would tend to make fires worse when they occur.

Density would also tend to make fires more dangerous and costly to fight. But the greatest cost increase could well come from the specialized equipment and training needed to fight commercial and industrial fires. With POLICE, this would be analogous to special techniques and equipment needed to patrol large deserted commercial and industrial areas at night. The effect of business density was more clearly shown in the full sample, where the range of density was greater.

Table 20.--Regression for dependent variable SEWER

Variable	B	Std Error B	F Significance	Beta
Oldhous	$.6175 \times 10^{-5}$	$.3147 \times 10^{-5}$	3.8488	.4321
			.064	
Pov	$.3573 \times 10^{-4}$	$.2011 \times 10^{-4}$	3.1570	.3881
			.091	
Salary	$.1556 \times 10^{-6}$	$.2132 \times 10^{-6}$	.53258	.1251
			.474	
Vden	$.1538 \times 10^{-11}$	$.6609 \times 10^{-11}$	.054192	.0399
			.818	
(Constant)	$-.3126 \times 10^{-3}$	$.1690 \times 10^{-3}$	3.7729	
			.066	

Summary Table

Variable	Multiple R	R Square	Simple R	Overall F	Significance
Oldhous	.7570	.5731	.7570	30.886	.000
Pov	.7958	.6333	.7496	19.001	.000
Salary	.8096	.6555	.2574	13.323	.000
Vden	.8102	.6565	.1532	9.556	.000

Value density may not work as well for among-city variation, since older areas often experience declining assessments. This produces an apparent decline in value density while physical density remains high.

Explanation of SEWER in the city sample is considerably improved over the full sample. As with FIRE, OLDHOUS explains by far the greatest portion of variation. All variables have high standard errors; none is significant at the 95 percent confidence level and only OLDHOUS and POV at the 90 percent. SALARY and VDEN are both well below acceptable levels of significance. With Beta values of .43 and .38, OLDHOUS and POV have a strong impact on SEWER costs.

The impact of OLDHOUS tends to confirm the association between aged housing and aged or obsolescent infrastructure. The effect seems to be consistent throughout a number of variables when considered only among cities.

The effect of VDEN seems to be subject to the same limitation given under FIRE. Although declining assessments would affect only part of the city, this could be enough to lower the aggregate density. This would distort the correlation and so its impact in the equation.

Table 21.--Regression for dependent variable ROADS

Variable	B	Std Error B	F Significance	Beta
Oldhous	$.5573x10^{-5}$	$.6656x10^{-5}$	.7010 .412	.2545
Salary	$.4895x10^{-6}$	$.4509x10^{-6}$	1.178 .291	.2569
Pov	$.3903x10^{-4}$	$.4253x10^{-4}$	.8421 .370	.2766
Vden	$-.1445x10^{-11}$	$.1397x10^{-11}$	.01069 .919	-.0245
(Constant)	$-.1189x10^{-3}$	$.3403x10^{-3}$	.1221 .730	

Summary Table

Variable	Multiple R	R Square	Simple R	Overall F	Significance
Oldhous	.5093	.2594	.5093	8.056	.009
Salary	.5641	.3182	.3106	5.135	.015
Pov	.5878	.3455	.5075	3.696	.028
Vden	.5881	.3459	.1611	2.644	.064

As in the full sample, the equation for ROADS falls far short of an adequate explanation of variation. None of the relationships is statistically significant, although

together they account for slightly over a third of the variation in ROADS.

It may be logical to accept the position that ROADS costs are high in both the central city and the suburban sources of communters. If this is so, then apparently none of the variables used are sufficiently correlated with commuters to produce a significant result. PROF to some degree had this quality in the full sample, but the same effect would not be expected to operate with a sample including only central and suburban cities. Here the cost for all should be fairly high, but PROF would vary. This would again produce a high standard error and non-significant result.

Selected Expenditures By Category

This section presents the breakdown by category of four selected costs: POLICE, FIRE, GENAD, and GOVT. The regression analysis is intended to provide trends and explanation of variation irrespective of classification. The group means and analysis of variance are used to determine whether in fact the differences are really very important. If they are, than distinguishing between these groups may be important for both policy making and interest group formation.

The four variables chosen are used because they are: (1) important parts of the local government's budget, and (2) widely reported (they have relatively few missing

cases). As previously noted, local governments may have difficulty in distinguishing GENAD expenditures and report these instead under GOVT. Therefore both categories are included. TOTEXP is not used because the smaller local governments face millage restrictions which effectively limit the total budget.

FIRE and POLICE have the largest number of reported expenditures for specific functions. Other categories such as sewers, parks and recreation and health expenditures are not consistently reported by smaller local governments. Highway expenditures are widely reported but the results are distorted by county and state highway operations. The four categories selected were felt most likely to yield the most accurate general picture of expenditures by category.

The group means for GOVT indicate a fair degree of consistency between cities and townships. Rural municipalities have a much higher expenditure. This suggests that their size is below the point where economies of scale occur; Beaton (1974) and Netzer (1969) believe this point to be between 4,000 and 10,000 while the average population of rural municipalities in this study is only 1,855. However, the sample size is too small (4) to make conclusions with any degree of confidence.

Both central and suburban cities seem to spend about the same per capita, although the standard deviation is rather high. Thus for GOVT the urban-suburban dichotomy does not exist, but is rather a city-township split.

Table 22.--Breakdown for GOVT expenditures

Category	Mean	Std. Dev.	No. of cases
Central city	24.31	11.19	13
Urban township	4.14	4.04	15
Suburban municipality	22.49	23.39	28
Suburban township	5.81	9.05	60
Rural municipality	36.70	27.60	4
Rural township	5.55	3.75	50
Total	10.48	14.74	170

ANOVA

	Sum of Squares	Degrees of Freedom	Mean Square
Between Groups	12402.24	(5)	2480.44
Within Groups	24320.50	(164)	148.29
Total	36722.74	(169)	
F = 16.72		SIG. = .0000	

GENAD presents the first case where central cities clearly spend more than their suburban counterparts. As noted before, GENAD is a "paperwork" variable. It seems that central cities spend a good deal more than suburban cities or any township categories for this type of service. In common with GOVT, the cost of administration for very small cities is extremely high.

GENAD presents the type of difference which provided the theory for the sample construction. That is, these cost items confirm that there is a real difference between the categories and that the difference is large enough to be considered important. So far though, townships do not seem to differ much. Township administrative costs do not increase

Table 23.--Breakdown for GENAD expenditures

Category	Mean	Std. Dev.	No. of Cases
Central city	25.74	6.87	13
Urban township	12.22	5.96	17
Suburban municipality	19.99	9.11	28
Suburban township	12.13	12.96	76
Rural municipality	52.20	51.10	4
Rural township	9.17	4.69	56
Total	14.16	13.52	194

ANOVA

	Sum of Squares	Degrees of Freedom	Mean Square
Between Groups	10253.3938	(5)	2050.6788
Within Groups	25042.5193	(188)	133.2049
Total	35295.9131	(193)	
F = 15.3949		SIG. = .000	

very much as urbanization increases. This is probably due to the revenue limitations of township government.

With the exception of rural municipalities, the standard deviation of GENAD is not unacceptably large. Thus the grouping (categories) seems to be a logical division.

POLICE and FIRE are among the very few costs which can be described as "common functions" for all local governments. Even in these categories quite a few localities did not report any expenditures. Surprisingly, many of those not reporting were in suburban rather than rural categories.

These line functions of government provide increased differentiation between central cities and the suburbs. For POLICE the per capita expenditures for suburban cities fell

Table 24.--Breakdown of FIRE expenditures

Category	Mean	Std. Dev.	No. of Cases
Central city	23.73	5.54	13
Urban township	5.21	4.27	17
Suburban municipality	9.69	6.54	23
Suburban township	3.79	3.05	-
Rural municipality	-	-	-
Rural township	2.05	1.17	34
Total	6.38	7.27	139

ANOVA

	Sum of Squares	Degrees of Freedom	Mean Square
Between Groups	5174.9964	(4)	1293.7491
Within Groups	2126.9972	(134)	15.8731
Total	7301.9936	(138)	
F = 81.5057		SIG. = .0000	

Table 25.--Breakdown for POLICE expenditures

Category	Mean	Std. Dev.	No. of Cases
Central city	31.39	7.02	13
Urban township	6.72	6.13	17
Suburban municipality	18.87	10.46	28
Suburban township	2.30	2.80	49
Rural municipality	11.20	6.48	3
Rural township	1.35	1.31	28
Total	8.95	11.41	138

ANOVA

	Sum of Squares	Degrees of Freedom	Mean Square
Between Groups	13186.3902	(5)	2637.2780
Within Groups	4659.6799	(132)	35.3006
Total	17846.0701	(137)	
F = 74.7091		SIG. = 0	

midway between central cities and townships, while for FIRE suburban cities are much closer to township expenditures. This coincides very well with the regression trends established for FIRE with BUSVAL and OLDHOUS.

POLICE cost in townships rises in an almost linear fashion as urbanization increases. POLICE costs are again much higher for rural municipalities than townships. No rural municipalities reported FIRE expenditures, probably because these are either assumed by the township or provided by volunteer companies.

On the whole, the cost breakdowns seem to provide some support for the sample categories. The statutory limits of townships place a low ceiling on township expenditures but there is still some urban-suburban-rural variation. The difference between central and suburban cities is much clearer.

Groups Means and Analysis of Variance

The purpose of presenting group means and analysis of variance is to test the sample selection and categorization and to determine what real differences exist between the categories. Variables presented fall into the general classes of structure, employment, income and wealth, and tax burden. These classes include some variables not used in the regression analysis.

In testing the sample categories, the primary question is whether or not the categories are discrete.

The analysis of variance indicates whether the variance between groups is greater than the variance within groups. This yields the chance, as given by significance, that the result could have been achieved by random distribution of variation. If categories are discrete for a number of varied elements, it may be concluded that using this technique for differentiating among local governments is a fruitful approach, and one that will provide an improved base for urban policy decisions.

Table 26.--Category mean populations

Category	Population
Central city	81,180
Urban township	18,851
Suburban municipality	18,878
Suburban township	7,240
Rural municipality	1,855
Rural township	3,010

Group mean populations are presented as background for the sample structure. They depict the relationship of community size to the classification and provide some perspective for population density. Of note are the mean populations of the last two groups (rural). These fall within the size range where economies of scale are still said to occur, meaning that average costs should fall as size increases in this group. All of these communities are within normal commuting distance of the nearest central

city, and may therefore be described as direct competitors for residential and at least some business location.

The physical structure of communities is measured by population density, value density and percent of industrial property value of total property. Most studies in the past have used employment rather than value. These two alternative measures will be compared.

Table 27.--Population density by category

Category	Mean	Std. Dev.	No. of Cases
Central city	4989	1387	13
Urban township	795	617	18
Suburban municipality	3436	2292	28
Suburban township	417	1174	77
Rural municipality	2041	227	4
Rural township	99	164	62
Total	1098	1906	202

ANOVA

F value = 63.78 significance = .0000

Table 28.--Residential value density by category

Category	Mean	Std. Dev.	No. of Cases
Central city	10100000	3790000	13
Urban township	2660000	3110000	18
Suburban municipality	10300000	7660000	28
Suburban township	938000	1930000	77
Rural municipality	3900000	1050000	4
Rural township	231000	4990000	62
Total	2820000	5070000	202

ANOVA

F value = 52.01 significance = .0000

Table 29.--Industrial value density by category

Category	Mean	Std. Dev.	No. of Cases
Central city	8140000	4860000	13
Urban township	619000	1340000	18
Suburban municipality	2690000	3580000	28
Suburban township	313000	790000	77
Rural municipality	725000	1060000	4
Rural township	40900	217000	62
Total	109000	2780000	202

ANOVA

F value = 45.96 significance = .0000

The data on density follow the anticipated rural to urban pattern. One exception to this in all density tables is the lower density of urban townships. Two alternatives may explain this. First, since the sample criteria were somewhat arbitrary, some suburban townships may have entered the urban township category. Secondly, the urban townships may not be as highly urbanized as was originally thought. Industrial density in particular is much closer to the suburban township level than to the central city. This fits fairly well with the theory of urban townships as "near suburbs" that compete for residential value, but not so well for those who hold that "near suburbs" are attracting industry.

Central and suburban cities appear to be qualitatively much different. Population density is much higher for the central cities, yet residential value density is

much lower. Industrial density is again higher in central cities. Unfortunately, an oversight in the study omitted commercial value density. This would have provided another valuable indicator of qualitative differences.

Density does contribute to the understanding of urban townships. Their density is lower than any category of city, yet they are much larger in population and denser than suburban townships. Although industrial density is lower, the study is a static analysis and does not indicate how value density is changing.

Table 30.--Industrial as a percent of total value

Category	Mean (%)	Std. Dev.	No. of Cases
Central city	32.6	13.3	13
Urban township	10.3	14.0	18
Suburban municipality	17.5	18.3	28
Suburban township	9.7	14.6	77
Rural municipality	8.4	11.1	4
Rural township	3.3	6.4	62
Total	10.3	14.9	202

ANOVA

F value = 12.70 significance = .0000

Industrial as a proportion of total property value again indicates that the urban townships are primarily residential and possibly commercial. Their percentage is much closer to suburban townships than to either central or suburban cities.

Suburban cities are still well below central cities in percentage industrial. This underscores the qualitative difference between the two. But this difference, combined with the residential value density may indicate the decline of housing in central cities relative to both suburban housing and industrial value in the cities.

Table 31.--Percent housing built before 1940 by category

Category	Mean	Std. Dev.	No. of Cases
Central city	59.58	14.46	13
Urban township	21.26	8.12	18
Suburban municipality	31.68	18.46	28
Suburban township	33.64	14.83	77
Rural municipality	48.89	12.00	4
Rural township	47.72	15.93	62
Total	38.56	18.04	202

ANOVA

F value = 17.19 significance = .0000

Table 32.--Overcrowded housing by category

Category	Mean	Std. Dev.	No. of Cases
Central city	10.46	11.41	13
Urban township	6.46	2.86	18
Suburban municipality	8.39	18.03	28
Suburban township	8.16	3.93	77
Rural municipality	7.35	3.14	4
Rural township	8.47	4.73	62
Total	8.27	8.09	202

ANOVA

F value = .3855 significance = .8544

Aged housing and crowding are both structural variables in which high levels of both are commonly ascribed to the central cities. Our sample indicates that for aged housing, this is indeed the case. Even the more stable rural areas do not approach the central cities in age of housing stock. The range between central and suburban cities explains the significance of this variable in the cities regression while the rural areas dilute the variation for the full sample.

On the other hand, crowded housing reveals the cause of that variable's non-significance in the regressions. There is very little variation across the whole sample, although the group standard deviations seem to indicate that there are some extreme individual cases.

One problem with CROWD may be that the Census definition is not extreme enough either to explain social problems or reveal differences between categories. Raising the measure to 1.5 persons per room might accomplish this.

Types of employment provide a useful comparison with property value, especially since so many studies use employment to characterize cities. Given the realities of commuting, value is likely to give a much more accurate picture of the city's tax base and physical attributes. The "employment" variable states how the residents are employed, not where they work. With properly drawn occupational categories this would be a useful social class variable.

Table 33.--Percent employed as professional, technical and managerial by category

Category	Mean	Std. Dev.	No. of Cases
Central cities	19.70	9.98	13
Urban townships	26.33	11.99	18
Suburban municipalities	28.02	12.57	28
Suburban townships	19.17	8.95	77
Rural municipalities	19.30	4.32	4
Rural townships	13.63	4.65	62
Total	19.37	10.07	202

ANOVA

F value = 12.79 significance = .0000

Table 34.--Percent employed in manufacturing by category

Category	Mean	Std. Dev.	No. of Cases
Central city	34.74	10.98	13
Urban township	34.55	8.55	18
Suburban municipality	32.36	10.07	28
Suburban township	37.72	9.02	77
Rural municipality	34.37	7.46	4
Rural township	41.04	9.70	62
Total	37.46	9.81	202

ANOVA

F value = 4.05 significance = .0016

The comparison between white- and blue-collar employment is quite interesting and does not parallel the findings of value density. There is a very slight difference in percentage employed in manufacturing. This seems

to indicate the tendency of blue- as well as white-collar workers to commute, and the possibility of commuting in both directions.

PROF clearly indicates where the upper class is going, or at least is now. Of particular interest is the role of urban townships in competing with cities. This trend is repeated in per capita income and value.

The standard deviations present in employment are worth noting, especially in PROF. The deviations for both central cities and suburbs admit some rather extreme cases of concentration, both on the high and low sides. Disaggregating PROF into more specific occupational groupings might shed some light on the causes and effects of concentration, but that is beyond the scope of this study.

A major question is the effect that the previous differences have made in income and wealth. These two factors have somewhat different fiscal implications.

Table 35.--Percent of families below the poverty level

Category	Mean	Std. Dev.	No. of Cases
Central cities	10.31	4.11	13
Urban townships	4.83	3.05	18
Suburban municipalities	4.03	2.26	28
Suburban townships	5.71	3.43	77
Rural municipalities	6.00	3.57	4
Rural townships	8.23	4.26	62
Total	6.47	3.98	202

ANOVA

F value = 9.93 significance = .0000

Table 36.--Percent of workers with incomes below $5,000 per year

Category	Mean	Std. Dev.	No. of Cases
Central cities	19.22	5.14	13
Urban townships	9.98	5.27	18
Suburban municipalities	9.73	4.56	28
Suburban townships	12.51	5.75	77
Rural municipalities	13.36	7.69	4
Rural townships	16.57	6.05	62
Total	13.59	6.30	202

ANOVA

F value = 10.61 significance = .0000

Tables 35 and 36 are included to indicate the slight difference between the two, as well as the differences between the categories. The percent of families living in poverty is the slightly lower income level. It is relatively higher (percent) in central cities than the $5,000 level. This may be a partial explanation for its greater effect in the regression equations.

The tables very clearly depict the difference between the central cities and suburbs in terms of poverty and maldistribution of income. This fits closely with results for larger cities, although here they are not so extreme.

In terms of poverty and income, the urban townships very closely resemble the suburban categories. The breakdowns seem to indicate a rural-suburban difference, although it is less pronounced. A factor in this is that the sample

rural areas are not typical or representative rural communities, even for Michigan. All are within commuting distance of cities and are more prosperous than the norm.

Table 37.--Per capita income by category

Category	Mean	Std. Dev.	No. of Cases
Central city	34.98	5.25	13
Urban townships	50.86	20.13	18
Suburban municipality	48.24	16.27	28
Suburban townships	37.73	9.20	77
Rural municipality	34.41	3.90	4
Rural townships	33.49	5.56	62
Total	38.81	12.21	202

ANOVA

F value = 12.43 significance = .000

Table 38.--Full per capita residential value

Category	Mean	Std. Dev.	No. of Cases
Central cities	1997.04	279.95	13
Urban townships	3216.55	1615.75	18
Suburban municipalities	2898.30	988.18	28
Suburban townships	2375.05	1005.04	77
Rural municipalities	1897.25	328.69	4
Rural townships	1925.09	1216.70	62
Total	2350.67	1169.04	202

ANOVA

F value = 5.83 significance = .0000

Income and wealth are not the same, expecially for local government. Only four cities of the entire sample

Table 39.--Per capita assessed value by category

Category	Mean	Std. Dev.	No. of Cases
Central cities	5127.53	1000.67	13
Urban townships	5323.11	2268.29	18
Suburban municipalities	5324.62	1769.68	28
Suburban townships	5759.25	2987.73	77
Rural municipalities	3580.33	978.66	4
Rural townships	4518.81	1460.29	62
Total	5195.61	2295.92	202

ANOVA

F value = 2.52 significance = .0306

are permitted an income tax. The rest tax on the basis of wealth. But residents feel the burden of the tax on income.

Per capita income and residential value reflect very closely the same pattern. As in PROF, income and housing value are now located in the suburbs. Of interest is that the highest values of both are in the urban townships, while the highest total value per capita is in the suburban townships.

This indicates that business value may be highest in suburban cities, while the highest residential values are outside cities, both central and suburban.

Were tax rates for low-income areas significantly lower than those for wealthier areas, cities would to some extent be compensated. But the reverse is actually the case; tax rates for cities are much higher. This is broken down by category in Table 40.

Table 40.--Local property tax millage

Category	Mean	Std. Dev.	No. of Cases
Central cities	57.13	6.55	13
Urban townships	45.94	4.15	18
Suburban municipalities	54.45	7.41	28
Suburban townships	41.81	4.44	77
Rural municipalities	49.98	5.07	4
Rural townships	37.39	4.88	62
Total	43.72	8.31	202

ANOVA

F value = 63.02 significance = .0000

This table also includes the county property tax of the county within which each local government is located. If this is taken as the total tax for local governments, the rate for central cities will be somewhat understated since four of the 13 have an income tax superimposed on the property tax.

The effect of tax on such factors as industrial localtion cannot be dismissed. While the tax rate differential between central and suburban cities is about five percent, the difference between central cities and urban townships is a rather large 24 percent. This rate difference and the proximity of urban (and suburban) townships to central city facilities makes them attractive sites for future relocation or expansion. An oft-heard convention is that cities provide many services that must be provided privately in suburban and rural areas. While this is true, cities in Michigan also tend to charge for those services.

Table 41 presents a breakdown of miscellaneous charges by local governments. This includes license fees and service charges, such as refuse collection. It does not include charges by independent agencies, such as water or power authorities.

Table 41.--Local government charges by category

Category	Mean	Std. Dev.	No. of Cases
Central cities	119.24	91.05	13
Urban townships	14.68	14.14	15
Suburban municipalities	50.27	45.58	28
Suburban townships	6.54	13.16	69
Rural municipalities	77.94	61.28	4
Rural townships	3.33	4.41	60
Total	21.91	44.87	189

ANOVA

F value = 32.29 significance = .0000

On the whole, the group means present a very good picture of some qualitiative differences between community types. Only two of the variables, GROWD and manufacturing employment failed to show a significant difference. Employment seems to be a variable suited perhaps to gross studies of larger cities, but not to comparisons between cities and their suburban neighbors. PROF in this context is as much a social class designation as an employment classification. Value by class of property seems to be a better measure of structure or "city type," although it too has its drawbacks.

CROWD produces an interesting comparison with measures of wealth. Overcrowding in various forms has long been a concern of social reformers. The Census measure is perhaps the most common one used in studies of overcrowding. Yet the measure is almost completely unresponsive to the large income differences in the sample. This seems to point towards overcrowding being something of a false or past issue, with income and employment differences being the more important.

V. CONCLUSIONS AND RECOMMENDATIONS

The approach taken in this study has been one designed to interest planners in the implications of municipal expenditures for urban functions and to discover those variables exerting strong influences on the urban finance in southern Michigan. It examines some of the tools used in comparative expenditure analysis and combines these with a look at other basic characteristics of the sample communities.

The first section summarizes the study's findings and conclusions. The second section applies the findings and conclusions to public policy recommendations and the final section identifies pertinent areas for further research.

The study began with three hypotheses describing the sample communities. The first was that Michigan's central cities are a distinct class, having more in common with each other than with other local governments. The second hypothesis was that characteristics which distinguish the central cities have a significant effect on the structure of municipal costs. The third was that the differences

in municipal costs can be explained by a limited number of structural and socioeconomic factors which cannot be altered over the short run. The second and third hypotheses depended on the first being true and described the implications of these common characteristics on municipal costs.

Findings

The hypothesis that Michigan's central cities are a distinct category was substantiated for most variables investigated. Only in the cases of overcrowded housing and percent employed in manufacturing did the analysis fail to discover significant differences between categories. Elimination of these variables still indicates that in structure, population, income and wealth, Michigan's central cities have much more in common between themselves than with their suburban neighbors. The classification system went somewhat further and distinguished between types of suburban areas with a considerable degree of precision.

The second hypothesis was that characteristics distinguishing the central cities have a significant effect on municipal costs. This was less definitively proven. Several variables had an important impact on variation in some costs. However, for several cost categories variation was substantially unexplained. The best evidence for substantiating the hypothesis was that the majority of variation in total expenditures was accounted for. Several

basic expenditure categories such as fire and police also had a substantial portion of variation accounted for.

With respect to the third hypothesis, the degree to which expenditure variations can be explained by a limited number of structural variables is indicated directly by the equations. Most of the variation was accounted for by only two or at most three variables. All such variables were chosen because they are basic indicators of municipal structure and cannot be altered over the short run. Therefore, to the extent that the regression equations are accepted, the third hypothesis is validated.

When examining the results of the study, a note must be made of the perspective of the planner. Unlike the pure social scientist, the planner is not necessarily seeking to create a general model. This has important ramifications concerning the statistical reliability of the study. In fact, the key to a "successful" expenditure study probably lies in not creating a sample which represents anything other than the communities included. Drawing a representative sample gets the planner away from the specific problem-solving approach. From that perspective, the sample used is something of a compromise; central cities are completely represented, but the rest of the suburban-rural continuum has a representative sample.

The classification system used seems to have performed fairly well. Most variables showed significant differences between groups. Refinements need to be made in

differentiating urban from suburban townships. There seems to be an important difference between the two, expecially in size and income. Yet the actual selection was somewhat arbitrary and probably included suburban as well as urban townships in the latter category.

Ideally, performance criteria should be set down for any classification system, rather than relying on political divisions (school systems) as this study did. This should not detract from the major purpose, which was to indicate what differences do exist. Other studies have used population and density criteria (Williams, 1971) which are perhaps even more arbitrary. Such a classification system, especially one used for policy purposes, must take several factors into consideration. Size is one, but employment, income and wealth are equally valid. Currently, school aid and general revenue sharing legislation distinguish communities by wealth, size, and tax rate.

A primary purpose of the regression analysis was to point out factors that should be considered in classification. The relationship of value density to cost and the difference between residential and business values indicate that businesses do generate a large portion of costs. Age of housing is another significant factor in rising costs, yet there is very little local government can do to alter this in the short run.

Other variables such as professional employment are indicative of broader changes in quality of life that

probably cannot be accounted for in any formula. Yet they are indispensable knowledge for anyone involved in planning for the future of these communities. As the real growth rate of society slows, these questions of distribution will become much more pressing than at present. Classification systems which define and delineate that distribution will be vital in finding viable solutions to problems resulting from maldistribution of society's resources.

Such classifications also firm up issues such as those involving cities and the quality of life. This has figured prominently in discussions of urban growth policy and city size:

> Conceptually, the underlying issue seems to be that of "quality of life." A city of any given size is not a goal unto itself; rather, city size seems important as it contributes to or detracts from conditions of life which are thought to be desirable." (Stanford Research Institute, 1974, p. 80.)

This study has used in its "central city" category those which fit within the commonly accepted "optimum" range of 25,000-250,000. Yet the differences in quality between these and the suburbs indicate fairly extreme differences in variables related to the "quality of life."

Another aspect of the "quality of life" issue is what the ACIR terms as the "decline of the balanced city" (ACIR, 1976, p. 33). Traditionally cities had poorer and richer sections. Although services on the "other side of the tracks" left much to be desired, the balance enabled the cities to remain financially afloat and support the

necessary range of public activity. Now the richer sections are moving to separate jurisdictions, in effect leaving the poor to fend for themselves. If society wishes to remedy the inequities inherent in this transfer, then new ways will have to be found to break down the expenditure and rights transfer barriers between communities.

Policy Implications and Recommendations

On the basis of the indicated trends and differences between urban and suburban cities of the sample, certain implications and recommendations can be drawn. Some relate to land and development policy, others to taxation which affects location and land policy. Most if not all apply to redistribution between urban and suburban communities.

Among cost variables, two distinct types of variation are delineated. The first is cost variation between cities. The increased costs in this category, as depicted by the second set of regression equations, are largely explained by the age of cities and their housing. This does not necessarily conflict with the emergence of property density as the major explanatory variable in the first regression set. It rather reflects the situation of similar densities among cities, while greatly differing densities are more a characteristic of the first set of equations.

The true significance of BUSVAL is that all the assorted theories of poverty, class and income add much less to the explanation of relative expenditure levels than the

simple fact of the city itself. BUSVAL is no less than a measure of the urban center, a quantitative indicator of the city's economic function. This suggests that the very structure of the industrial city is responsible for the high level of municipal costs. Certainly within the category of city and for specific municipal functions, other more specific causes may be found. But these will probably be secondary in nature to the basic structure of industrial urban life.

This finding carries significant implications for the options available to the cities and state. Foremost must be the realization that the structure of increased costs is basic to the nature of the city; the same density that accounts for cost increases in most basic spending categories is also the very heart of the city, and in a sense the reason for its existence. To some extent the age and structure of the city may be altered, but this is not likely to be accomplished over the short run. This implies that the increased and increasing costs of the central cities are likely to remain with us, and the solution will not be found by exhorting city managers and city councils to spend less on essential services.

Nor will important and sustainable economies be realized by simply cutting back on basic operating budgets. The reason for this is not a question of ethics involved with income redistribution or of increasing social problems if such services are curtailed. It is rather that costs

will increase in basic services, without which the city would not exist. Temporary economies achieved by cutbacks in operating budgets will eventually increase the costs in basic services areas as the cities decline further.

One possible explanation for the changing cost patterns may be that as suburban and rural areas begin to add urban-type physical facilities, state and federal assistance is more likely to pick up at least part of the cost. Thus the outlying areas are faced with a relatively smaller financial burden than the cities, which originally paid the full cost of providing the infrastructure and are now having to replace them at much higher cost. In the regression, this shows up as the smaller increased cost for sewers explained by PROF or mostly suburban areas. The maintenance and operating costs show up as an increase because this is not compensated for as a specific cost by aid programs, whereas capital costs may be handled in a number of different ways.

The central cities face the situation where, even when the state assumes the cost of many social programs, the central cities will still face a higher per capita operating cost that will be reflected in higher personal and property taxes. Some general legislative approaches recognize this cost factor and attempt to compensate for at least some of its effects. One type of program is state revenue sharing. This allows the state to assume a portion of general operating costs on a scale proportional to tax

burden. Other approaches involve various forms of tax reform to expand the tax base of the cities and reduce the fiscal incentives to leave the cities.

One of the most striking findings of the study is the variation in tax effort by community type. Programs need to be designed which will take this kind of difference into account. The present state revenue sharing formula is calculated to return money to communities with high tax rates, but ignores the crucial difference in the ability of communities to finance those taxes.

The formula operates on the basis of tax burden with respect to property value. While current income is not the sole determinant of ability to pay, it needs to be heavily considered along with valuation. The present formula could be modified to include a measure of income. This would decrease returns to wealthy communities with high tax rates and also benefit communities which rely more heavily on industrial rather than high residential valuation. Since the federal government now requires income data by community for federal revenue sharing purposes, adjustment for income level should be available to the state on a consistent basis and at reasonable cost.

Another problem with the present formula is that it operates from a fixed per capita floor with increments added as state funds permit. The progressive increment is allocated by tax burden. Thus, when the fund operates near the floor, as it does at present, richer communities receive

almost the same per capita amount as the poorest. If this continues the relative tax disparity between central cities and suburbs will remain, as will fiscal incentives to move industry to the suburbs. This could be remedied either by lowering the floor or increasing funds allocated to the revenue sharing program.

Various tax proposals have also been made to redistribute income geographically. One form of this is tax-base sharing. A variant of this is being tried in Minneapolis and one has been proposed for the areas surrounding Baltimore (Lyall, 1975). A similar proposal for the Detroit metropolitan area was made in 1976 (Senate Bill 6010). This measure is expected to receive serious consideration as one long-term solution to Detroit's fiscal problems.

The statewide industrial tax is more a more radical change from the present tax structure. This proposal would simply remove business property from the local tax base and tax it at a single statewide rate. This is now done for some utilities' property and property such as rail lines.

The statewide industrial property tax has several advantages. It would be both fairer and easier to administer than the local property tax, and would remove from local consideration the question of valuation of large and unique industrial properties. Under the tax-base sharing proposals, differential assessment would still be a temptation. By removing the tax advantage of migration,

the state would foster a more efficient location of industries with respect to transportation, employment and other imputs. This would allow the central cities to bring underutilized resources back into production.

Another point related to the industrial tax question is that of the property tax credit currently granted on the state income tax. While this provision may grant some relief to urban residential property owners and renters, it does not affect income-producing property. The state, by using the tax credit to encourage localities to raise millage rates is in effect hastening the departure of industries from the cities to outlying tax havens. If the tax credit is to be used for its original purpose, then either some relief must be granted to industries or industry must be removed from the local tax base. The easiest and most logical means of accomplishing that would be through a statewide uniform tax. This would still retain the industrial tax base while reducing the unintended but damaging anti-urban bias of the tax credit.

In contrast to tax-base sharing a statewide industrial property tax would not require the delineation of "urban-suburban" tax base areas. Were such areas to be established in Michigan, southern Michigan would require a minimum of 11 areas. The possibility of inequity and political conflict is much greater there than in the creation of a single uniform tax base and rate.

The tax-base sharing concept also differs in that it is an incremental approach to changing the tax base. Under S.B. 6010, only new property would be added to the "tax pool" shared by communities. As time goes by, a progressively greater proportion of the industrial tax base would be included. But it would probably take in excess of 50 years to include the total industrial and commercial tax base. Once included in the pool, property is taxed at the average tax rate and the money is shared between communities in much the same manner as funds under revenue sharing.

A concept related to tax-base sharing is that of life cycle financing. Part of the purpose of expenditures analysis is to reveal the fiscal implications of different stages of growth and decline. When this is delineated, financing and the tax base can be shifted with stages of the cycle to share tax burdens as each part of the urban structure moves through the cycle. As yet, however, not enough is known about the cycle to develop practical guidelines for this policy.

The analysis of expenditures by class has opened the way for a new structure of advocacy planning. Central cities are themselves a class of clients. This study has indicated that central cities have a great deal in common and much to gain by banding together in support of common interests.

The classification system is necessary to reveal this sort of relationship, and is quite possibly its most

important use. The original contractor of the study, Middle Cities Education Association, directly parallels this philosophy in the public education structure.

The role of the planner as advocate for the central cities involves: (1) seeking to clarify the relationship between central cities and their surroundings, (2) emphasizing those aspects which are perceived to be inequities; and (3) pointing out alternatives which may rectify the perceived inequities. In this view planning is not a science in which only Pareto-optimal solutions are acceptable, but a tool which is part of a larger struggle for social justice.

Recommendations For Further Research

Although useful, the regression approach is obviously an imperfect tool for expenditure analysis, and probably for urban research in general. Its wide use is probably explained by its relative simplicity compared to other more sophisticated approaches such as path analysis. These more sophisticated methods, which are more capable of distinguishing between direct and indirect effects, need to be made more usable and more understandable to social scientists and planners.

Working extensively with financial and urban statistical data brings with it the realization that most of our measures are fairly crude. In Michigan, for example, consistent data on property value by class was not available before 1972. In most states it is not yet available. As a

result, comparative data on the physical structure of cities is virtually non-existent and researchers have fallen back on less appropriate measures.

One of the important sectors not included in the analysis is county government expenditures. Although some large cities comprise whole counties or collections of counties (such as New York) the more common situation in Michigan is one where the central city is contained in the same county as its inner suburbs. While ample data are available listing sources of county revenues, there is very little information on geographical expenditure patterns within county borders. A major unexplored issue is whether counties are using urban-derived revenues to finance suburban servcies. Some evidence suggests that for such services as police and highways, county governments are furnishing some services to urban and suburban townships that cities must provide for themselves. Additional research is needed to discover the real pattern of county expenditures, and whether changing that pattern might be an important factor in equalizing tax effort and service structure.

Research is also needed in additional areas. This study has dealt with the effects of current operating costs. While this is a major immediate concern, capital costs have a significant impact on municipal budgets. But capital expenditures by local government are also much more difficult to measure consistently and accurately. Research on capital expenditures has lagged far behind that of current

expenditures. In particular, more information is needed on the useful life and replacement cost of major components such as public buildings and utilities. While the older central cities are the focus of this impact now, it may be expected that the more established suburbs will be facing similar problems in the near future.

A final problem which is almost unique to the central cities is the cost of population and industrial decline. In Michigan this problem is neither small nor isolated; between 1960 and 1970, 58 Michigan cities declined in population. This is 26 percent of all Michigan cities over 2,500 population. Within the sample, only one central city, Ann Arbor, increased in population between 1970 and 1973. Yet the expenditures for these declining cities are apparently still increasing. Research needs to be done on "recycling" abandoned urban areas and on ways to both minimize and equitably distribute the costs of redevelopment.

While more equitable aid formulas and tax structures may help equalize the burdens in the urban areas, a long-term solution must be found in helping cities to develop a base of economic activity consonant with its cost and structure. To do so will require aid not only in improving the cities' immediate financial situation but in assisting them in developing a new, more functional economic base.

Expenditures analysis has produced the base information and techniques of analysis that make possible new opportunities for more rational use of planning policies

and power. Among these is the greater integration of tax and fiscal structure into the planning process, and the more accurate anticipation of the effects of fiscal policies on land use. It is only when the true costs and benefits of major decisions are made known that rational goals and policies may be set.

APPENDICES

APPENDIX A

APPENDIX A

MEANS, STANDARD DEVIATIONS AND NUMBER OF VALID CASES FOR REGRESSION VARIABLES

Variables for first set of equations:

Variable	Mean	Standard Dev	Cases
PROF	19.37	10.07	202
LOWINC	13.59	6.30	202
OLDHOUS	38.56	18.04	202
CROWD	8.27	8.09	202
BUSVAL	2283505.	4890554.	202
FIRE	6.38	7.27	139
TOTEXP	71.36	97.01	202
GENAD	14.16	13.523	194
BLDGS	1.329	1.567	127
HEALTH	.668	1.309	27
HIWAY	7.643	8.452	180
HUD	10.402	10.385	15
COP	8.952	11.413	138
SEWER	32.890	49.560	118
SAN	3.674	5.403	6
GOVT	10.481	14.740	170
DEBT	8.400	10.128	108

Variables for second set of equations:

Variable	Mean	Standard Dev	Cases
POV	7.05	3.66	25
OLDHOUS	42.16	23.59	25
POPDEN	4190.	1905.	25
SALARY	838.	271.	25
ROADS	.0008	.0005	25
VDEN	20244213.	8764191.	25
SEW	.0004	.0003	25
GEN	.0011	.0005	25
FIRE	.0013	.0008	25
POLICE	.0018	.0009	25

APPENDIX B

APPENDIX B

Correlation Coefficients for Full Sample Regression

LOWINC	-.47309								
OLDHOUS	-.46212	.53363							
CROWD	-.24958	.16459	.03624						
VDEN	.43629	.09752	-.08032	.13021					
BUSVAL	.20816	.08541	.03720	.06853	.87864				
FIRE	.12737	.21085	.31097	.01505	.67451	.67478			
TOTEXP	.27102	-.01779	.07476	.07597	.81177	.76767	.84076		
GENAD	.06906	.11944	.06136	.00357	.32507	.31038	.72279	.41534	
BLDGS	.11442	-.04774	.07092	-.07108	.39338	.33766	.43713	.45880	
HEALTH	-.11888	.22408	.32385	.09159	.57234	.54011	.38498	.53001	
HIWAY	.18039	-.03679	.08031	-.07140	.39543	.36889	.39302	.49202	
HUD	-.29270	.57261	.23384	.18609	.26554	.25880	.18307	.21037	
POLICE	.26498	.01434	.17951	.05574	.80131	.73058	.86577	.88595	
SEWER	.27599	-.01831	.14133	.01622	.71688	.56917	.61828	.85280	
SAN	-.46326	.42772	.81396	.24290	-.71286	-.44622	.21586	-.15307	
GOVT	.01927	.07070	.19789	.01964	.34466	.30749	.71946	.50535	
DEBT	.04876	-.13278	-.10609	-.07195	.04566	.07250	.12827	.13849	
	PROF	LOWINC	OLDHOUS	CROWD	VDEN	BUSVAL	FIRE	TOTEXP	
BLDGS	.42497								
HEALTH	.25171	.25906							
ROADS	.29371	.51991	.40593						
HUD	.49433	.17156	.95769	-.03011					
POLICE	.50461	.58712	.48541	.51258	.20516				
SEWER	.51410	.39699	.31365	.37397	-.16363	.69323			
SAN	.46921	-.18995	-.10080	-.09912	0	.07144	-.80590		
GOVT	.46275	.47053	.18789	.32033	-.02043	.48074	.55807	-.86991	
DEBT	.25855	.00127	.17575	.00987	.31213	.02642	.07882	-.56902	.24033
	GENAD	BLDGS	HEALTH	HIWAY	HUD	POLICE	SEWER	SAN	GOVT

APPENDIX C

APPENDIX C

SIMPLE CORRELATIONS FOR CITIES ONLY VARIABLES

POP	.0980						
OLDHOUS	.7926	.1237					
SALARY	.1224	.2577	.1381				
INCOME	-.6072	-.0887	-.4796	.1948			
POPDEN	.1252	.1553	.0568	.3673	.0871		
VDEN	.0910	.4352	-.0009	.6256	.1793	.7974	
PCSEV	-.2351	.2471	-.2527	.1030	.1709	-.4489	.1097
	POV	POP	OLDHOUS	SALARY	INCOME	POPDEN	VDEN

APPENDIX D

APPENDIX D

List of Data Sources

Variable	Source
1. Full sample expenditure variables	1972 Census of Governments, Data tape, file A
2. No. employees for municipal functions	1972 Census of Governments
3. Salaries for common municipal functions	1972 Census of Governments
4. Area	1967 Area Measurement Reports, Bureau of Census, Ge-20 no.4
5. Population	Bureau of Census Current Population Series P-25, 1973.
6. Per capita income	Bureau of Census Current Population Series P-25, 1973
7. Low income and poverty levels	1970 Census, fourth count
8. Housing Built before 1940	1970 Census, fourth count
9. Percent employment by occupations	
10. Tax millage	1973 Tax tables, State Tax Commission
11. Assessed valuation by category	1973 Tax Commission working tables, State Tax Commission

APPENDIX E

APPENDIX E

Sample of Municipalities

Category One - Central City

Bay City
Benton Harbor
Battle Creek
Flint
Lansing
Jackson
Kalamazoo
Grand Rapids
Muskegon
Muskegon Hts.
Pontiac
Saginaw
Ann Arbor

Category Two - Urban Township

Benton
Hagar
Battle Creek
Emmett
Pennfield
Dewitt
Flint
Delhi
Lansing
Kalamazoo
Grand Rapids
Laketon
Muskegon
Bloomfield
Pontiac
Waterford
Saginaw
Ann Arbor

Category Three - Suburban Municipality

Auburn
Essexville
Buchanan
St. Joseph
Marshall
Springfield
Grand Ledge
Burton
East Lansing
Galesburg
East Grand Rapids
Kentwood
Walker
Wyoming
Milan
N. Muskegon
Norton Shores
Roosevelt Park
Berkley
Huntington Woods
Lathrup Village
Oak Park
Royal Oak
Southfield
Sylvan Lake
Frankenmuth
Zilwaukee
Ypsilanti

Category Four - Suburban Township

Beaver
Frankenlust
Hampton
Kawkawlin
Merritt
Monitor
Portsmouth
Williams
Bainbridge
Baroda
Bertrand
Buchanan
Lincoln
Niles
Royalton
St. Joseph
Sodus
Bedford
Watertown
Delta
Oneida
Roxand
Genessee
Mt. Morris
Mundy
Meridian
Blackman
Henrietta
Leoni
Summit
Waterloo
Charleston
Oshtemo
Pavilion
Ross
Texas

Convis
Eckford
Fredonia
Lee
Marengo
Marshall
Eagle
Egelston
Fruitland
White Hall
Commerce
Highland
Milford
Royal Oak
Southfield
White Lake
Blumfield
Buena Vista
Carrollton
Frankenmuth
Kochville
Zilwaukee
Tuscola
Lodi
Northfield
Alpine
Plainfield
London
Milan
Blue Lake
Cedar Creek
Dalton
Pittsfield
Salem
Saline
Scio
Superior
Webster
York
Ypsilanti
Comstock

Category Five - Rural Municipality

Pinconning
Potterville
Clio
Cedar Springs

Category Six - Rural Township

Bangor
Fraser
Garfield
Gibson
Mt. Forest
Pinconning
Berrien
Pipestone
Batavia
Matteson
Sherwood
Union
Athens
Burlington
Clarence
Flushing
Montrose
Thetford
Vienna
Bentley
Bunkerhill
Ingham
Stockbridge
Wheatfield
White Oak
Parma
Springport
Tompkins
Brady
Praire Ronde

Leroy
Tekonsha
Benton
Brookfield
Windsor
Oakfield
Solon
Spencer
Iosco
Unadilla
Exeter
Holton
Independence
Springfield
Greenwood
Allendale
Tallmadge
Birch Run
Taymouth
Mendon
Park
Augusta
Bridgewater
Freedom
Lyndon
Manchester
Sharon
Schoolcraft
Wakeshma
Algoma
Courtland
Nelson

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