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Municipal Bond Credit Ratings: Regional Patterns and Spatial Correlates

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# MUNICIPAL BOND CREDIT RATINGS:

## REGIONAL PATTERNS AND SPATIAL CORRELATES

By

Donald Jay Zeigler

### A DISSERTATION

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

DOCTOR OF PHILOSOPHY

Department of Geography

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#### ABSTRACT

### MUNICIPAL BOND CREDIT RATINGS: REGIONAL PATTERNS AND SPATIAL CORRELATES

By

#### Donald Jay Zeigler

The general obligation credit ratings assigned by Moody's Investors Service to central cities on the bond market are analyzed in this research in an effort to delineate the regional bond rating patterns which have evolved over the 1960 to 1980 period and to determine the degree of correlation between bond ratings and selected social, demographic, and geopolitical characteristics of cities in the various rating categories. Many of these selected characteristics are subsequently used to determine how successfully central city credit ratings may be predicted by employing step-wise multiple regression and multiple discriminant models as classification tools. The hypotheses under investigation are that the bond ratings of central cities exhibit meaningful spatial and temporal variability which parallels the decline of the American manufacturing belt and the rise of the peripheral amenity belts, and that non-financial characteristics of central cities may be used to predict credit standing because they are important correlates of financial wellbeing. This study departs from previous investigations of credit ratings in that it is the first to focus on the regional aspects of the ratings and the first to use only non-financial correlates in multivariate models. A nationwide set of 354 central cities, comprising all central cities on the municipal bond market during the past two decades, serves as the study area for this analysis.

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Donald Jay Zeigler

Graphic, cartographic, and statistical analyses of the changing regional patterns of central city bond ratings reveal that over the 1960 to 1980 period the Northeast Census region experienced a dramatic decline in credit standing, the South a dramatic improvement, the North Central little net change, and the West only slight improvement. Cities of the North Central emerge as the highest rated in the nation. Cities of the Middle Atlantic and the East South Central divisions emerge as the lowest rated. Over the decade of the 1970s location has become an increasingly better predictor of credit ratings indicating a trend toward more homogeneous bond rating regions and an increasingly regional perception of the American metropolitan system.

Of the individual correlates of municipal bond ratings which are examined using crosstabulation analysis and analysis of variance, the highest degrees of association are to be found with city population size, metropolitan growth rate, annexation activity, percent of a metropolitan area's population in the central city, per capita income, unemployment rate, percent of population black, and the growth and age of the housing stock. Several multivariate social indices are also closely associated with municipal bond ratings, particularly a per capita needs index and several quality of life indices. These associations indicate not only that social characteristics of cities are important correlates of the ratings but also that the assignment of credit ratings discriminates against the neediest cities.

A comparison of the multiple regression and discriminant analyses reveals that the latter yields a superior equation for the prediction of bond ratings. By utilizing a selected set of demographic, social, and

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geopolitical variables and by running separate analyses for each Census region, the discriminant models are able to correctly predict 61 percent of central city credit ratings, a higher predictive accuracy than has been found in other discriminant analyses using only financial variables. This finding suggests that non-financial variables, heretofore ignored in studies of creditworthiness, need to be incorporated into theoretical models of financial well-being. Within the context of the nascent field of urban financial geography, the study of municipal bond ratings illustrates the need to devote more attention to the interface between the social well-being of city populations and the financial wellbeing of governmental units. Copyright by DONALD JAY ZEIGLER 1980

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### CHAPTER I

### INTRODUCTION TO THE PROBLEM

When local governmental units in the United States need to acquire large sums of money in order to fund major capital improvements such as bridges, highways, parking facilities, or schools, they may venture onto the securities market by authorizing the issuance of bonds. A bond may be defined as:

> an interest bearing certificate of debt, being one of a series constituting a loan made to or an obligation of a government or business corporation, a formal promise by the borrower to pay to the lender a certain sum of money at a fixed future date with or without security, and signed and sealed by the maker. (Garcia, 1962, 79)

The sale of bonds enables incorporated municipalities and other public agencies to borrow money from private institutions and individuals who have funds to invest. "Municipals" is the term applied to any bond issued by a state or local governmental unit. When these securities are purchased by investors, they earn interest which is exempt from federal income taxes. This tax-exempt property is the primary attraction of municipals, in competition with corporate bonds, as investment opportunities.

Bond issues, general taxation, and intergovernmental transfer payments constitute the three main sources of revenue for local governmental units. Bond issues, however, differ from the other two methods of

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revenue generation in that communities which issue bonds assume a burden of debt that must be paid off, with interest, over a span of time ranging up to fifty years into the future. When this debt is backed by the full faith, credit, and taxing power of the municipality, the bonds are known as "general obligations" or "GOs." In 1977, total long term local debt amounted to \$157 billion of which \$95 billion was full faith and credit debt; the remainder was nonguaranteed (The Tax Foundation, 1979, 253).

Because the number of municipalities with outstanding bond issues numbers in the tens of thousands, investors would find it difficult to investigate and pass judgment upon each municipal bond issue were it not for the services of the two national credit rating agencies, Moody's Investors Service and Standard and Poor's Corporation. Credit ratings assigned by these two companies provide potential buyers with an indication of the relative soundness of municipalities' bond issues as longterm securities. These ratings, expressed by an alphanumeric code to be discussed later, provide a third party's evaluation of a municipality's prospects for the future. Lower credit ratings are likely to undermine a city's ability to attract investment dollars on the bond market and usually result in higher interest costs on the money borrowed. Interest paid on debt, or debt service, amounted to an expenditure of \$7.9 billion by local governments in 1977 (The Tax Foundation, 1979, 231). This figure is the aggregate price localities paid for the use of funds provided by the private sector of the American economy.

This study is concerned not with the operation of the bond market but with the ratings assigned by Moody's Investors Service to municipalities issuing general obligation bonds. According to Moody's, ratings are not the outcome of a fixed statistical formula but instead "include

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the recognition of many non-statistical factors" (Moody's, 1979, v). As a result, the specific characteristics that are utilized by the rating agencies and communicated to the investing public have been open to question as evidenced by the testimony before the U.S. Congressional commitees (U.S. Congress, 1967-1968 and 1977), the critical evaluation of the ratings by a Twentieth Century Fund Task Force (Twentieth Century Fund Task Force, 1974), and the range of explanations about what credit ratings actually measure which appears in the literature.

Because the credit ratings of general obligation bonds provide an index for comparing one city with another, they lend themselves well to geographic analysis. This study attempts to delineate the regional patterning of municipal bond ratings for central cities of Standard Metropolitan Statistical Areas (SMSAs) over the past twenty years and to define the distinguishing demographic, geopolitical, and social correlates of the ratings for cities in the different bond rating categories. While it is impossible for anyone but Moody's or other ratings agencies to say exactly what considerations are encapsulated in the ratings, it is still possible to explore the dimensions of regional variation in non-financial characteristics which may be communicated by the ratings. With this in mind, it is also the aim of this investigation to determine how much of the spatial variation in assigned credit ratings of central cities may be accounted for by reference to variables in the demographic, geopolitical, and social realms and to determine which of these factors best discriminate among central cities in various rating categories. These non-financial variables have largely been ignored in previous attempts to develop statistical models for predicting the ratings.

Wr d: 2 S P t a S Background to the Problem

### What is a Credit Rating?

The credit ratings assigned to long-term general obligations are ordinal level measures of the future financial prospects of local governmental units as assessed by private enterprise or, more specifically, by small groups of investment analysts employed by Moody's and Standard and Poor's. Both agencies are based in New York City. Any municipality in the United States may apply to either agency on a fee-for-service basis and receive a credit rating, provided that all required information is supplied to the rating agency. Fees are computed according to the population of the borrowing unit and the amount of work involved in processing the rating. In 1974 fees ranged from \$650 for a municipality with fewer than 10,000 inhabitants to \$1,750-\$2,500 for a municipality with more than a million inhabitants (Moody's, 1974, 16). Prior to 1970, no fee was charged.

The rating system itself was devised by John Moody who began rating railroad securities in 1909 and eventually applied his system to the full range of corporate and municipal securities as well. Moody's intent was "to provide investors with a simple system of gradations by which the relative investment qualities of bonds may be noted" (Moody's, 1978,v). The first published municipal bond rating appeared in 1918 (Ellinwood, 1957, 74), more than century after the first municipal bond was known to have been issued by an American city, New York City in 1812 (Greenberg, 1977, 339). Standard and Poor's did not begin rating municipal bonds until 1950.

Since World War II, state and local government debt has grown much more rapidly than private debt, federal debt, or the gross national

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Rather than objective, quantitative measurements of financial conditions, municipal credit ratings have been and continue to be qualitative judgments about the creditworthiness of local governmental units which have issued "full faith and credit" bonds. In essence, ratings are supposed to communicate to investors the likelihood that the municipality will be able "to earn or to raise by taxation sufficient funds to pay the interest and principal on its debt" when they fall due (Greenberg, 1977, 340). The ratings admittedly represent judgments about the future and are appealing to the geographer because of the small scale at which they are available. Ratings provide an index for comparing one city with another and for measuring improvement or degradation in a city's financial prospects over time as perceived by the investment community.

The ratings which are used by Moody's to indicate the creditworthiness of an obligation range from Aaa ("triple A"), the highest grade, to C, the lowest. A description of the eleven rating categories is provided

# Table 1.

LONG-TERM STATE AND LOCAL DEBT, 1944-1977

ν	Total	State Debt	Local Debt Total Full Faith and Credit		Percentage Increase Since Last Census	
iear	Debt				in Total Debt	in Local D <b>e</b> bt
1944	\$ 17,323	\$ 2,786	\$ 14,537	\$12,605		
1952	28,720	6,640	22,080	18,480	65.8	51.9
1957	50,845	13,522	37,323	26,087	77.0	69.0
1962	77,543	21,612	55,931	38,008	52.5	49.9
1967	107,621	31,185	76,436	49,204	38.8	36.7
1972	158 <b>,78</b> 1	50 <b>,5</b> 42	108,239	70,585	47.5	41.6
1977	246,816	87,184	159,632	93,496	55.4	47.5

Source: U.S. Census of Govern	nments, 1944-1977.
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Securities which are rated Aaa are termed gilt edge investments by investment analysts. Cities which have issued full faith and credit bonds and which have gained a Aaa rating may therefore be termed "gilt edge" cities since the credit rating is based on the creditworthiness of the municipality. Although there is no comparable term popularly used to refer to securities rated at the lowest end of the investment range, the term "grit edge" has been coined and adopted in this study to refer to cities with Baa (not Baa-1) ratings and below. The term grit edge was modeled after Proctor and Matuszeski's <u>Gritty Cities</u> (1978) since so many of the lowest rated cities seem to exhibit the characteristics of gritty cities as described by the authors. Gilt edge and grit edge will be used throughout this treatise to refer to the extremes of the bond rating continuum and to the cities which hold those ratings.

## What Do Municipal Credit Ratings Measure?

Credit ratings are designed to measure the creditworthiness of a **particular bond issue**, which means, in the case of general obligation

			Aaa	Best quality; smallest degree of investment risk; "gilt edge"
	HIGH GRADE		Aa	High quality; long-term risks some- what larger than Aaa securities
INVESTMENT QUAL I TY		UPF	A-1	Possess many favorable investment attributes; elements may be present
BONDS		PER	A	which suggest a susceptibility to impairment sometime in the future
	MEDIUM GRADE	LOW	Baa-1	Neither highly protected nor poorly secured; certain protective elements
		VER	Baa	may be lacking; lack outstanding investment characteristics
			Ba	Judged to have speculative elements; future not well assured
SUB-INVESTMENT			ß	Lack characteristics of desirable investment
QUAL I TY BONDS	LOW GRADE		Саа	Poor standing; such issues may be in default
			Са	Speculative in a high degree; often in default
			C	Extremely poor prospects of ever attaining real investment standing

Moody's Municipal Bond Credit Ratings. (Source: <u>Moody's Municipal and Government Manual</u>, 1979, p. viii) Figure 1.

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bonds, the creditworthiness of the particular municipality backing the debt with its full faith, credit, and taxing power. Nevertheless, "no complaint is more frequently voiced than the lack of clarity about what the ratings actually measure," according to the report of the Twentieth Century Fund Task Force on Municipal Bond Credit Ratings (1974, 3). The premier recommendation of the Task Force, in fact, was that the rating agencies should more explicitly define the considerations which are utilized in measuring creditworthiness and assigning ratings (Twentieth Century Fund Task Force, 1974, 6-8).

In theory, credit ratings are supposed to measure credit risk, i.e., the risk that a municipality will not be able to meet its payments on interest and principal when they fall due over the course of the bond issue. What an evaluation of this risk depends on, however, has been attributed to different factors by different authors. At one extreme are those who see a rating only as an indication of financial well-being. At the other are those who see bond ratings as more holistic indicators of general financial, economic, political, and social well-being. Some explanations are almost overly simplistic as exemplified by Robinson's assertion that "bond ratings are based on financial information" (Aronson and Schwartz, 1975, 235). Other explanations acknowledge a broader array of factors but still focus only on financial and economic characteristics. An introductory banking textbook, for instance, attributes the assignment of credit ratings to the diversity of industry, stability of employment, and debt load that has been incurred by a community (Campbell, 1978, 111). Likewise, White's literature survey states simply that rating services look at a government's assets, debts, and financial practices (White, 1977, 2). Even Sullivan's superb report on bond

ratin relat: debt w As Cha predic tively M long ad social, things' 1950s t a more ships, a (1970, : <sup>been</sup> a r judgment foremost <sup>believes</sup> <sup>This</sup> div <sup>gate</sup> exa <sup>used</sup> as : <sup>cial</sup> tern In s

ratings as grant/tax mechanisms views them as a direct function of the relationship between debt outstanding and an estimation of the amount of debt which the municipality can repay on schedule (Sullivan, 1976, 3). As Chapter 3 will demonstrate, however, studies which have sought to predict credit ratings using only financial correlates have been relatively unsuccessful.

Moody's, as verbalized by a vice-president of the corporation, has long acknowledged that "in the appraisal of long term risks, economic, social, and political trends and tendencies are considered, among other things" (Ellinwood, 1957, 75). Packer (1968, 95) noted during the late 1960s that "the focus has shifted away from preoccupation with default to a more inclusive analysis of economic trends, intergovernmental relationships, and other factors that affect an issue's market standing." Moak (1970, 163) augments the previous statement by noting that "there has been a new awakening to the importance of key social factors in reaching judgments as to community credit." More recently, one of the country's foremost experts on credit ratings has summarized the factors which he believes influence the ratings as follows:

> In the case of general obligation bonds, prime importance is attached to various measures of debt to wealth, population, and governmental revenues. The economic base of a community, the stage of its development, its sociological character, and the quality of its government are also leading factors. Last, the analysts examine the exact nature and strength of the legal obligation that the bonds represent. (Petersen, 1974, 83)

This diversity of explanations underscores the need to further investigate exactly what the ratings measure and the extent to which they may be used as indices and forecasts of municipal well-being in more than financial terms.

In schematic form, some general categories of factors which

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Acknowledging the logical importance of financial characteristics, however, is not equivalent to dismissing the importance of social, demographic, and political characteristics. Such factors may be important correlates of the ratings either because they are directly examined by the bond analysts or because they influence the financial complexion of the community. In either case, the influence of such non-traditional factors on the ratings may make it possible to use credit ratings as multivariate indices of city well-being.

Other factors which are shown in Figure 2 to influence credit ratings are the persuasiveness of the community vis-a-vis the rating agencies, the background and attitudes of the financial analysts, the history of payment and default on municipal obligations, and managerial expertise. Management factors listed by Moak (1970, 165-167) which



Figure 2. Direct and Indirect Determinants of Municipal Bond Credit Ratings.

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exercise an important influence on the evaluation of creditworthiness include the overall government structure, the degree to which government is well-administered, organization for financial administration, excellence of budgetary practices, effective capital planning and programming, quality of revenue administration, the revenue base, the revenue calendar, the reputation for prudent financial management, the condition of the physical plant, and contingent liabilities.

Social scientists have devised elaborate multivariate indices to analyze the character and function of urban places, but few of these indices have had more than academic applicability. Examples of some very valuable indices devised by social scientists which have yet to be employed in a problem-solving capacity are the various quality of life indices, hardship indices, industrial diversity indices, and housing quality indices. On the other hand, the credit rating, which has been devised for the practical purpose of guiding private investment decisions has been largely ignored by social scientists. As Rabinowitz (1969, 136) has noted, ratings have commanded little research attention at least in part because "the combination of lack of data, lack of theory, and incredible variation among local governments has limited professional writings on the subject." Yet, the credit rating seems to provide a commentary on some of the issues which social scientists are addressing, such things as the financial plight of the central cities, the inequities of a private marketplace which discriminates against the most socially distressed cities, the decline of the Frostbelt and the rise of the Sunbelt, and the American urban future. While credit ratings are meant to be a guide to the future financial well-being of cities, it must be understood that the concept of financial well-being

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rests on a broader social, economic, and political foundation than simply debt ratios and tax delinquency rates. In short, while credit ratings are imprecisely defined, they may be thought of as indices of creditworthiness, financial well-being, and confidence in the American urban future. The dimensions of these concepts, however, remain to be more fully elaborated and theoretically justified.

## What is the Bond Market?

The bond market is an over-the-counter exchange between the users of funds and the suppliers of funds. Since the users of funds may be either private or public institutions, bonds issued by municipalities and other public authorities must directly compete with bonds issued by corporations for the fixed amount of investment capital which is available at any one time. Whereas the yields of corporate bonds are higher than those of municipals, the tax-exempt feature of municipals commends their purchase to individuals and institutions in higher income tax brackets. Municipals are exempt from federal income taxes and from state taxes if held within the state where they were issued. The suppliers of funds on the municipal market are essentially limited to only three groups: commercial banks, insurance companies, and wealthy individuals and personal trust funds. Commercial banks, in fact, hold over half the long-term municipal debt in the United States (Dougall, 1973, 167).

There are essentially two major types of municipals: (1) general obligation bonds, and (2) limited liability bonds, of which revenue bonds are the most important type. General obligations are backed by the full faith, credit, and taxing power of the municipality, while revenue bonds are backed only by the revenue generated by the facilities financed by the bond issue. Prior to World War II most local bonds were

ш S U; se ti E.a by er bo ٩ hoi ra enc ממט thi att ill Fia low tere Year Cent sold as general obligations but since, sales of revenue bonds have risen to nearly fifty percent of total municipal sales (Forbes and Petersen, 1976, 45). Bonds of either type are usually the preferred means of funding major capital improvements at the local level in order to assure user-benefit equity. As Steiss (1975, 5) puts it: "a public facility should be financed so that the burden does not fall to one generation of users but is spread over the life of the facility."

Only general obligation bonds are under consideration in this research effort since their ratings alone may be interpreted as evaluations of the creditworthiness of the municipalities issuing them. No matter how many separate general obligation bond issues have been floated by a single municipality, the rating assigned to the municipality's general obligations remains the same for all issues. General obligation bonds are generally sold by a competitive bidding process (as opposed to negotiated sale). Bids are submitted to the municipality by investment houses, commercial banks, and syndicates; the bid which offers the lowest rate of interest is accepted. The bidding process is strongly influenced by the ratings assigned to an issue. Bond issues with lower ratings understandably attract fewer bidders when the issue is put up for sale; this results in higher interest costs. Bond issues with higher ratings attract more bidders with the result that interest rates are lower. To illustrate the importance of credit ratings, New York City's Director of Finance testified before a Congressional Committee that when Moody's lowered New York's rating from A to Baa in the mid-1960s, the extra interest cost was \$2.5 million per year per issue or about \$20 million per year total extra cost (U.S. Congress, 1967-68, 20-21). The Twentieth Century Fund Task Force (1974, 2) confirmed New York's experience as a

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general principle by noting that each rating step down involves an additional 0.1 to 0.3 percent in interest costs.

When new issues are "underwritten," or purchased, by a bond dealer the primary market has fulfilled its function. The dealer may then reoffer the bonds for sale on the secondary, or trading, market which involves a much larger number of transactions. The secondary market allows investors to convert bonds into cash before the bonds have reached their final date of maturity, a time which may be several decades away. Here again, ratings influence the demand for a particular bond issue. Bonds with higher ratings are more easily and profitably liquidated than bonds with lower ratings. It should be pointed out, however, that Moody's stresses the fact that ratings are not recommendations to buy or sell (Moody's, 1978, v). The attractiveness of a bond to a potential buyer may depend on other factors that are not involved in the ratings such as yield, date of maturity, or tax considerations. Nevertheless, bond ratings do have a demonstrable effect on the operation of the secondary as well as the primary market and therefore on the flow of funds between the private and public sectors of the American economy.

## Statement of the Problem

Determining what municipal credit ratings reveal about central cities in the United States and how they are patterned in space are the basic problems under investigation in this analysis. The primary objective of this study is to examine the interrelationships between bond ratings as assigned to central cities in the United States by Moody's Investors Service, and the regional demographic, social, and geopolitical characteristics of these cities and their metropolitan areas. Specifically, the purposes of this research are fourfold:

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- To define and interpret the regional patterning of central city bond ratings as it has varied over the past twenty years;
- (2) To analyze the relationships between central city bond ratings and selected demographic, geopolitical, and social variables;
- (3) To develop a model expressing the probability that a central city will have a particular bond rating given knowledge about its demographic, geopolitical, and social structure;
- (4) To determine what factors best discriminate among central cities in the various rating categories.

#### Significance of the Study

The financial troubles experienced by New York City in 1975, coupled with the increasing popularity of municipal bonds, has led to a rapid expansion of municipal bond research on individual issues and municipalities (Madrick, 1977, 81). At a larger scale, "much of the research in municipal debt has involved studies of how the market might be changed to improve the efficiency of tax-exemption as an implicit subsidy to state and local borrowers" (Petersen, 1979, 46-47). In general, research on municipal bonds has been relatively restricted in scope to individual municipalities and some of the injustices and inequities of the bond market. This study broadens the base of the municipal bond literature by examining bond ratings from a social time-space perspective. It will contribute to four areas of contemporary concern to the geographic and social science community: (1) urban financial geography, (2) the study of money flows and allocations, (3) the geography of the urban future, and (4) the regional analysis of the United States.

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### Urban Financial Geography

"The problems facing the bond analysts suggest how little is truly known by state officials, credit analysts, budget-makers, politicians, political scientists, economists, and planners about our complex urbanizing environment and the conditions under which local government can best be operated" (Rabinowitz, 1969, 77). By virtue of its intent to explain the spatial and temporal variations in assigned credit ratings, this study may be seen as a contribution to the nascent field of urban financial geography which may be defined as the study of the spatial patterns of revenue generation and allocation and their impacts on the urban environment and the American metropolitan system. Geographers have pioneered in the effort to understand the economic, social, and physical structure of cities and metropolitan areas but have never explored the linkages between these structural characteristics and financial wellbeing. Just as the socioeconomic and physical make-up of a city affect the way in which a city raises and spends public revenues, so the various methods of revenue generation and allocation have an impact on the geographic environment, including both people and places. The property tax, for instance, has had a dramatic effect on the condition of city neighborhoods; whatever comes to replace the property tax as we know it will also have a demonstrable effect of the use of land and the well-being of people. Similarly, the user fees levied on public services have a direct impact on place utilities, that is, the use which city residents make of public facilities. Likewise, the social geography of the city greatly influences the spending of public funds and, in so doing, often confers benefits on one part of the city at the expense of another. Many of the financial regulations, methods of taxation, and the intracity allocation

ſ h С h 19 is go to Yo: of sca ti<sub>o</sub> Pro capj Vate of funds decided upon by local governmental units have discernable spatial impacts which have yet to be studied by geographers. These and other topics comprise the emerging field of urban financial geography which should command more attention in the fiscally conservative decade ahead.

Because patterns of city expenditures and fiscal problems are closely related to the underlying character of the city and its inhabitants, research in urban finance may find a comfortable niche in geography and the other social and behavioral sciences. Hirsch, for instance, outlines three reasons for the increasing difficulty which central cities are having in financing urban public services: (1) Central cities have been havens for the poor and disadvantaged minorities; (2) central cities are characterized by aging physical structures, congestion, outmigration of high income groups and industry, and diseconomies of scale; (3) central cities are the victim of metropolitan governmental fragmentation which has produced major spillovers of social costs and benefits (Hirsch, 1971a, 5). It is obvious, therefore, that fiscal distress (or well-being) is clearly associated with the social and political characteristics of governmental units and that relationships between city finance and the total urban environment need to be more fully examined.

## Money Flows and Allocations

One of the major subfields of urban financial geography is the study of money flows and allocations at both the intraurban and interurban scales. While the present research undertaking is primarily an examination of the "point pattern" of bond ratings, the next step in the research process should be an examination of the "flow pattern" of investment capital as it is affected by the ratings. The flow of capital from private institutions and wealthy individauls into public coffers is, in part,

D e S lä f] 10 Co Ge Wh( Vaj urł ing Bec the Se] Per are Viti Reg determined by assigned credit ratings. Even more important, however, is the reverse flow of money paid out of the public purse for debt service. Since credit ratings "exert substantial influence on the cost of capital to state and local governments" (Twentieth Century Fund Task Force, 1974, 2), they discriminate against some cities while benefiting others. Just as the equitable allocation of federal funds to America's urban areas needs to be undertaken with great care, public policy should be considered to make more equitable the flow of funds between the public and private sectors of the American economy as regulated by the bond market. In related areas of financial geography, geographers have investigated money flows and allocations with reference to federal housing assistance and mortgage lending practices (Harvey and Chatterjee, 1974; Boddy, 1976; Cox, 1978; Darden, 1977, 1980; and Dingemans, 1979).

## Geography of the Urban Future

Credit ratings are acknowledged to be judgments about the future. When they are cartographically displayed, the distribution of cities in various rating classes may be seen as maps of confidence in the American urban future as perceived by investors and credit analysts. Credit ratings therefore comprise predictions about the future of American cities. Because the ratings serve to direct the flow of private funds, however, their function as an index of future well-being may turn out to be a self-fulfilling prophesy. Nevertheless, they provide one of the few, perhaps only, operational indices of the urban future as viewed from the arena of the national capital market, a group of borrowers and lenders with considerable vested interest in the future of American cities.

#### Regional Analysis

Credit ratings may be used as a criterion for regional analysis and **regionalization at the national, state, and metropolitan scales.** Their

variability over time and over space should parallel many of the trends taking place in the United States with respect to the economic, social, and political complexion of the country. For those interested in defining the distinctive regional character of the United States, therefore, credit ratings may be another component in assessing unique regional identities. This study comprises a maiden attempt at moving in this direction at the national scale.

In the chapters which follow, the regional patterning and spatial correlates of municipal bond ratings over the past twenty years will be the focus of attention. Chapter 2 presents the working hypotheses around which this research is centered; it also delineates the study area, sets forth the variables used, and describes the methods of analysis, both graphic and statistical. Chapter 3 is a review of the literature and Chapter 4 presents a time-space analysis of central city credit ratings. Chapter 5 examines the spatial correlates of assigned credit ratings and Chapter 6 presents the results of two multivariate models relating creditworthiness to the demographic, social, and geopolitical characteristics of central cities. The final chapter comprises the summary and conclusions and offers recommendations for further research.

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#### CHAPTER II

### **RESEARCH METHODOLOGIES**

In light of the problem discussed in Chapter 1, the working hypotheses under investigation, the study area of the research, the variables and data sources, and the methods of analysis are put forth in the present chapter.

### Hypotheses

Two broad working hypotheses are offered to guide the course of this research. These hypotheses are, of necessity, broad for several reasons. First, there are few macrospatial financial analyses of urban systems on which more specific hypotheses may be based. Second, the absence of a unifying theory makes it impossible to use a purely deductive approach. Third, the employment of more specific hypotheses would needlessly restrict the range of variables to be employed. The hypotheses which have guided the course of this research follow:

> (1) Bond ratings of central cities exhibit meaningful spatial and temporal variability; their geographic distribution, as it has changed over time, provides a map of confidence in the American urban future as perceived by investors and parallels the decline of the American manufacturing belt, particularly the industrial Northeast, and the rise of the

peripheral amenity belts.

(2) Social, geopolitical, and demographic characteristics of central cities in the United States are correlated with assigned credit ratings whether or not they have been taken into consideration by the rating agencies.

#### Study Area

The central cities of Standard Metropolitan Statistical Areas (SMSAs) in the United States, as recognized by the U.S. Bureau of the Census, serve as the subjects of this investigation, Central cities are those appearing in the official SMSA titles. These are the same cities which serve to anchor the American metropolitan system, give focus to the system's component metropolises, and generate many of the impulses whose impacts are felt nationwide. Of the more than 80,000 units of local government in the United States, central cities comprise one of the most conspicuous and important sets of municipalities at the national scale.

As of January 1980, there were 382 officially designated central cities (excluding four in Puerto Rico) in the United States. Out of this number, 343 were assigned credit ratings by Moody's Investors Service. In 1960, only 306 of the 382 cities were rated, indicating that over the course of the last two decades an increasing number of cities have felt the need to solicit a credit rating in order to market their municipal obligations. During the same two-decade period, however, 28 of the 382 officially designated central cities had never been assigned credit ratings by Moody's.<sup>1</sup> These unrated cities were predominantly in the South;

<sup>&</sup>lt;sup>L</sup>Fort Smith, Pine Bluff, Springdale, and Texarkana, Arkansas; Garden Grove, Lompoc, Seaside, and Simi Valley, California; Washington, D.C.; Lakeland, Panama City, Pensacola, and Winter Haven, Florida; Kankakee and Rantoul, Illinois; Bloomington and West Lafayette, Indiana; Hopkinsville,

they comprised many of the smaller central cities in the U.S. Their elimination reduces the number of data points used in this analysis to 354 cities. For any given year, however, additional cities may have gone unrated. In 1960, for instance, there were a total of seventy-six unrated cities and in 1980, the number had been reduced to forty. The fact that some cities do not have credit ratings assigned by Moody's may be accounted for by any one of the following reasons: (1) The city may never have needed to borrow funds on a long-term basis; (2) the city may have depended on local institutions or the regional capital market to supply it with long-term credit; (3) the amount of money borrowed on the national capital market may have been so little that a rating was not assigned; (4) the city may have requested a rating but may not have supplied the investment service with all of the information needed to assign a credit rating; (5) the city may not have solicited a credit rating, preferring to sell unrated bonds on the local capital market; or (6) the city may have decided that Standard and Poor's services were more desirable than Moody's.

The study area, therefore, comprises a nationwide set of all central cities, as defined by the U.S. Department of Commerce in 1980, which have carried a municipal credit rating by Moody's sometime during the preceding score of years. The regional distribution of these 354 cities is presented in Table 2. Only two states, Vermont and Wyoming, and the District of Columbia are unrepresented in the study area. Otherwise, the location of the cities ranges nationwide. In terms of population size,

<sup>&</sup>lt;sup>1</sup>(Cont'd) Lexington, and Owensboro, Kentucky; Baton Rouge and Lafayette, Louisiana; Muskegon Heights and Norton Shores, Michigan; Moss Point, Mississippi; San Benito, Texas; and Weirton, West Virginia.

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REGIONAL DISTRIBUTION OF CENTRAL CITIES

<b>Census Region and</b> Census Division	Number of Central Cities in Each Region	Relative Frequency (in percent)
Northeast	78	22.0
New England	35	9.9
Middle Atlantic	43	12.1
North Central	94	26.6
East North Central	66	18.6
West North Central	28	7.9
South	124	35.0
South Atlantic	57	16.1
East South Central	21	5.9
West South Central	46	13.0
West	58	16.4
Mountain	18	5.1
Pacific	40	11.3
TOTAL	354	100.0

Source: Compiled by author.

**as** presented in Table 3, the central cities used in this analysis ranged **f** rom 13,400 to 7,838,000 in population as of 1976. Despite the popular **c** onception of a central city as one with 50,000 or more inhabitants, more **t** han a quarter of the 354 cities had fewer than 50,000 in 1976. In gen**e** ral, these smaller central cities are companions of larger cities which **actually** qualified their areas for metropolitan status, components of **t** win-city SMSAs, or the primary central cities of SMSAs designated under **t** he revised population criteria of 1974.

#### Variables and Data Sources

Municipal credit ratings, as they have been assigned to central cities in the United States by Moody's Investors Service, serve as the dependent variables in the regression and discriminant analyses to be employed. Independent variables have been selected to portray the location, age, demographic, geopolitical, social, and financial character of cities and their metropolitan areas. The social variables were chosen to portray the well-being of people and their living environment. As such, many of the social variables do overlap economic variables, particularly measures of well-being such as per capita income and unemployment rate. The number of variables employed could have been greater or fewer had additional data been readily available. All of the variables used in this investigation are presented in Table 4 along with the sources from which they were drawn.

# Bond Ratings

The most convenient and timely source of general obligation bond **Tatings is the monthly publication** <u>Moody's Bond Record</u>. The January **Issue of each volume is designated** "Year End Edition" and it is from **This number that bond ratings have been taken**. This publication first

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<b>1976</b> Population Size	Number of Central Cities in Each Size Class	Relative Frequency (in percent)
<b>13,400 to 25,000</b>	11	3.1
25,100 to 50,000	86	24.3
50,100 to 100,000	121	34.2
100,100 to 250,000	81	22.9
<b>250,100</b> to 500,000	31	8.8
500,100 to 1,000,000	18	5.1
1,000,100 to 7,838,000	6	1.7
TOTAL	354	100.0

# Table 3.

DISTRIBUTION OF CENTRAL CITIES BY POPULATION SIZE, 1976

Source: U.S. Bureau of the Census, "Population Estimates and Projections," Series P-25, nos. 740-789, 1979.

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SOURCES OF DATA FOR CENTRAL CITIES AND METROPOLITAN AREAS

Vari	able	Year	Data Source
BOND	RATINGS		
(1)	Moody's G <b>ene</b> ral Obliga- tion Bond Ratings	1960 through 1980	Moody's Bond Record Vol. 27 (1960) - Vol. 47 (1980) "Year-end Edition," January
DEMO	GRAPHIC VARIABLES		
(2)	City Population	1960	The World Almanac 1980
(3)	City Population	1970	Same as (2)
(4)	City Population	1976	U.S. Bureau of the Census, Population Estimates and Projections, Series P-25, nos. 740-789
(5)	SMSA Population	1970	U.S. Bureau of the Census, Population Estimates and Projections, Series P-25, no. 739
(6)	SMSA Population	1976	Same as (5)
(7)	City Population Growth	1960-1970	Derived from (2) and (3)
(8)	City Population Growth	1970-1976	Derived from (3) and (4)
(9)	City Population Growth	1960-1976	Derived from (2) and (4)
LO)	SMSA Population Growth	1970-1976	Derived from (5) and (6)
EOPC	DLITICAL VARIABLES		
1)	<b>Percent</b> of Urbanized Area <b>Population in Central City</b>	1970	U.S. Bureau of the Census, Population of Urbanized Areas Established Since the 1970 Census, Table 2
-2)	Percent of SMSA Population in the Central City	1970	Derived from (3) and (5)
L3)	<b>Percent</b> of SMSA Population in the Central City	1976	Derived from (4) and (6)
Table 4 (Cont'd).

Vari	able	Year	Data Sourc <b>e</b>
(14)	Territory Annexed (more than 20 square kilometers) Rank	1970-1977	U.S. Bureau of the Census, Boundary and Annexation Survey 1970-1977, Table 4
(15)	Geopolitical Fragmentation Index Rank	1970-1972	Derived from (3), (5), and the number of local governments per 100,000 population in the SMSA as reported in U.S. Bureau of the Census, Census of Governments 1972
SOCI	AL VARIABLES		
(16)	Percent of the Population Foreign Born	1960	County and City Data Book 1962
(17)	Percent of the Population of Foreign Stock	1970	County and City Data Book 1972
(18)	Percent of Population Nonwhite	1960	Same as (16)
(19)	Percent of Population Black	1960	County and City Data Book 1967
(20)	Percent of Population Black	1970	County and City Data Book 1977
(21)	Difference in Percent of Population Black	1960-1970	Derived from (19) and (20)
(22)	Median School Years Com- pleted (population over 25 years of age)	1960	Same as (16)
(23)	Median School Years Com- pleted (population over 25 years of age)	1970	Same as (17)
(24)	Difference in Median School Years Completed	1960-1970	Derived from (22) and (23)
(25)	Percent of Civilian Labor Force Unemployed	1960	Same as (16)
(26)	Percent of Civilian Labor Force Unemployed	1970	Same as (17)

Table 4 (Cont'd).

<b>V</b> ari	able	Year	Data Source
<b>(</b> 27)	Difference in Civilian Unemployment Rate	1960-1970	Derived from (25) and (26)
<b>(</b> 28)	Percent of Civilian Labor Force Professional and Managerial	1970	Same as (17)
(29)	Per Capita Income	1959	Same as (19)
(30)	Per Capita Income	1969	Same as (17)
(31)	Per Capita Income	1974	Municipal Year Book 1977
(32)	Per Capita Income Growth	1959-1969	Derived from (29) and (30)
<b>(3</b> 3)	Per Capita Income Growth	1969-1974	Derived from (30) and (31)
(34)	Per Capita Income Growth	1959-1974	Derived from (29) and (31)
(35)	Percent of All Families Below Low Income Level	1969	Same as (17)
(36)	Percent of Occupied Hous- ing Units Owner Occupied	1960	Same as (19)
(37)	Percent of Occupied Hous- ing Units Owner Occupied	1 <b>97</b> 0	Same as (20)
(38)	Difference in Occupied Housing Units Owner Occupied	1960-1970	Derived from (36) and (37)
(39)	<b>Percent Change in</b> Housing Stock	1960-1970	Same as (17)
(40)	Per Capita Needs Index Rank	1970	U.S. Department of H.U.D., An Evaluation of the Community Development Block Grant Formula by Harold Bunce
(41)	Liu's Metropolitan Quality of Life Index	1970	Midwest Research Institute, Quality of Life Indicators in the U.S. Metropolitan Areas, 1970, 1975

Table 4 (Cont'd).

Vari	able	Year	Data Source
<b>(</b> 42)	Zeigler's Metropolitan Quality of Life Index	1970	Unpublished M.A. Thesis, "Selected Quality of Life In- dicators and Demographic Char- acteristics of SMSAs in the U.S.," 1976
<b>(</b> 43)	Liu's State Quality of Life Index	1970	Midwest Research Institute, The Quality of Life in the United States 1970, 1973
<b>(4</b> 4)	Smith's State Quality of Life Index	1970	The Geography of Social Well- Being in the U.S., 1973
(45)	Wilson's State Quality of Life Index	1970	Midwest Research Institute, Quality of Life in the United States, 1974
(46)	<b>Percent</b> of Housing Units in Structures Built Prior to 1950	1970	Same as (17)
FINA	NCIAL VARIABLES		
(47)	General Revenue	1975-1976	Municipal Year Book 1977
(48)	Revenue Per Capita	1975-1976	Derived from (4) and (47)
(49)	Percent of General Revenue from Own Sources	1975-1976	Same as (47)
(50)	Gross Outstanding Debt	1975-1976	Same as (47)
(51)	Outstanding Debt Per Capita	1975-1976	Derived from (4) and (50)
(52)	Percent of Outstanding Debt Non-guaranteed	1975-1976	Same as (47)
53)	Ratio of General Revenue to Outstanding Debt	1975-1976	Derived from (48) and (50)

Source: Compiled by author.

appeared in 1931 as Moody's Bond Ratings and in 1936 changed its name to Moody's Bond Record. Bond ratings have also been reported in the annual Moody's Municipal and Government Manual since 1918. Whereas Moody's Bond Record reports only bond ratings, the Municipal and Government Manual presents a full assessment of bonded debt, tax effort, and details of particular bond issues for communities on the bond market. In addition to towns and cities, ratings are reported for states, townships, counties, **special districts**, and other public authorities. The variety of small geographic areas for which ratings are available make possible intrame tropolitan studies of financial well-being as well as broad national studies. A problem with the isolation of credit ratings as dependent **variables** for a given year is that there is no ready way of ascertaining when the rating for a particular city was last reviewed. A set of city **ratings** may therefore represent evaluations from any number of years in the past rather than an assessment from the perspective of a single point **in** time. Since the mid-1970s, however, Moody's has made it a point to maintain an active data file on the cities it evaluates in order to make sure bond ratings accurately reflect the status and performance of the community.

The only other widely-used rating of municipal creditworthiness is Standard and Poor's whose credit ratings are reported monthly in <u>The</u> <u>Municipal Bond Selector</u>. It is common practice for municipalities to apply for a rating from each agency. Because Moody's has rated more than twice as many central cities as has Standard and Poor's, Moody's credit ratings provide a more substantial data set for geographic analysis at the national scale. When Moody's rating differs from Standard and Poor's, a community is said to have a "split rating," but a Con-Sressional committee investigating public facility financing found that

70 percent of the ratings issued by the two rating services were identical (U.S. Congress, 1967-1968, 3). Whether there are any systematic differences between communities with identical versus split ratings has yet to be investigated.

#### **De**mographic and Geopolitical Variables

Demographic variables have been employed to determine the impact of city and metropolitan population size and growth on municipal credit rat-**Ings.** Geopolitical variables which reflect the impact of political boundaries on the structure of metropolitan areas were selected as a complement to the demographic variables in order to determine how central city **dominance** and geopolitical fragmentation affect assigned credit ratings. Proportion of the urbanized area population and the SMSA population residing in the central city have been used as a measure of central city dominance. City annexation activity has been used as a measure of the **abi**lity of central cities to capitalize on growth on the periphery. Cities which annexed twenty or more square kilometers during the period **1970-1977** numbered sixty-five. The Geopolitical Fragmentation Index (GFI) **is** a single value calculated by dividing the number of local governments Per 100,000 population in the SMSA by the proportion of the SMSA population living in the central cities. A GFI was calculated for each SMSA reported in the U.S. Census of Governments 1972. Annexation activity and the GFI were used as ordinal measures of the geopolitical character of a community.

Type of government (mayor council, council manager, commission, etc.) Was considered as an additional political variable but a preliminary in-Vestigation did not reveal any significant relationship between superlative or inferior bond ratings and type of government. Sanders (1979, 107),

in a study of all cities with more than 10,000 inhabitants, also found that there were no significant differences in ratings between municipalities with mayor-council or council manager form of government. He did find that cities with a commission form of government (a distinct minority) were rated the lowest of all cities.

#### Social Variables

There are two basic types of social variables which have been employed in this research: unidimensional variables and multidimensional (or index) variables. The unidimensional variables describe selected characteristics of the city population and their magnitude or rate of change over time. Basic characteristics refer to the percent of population black, nonwhite, or foreign born; median educational attainment; unemployment rate; per capita income; and percent of occupied housing units owner occupied. The multidimensional variables comprise three quality of life indices computed for states, two quality of life indices computed for metropolitan areas, and one per capita needs index computed for cities. All six will be discussed in detail in Chapter 5.

#### **Financial Variables**

Although the primary purpose of this research is to investigate the relationship between bond ratings and the demographic, social, and geo-Political character of central cities, several financial variables were collected as a basis for comparison. Revenue per capita, outstanding debt per capita, and general revenue as a percentage of gross outstanding debt have traditionally been used, along with several other variables, as measures of fiscal capacity. These financial variables have figured into the following analyses only as a basis for comparison in the multivariate models derived in Chapter 6.

#### Methods of Analysis

Both graphic and statistical methods have been used to describe and analyze the regional variation and spatial correlates of assigned credit ratings over the past twenty years, 1960-1980.

#### Cartographic and Other Graphic Methods

The regional patterning of central city bond ratings has been delineated by graphing the bond rating spectrum for each of the four Census regions and by mapping those central cities (1) in the highest and lowest bond rating categories for five-year intervals between 1960 and 1980, and (2) those which have moved up and down by more than one rating category during the 1960-1980 and the 1970-1980 periods.

In addition, time graphs have been prepared to demonstrate changes in bond ratings over the 1960 to 1980 period. These graphs have been constructed for all central cities which have been rated Aaa at any time during the past twenty years and for all central cities which have had Baa or lower bond ratings at any time during the two-decade period. These temporal profiles of forty-four gilt edge and seventy-nine grit edge cities are analyzed by regional groupings in order to demonstrate the degree of regional homogeneity of credit rating histories. A time graph is also presented to depict the credit standing of the nation's ten largest cities, according to the 1976 population estimates, over the twenty-year span.

#### Statistical Methods

Four basic statistical methods are employed to elucidate the characteristics of financial well-being and to determine the relationship between bond ratings and the underlying social, geopolitical, and demographic characteristics of central cities: (1) Crosstabulation analysis using the Chi-square test of statistical significance, (2) analysis of variance, (3) multiple regression analysis, and (4) multiple discriminant analysis. The computer programs provided by the <u>Statistical Package for</u> <u>the Social Sciences</u> (Nie et al., 1975) were selected for use in conducting the statistical analyses; they are identified in the source statements for tables presenting results of the analyses.

Crosstabulation analysis has been used to test the relationship between bond ratings and all discrete independent variables such as the quality of life, geopolitical fragmentation, and per capita needs indices, regional groupings of cities, and the rank in territory annexed to the central city. Results of these analyses indicate the extent to which the various independent variables predict or vary with bond ratings.

Multiple regression and discriminant analysis have both been used to test the relationship between bond ratings and the previously discussed set of continuous independent random variables. The specific hypothesis tested by the multiple regression exercise is that municipal bond ratings depend, at least in part, on certain given characteristics of the issuing municipality. The regression model derived from the set of independent variables is then used to predict the bond ratings of central cities in the sample. The specific hypotheses tested by the discriminant analysis is that the probability distribution of the independent random variables is the same for each of the bond rating categories. The use of discriminant analysis makes it possible to identify the dimensions of variation which best discriminate among the various rating classes of central cities. Discriminant functions have been identified for the nation as a whole and for each of the four Census regions to determine whether different variables emerge as being important in classifying the financial

well-being of central cities in different parts of the country.

Throughout this investigation a series of descriptive and inferential statistical analyses are used. The cities under study, however, do not constitute a sample from a larger population to which conclusions may be generalized. All central cities with assigned credit ratings have been included in the study area and no effort has been made to predict the credit ratings of other cities in the United States. A justification for the use of inferential statistics in this study is therefore in order. For the purpose of this research, central cities do not represent a sample of all cities, but the ratings assigned to central cities represent a sample of all possible ratings which the bond analysts at Moody's could have assigned to the central cities of the nation. The ultimate aim of the inferential statistical analyses, therefore, is to garner support for the underlying hypothesis that the assignment of credit ratings is not a random one but instead is influenced, whether directly or indirectly, by regional location, characteristics of social well-being, and the specific demographic and geopolitical character of the cities being evaluated.

Both multiple regression and discriminant analysis have been used by other authors investigating bond ratings, both municipal and corporate. Horrigan (1966), Pogue and Soldofsky (1969), Horton (1970), West (1970 and 1973), Bahl (1971), and Rubinfeld (1971 and 1973) have used multiple regression analysis in their investigations. Carleton and Learner (1969), Pinches and Mingo (1973), Rubinfeld (1973), Morton (1975-76), and Michel (1977) have all used discriminant analysis. Of those aforementioned studies which have focused on municipal bond ratings rather than corporate bond ratings, explanatory variables have been almost exclusively financial and economic while the regional dimensions of credit

standing have been almost completely ignored. As stated above, this study departs from previous studies in that it attempts to link the concept of financial well-being to non-financial characteristics of municipalities and to elucidate the regional patterning of financial well-being as measured by credit ratings and their correlates.

#### CHAPTER III

## **REVIEW OF THE LITERATURE**

Social scientists have almost completely ignored the subject of credit ratings and only a limited number of formal investigations have been done by the financial community. These studies have generally ignored the spatial patterning of credit ratings or have treated regionality as a peripheral component of multivariate models. Similarly, the search for correlates of municipal credit ratings has been hampered by considerable confusion over what the ratings actually measure and has focused primarily on financial and economic characteristics of communities.

#### Summaries and Critiques of the Municipal

#### Bond Rating System

Background statements on the rating and marketing of municipal bonds may be found in more comprehensive works which put the subject of municipal credit within the framework of either local public financial administration or investment analysis. The public finance literature emphasizes the selling of bonds as debt instruments while the investment literature emphasizes the buying of bonds as securities. Steiss (1975), for instance, treats the subject of municipal bonds within the overall context of local capital facilities planning and debt administration. Similar treatises exist as part of the municipal finance community's

trade literature: Aronson and Schwartz (1975), in a book published by the International City Management Association, and Moak (1970), in a book published by the Municipal Finance Officers Association, both offer a handbook of financial practices, including debt administration, for local governments. Moak provides perhaps the most comprehensive list of factors considered by investors and rating agencies in determining preferences for and prices of municipal bonds. These factors are listed under four main headings: (1) amount and nature of the debt and debt services requirements, (2) economy of the community and the region of which it is a part, (3) social factors, and (4) management of the local government (Moak, 1970, 157-171). Aronson and Schwartz (1975, 235), as cited previously, say only that "bond ratings are based on financial information."

Authors which treat the subject of municipal bonds as investments within the broader context of investment analysis include Amling (1974), Campbell (1978), Christy and Clendenin (1978), Dougall (1973), Gup (1979), Mendelsohn and Robbins (1976), and Stevenson and Jennings (1976). These are supplemented by the investment community's trade literature as exemplified by Davis (1958), Calvert (1965 and 1969), Drott (1971), Moody's Investors Service (1974), and Smith (1979). The volume edited by Calvert and published by the Investment Bankers Association provides probably the best technical summary of municipal credit and the bond market. Smith (1979), in a volume published by Moody's, provides another excellent and very comprehensive summary of the meaning of credit risk.

Bond ratings in particular are also elaborated upon by Burke (1968), Ellinwood (1957), Greenberg (1977), Hoffland (1972), Kirk (1967), Matteson (1968), Packer (1968), Riehle (1968), Rose (1975), and Tyler (1962). Burke (1968, 171) attributes bond ratings to a sound financial program, an

ability to pay bills as they fall due, and the role of management. To the extent that ratings are based on the ability to pay, Ellinwood (1957, 75) attributes them to the extent of community income and/or reserve wealth, commercial and residential resources, and what he calls economic geography. Riehle (1968, 72), a Moody's vice president, cites only two major considerations, an economic base factor and a management factor, both of which he elaborates upon.

During the 1970s a Task Force was commissioned by the Twentieth Century Fund to study municipal bond ratings; another was commissioned to study the municipal bond market (Twentieth Century Fund Task Force, 1974 and 1976). Their reports and the background papers which accompany them (Petersen, 1974; Forbes and Peterson, 1976) are liberally referenced to the municipal bond literature and provide a useful guide thereto. The report of the Bond Market Task Force provides a critique on the bond market as an efficient and equitable resource allocation mechanism. The most important recommendation of the Bond Market Task Force was that the market should be broadened to appeal to a wider variety of investors (not just commercial banks, insurance companies, and wealthy individuals) by creating a voluntary taxable bond option. Secondly, the report recommended that in order to reduce the supply of bonds, tax-exempt financing be eliminated as a means of funding industrial development, pollution control facilities, and the acquisition of facilities for private firms.

The Bond Rating Task Force strongly criticized the current rating system because of the ambiguity over what assigned credit ratings measure. The study recommended that the factors and their relative weights be made public and that a National Data Bank be created to collect and disseminate reliable and timely information on local governmental units. Since the

Bond Rating Task Force report a greater burden of responsibility has been placed on municipalities to supply the rating services with accurate and timely information and to update that information on a regular basis. In addition, Madrick (1977, 81) reports that there has been a rapid expansion of municipal bond research on the part of brokerage firms and financial institutions. To date, however, no action has been taken in the establishment of a National Data Bank and no definitive criteria have been issued by Moody's to define the requisites of a high credit rating.

The two Twentieth Century Fund reports supplement two major contributions made to the municipal bond literature during the 1960s by Hempel (1967) and Rabinowitz (1969). Hempel focused on the problem of measuring municipal bond quality and in so doing provided a critique on the operation of the capital market and a history of municipal bond defaults. Rabinowitz treated many of the problems investors face as participants in the capital market. He also discussed the issue of objectively measuring bond quality and concluded that while the present bond rating system needs to be improved it should not be standardized (Rabinowitz, 1969, 75).

#### Studies on the Correlates of

#### Municipal Bond Ratings

Five studies have appeared in the financial research literature aimed at determining the correlates of Moody's municipal bond ratings. They have all been prompted by an interest in predicting assigned credit ratings using multivariate models. The studies by Carleton and Learner (1969), Horton (1970), and Michel (1977) all attempted to build a predictive model based on a set of independent variables, primarily financial and economic, using either multiple regression or discriminant analysis. Carleton and Learner's independent variables, which are presented in Table

5 along with variables used in the other studies as well, were chosen on the basis of being commonly used and readily available; their model was able to correctly classify only 54 percent of a holdout sample into five rating categories (Carleton and Learner, 1969, 760). Morton (1976, 80) was able to correctly classify 58 percent of cities in his original sample into one of four Moody's bond rating categories using a discriminant model and primarily financial variables. Michel (1977, 595) chose independent variables which had been cited in the literature as the most important determinants of municipal bond ratings; his model was able to correctly classify only 58 percnet of a holdout sample. Michel concluded his analysis by asserting that "probably the most important reason for poor classification accuracy is that the variables most frequently used to characterize risk are not reflective of economic reality" and that "classificaprediction is relatively ineffective using traditional measures of municipal risk assessment" (Michel, 1977, 597). Horton, unlike either of the previous two studies, attempted only to distinguish between the characteristics of investment quality (Baa and above) and subinvestment quality municipals; his best regression model was able to classify only 80 percent of a holdout sample into the correct grade (Horton, 1970, 36).

In another study, Rubinfeld (1973) sought to relate municipal credit ratings to municipal bond yields and in so doing to determine what community characteristics are important indicators of the ratings. His sample of 128 cities and towns is restricted to New England; it is the only one of the five studies listed in Table 5 which is geographically restricted in scope. The author uses both regression analysis and multiple discriminant analysis to predict bond ratings. He did not work with a holdout sample but instead applied his predictive models to the original sample

	MUNICIPAL BOND RA	TING RESEARCH USING REC	GRESSION AND DISCR	IMINANT ANALYSIS
Author(s) & Date	Subject of Investigation	Study Area	Methodology	Objective of the Study
Carleton and Learner, 1969	Moody's General Obligation Bond Ratings	Municipalities and districts in the U.S.; 491 in the original sample	Discriminant analysis using Rao's V	To develop a statistical scoring system which would duplicate Moody's ratings and be appli- cable to unrated bonds
Horton, 1970	Moody's G <b>ene</b> ral Obligation Bond Ratings	Municipalities and districts in the U.S.; 150 in the original sample	Multiple regression analysis	To develop a method for separ- ating unrated bonds into invest- ment and subinvestment cate- gories
Rubinfeld, 1973	Moody's General Obligation Bond Ratings, 1970	Cities and towns in New England; 128 in sample	Multiple regres- sion & discrim- inant analysis	To determine if bond ratings affect yields and to develop a model for predicting bond ratings
Michel, 1977	Mood's General Obligation Bond Ratings, 1962-1971	50 largest American cities (except New York, Washington, and Honolulu)	Discriminant analysis with Wilks' lambda	To determine how well financial ratios can be used to predict bond ratings
Morton, 1976	Moody's and Stan- dard & Poor's Gen- eral Obligation Bond Ratings, 1972	Major central cities of SMSAs in the U.S.; 170 (Moody's) and 112 (S & P's) in samples	Discriminant analysis	To predict and compare Moody's and Standard and Poor's Bond Ratings

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Table 5.

Author (s)	Explanatory Variables		
Carleton and Learner	School district Debt/assessed value	Debt/population Log of population	Log of debt Current tax collection rate
Horton	School district Debt/assessed valuation Debt/population Log of population Log of debt	Tax collection rate Water-sewer Poorer states Better states Debt/capacity	% income increase % per capita income increase Per capita income Total income State per capita income
Rubinfeld	Full valuation of property % of taxes uncollected	Location in Massachusetts Direct net debt/assessed valuation	Median family income Overlapping debt
Michel	Debt per capita Revenue per capita Debt as % of assessed value Revenue as % of debt service Federal and state aid as % of debt service	Welfare payments as % of total revenue Pension fund obligations as % of total revenue Uncollected taxes as % of total taxes	Short term debt as % of total revenue Expenditures for personal ser- vices as % of total revenue Long term debt issued as % of long term debt retired
Morton	Debt/true value Tax/\$1000 assessed value Tourist oriented commun- ities Per capita income	Government expenditures/ estimated true value % change in black pop- ulation Location in New England	Per capita debt Population of SMSA, 1960 % current expenditures on interest

Table 5 (Cont'd)

Source: Compiled by author.

from which the models had been derived. He was able to correctly predict 67 percent of the ratings using the regression procedure and 68 percent using the discriminant function procedure. This success rate would undoubtedly have been lower had the author tested it on an independently selected holdout sample.

A study done by Morton and McLeavey (1978) departs from the five aforementioned studies in both method and objectives. Rather than trying to predict bond ratings, they propose an "objective and mathematically defensible" method of rating general obligation bonds. They derive groups of similar cities from a cluster analysis of 171 major cities in the United States using twenty-six independent variables which are theoretically related to municipal bond quality. They suggest that cluster analysis be the first stage in a two-stage rating process which objectively assigns credit ratings on the basis of quantifiable variables unless non-quantifiable factors may be cited to justify other ratings.

Parallel studies of corporate and industrial bond ratings have been done with the objective of being able to predict the assigned ratings by calling on a vector of accounting ratios. Horrigan (1966), Pogue and Soldofsky (1969), and West (1970) use regression techniques in order to determine the characteristics of a firm which determine the credit rating assigned by Moody's Pinches and Mingo (1973) use factor analysis and discriminant analysis to accomplish the asme purpose. While the specific subject matter of these studies on corporate bond ratings is peripheral to the present undertaking, their research demonstrates the appropriateness of using the same methodologies for studying both corporate and municipal bond ratings.

As evidenced by the variables listed for each study in Table 5, the

most commonly ascribed correlates of municipal bond ratings are financial and economic characteristics, and to a lesser extent demographic characteristics of the issuing municipality. The rather disappointing results of these studies seem to indicate that traditional indicators of creditworthiness may be outweighed by other factors in the assignment of credit ratings by Moody's. Such results should not be surprising given the subjectivity of the ratings acknowledged by Moody's as early as 1931 when they published the following in the first issue of Moody's Bond Ratings:

> The ratings on all bond issues, of every class, are based on a scientific formula [sic.] which, after exhaustive research, has been proven to be the most accurate guide for determining correct investment values for bond risks. . . The so-called "statistical rating" is then put to the test with various non-statistical factors which affect the investment value of nearly all bonds to a more or less degree; the ultimate result of such test giving us the "final rating." (Moody's, 1931, 4)

Today Moody's makes no pretense of using a "scientific formula" and maintains that the evaluation of credit risk is as much an art as a science. As Kirk (1967, 10) has put it: "The job of the rating analyst is to review all the factors--and those factors vary from municipality to municipality--to find those specific factors in the 'life' of the community which would over a period of years. . .result in these particular bonds being in a dangerous position." The correlates of municipal bond credit ratings do not and would not appear to be consistent from one city to another.

Brunn and Zeigler (1979) examined a series of demographic, geopolitical, and social characteristics of the highest rated and lowest rated central cities in the United States and found strong relationships between the ratings and population size and growth rate, the proportion of the metropolitan area's population living in the central city, and a per capita needs index which comprised a vector of social attributes of the cities. Another study which has explored the policy implications of bond ratings as they affect municipal borrowing cost, has also found an inverse correlation with city need: Sullivan (1976) discovered a tendency to assign lower bond ratings to the neediest communities and higher bond ratings to the wealthiest. In essence, concludes Sullivan (1976, 46), "bond ratings tend to penalize those least in a position to finance debt obligations." Supportive of further research on the social correlates of financial wellbeing is Sullivan's finding that of the ten municipal need proxies employed in his analysis, the three social variables (per capita income, percentage of families below the poverty level, and employment rate) were the most powerful in proving that ratings discriminate against the neediest cities. His financial variables (per capita expenditures, tax rates, local tax effort, etc.) were far less effective.

## References to the Regional Patterning

#### of Municipal Bond Ratings

Interest in municipal bonds is usually limited to the bond yields of individual municipalities or to some of the imperfections of the bond market itself. Little has been written on the spatial patterning of bond ratings as an indication of the financial future of the American metropolitan system. Only the pioneering study by Brunn and Zeigler (1979) has approached municipal bond ratings from a geographic perspective. Their research provided an analysis of the regional patterning of Moody's municipal bond ratings in 1979 and included maps of the gilt edge and grit edge central cities of the United States. The present investigation builds on the Brunn and Zeigler study by expanding the temporal dimensions of the

invest duced to sup T bond r econom the fa prefer lens w excell with an Mendels locatio conside municip all par tailor siderat In Moody's ings an cities and mos <sup>quat</sup>ely <sup>to</sup> the s in his a <sup>10tes</sup> th investigation, by increasing the number of independent variables introduced into the analysis, and by utilizing a number of statistical methods to supplement the cartographic analysis of the data.

There is ample evidence in the finance literature to indicate that bond ratings are a regionally patterned phenomenon. Moak (1970) lists the economy of the community and the region of which it is a part as one of the factors considered by investors and rating agencies in determining preferences. He goes on to acknowledge that there are regional image problems which are likely to extend to the bonds of a local government with an excellent actual credit situation . . . because of 'guilt by association' with an overlapping unit" (Moak, 1970, 173-174). Investment analysts Mendelsohn and Robbins (1976, 529) also acknowledge that the community's location, particularly with respect to regional growth, is an important consideration in evaluating a municipal obligation. Since the volume of municipals in circulation on the market is so large and originates from all parts of the country, investors have ample opportunity to regionally tailor their purchasing habits based on both rational and irrational considerations.

In a study of twenty-five of the largest cities in the United States Moody's Investors Service (1977) found some relationship between bond ratings and location but concluded that "while the young and fastest growing cities tend to be highly rated and lowest rated cities are among the oldest and most stagnant, neither geographic location or stage of development adequately explains assigned ratings" (Moody's, 1977, i). Other references to the spatial patterning of municipal bond ratings are made by Sanders in his analysis of U.S. cities with 10,000 or more population in which he notes that New England communities have the highest bond ratings with 56

perce the 1 Engla Massa other found predic Arkans Carol: group Connec and In quali fy the changi ļ Eeanin cial c graphi <sup>the</sup> de elsewh <sup>mentin</sup> <sup>sev</sup>era found is, an anothe regula <sup>of</sup> the percent rated Aa or better and that the solid South and mid-Atlantic have the lowest ratings (Sanders, 1977, 107). In Rubinfeld's study of New England towns and cities, he noted that of all the New England states, Massachusetts' communities received higher ratings than communities in other New England states (Rubinfeld, 1973, 24). Similarly, Horton (1970) found that the state in which a community was located was one of the best predictors of bond quality. States in Horton's poorer group were Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Minnesota, and New Jersey. States in the better group were Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, Pennsylvania, Wisconsin, Michigan, Ohio, Illinois, and Indiana. Horton was only trying to discriminate between investment quality and subinvestment quality ratings, however, and he did not specify the basis of his state groupings. Nor did he attempt to chart the changing regional character of credit evaluation over a period of years.

Why is it reasonable to suspect that credit ratings should exhibit meaningful patterns of geographic variation? Simply because the financial characteristics of cities, as they are correlated with diverse demographic, social, and political characteristics, vary considerably from the declining cities of the Northeast to the growth centers of Texas and elsewhere, especially over the past two decades. Peterson (1976), commenting on the urban financial predicament, asserted that the future of several old, industrial cities was so precarious that no one could be found to buy their bonds. Since the urban financial predicament has been, is, and will be significantly different from one region of the country to another, one might suspect that bond ratings would also exhibit regional regularities. It is these regional regularities which serve as the focus of the chapter to follow.

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#### CHAPTER IV

# SPATIAL AND TEMPORAL DIMENSIONS OF MUNICIPAL CREDIT RATINGS:

## 1960-1980

One of the working hypotheses of this research endeavor is that bond ratings of central cities in the United States exhibit patterns of regional and temporal variation which parallel the decline of the American manufacturing belt, particularly the industrial Northeast, and the rise of the peripheral amenity belts. In this chapter, the regional patterning of municipal credit ratings as it has varied over time (1960 to 1980) will be explored at the scale of Census region and Census division; the 37th parallel as proposed by Sale (1975) has been used as a divide between Sunbelt and Frostbelt. In a general sense, the Northeast and North Central Census regions may be equated with the American manufacturing belt and the South and West regions may be equated with the peripheral amenity belts. The bond ratings assigned by Moody's to central cities in the United States over the past twenty years provide the raw material for this regional analysis.<sup>2</sup> In the two chapters which follow, the city characteristics

<sup>&</sup>lt;sup>2</sup>All central cities which have been rated at any time between 1960 and 1980 are included in Appendix A which is a year-by-year enumeration of bond ratings for all central cities in the study area. Appendix B provides a table of all states which comprise the four regions and nine

which are related to the regional patterning of bond ratings are analyzed.

#### Regional Patterns in 1980

Central city bond ratings as of January 1980 are aggregated by Census region in Table 6. Striking regional contrasts between rating categories are apparent from an examination of the relative percentages of central cities in each rating category. The modal rating for the Northeast in 1980 was Baa, with 23 percent of the seventy-seven rated central cities having been assigned to this rating category. In contrast, the modal rating for the North Central and West was Aa, which accounted for approximately 50 percent of all 147 rated central cities in both regions. In the South, the modal rating for 1980 was A-1 with 35 percent of all 118 rated central cities in the region.

At a more refined scale, all but two of the Census divisions of the United States exhibited the same modal category as the regions to which they belong. A breakdown by Census division is presented in Table 7. The region with the sharpest contrast between divisions is the Northeast where central cities in New England exhibit markedly better ratings than central cities in the Middle Atlantic division. The Aa category accounted for 29 percent of rated central cities in the New England states while the Baa category accounted for 33 percent of rated central cities in the Middle Atlantic states. These are the modal categories in each division. The only other Census division to deviate markedly from the region in which it is located was the East South Central where over one-third of all central

<sup>&</sup>lt;sup>2</sup>(Cont'd) geographic divisions of the United States as defined by the U.S. Bureau of the Census. Many of the analyses to follow will utilize these statistical areas.

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# Table 6.

## THE DISTRIBUTION OF CENTRAL CITY BOND RATINGS

BY CENSUS REGION: 1980

C <b>en</b> sus		Numbe	per of Central Cities by Rating Category						
R <b>egi</b> on		(Perce	cent of Rated Central Cities in a Region)						
	Aaa	Aa	A-1	Α	Baa-1	Baa	В	Caa	
Northeast	2	16	14	17	9	18	1	0	
	(3)	(21)	(18)	(22)	(12)	(23)	(1)	(0)	
North	13	45	20	9	2	1	0	1	
Central	(14)	(50)	(22)	(10)	(2)	(1)	(0)	(1)	
South	5	28	41	28	6	10	0	0	
	(4)	(24)	(35)	(24)	(5)	(8)	(0)	(0)	
West	6	27	10	12	0	1	0	0	
	(11)	(48)	(18)	(21)	(0)	(2)	(0)	(0)	
TOTAL	26	116	85	66	17	30	1	1	

Source: Moody's Bond Record, January 1980.

# Table 7.

# THE DISTRIBUTION OF CENTRAL CITY BOND RATINGS

BY CENSUS DIVISION: 1980

Census Division		Numbe (Percen	per of Central Cities by Rating Category ent of Rated Central Cities in a Division)					
	Aaa	Аа	A-1	A	Baa-1	Baa	В	Caa
New	2	10	8	8	3	4	0	0
England	(6)	(29)	(23)	(23)	(9)	(11)	(0)	(0)
Middle	0	6	6	9	6	14	1	0
Atlantic	(0)	(14)	(14)	(21)	(14)	(33)	(2)	(0)
East North	6	33	14	8	1	1	0	1
Central	(9)	(58)	(22)	(13)	(2)	(2)	(0)	(2)
West North	7	12	6	1	1	0	0	0
Central	(26)	(44)	(22)	(4)	(4)	(0)	(0)	(0)
South	2	15	23	8	1	4	0	0
Atlantic	(4)	(28)	(43)	(15)	(2)	(8)	(0)	(0)
East South	0	5	4	7	2	2	0	0
Central	(0)	(25)	(20)	(35)	(10)	(10)	(0)	(0)
West South	3	8	14	13	3	4	0	0
Central	(7)	(18)	(31)	(29)	(7)	(9)	(0)	(0)
Mountain	1	10	3	3	0	1	0	0
	(6)	(56)	(17)	(17)	(0)	(6)	(0)	(0)
Pacific	5	17	7	9	0	0	0	0
	(13)	(45)	<b>(</b> 18)	(24)	(0)	(0)	(0)	(0)
TOTAL	26	116	85	66	17	30	1	1

Source: Moody's Bond Record, January 1980.

cities were rated A, making it the most common rating in the division. The Middle Atlantic and the East South Central divisions, in fact, are the only Census divisions to completely lack any Aaa rated central cities.

The spatial distribution of bond ratings in 1980, as Tables 6 and 7 reveal, was not a random one but one that exhibited some distinct regional concentrations. If the percent of all central cities in a particular rating category which fall in a single Census region may be used as an index of regional concentration, central cities at the extremes of the rating scale exhibited the most pronounced patterns of regional alignment. The regionality of bond ratings is presented in Table 8 which indicates what percentage of all central cities with a given bond rating are accounted for by a particular region.

Whereas the North Central region accounted for only 27 percent of all rated central cities in 1980, 50 percent of the Aaa-rated cities fell in that region. Only the grit edge cities (those with Baa ratings and below) were more regionally concentrated than the gilt edge cities in 1980. Almost 60 percent of the grit edge cities were located in the Northeast region even though the region contained only 23 percent of all rated central cities in the country. Similarly, though the association is not quite as pronounced, the Aa-rated cities were most heavily concentrated in the North Central region and the Baa-1 rated cities were most heavily concentrated in the Northeast. The remaining two categories, A and A-1, were most heavily concentrated in the South but their distribution tends to more closely approximate the overall distribution of central cities in the entire study area.

The location of the twenty-six gilt edge and thirty-two grit edge central cities in 1980 is displayed in Figure 3. The North Central region

# Table 8.

## THE REGIONAL DISTRIBUTION OF CENTRAL CITIES

IN EACH RATING CATEGORY: 1980

Bond	Number of	Distributi	Distribution by Census Region (in percent)						
Rating	Cities	Northeast	North Central	South	West				
Aaa	26	7.7	50.0	19.2	23.1				
Aa	116	13.8	38.8	24.1	23.3				
A-1	85	16.5	23.5	48.2	11.8				
A	66	25.8	13.6	42.4	18.2				
Baa-1	17	52.9	11.8	35.3	0.0				
Baa, B, & Caa	32	59.4	6.3	31.3	3.1				
TOTAL	342	22.5	26.6	34.5	16.4				

Source: Moody's Bond Record, January 1980.





clearly stands out for its heavy concentration of Aaa ratings and for its near absence of grit edge ratings; only Detroit and Cleveland carried a Baa or lower rating in 1980. Within the North Central, the state of Iowa emerges as the focus of gilt edge ratings, accounting for four of the twenty-six, a total exceeding that of any other state. Outside the North Central, only Oregon, California, Utah, Texas, North Carolina, Connecticut, and Maine are represented by central cities with Aaa bond ratings. Those cities with Baa and lower ratings, on the other hand, are heavily concentrated in the Northeast and include many of the gritty cities of Pennsylvania, New Jersey, and New York such as Johnstown, Scranton, Passaic, Buffalo, and Troy. All other central cities with grit edge ratings in 1980 were located in the Sunbelt.

With respect to the regional cleavage between Sunbelt and Frostbelt in 1980, it can be seen that the most striking contrast in bond ratings was not between cities north and south of the 37th parallel. Instead, it was between the cities of the Northeast and the North Central regions of the country, that is, within the region designated in this analysis as the American manufacturing belt. Similarly, within the peripheral amenity belt there is a strong contrast between the South and the West. There consequently appears to be a stronger contrast between east and west within the manufacturing belt and within the peripheral amenity belt than between Sunbelt and Frostbelt.

#### Changing Patterns of Central City

#### Credit Ratings, 1960 to 1980

The credit ratings assigned to municipalities on the bond market by Moody's Investors Service are not revised at regular intervals nor, as evidenced by the rating histories presented in Appendix A, are they

subject to frequent revisions. Nevertheless, during the two-decade period under study, only eighty-seven out of a total of 271 central cities which were rated for the entire period, had experienced no change in ratings from year to year during the period. During any given year, however, fewer than one in twenty cities had their credit ratings changed from the previous year. Only in 1968 when 18 percent of all central cities experienced a change in rating and during the 1972 to 1977 period when 6 to 12 percent per year experienced a change, did more than one in twenty cities change ratings in a single year. The large number of changes in 1968 probably resulted from the heavy criticism of the ratings which followed the downgrading of New York City's bonds in 1965 and which reached a peak with the Congressional hearings on municipal bond finance (U.S. Congress, 1967-68) in 1967 and 1968. The large number of changes during the mid-70s may be explained by the many changes to new rating categories, A-1 and Baa-1, and perhaps by the impact of newly released 1970 Census data.

Moody's acknowledgs that bonds of lower grades are more likely to experience rating changes than bonds of higher grades (Moody's, 1978, v). This policy, combined with the initiation of the A-1 and Baa-1 categories to designate the better credit risks among A and Baa rated bonds, has nurtured a general trend toward higher ratings over the 1960 to 1980 period. Of the 296 central cities which were rated in both 1960 and 1980, 38 percent experienced a net improvement in rating and only 24 percent experienced a net decline. The remainder experienced no net change in credit status. Similarly, during the 1970 to 1980 period, more cities improved in the ratings than declined. A second noteworthy trend over the twodecade span has been the increase in the proportion of the 382 central cities which carry credit ratings. Only 80 percent of the total were

rated in 1960 while 90 percnet were rated in 1980.

The graphs in Figures 4 and 5 display absolute changes in the popularity of bond rating classes during the 1960 to 1980 period. A comparison of the 1960 and the 1967 graph in Figure 4 reveals a decline in the number of unrated central cities, an increase in the number and relative proportion of Aa, A, and Baa rated central cities, and a decline in the number of cities rated at the extremes of creditworthiness, i.e., Aaa and Ba. Beginning in 1968, the number of rating categories was increased by two, A-1 and Baa-1, and by 1970, as revealed in Figure 5, these new ratings accounted for almost 18 percent of the ratings assigned to central city general obligations. By 1980, the relative proportion of A-1 and Baa-1 ratings had increased to 30 percent. In contrasting the early 1970s with the later 1970s, the period from 1970 to 1975 was characterized by an overall improvement in bond ratings: Cities rated Aaa, Aa, and A-1 increased in number and relative percentage, while cities rated A, Baa-1, Baa, and Ba decreased in number and relative percentage. The 1975 to 1980 period, on the other hand, saw no net change in the number of cities rated Aaa, a decline in the number and relative percentage of cities rated Aa, and an increase in the number and relative percentage of cities rated Baa-1, Baa and below. This negative trend may have been related to the recession and inflation which severely affected central city fiscal well-being during this period. During the entire decade, the number of central cities not rated varied only slightly.

#### A Graphic Analysis of Regional Change

Aggregating rated central cities by Census region for the years 1960, 1970, and 1980, as illustrated in Figure 6, reveals that over the past twenty years (1) the Northeast has experienced a dramatic decline in credit


Figure 4. Number of Central Cities in Each Bond Rating Category, 1960 and 1967.



Figure 5. Number of Central Cities in Each Bond Rating Category, 1970, 1975, and 1980.



Figure 5 (Cont'd).



Figure 6. A Regional and Temporal Comparison of Central City Bond Ratings.

standing, (2) the South a dramatic improvement, (3) the North Central little net change, and (4) the West only a slight improvement. The most consistently highly rated region has been the North Central with over 60 percent of its central cities enjoying either Aaa or Aa standing in 1960, 1970, and 1980. In the Northeast, on the other hand, the number of Aaa and Aa rated central cities has shrunk from about 50 percent in 1960 to 28 percent in 1980. In addition, the modal bond rating category for the Northeast changed from A in 1960 and 1970 to Baa in 1980. In the South it changed from A in 1960 and 1970 to A-1 in 1980. The modal category for the North Central and West has been Aa for all three years.

The maps presented in Figure 7 depict changes in the regional distribution of gilt edge and grit edge central cities at five year intervals during the 1960 to 1980 period. In 1960 it can be seen that the Northeast was as generously endowed with Aaa rated central cities as the North Central region. An examination of the succeeding maps shows in the Northeast a continuous attrition of cities in the gilt edge category. By 1980, the only Northeastern central cities to be included in the Aaa category by Moody's were Portland, Maine, and Stamford, Connecticut. Portland is one of only eight central cities in the United States which has retained a Aaa rating for the entire two decades and Stamford, located on Connecticut's "gold coast," is the only Northeastern cities which lost their Aaa rating during the period. Northeastern cities which lost their Aaa rating during the period include such cities as Buffalo, Rochester, and Syracuse in New York; Hartford in Connecticut; and Harrisburg and Lancaster in Pennsylvania.

In 1960, 1965, and 1970, the only gilt edge central cities outside the North Central and Northeast were Salt Lake City, Utah, and Richmond,



Figure 7. The Gilt Edge and Grit Edge Central Cities, 1960-1980.

Virginia. The 1975 map reveals, however, a blossoming of the Sunbelt and West Coast with two cities for North Carolina, three for Texas, two for California, and two for Oregon showing up in the gilt edge category. Between 1975 and 1980, the number of gilt edge central cities remained the same, but the Northeast lost Hartford, Connecticut, while California gained Sacramento. The number of gilt edge central cities remained the same in the North Central region but Iowa lost Sioux City while Minnesota gained Rochester.

While the number of central cities in the Northeast with gilt edge ratings has been steadily declining, the number of cities in the grit edge category (Baa and below) has been steadily increasing. In 1960, the grit edge cities of the Northeast were confined to the eastern metropolises of the region. From this hearth, their number has steadily moved westward, extending all the way to Detroit; their density has also increased. At the same time, the number of grit edge cities in the South has steadily diminished and their number in 1980 was confined to central cities in Florida, Alabama, Mississippi, Louisiana, and Texas. In the West, where grit edge central cities never numbered more than five, there was an initial increase in their number during the early 1960s followed by a gradual decline.

Three basic trends in the regional patterning of central city bond ratings over the two decade period from 1960 to 1980 may be defined: (1) the decline of Northeastern central cities, a decline underway since at least 1960, (2) the improvement of Sunbelt and West Coast central cities, particularly during the 1970s, and (3) the stability of North Central central cities which have remained the most highly ranked in the nation.

Using Sale's 37th parallel as the divide between Sunbelt and Frostbelt

reveals that the strongest cleavage along this line was in 1960. At that time, the Sunbelt was a decidedly homogeneous region of low credit standing while the Frostbelt's central cities enjoyed an overall high evaluation of their creditworthiness. The increase of grit edge cities in the Frostbelt and the increase of gilt edge cities in the Sunbelt since then has largely blurred the regional dichotomy. By 1980 the most striking dichotomy between extremely high and extremely low credit ratings was not between Sunbelt and Frostbelt but within the Frostbelt itself. A line passing between Lansing and Detroit, Michigan, and between Fort Wayne, Indiana, and Cleveland, Ohio, splits the Frostbelt into two almost perfectly homogeneous regions of credit quality as evidenced in the 1980 map displayed in Figure 7.

The long-term trend, assuming the pattern of the 1970s continues, seems to be toward a reversal of the Sunbelt-Frostbelt cleavage that existed in 1960. The Frostbelt is becoming increasingly characterized by central cities with low credit ratings while Sunbelt central cities are attaining increasingly higher credit ratings. This trend is confirmed by comparing the maps which portray the gilt edge and grit edge cities in 1960 and 1980 (Figure 7). Further evidence is provided by Figure 8 which depicts all central cities which have moved up and down in credit standing by more than one rating during the 1960 to 1980 period and during the second half of that period, 1970 to 1980. The Sunbelt stands out on those maps as a region of improving creditworthiness while the Northeastern portion of the Frostbelt stands out as a region of decidedly declining creditworthiness. The map of changes in credit ratings during the 1970s reveals that only a single Sunbelt city moved down by two or more rating classes during the 1970 to 1980 period. Twenty-six Frostbelt cities, however,



Figure 8. Changes in Central City Bond Ratings, 1960-1980 and 1970-1980.

declined by two or more ratings during the same period.

By the same token, so long as the American manufacturing belt is defined as comprising the Northeast and North Central regions of the United States, its internal pattern of central city bond ratings continues to be very heterogeneous. As the eastern portion of the manufacturing belt grades into the agricultural and less densely populated interior, central city bond ratings improve considerably. Likewise, the peripheral amenity belt as of 1980 still contains a heterogeneous pattern of bond ratings with both extremely high and extremely low rated central cities. In terms of changing bond ratings (Figure 8) the peripheral amenity belt exhibits a much more homogeneous complexion in that both the West and the South Census regions completely lack cities which have fallen two or more rating categories over the past decade.

### A Statistical Analysis of Regional Change

How successfully can geographic region be used to predict bond ratings of central cities? To test the hypothesis that there has been a significant correlation between the bond ratings assigned to central cities and their locations, crosstabulation analysis has been employed. Bond rating categories have been set up as the dependent variable and both Census region and Census division as the independent variables for each year between 1970 and 1980.

For this analysis and for the multiple regression analysis to follow, bond ratings are being treated as an interval level random variable. The assumption that the intervals between bond rating categories are equivalent has been made by Bahl (1971) in his study of municipal creditworthiness, and by Horrigan (1966), West (1970), and others in their regression analyses of corporate bond ratings. Census region and Census division are

both nominal level variables.

With a nominal level and an interval level random variable, the correlation ratio represented by eta-squared is an appropriate measure of association in crosstabulation analysis (Mueller, Schuessler, and Costner, 1970, 325-333). Eta varies between zero and one depending on how different the means are in each of the nominal categories, in this case in each of the four Census regions or the nine Census divisions. Eta-squared may be interpreted as the proportion of the variance accounted for by the independent variable, region or division.

The Chi-square test statistic indicates a highly significant statistical association between bond ratings and both region and division (Tables 9 and 10). In each year between 1970 and 1980, the pattern of correlation which emerged from the crosstabulation analysis would have been expected by chance only once in more than 10,000 times as evidenced by the .0000 level of statistical significance. The values of eta and etasquared, as enumerated for regions in Table 9 and for divisions in Table 10, indicate the strength of association between the dependent and the independent variables. As revealed by the values of eta-squared in Table 9, the maximum proportion of the variance which may be accounted for by Census region is 17.8 percent in both 1979 and 1980. Since 1972 the trend in explained variance has been upward indicating that region is becoming a better predictor of bond ratings. Using a finer geographic mesh, that of Census division, the predictive power of location is increased to 22.6 percent for 1980. Again the proportion of variance which may be explained by location has been upward since 1972. The values of eta-squared for Census division are presented in Table 10. If regional boundaries were altered to conform with spatial bond rating patterns, rather than using

# Table 9.

# A CROSSTABULATION ANALYSIS OF BOND RATINGS

AND CENSUS REGION: 1970-1980

Year	Level of Significance			Degree of Association	
	Chi square	Degr <b>ee</b> s of F <b>ree</b> dom	Sifnif- icance	Eta	Eta- Squared
1970	58.3	15	.0000	.35129	.123
1971	57.4	15	.0000	.35568	.127
1972	54.3	15	.0000	.33519	.112
1973	60.3	15	.0000	.34611	.120
1974	67.9	15	.0000	.35750	.128
1975	61.2	15	.0000	.36903	.136
1976	54.3	15	.0000	.35613	.127
1977	63.0	15	.0000	.38567	.149
1978	71.7	15	.0000	.40497	.164
1979	80.2	15	.0000	.41948	.178
1980	80.0	15	.0000	.42161	,178

Source: SPSS,	CROSSTABS.
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# Table 10.

# A CROSSTABULATION ANALYSIS OF BOND RATINGS

## AND CENSUS DIVISION: 1970-1980

Year	Level of Significance		Degree of Association		
	Chi square	Degrees of F <b>ree</b> dom	Signif- icance	Eta	Eta- Squared
1970	90.1	40	.0000	.41007	.168
1971	93.6	40	.0000	.41868	.175
1972	103.5	40	.0000	.40668	.165
1973	100.7	40	.0000	.41141	.169
1974	106.1	40	.0000	.43434	.189
1975	106.0	40	.0000	.44554	.199
1976	111.8	40	.0000	.45163	.204
1977	114.4	40	.0000	.45645	,208
1978	116.7	40	.0000	.46740	.218
1979	122.0	40	.0000	.47225	.223
1980	117.8	40	.0000	.47542	.226

Source:	SPSS,	CROSSTABS.
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pre-established regional divisions, it is likely that the explained variance would be higher.

### Bond Rating Dynamics of the Gilt Edge

# Central Cities, 1960-1980

Over the past score of years, forty-four central cities in the United States have found themselves assigned to the Aaa rating category at one time or another. These cities are singled out by name in Figures 9, 10, and 11 in which their credit rating histories are charted at yearly intervals for the period between 1960 and 1980. The entire set of gilt edge cities has been divided up into regions with Northeastern central cities displayed in Figure 9, North Central in Figure 10, and South and West in Figure 11. Each composite regional profile evidences a distinctly different pattern of bond rating dynamics. In the Northeast, there were thirteen central cities which were rated Aaa in 1960 and only two with that rating in 1980. In the South and West the pattern is completely reversed: In 1960 there were only two central cities with Aaa ratings and in 1980 there were eleven. The most dramatic decline in bond rating since 1960 was among cities which began the 1960-1980 period with a gilt edge rating and plummeted to the Baa category by 1980. Only Harrisburg, Pennsylvania, and Buffalo, New York, experienced this dramatic but negative total transition. No central city has moved up to the Aaa category from a rating less than A, and only four have made the transition from A to Aaa during the past two decades. All but one of the four, Rochester, Minnesota, have been Sunbelt cities.

Only one central city in the Northeast and one central city in the West retained a Aaa bond rating for the entire two-decade period. No central city in the South may claim twenty-one years of Aaa status. This



Figure 9. Rating Profiles of Gilt Edge Cities in the Northeast.



Figure 10. Rating Profiles of Gilt Edge Cities in the North Central.



Figure 11. Rating Profiles of Gilt Edge Cities in the South and West.



Figure 12. Rating Profiles of Grit Edge Cities in New York and New England.



Figure 13. Rating Profiles of Grit Edge Cities in Pennsylvania and New Jersey.



Figure 14. Rating Profiles of Grit Edge Cities in the North Central.



Figure 15. Rating Profiles of Grit Edge Cities in the South Atlantic.



Figure 16. Rating Profiles of Grit Edge Cities in the East South Central.

Figure 17. Rating Profiles of Grit Edge Cities in the West South Central.





Figure 18. Rating Profiles of Grit Edge Cities in the West.

paucity of consistently high ranking cities contrasts sharply with the North Central where six central cities have been rated Aaa for the past two decades. Four more in the region were removed from the Aaa category during the 1960s but had been reinstated by 1980. The North Central region's pattern of Aaa dynamics, as seen in Figure 13, has been characterized by decline during the 1960s with half of the cities rated Aaa in 1960 dropping out of the gilt edge category by 1968. During the 1970s in the North Central region, however, there was a reversal of the credit evaluation of many cities as seven central cities moved into the gilt edge category from lower classes and only one city dropped to a lower rating.

#### Bond Rating Dynamics of the Grit Edge

#### Central Cities, 1960-1980

The grit edge central cities are those whose general obligation bonds are rated Baa or below. Baa-1 rated cities, a category used only since 1968, are not included in the grit edge category. In actuality, few central cities, only fourteen during the past twenty years, have been rated Ba or below with the result that most of the grit edge cities carry Baa ratings. All cities which have fallen into the grit edge category during the past two decades are profiled in Figures 12 through 18. They are grouped by either Census region, Census division, or groups of states within a Census division.

The conspicuous point of contrast between the temporal profiles of the grit edge cities and the gilt edge cities is that there have been almost twice as many grit edge cities as gilt edge cities over the past two decades. Seventy-nine central cities have found themselves in the Baa rating category or below between 1960 and 1980. When these cities are

grouped by region, distinct regional profiles emerge just as they did with the Aaa cities.

The Northeastern central cities are illustrated in Figures 12 and 13. These two graphs portray the declining evaluation of credit quality in the Northeast. While there were only eight Northeastern central cities with Baa or lower bond ratings in 1960, that number had increased to nineteen by 1980. Most of these had dropped into the Baa category from an A rating. Only one central city, Pawtucket, Rhode Island, began the decade of the 1960s with a Baa rating and ended the decade of the 1970s with a Aa rating. Long Branch, New Jersey, was the only central city that began with a Ba rating and ended with a A rating, and only one other, Jersey City, New Jersey, began with a Baa rating and ended with a Baa-1 rating.

Another conspicuous feature of Figures 12 and 13 is the numerous changes in credit ratings for so many central cities. This makes many of the graphs appear like a maze. Very few grit edge central cities in the Northeast which have had their ratings revised upward during the twodecade period have retained those higher ratings. The period of substantial downgrading in credit quality began in New Jersey and Pennsylvania during the later 1960s; New York and New England did not experience the initiation of such a decline until the mid-1970s.

The remarkable point of contrast between the Northeast's temporal profiles and the North Central's, as portrayed in Figure 14, is the far fewer number of cities in the latter region which have ever been rated Baa or below. The pattern of grit edge ratings in Figure 14 parallels the pattern of gilt edge ratings in Figure 10 in that the period through the early 1970s was one of overall movement down while the remainder of the decade was one of overall movement up in credit evaluation. The only

exceptions to this generalization are Detroit and Cleveland, the North Central's only two grit edge cities in 1980.

In contrast to the temporal profiles of grit edge cities in the Northeast, the temporal profiles of grit edge cities in the South, as portrayed in Figures 15, 16, and 17, and the West in Figure 18, reveal a pattern of movement out of the grit edge category. The South began the 1960s with thirty-two grit edge central cities and ended the 1970s with only nine. Similarly, the West had five central cities rated Baa or below in 1960 but only one, Las Vegas, in 1980. No city in either region had made the complete transition to gilt edge status, but Jackson, Mississippi, and Albuquerque, New Mexico, had improved to a Aa rating and thirteen more had risen to A-1 standing. Also noteworthy is that not a single city in either the South or the West dropped permanently into the Baa category from a higher rating and only one central city, Galveston, Texas was reassigned to the Baa category after a brief period of higher credit standing.

### Summary

The regional patterning of central city bond ratings in 1980 has revealed a strong cleavage between the highly rated cities of the North Central region and the lowly rated cities of the Northeast. This cleavage makes it impossible to characterize the Frostbelt as a homogeneous bond rating region. The peripheral amenity belt was also characterized by an east-west split as central cities in the West have been assigned ratings in the highest classes while Southern central cities reveal a diversity of ratings spanning the entire investment grade rating continuum. The most highly rated Census division in 1980 was the West North Central, while the most lowly rated division was the Middle Atlantic.

Between 1960 and 1980 there has evolved a general trend toward higher ratings. At the regional scale, Northeastern central cities experienced a dramatic decline in bond ratings, the South a dramatic improvement, the North Central little net change, and the West only slight improvement. The most consistently high rated cities have been those in the North Central region. These trends are verified by the regional distributions of all bond rating categories and particularly the gilt edge, Aaa, and grit edge, Baa and below, categories of bond ratings which have been the most regionally concentrated. Maps of those cities which have improved and declined in the ratings between 1960 and 1980 show the Sunbelt to be a region of improving credit standing, while the industrialized Northeast stands out as a region of decidedly declining credit evaluation. The statistical analysis of regional change in credit ratings revealed a statistically significant association between bond ratings and Census region and division, an association which has increased over time or that in 1980, Census divisions alone explained 22.6 percent of the variation in credit ratings nationwide.

The temporal profiles which were devised to depict the bond rating histories of the gilt edge and grit edge cities over the past twenty years illustrate once again the distinctive regional character of central city bond rating dynamics. The temporal profiles for Northeastern gilt edge cities show a continuous attrition of cities rated Aaa, while those for Southern and Western gilt edge cities show a movement into Aaa category, and those for North Central gilt edge cities a pattern of fairly consistent high ratings. The grit edge cities evidence bond rating histories which are just the opposite, though subject to more frequent changes. Grit edge cities in the Northeast have been shown to have dropped into the

Baa and below rating categories since the late 1960s, while grit edge cities in the South and West have been shown to have moved rapidly out of the lower ratings and into higher ones. The North Central region has had only a very few grit edge cities; those which dropped into the Baa category during the two-decade span have tended to rebound to higher ratings.

The bond ratings have therefore been shown to be a highly regional phenomenon which have changed their geographic complexion considerably over the past score of years. The spatial correlates of municipal bond ratings which will be discussed in the next chapter may be called upon, in fact, to help explain these regional tendencies.

#### CHAPTER V

# SOCIAL, DEMOGRAPHIC, AND GEOPOLITICAL CORRELATES OF MUNICIPAL CREDIT RATINGS

The objectives of the present chapter are twofold: (1) to establish some of the univariate relationships between assigned credit ratings on the one hand and selected demographic, geopolitical, and social characteristics on the other, and (2) to determine the degree of association between bond ratings and several multivariate statistical indices measuring geopolitical fragmentation, city need, and quality of life. The two methods of analysis used to test the significance of the relationship between bond ratings and the above selected variables are (1) crosstabulation analysis using gamma as a measure of association and the Chi-square test statistic, and (2) one-way analysis of variance to test the differences between group means of normally distributed variables.<sup>3</sup> Because so many of the variables examined in this chapter are highly regional in character, the explanation for the regional patterns delineated in Chapter 4 is provided here. Furthermore, the present chapter lays the foundation for

<sup>&</sup>lt;sup>3</sup>In general, crosstabulation analysis was used on discrete variables and variables such as population size which are continuous but not normally distributed. Analysis of variance was used on variables which are continuous and which appear to be normally distributed.

the multivariate regression and discriminant models to be developed in the chapter which follows.

#### Population Size

As presented in Chapter 2, the central cities under investigation ranged from 17,000 to almost 7.5 million inhabitants in 1976 according to the population estimates of the U.S. Bureau of the Census. With respect to the impact of population size on assigned credit ratings, Horton (1970, 32) has summarized the traditional wisdom in this regard as follows:

> The population of a community is likely to influence the rating of its bonds in a number of ways. Larger communities tend to have more specialized and experienced financial staff and management, and a larger community is likely to have greater economic diversity than a smaller one and thus is able to better withstand fluctuations in economic conditions. Size in itself may allow a larger municipality to withstand financial difficulties which a smaller community could not. There is also the consideration that the larger community may be more able to depend upon being bailed out of financial difficulties by higher levels of government.

Mendelson and Robbins (1976, 536) add another factor to account for the predicted relationship between bond ratings and city size by noting that "available data will probably be more comprehensive for larger communities, thereby facilitating the analysis [of creditworthiness]." Sanders' empirical investigation of 1976 bond ratings for all American cities with 10,000 or more inhabitants verified the fact that "with the notable exception of New York City, large cities receive the highest ratings" (Sanders, 1979, 107). Because of the theoretical and empirical evidence which does suggest that higher ratings are assigned to larger cities, population size has been the most common non-financial factor incorporated into models designed to predict municipal bond ratings (Table 5 of Chapter 3). The relationship between bond ratings and city size is tested in this study by using crosstabulation analysis and Chi-square statistic. All cities under investigation were divided into population size quintiles based on their 1960, 1970, and 1976 populations. These quintiles were then crosstabulated with four categories of bond ratings, Aaa, Aa, A/A-1, and Baa/Baa-1 and below. Only four rating categories were used in order to make comparable the 1960, 1970, and 1976 matrices.

For all three years the Chi-square test statistic indicated a highly significant association between city size and bond rating category. These significance levels are listed in Table 11. This association, as it existed in 1976, is graphed in Figure 19. It can be seen that with every step down in bond rating, the proportion of large cities decreases and the proportion of small cities increases with striking regularity. As evident in the figure, there were no Aaa central cities in the smallest population quintile in 1976. Nor were there in 1960 or 1970. In addition, despite the fact that one-quarter of all rated central cities fell below 50,000 population, a common cut-off for metropolitan status, none of the Aaa cities and only 20 percent of the Aa cities fell below the 50,000 threshold in 1976. These findings support the contention that there is a minimum population size which appears to be a necessary, albeit insufficient, condition for being assigned the highest credit rating, Aaa. A large population size, however, is no guarantee of a superior credit evaluation as witnessed by the 12.5 percent of the Baa-1 and lower rated cities which were in the largest population size quintile in 1976. In 1980 the outstanding examples of large cities with poor credit ratings were New York City and Cleveland, Ohio, the only two central cities in the country rated at the sub-investment level.

Та	ble	11.

Year	Raw Chi-square	Degrees of Freedom	Signif- icance	Gamma
1960	36.7	12	.0002	.23918
1970	46.9	12	.0000	.31738
1976	44.5	12	.0000	.39280
Courses	CDCC CDCCCTARC			

### BOND RATINGS AND CITY POPULATION SIZE

Source: SPSS, CROSSTABS.

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## Table 12.

### BOND RATINGS AND METROPOLITAN POPULATION SIZE

Year	Raw Chi-square	Degrees of Freedom	Signif- icance	Gamma
1970	24.6	12	.0167	.18021
1976	23.8	12	.0216	.21712

Source: SPSS, CROSSTABS.



Figure 19. Bond Ratings and City Population Size, 1976.

Another statistic reported in Table 11 is the gamma statistic. Gamma is the best measure of association between two variables which are both rank ordered by categories; other measures such as lambda and tau are not as well suited and may provide a "misleading summary" of the association (Mueller, Schuessler, Costner, 1970, 279). Gamma may vary between positive one and negative one. In the table the sign of the gamma statistic is positive indicating a direct correlation between bond ratings and population size, i.e., as city population increases the bond rating also has a tendency to increase. The magnitude of the gamma statistic may be interpreted as the probability of correctly predicting the ordering of a pair of cities on the bond rating variable once the ordering of the cities on the population size variable is known. While the gamma value for the association in 1960 is somewhat weak, a value of .39280 in 1976 indicates a fairly strong association between the two variables. The trend toward a higher gamma over time also indicates that city population size may be a better predictor of bond ratings in the future.

Credit ratings of the nation's ten largest cities in 1976 are graphed for the 1960 to 1980 period in Figure 20. The temporal profiles of these cities indicate that region must be taken into consideration before it can be asserted that the nation's largest cities themselves are evaluated as the best credit risks. While Sanders, as cited previously, mentioned only New York City (Sanders, 1979, 107) as an exception to the foregoing rule, the graphical portrayal in Figure 20 indicates that the list of exceptions comprises more than one city, particularly in the Northeast.

During the 1960s, mega-cities in the South and West improved in the ratings while those located in the Northeast declined (Figure 20). In the North Central region, Detroit, like its Northeastern counterparts,


Figure 20. Temporal Bond Rating Profiles of the Nation's Ten Largest Cities.



Figure 21. Bond Ratings and Metropolitan Population Size, 1976.

dropped in the ratings to a Baa, and Chicago, in keeping with the superior credit evaluations of many other cities in the North Central, improved in the ratings to a Aa. In the Northeast and North Central regions it has been the smaller (e.g., Portland, Maine, and Dubuque, Iowa) and larger medium-sized cities (e.g., Omaha, Nebraska, and Minneapolis, Minnesota) which have been rated Aaa fairly consistently. In the South and West, the largest cities (e.g., Los Angeles, Dallas, Houston) were the first to move into the Aaa rating category. In point of fact, the average size of Aaa cities in the South and West was 666,700 in 1976, while the average size in the Northeast and North Central was only 224,700. Both means fall into the largest population size quintile but a wide gulf separates the city means when divided on a regional basis.

In addition to the size of the central city, the size of the entire metropolitan area is also examined with respect to its relationship with assigned credit ratings. Given the strong correlation between city size and metropolitan size, it is not surprising that the Chi-square test statistic computed from the crosstabulation analyses in 1970 and 1976 indicated a significant relationship between metropolitan population size and bond ratings. Chi-square values, significance levels, and the gamma statistics are listed in Table 12. As evidenced by the graph in Figure 21 and the gamma values in the table, this relationship was not as strong as the one with city population size though the same general trend presented in Figure 19 is still in evidence.

#### Population Growth Rate

The relationship between city finances and population growth rate has been demonstrated by both Peterson (1976) and Muller (1975a and 1975b). Peterson found that among cities with over 500,000 population, per capita

governmental expenditures were more than 70 percent greater in declining cities than in growing cities (Peterson, 1976, 48-50). Muller also assembled data for cities with over 500,000 population and found that per capita outlays for local services averaged 46 percent higher for declining cities when compared with growing cities (Muller, 1975b, 36). No regional dimensions were considered in either study, however. Given these demonstrated correlations between fiscal characteristics and population change, it is reasonable to suspect that declining cities would be assigned lower credit ratings than growing cities, with the caveat that rapid growth deriving from a narrow economic base or such industries as tourism would probably not be perceived as deserving of high quality ratings.

In Sanders' empirical investigation of municipal credit ratings, population change from 1970 to 1975 was found to have only a limited association with 1976 bond ratings (Sanders, 1979, 107). The results of the data set investigated in this study for the most part confirm Sanders' finding that population growth rate of the central city is not a good predictor of bond ratings. As with population size, crosstabulation analysis is used to test the relationship between annual city growth rate (divided into quintiles) and bond ratings for the periods 1960-1970, 1970-1976, and 1960-1976. Significance levels based on the Chi-square statistic were found to be .204, .637, and .957 respectively for the three periods. None of the three are significant at the .01 or even the .05 level, results that are not surprising given the fact that almost all cities, with the exception of some growth centers in the Sunbelt, have entered a period of slow or negative population growth. Between 1970 and 1976, for instance, 47 -percent of all rated central cities experienced an absolute loss in Population and 24 percent more grew by less than 1.5 percent annually.

In general, cities in the various bond rating categories seem to take on the growth character of the region in which they are located. That is, in the Frostbelt, both Aaa and Baa cities are likely to be declining; whereas, in the Sunbelt they are both likely to be growing. In 1976, Aaa cities in the Northeast and North Central regions experienced an annual growth rate of -.66 percent and Aaa cities in the South and West experienced an annual increase of 1.17 percent during the 1970 to 1976 period. Similarly, central cities rated Baa-1 and below were likely to be growing in the South and West, where their average annual growth rate from 1970 to 1976 was 2.12 percent, and declining in the Northeast and North Central at -.81 percent per year during the same period. While these figures mirror the national cleavage in growth rates, they seem to indicate that there is not a simple or direct relationship between bond ratings and city growth.

Metropolitan population growth between 1970 and 1976 was also divided into quintiles and crosstabulated with bond ratings for 1976. No statistically significant relationship appeared; the significance level was .5604. Consequently, an alternative crosstabulation was designed. Only 14 percent of all SMSAs under investigation lost population during the six year period and an equal number grew by more than 18 percent. While the initial corsstabulation analysis using metropolitan growth quintiles failed to reveal any direct positive relationship between metropolitan growth and bond ratings, it was suspected that either negative population growth in the metropolitan area or very rapid population growth may have an impact on bond ratings. The results of the crosstabulation analysis, which was performed using three categories of metropolitan growth and four bond

rating categories for 1976, are listed in Table 13.<sup>4</sup> A Chi-square test yielded an alpha value of .0038 which indicates a highly significant relationship. As expected, both Aaa and Aa cities were underrepresented among both the declining cities and the rapidly growing cities. Similarly, the medium and substandard grade ratings are overrepresented at the extremes of the metropolitan growth continuum. There consequently appears to be a definite reluctance on the part of investment analysts to assign high ratings to cities in either declining or rapidly growing metropolitan areas. Consequently, the regional patterns of slow growth and rapid growth metropolitan areas discussed by Phillips and Brunn (1978) and by Zeigler (1980) may serve as good precursors of regional bond rating patterns.

In 1980 the only two central cities rated at the subinvestment level were New York City and Cleveland, Ohio, both of which experienced negative city growth and negative metropolitan growth during the 1970s. Also in 1980, one-third of all central cities which were declining themselves and which were located in declining metropolitan areas carried a rating of Aaa or Aa. For cities with positive city and positive metropolitan growth trends during the 1970s the figure was not that much higher, only 42 percent.

#### Metropolitan Geopolitical Organization

Metropolitan geopolitical organization refers to the structure imposed on a metropolitan area by the political boundaries which partition

<sup>&</sup>lt;sup>4</sup>In Table 13 expected frequencies are given in parentheses under the observed frequencies. Each cell enclosed in a rectangle is one in which the observed frequency is less than the expected frequency.

## Table 13.

# BOND RATINGS AND METROPOLITAN GROWTH

SMSA Growth,	Bond	Bond Rating Frequencies, 1976 (Expected Frequencies)				
1970-1976	Aaa	Aa	A/A-1	Baa/Baa-1 and Below	Cities	
Zero or Negative Population Growth	1 (4)	16 (17)	23 (22)	7 (5)	47	
Positive Population Growth	24 (19)	98 (88)	105 (112)	16 (23)	243	
Rapid Population Growth	2 (4)	9 (18)	28 (22)	9 (5)	48	
TOTAL	27	123	156	32	338	

Source: SPSS, CROSSTABS.

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the region into an interlocking and overlapping jigsaw of municipal jurisdictions. The central city or cities which anchor a metropolitan area may be bounded by very constricting and inflexible boundaries or they may be granted the power to periodically adjust their corporate limits and annex adjacent territory. The power of annexation permits a central city to take advantage of new growth on the periphery by increasing the size of the city and its financial base. In general, annexation has a positive impact on the financial well-being of a city. A case study of Richmond, Virginia, by Muller and Dawson (1973, 1976), for instance, concluded that "from the perspective of aging central cities, there is little doubt that annexation is fiscally beneficial when viewed over the longer run" (Muller and Dawson, 1976, 80).

During the period from 1970 to 1977, sixty-five central cities annexed more than twenty square kilometers of territory (U.S. Bureau of the Census, 1979a, 18). Sixty-one of those cities were rated by Moody's in 1978 and of those sixty-one, 61 percent carried either a Aaa or a Aa rating; only one was rated below A. Nine gilt edge cities were among the sixty-one; these nine comprised one-third of all Aaa cities in 1978. The overall high rating of the most actively annexing central cities suggests that annexation is one of the geopolitical characteristics of cities which has a potentially favorable impact on the city's financial future. A high credit rating, in turn, may save the city millions of dollars in debt service. As a practical application, such potential savings should be included in any cost-benefit analysis of the annexation process.

One of the major components of metropolitan geopolitical organization is central city dominance as measured by the percentage of the total metropolitan or urbanized area population living in the central city.

Central city dominance during the 1970s is delineated in Table 14. The average percentages of central city dominance are grouped according to four bond rating categories. The most outstanding contrast in the percentage of the SMSA population living in the central city is between the Aaa rated and the Baa/Baa-1 and lower rated cities in 1970 and 1976. In 1970, 37.0 percent of the SMSA population in metropolitan areas with gilt edge central cities lived in the central city whereas only 27.5 percent of the SMSA population in metropolitan areas with Baa/Baa-1 and lower rated cities lived in the central city. The gap separating the most highly rated and the most lowly rated central cities increased from 9.5 to 11.5 percentage points between 1970 and 1976, indicating that cities which dominate their metropolitan areas have been favored in assigning Aaa bond ratings during the period. In addition, by 1976 there had evolved an even more regular relationship between average central city dominance and bond ratings. With each successively higher step up the bond rating scale, the mean proportion of the SMSA population living in the central city increas-This trend suggests that variables measuring central city dominance es. are becoming more closely associated with credit standing. In the future, therefore, it would be reasonable to predict that central cities which cannot dominate their metropolitan areas will be increasingly disadvantaged when compared with cities which can maintain their dominance. By inference, this trend also suggests that central city dominance will have an increasingly stronger impact on city budgets and financial well-being.

An analysis of variance test on the four bond rating groups in Table 14 indicated a significant difference among the 1976 group means at the .002 level. Another similar test on the ratio of central city to urbanized area population in 1970 proved to be significant at the .013 level,

# Table 14.

## CENTRAL CITY DOMINANCE

	Avera	ages by Be	Average of		
Variable (Bond Rating Year)	Aaa	Aa	A/A-1	Baa/Baa-1 and Lower	All Rated Cities (Significance)
Percent of Ur- banized Area Population Liv- ing in the Cen- tral City, 1970 (BR = 1970)	55.9	60.0	55.5	44.7	55.6 (.013)
Percent of SMSA Population Liv- ing in the Cen- tral City, 1970 (BR = 1970	37.0	35.0	36.4	27.5	34.5 (.056)
Percent of SMSA Population Liv- ing in the Cen- tral City, 1976 (BR = 1976)	40,1	35.5	32.8	28.6	34.0 (.002)

Source: SPSS, BREAKDOWN.

while the ratio of central city to SMSA population proved to be significant at the .056 level. An opinion about the tendency to downgrade cities victimized by their political geography, of which a goodly number are in the Northeast, is offered by Packer (1968, 95):

> Geographical boundaries have in recent years tended to isolate those with the greatest need for pubic services and the least ability to pay for them. Apart from the social issues involved, the approach of simply downgrading the bond ratings of large central cities in response to those changes may well be an oversimplification, in view of the pivotal role these cities play in the economies of their metropolitan areas and states.

Another primary component of metropolitan geopolitical organization is the number of local governmental units per 100,000 population in the SMSA. A geopolitical fragmentation index (GFI), discussed in greater detail by Zeigler (1980), has been computed for each of the 264 SMSAs included in the 1972 Census of Governments. In essence, the GFI combines the two major characteristics of metropolitan geopolitical organization, that is, the proportion of the SMSA population living in the central city or cities and the number of local governments (excluding special districts) per 100,000 population. The formula used for the computation of the index is:

GFI = Percent of SMSA population living in the central city

The underlying assumption behind the index is that geopolitical fragmentation is directly proportional to the number of governmental units per 100,000 population in the SMSA and inversely proportional to the percent of the SMSA population living in the central city(s). In essence the importance of the jurisdictional fragmentation ratio in the numerator is discounted as the proportion of the population living in the central city increases.

Scores on the geopolitical fragmentation index were rank ordered and the 264 SMSAs were divided into quintiles. Central cities were assigned the quintile rank of the SMSAs in which they are located. These quintiles were then subjected to crosstabulation analysis with bond ratings for the entire decade of the 1970s. Significance levels from the crosstabulation analyses ranged from .05 in 1975 to .87 in 1980 but even in 1975, the only year when alpha dropped below the .05 level, the gamma value of the association was only .041 indicating an almost nonexistent relationship. In addition, there was no identifiable trend upwards or downwards over the decade from an examination of the crosstabulation matrices, or their associated significance levels or gamma values. Central city dominance alone, the quantity appearing in the denominator of the GFI formula, proved to be a much better predictor of bond ratings than the GFI. Such a finding is understandable given the fact that the second variable introduced into the GFI calculations is descriptive of the metropolitan area as a whole rather than the central cities which are the entities being rated by the credit agencies.

#### Selected Social Characteristics

#### of Central Cities

The social characteristics of central cities may influence the rating process in either or both of two ways. They may be examined directly by analysts and investors or they may affect the financial well-being of the municipality and through that medium indirectly affect credit ratings. One recent investments textbook highlights the direct impact of social characteristics on bond ratings by urging potential investors in the municipal bond market to ask themselves the following questions: "Does the

population contain a substantial percentage of native-born, educated, income-tax paying, propertied citizens?" (Christy and Clendenin, 1978, 509). Indirectly, the financial success of a community and its prospects for the future rest on the ability of its residents to pay the necessary taxes to finance present and future obligations of the local public sector. This ability depends on such social factors as income, employment, and the demand for public services by groups which may not be financially capable of supporting them.

In an attempt to identify the individual social dimensions of variation along which central cities in the various bond rating categories differentiate themselves, group means on variables pertinent to income, employment, education, race and ethnicity, and housing have been examined and compared. The results of this breakdown by four major bond rating categories are displayed in Table 15. An analysis of variance test was performed on each variable in the table to determine the statistical significance of the differences among the group means. Most variables consider the status of a city in 1960 or 1970. More recent Census data are unavailable at the city scale for any of the variables except income.

Many of the differences in means among the bond rating categories in Table 15 proved to be significant at the .05 level; a number were even significant at the .01 level. As might be suspected, per capita income in both 1969 and 1974 exhibited a strong relationship with bond ratings. The highest rated cities were the wealthiest and the lowest rated cities were the poorest, an assertion also confirmed by the differences among the proportion of all families living below poverty level in 1969 for each category. As Hirsch (1971a) has noted, "the presence of so many poor people is a major factor, perhaps the major factor, in the central

### Table 15.

## BOND RATINGS AND SOCIAL CHARACTERISTICS OF CENTRAL

## CITIES: A COMPARISON OF GROUP MEANS

Variable	Aver	ages by E	Sond Ratin	g Category	Average of
(Bond Rating Year)	Aaa	Aa	A/A-1	Baa/Baa-1 and Lower	All Rated Cities (Significance)
INCOME					
Per Capita Income, 1960 (BR = 1960)	\$2034	\$201 <b>9</b>	\$1858	\$2146	\$1972 (.387)
Per Capita Income, 1970 (BR = 1970)	\$3131	\$3166	\$3007	\$2837	\$3044 (.000)
Per Capita Income, 1974 (BR = 1974)	\$4832	\$4569	\$4474	\$4068	\$4476 (.000)
Income Growth, 1959-1969 (BR = 1970)	54.3%	58.2%	59.4%	64.8%	59.4% (.050)
Income Growth, 1969-1974 (BR = 1974)	44.5%	44.9%	48.8%	47.4%	47.0% (.013)
Families Below Poverty Level, 1970 (BR = 1970)	11.3%	9.5%	11.4%	15.2%	11.4% (.000)
EMPLOYMENT					
Unemployment Rate, 1960 BR = 1960)	4.9%	5.1%	5.3%	6.5%	5.4% (.000)
Unemployment Rate, 1970 (BR = 1970)	4.3%	4.8%	4.6%	5.4%	4.8% (.001)

Table 15 (Cont'd).

Variable	Aver	ages by E	ond Ratin	g Category	Average of
(Bond Rating Year)	Aaa	Aa	A/A-1	Baa/Baa-1 and Lower	Cities (Significance)
EDUCATION				<u> </u>	
Median School Years Completed, 1960 (BR = 1960)	10.8	10.9	10.7	10.5	10.8 (.091)
Median School Years Completed, 1970 (BR = 1970)	11.8	11.9	11.8	11.3	11.8 (.001)
RACE AND ETHNICIT	Y				
Black Popula- tion, 1960 (BR = 1960)	8.7%	8.9%	14.0%	18.1%	12.3% (.000)
Black Popula- tion, 1970 (BR = 1970)	10.9%	11.7%	12.7%	16.9%	12.9% (.063)
Foreign Born Pop- ulation, 1960 (BR = 1960)	6.5%	5.7%	5.3%	5.7%	5.7% (.674)
Foreign Stock Population, 1970 (BR = 1970)	1 <b>9.</b> 0%	16.2%	15.6%	19.8%	16.7% (.142)
HOUSING					
Owner Occupied Housing, 1960 (BR = 1960)	53.4%	58,5%	56.6%	55.9%	56.9% (.135)
Owner Occupied Housing, 1970 (BR = 1970)	51.9%	56.8%	57.5%	54.8%	56.5% (.130)

Table 15 (C	ont'd).
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Variable	Avera	ges by Bo	Average of		
(Bond Rating Year)	Aaa	Aa	A/A-1	Baa/Baa-1 and Lower	Cities (Significance)
Change in Housing Stock 1960-1970 (BR = 1970)	7.1%	19.1%	21.9%	33.1%	21.8% (.024)
Housing Units in Pre-1950 Structures, 1970 (BR = 1970)	73.1%	61.3%	55.0%	52.8%	57.8% (.000)

Source: SPSS, BREAKDOWN.

city's fiscal plight."

When income growth between 1959 and 1969 and between 1969 and 1974 were compared, it was found that the lowest rated cities had faster rates of income growth than the highest rated cities. This inverse correlation may, in part, simply be attributable to the fact that in a growing economy, cities with small bases are likely to experience higher average rates of growth over a period of time than are cities with large bases. Projected over time, this trend appears to auger well for the financial future of the poorer cities with rapid rates of income growth. Already in the Sunbelt are many cities, which were rated Baa or below in 1970, that have subsequently moved up and out of the grit edge category.

Employment levels also exhibited the expected relationship with bond ratings, with the highest rated cities in both 1960 and 1970 experiencing the lowest rates of unemployment and the lowest rated cities the highest rates. Educational attainment, on the other hand, as measured by the median number of school years completed by the population 25 years of age and older, failed to exhibit a statistically significant pattern in 1960, but it did in 1970 when cities rated Baa/Baa-1 and lower fell far below the overall mean in median educational attainment. The average figures for the other bond rating categories hovered close to the mean of all rated cities in 1970.

In terms of race and ethnicity, the percent of the population black exhibited a much stronger correlation with bond ratings than did ethnicity as measured by percent of the population foreign born or of foreign stock. In both 1960 and 1970, those cities which had a higher proportion of black residents were not rated as high as those cities whose populations were more predominantly white.

The housing variables exhibited the most surprising relationship with bond ratings. It was expected that the proportion of all occupied housing units which were owner occupied would be highest in cities with Aaa ratings and lowest in cities at the opposite end of the rating continuum. While the differences among means of the four rating groups was not statistically significant, it is nevertheless surprising that in both 1960 and 1970, the Aaa cities had the lowest percentage of housing units owner occupied. It is not surprising, however, that in both years the Baa-1 and lower rated cities also ranked below the mean of all rated cities.

The other two remaining housing variables measured the growth and age of the housing stock. In both cases the differences among group means were statistically significant. As for change in housing stock, it was the lowest rated cities which experienced the most change and highest rated cities which experienced the least. This finding suggests a preference for stability among the credit analysts. Closely associated with housing growth was the percentage of housing units in structures built prior to 1950. The Aaa cities had the oldest housing stock and the Baa/ Baa-1 and lower rated cities the youngest. A possible explanation for this pattern is provided by Sanders (1979, 107) who notes that "young cities need vast sums for new streets, sewers, and basic infrastructure. Their needs may exceed their fiscal ability and their governmental competence."

In summarizing the association of selected social variables with central city bond ratings, central cities with high credit ratings as of 1970 had high per capita incomes, comparatively low rates of income growth, fewer than an average number of families below poverty level, low

unemployment, relatively high median educational attainment, relatively low percentages of the population black, and relatively slow rates of growth in housing stock. Characteristics of cities with lower credit ratings were, on the whole, just the opposite. In light of these findings, it is not surprising that the multivariate per capita needs index and the quality of life indices to be discussed next exhibit strong correlations with bond ratings.

### The Per Capita Needs Index

Developed in the U.S. Department of Housing and Urban Development (1976) by Harold Bunce as a tool for evaluating the distribution of Community Development Block Grant funds, the Per Capita Needs Index (PCNI) comprises a vector of attributes related to poverty, urban blight, and neighborhood instability at the city scale. Thirteen variables were factor analyzed and five factors were derived, weighted, and consolidated into the final standardized index value. The specific variables used in the formulation of the index and the dimensions of variation which evolved from the factor analysis are enumerated in Table 16. Four-hundredthirty-five "entitlement cities" were rank-ordered on the basis of the PCNI. To test the proposition that there is a direct correlation between city need and general obligation bond ratings, the central cities of SMSAs were extracted from the list of 431 cities and divided into quintiles. Crosstabulation analysis was used to test the significance and magnitude of the correlation between urban need and bond ratings. While most of the variables used to compute the PCNI were derived from the 1970 Census, city scores on the index were compared to their bond ratings for each year between 1970 and 1980. The assumption is that the 1970 Census statistics continued to influence the decisions of rating analysts well into

### Table 16.

## COMPONENTS OF THE PER CAPITA NEEDS INDEX

Variables Subjected to Factor Analysis	Factors Defined and Weighted	
Persons Aged 65 and Over	Poverty (.35)	
Crime Rate	Age of Housing Stock (.25)	
Nonwhite Population	Density (.20)	
Persons Over 25 with Less than a High School Education	Crime and Unemployment (.10)	
Female Headed Families Below the Poverty Level	(.10)	
Poor Persons Under 18		
Persons Below Poverty Level		
Housing Units Lacking One or More Plumbing Facilities		
Occupied Housing Units With More Than 1.01 Persons per Room		
Unemployed Persons		
Housing Units Built Before 1939		
Persons Per Square Mile		
Owner-Occupied Houses		

Source: Department of Housing and Urban Development, <u>An Evaluation</u> of the Community Development Block Grant Formula by Harold Bunce, 1976, pp. 49-51.

the 1970s.

The results of the crosstabulation analysis are summarized in Table 17. Between 1970 and 1980 the association between bond ratings and the PCNI became increasingly significant statistically. In 1970 the significance level was only .0726 but by 1980 it had risen to .0000 meaning that the association portrayed in the crosstabulation matrix could be expected to occur by chance fewer than one in ten thousand times. This finding supports the hypothesis that variables related to city need are influential in assigning bond ratings to central cities.

The gamma statistics in Table 17 also reveal a steadily increasing degree of association between bond ratings and city need over the tenyear period. Without exception, the magnitude of gamma increases with each succeeding year of the decade. In 1980, a gamma value of .31475 indicates a fairly strong degree of association. The negative sign, present throughout the decade, indicates a negative correlation, that is, cities in the low category of need have higher bond ratings than cities in the higher category of need. Changes in the matrices from year to year are the result of cities being either upgraded or downgraded in their bond ratings. The trend in correlation over the course of the decade, therefore, indicates the downgrading of needy cities and the upgrading of the least needy.

The relationship between bond ratings and the PCNI in 1980 is graphically displayed in Figure 22. The inverse correlation between the two variables is remarkably consistent through the fourth quintile of city need. That is, as city need measured on the PCNI decreases, the proportion of Aaa and Aa cities increases and the proportion of Baa/Baa-1 and lower rated cities decreases and eventually disappears. In the fifth

# Table 17.

# CROSSTABULATION ANALYSIS OF BOND RATINGS AND THE

Raw Chi-square	Degrees of Freedom	Signif- icance	Gamma
24.8	16	.0726	03817
26.5	16	.0472	05667
30.7	16	.0148	08196
28.2	16	.0296	13427
35.7	16	.0032	14628
34.5	16	.0046	18517
35.8	16	.0031	22268
41.3	16	.0005	22722
39.5	16	.0009	25732
54.5	16	.0000	29949
58.2	16	.0000	31475
	Raw Chi-square 24.8 26.5 30.7 28.2 35.7 34.5 35.8 41.3 39.5 54.5 58.2	Raw Chi-squareDegrees of Freedom24.81626.51630.71628.21635.71634.51635.81641.31639.51654.51658.216	Raw Chi-squareDegrees of FreedomSignif- icance24.816.072626.516.047230.716.014828.216.029635.716.003234.516.003141.316.000539.516.000954.516.000058.216.0000

# PER CAPITA NEEDS INDEX, 1970-1980

Source: SPSS, CROSSTABS.



Figure 22. Bond Ratings and the Per Capita Needs Index, 1980.

quintile of city need, i.e., the least needy cities, ratings are almost evenly divided between high grade and medium grade. This almost normal distribution of bond ratings suggests that other characteristics of the city must militate against the assignment of higher bond ratings which one would suspect given the trend in bond ratings in the first four quintiles. The explanation for the fewer than expected Aaa and Aa ratings is that the least needy central cities are often the secondary central cities of SMSAs; they are both high income enclaves and smaller in population size. The previously demonstrated relationship between city population size and bond ratings would therefore work against high credit evaluations of smaller cities. In support of this explanation, a close examination of the data reveals that the average size of cities in the fifth quintile ofcity need in 1970 was only 90,100 while the average size of cities in the first four quintiles was 230,500. The average population size of cities in the fifth quintile of need in both 1970 and 1976 was the lowest of all quintiles.

These inverse correlations with city need support the conclusion arrived at by Sullivan (1976) who found that "high credit ratings tend to be assigned to bond issues of relatively wealthy cities while lower ratings tend to be assigned to the bond issues of the neediest communities" especially as measured by per capita income, percentage of families below poverty level, and employment rate (Sullivan, 1976, 43-45). Low credit ratings, as they affect interest rates, were compared by Sullivan to ad valorem taxes, and high credit ratings were compared to matching grants administered by the major bond rating agencies. In essence, the flow of private funds works against the flow of public funds into the nation's neediest cities. Intergovernmental transfer payments simply compensate

the neediest cities for losses to the private sector resulting from an inequitable market in municipal securities. This finding suggests the need for public attention on the part of policy-makers at the state and federal levels of government.

### Selected Quality of Life Indices

The measurement of inter-state and inter-metropolitan variations in social well-being has been the objective of several quality of life indices constructed during the late 1960s and the 1970s. At the state scale, three major studies of quality of life have been done by Wilson (1969), Smith (1973), and Liu (1973). Wilson's study was decidedly goaloriented and the eighty variables which were consolidated into the final index were chosen to illustrate state achievement in nine domestic goal areas: individual status, individual equality, state and local government, education, economic growth, technological change, agriculture, living conditions, and health and welfare (Wilson, 1969, 6-7). The state study of social well-being carried out by Smith, a geographer, included forty-seven variables grouped into six categories: income; wealth and employment; housing; health; education; social disorganization (personal pathologies, family breakdown, crime); and alienation and participation (voting, criminal justice, racial segregation) (Smith, 1973, 82-83). Most of Smith's variables were based on data published during the late 1960s. Liu's study of quality of life at the state scale was conceptually patterned after Wilson's. His nine categories of quality of life indicators were individual status, individual equality, living conditions, economic status, technological development, and state-local government (Liu, 1973, 1).

To test the hypothesis that states with high standing on quality of

life indices are more likely to have their central cities assigned higher bond ratings and vice versa, all states were rank ordered on each of the above quality of life indices and divided into quintiles. Rated central cities were then assigned to quintiles according to the state where they were located. These quintiles were then crosstabulated with bond rating categories as the composition of those categories changed between 1968 and 1980. The results of these analyses are presented in Table 18.

Between 1968 and 1980, Chi-square tests revealed a statistically significant association between central city bond ratings and all three quality of life indices at the state scale. The consistently positive sign of the gamma statistic indicates that improvements in social wellbeing as measured by the three indices are positively correlated with improvements in bond ratings. The only index which revealed a fairly strong degree of correlation between the two, however, was Smith's which evidenced a gamma value of .47578 in 1968 with four bond rating categories and .39326 in 1970 with five categories. In 1970, ten of the seventeen gilt edge cities were located in states ranked in the top quintile of social well-being (Utah, Minnesota, Iowa, Wisconsin, New York, Connecticut), and twenty-one of the forty-three grit edge cities were located in states ranked in the lowest quintile of social well-being (Texas, Louisiana, Arkansas, Mississippi, Alabama, North Carolina). Since Smith's variables were all descriptive of conditions during the 1960s it is not surprising that the maximum degree of association was in 1968, with steadily decreasing probabilities in succeeding years. Smith's study drew on only forty-seven selected variables judged to be central to measuring social well-being. His indicators are more strictly social than either Wilson's or Liu's in that they tend to be descriptive of the population

## Table 18.

# CROSSTABULATION ANALYSES OF BOND RATINGS AND STATE

# QUALITY OF LIFE INDICES

Year	Raw Chi-square	Degrees of Freedom	Signif- icance	Gamma
WILSON'S	QUALITY OF LIFE	INDEX, 1969	<u></u>	
1968	36 3	12	0003	34829
1970	37 0	16	0021	27358
1972	30 /	16	0161	2/350
107/	10.4 12 7	16	.0101	.241/2
1076	46 4	16	0001	22018
1078	40.4	16	.0001	16072
1090	41.2	10	.0005	.10772
1900	40.0	10	.0000	,101/4
SMITH'S Q	UALITY OF LIFE I	NDEX, 1973		
1968	69.2	12	.0000	.47578
<b>19</b> 70	71.4	16	.0000	<b>.39</b> 326
1972	64.5	16	.0000	.38176
1974	64.2	16	.0000	.36876
1976	73.6	16	.0000	.35947
1978	61.0	16	.0000	.28097
1980	57.4	16	.0000	.24363
LIU'S QUA	LITY OF LIFE IND	EX, 1973		
1968	33.7	12	.0008	.24582
1970	40.0	16	.0008	.18174
1972	48.4	16	.0000	.15603
1974	48.3	16	.0000	.14221
1976	57.4	16	.0000	.13162
1978	47.3	16	.0001	.06040
1080	45 1	16	0001	04010

Source: SPSS, CROSSTABS.

rather than the states themselves. Wilson's study, on the other hand, incorporated almost eighty variables and Liu's over 200. The lower predictive power of the Wilson and Liu models is understandable in that their indices included many variables not relevant to credit evaluation. In fact, Liu's study, which incorporated the most variables, fared the worst in predictive power with a maximum gamma value of only .18174 for the 1970s.

At the metropolitan scale, the most comprehensive study of quality of life was done by Liu (1975, 1976). He combined over 100 indicators pertinent to economic, political, environmental, health, education, and social well-being into a single standardized index value for 243 SMSAs. Within each of the three metropolitan size classes (large, medium, and small), SMSAs were ranked along a continuum and divided into five quality of life categories: outstanding, excellent, good, adequate, and substandard. Outstanding and substandard SMSAs were those which ranked one standard deviation or more from the mean, while excellent and adequate SMSAs were those which ranked between .28 and one standard deviation from the mean. SMSAs whose scores on the overall quality of life index hovered near the mean were rated as good.

To perform the crosstabulation analysis with municipal bond ratings, central cities were assigned to the quality of life category of the SMSA in which they are located. Forty-eight central cities could be assigned no rank because their SMSAs were not included in Liu's study. The crosstabulation matrix had five quality of life categories (outstanding to substandard) along one axis and five bond rating categories (Aaa through Baa/Baa-1 and lower) along the other. The Chi-square statistic computed for each year of the 1970 to 1980 period indicated a very highly

significant association between the two variables (Table 19). The gamma values revealed a high degree of association throughout the period but especially between 1970 and 1975. After 1975, the predictive power of Liu's quality of life index decreased to a value of .40995 in 1980 even though the relationship remained significant at the .001 level. The average gamma value for the decade was .43. The consistently positive sign of the gamma statistic indicates that as the quality of life in a metropolitan area increases so does the bond rating of the central city.

In addition to examining the overall quality of life ranking of cities on Liu's index, crosstabulation analysis was performed on five subcomponents of the overall index. These components, economic, political, environmental, health and education, and social, and their relationship to bond ratings in 1970, 1975, and 1980 is displayed in Table 20. Of the five, the social component proved to exhibit the highest level of statistical significance and the most consistently high degree of association with bond ratings during the 1970s. The social component comprised a series of indicators measuring individual concerns, individual equality, and community living conditions. The highest gamma value in the entire analysis of the subcomponents of the overall quality of life index was for the political component in 1970; it was .38725. The political component represents attributes related to the professionalism and performance of the local governments, and individual activities such as voter participation. Ironically, the economic component ranked behind both the political and the social components in predictive power in 1970 and at no time during the decade did a crosstabulation analysis reveal a significance level for the economic component as high as for the social component. This result is somewhat surprising in light of the accepted

# Table 19.

# CROSSTABULATION ANALYSIS OF BOND RATINGS AND LIU'S

Year	Raw Chi-square	Degrees of Freedom	Signif- icance	Gamma
1970	69.5	16	.0000	,43211
1971	72.0	16	.0000	.44600
1972	70.4	16	.0000	.43170
1973	79.0	16	.0000	.43526
1974	77,6	16	.0000	.42801
1975	73.2	16	.0000	.45537
1976	68.8	16	.0000	.43743
1977	68.1	16	.0000	.41679
1978	70.9	16	.0000	.41853
1979	65.0	16	.0000	.41408
<b>198</b> 0	67.8	16	.0000	.40995

# METROPOLITAN QUALITY OF LIFE INDEX

Source: SPSS, CROSSTABS.

## Table 20.

# CROSSTABULATION ANALYSIS OF BOND RATINGS AND

# SUBCOMPONENTS OF LIU'S METROPOLITAN

### QUALITY OF LIFE INDEX

Year	Raw Chi-square	Degrees of Freedom	Signif- icance	Gamma
ECONOMIC C	COMPONENT S			
1970	31.4	16	.0120	.29774
1975	39.7	16	.0009	.34214
1980	35.5	16	.0034	.31645
POLITICAL	COMPONENT S			
1970	64.3	16	.0000	.38725
1975	33.9	16	.0057	.29136
1980	36.8	16	.0023	.16959
ENVIRONMEN	TAL COMPONENTS			
1970	23.1	16	.1109	.13868
1975	17.6	16	.3450	.17615
1980	15.6	16	.4828	.16042
HEALTH AND	EDUCATION COMP	ONENTS		
1970	32.4	16	.0089	.21646
1975	40.3	16	.0007	.28801
1980	39.5	16	.0009	.30128
SOCIAL COM	PONENTS			
1970	48.0	16	.0000	. 33524
1975	55.4	16	.0000	. 32797
1980	51.1	16	.0000	.36002

Source; SPSS, CROSSTABS.

close association between the economic characteristics of cities and credit standing.

One additional metropolitan quality of life index was examined to confirm, once again, the relationship between bond ratings and social wellbeing. This index was devised by the author in 1976 (Zeigler, 1976) and appeared about the same time as Liu's metropolitan quality of life index (Liu, 1976). The Zeigler index comprises thirty-eight variables related to education, income, housing, health, and general welfare; it was computed for 100 randomly selected SMSAs in the United States. To perform the crosstabulation analysis with bond ratings, metropolitan areas were divided into quintiles and central cities were assigned the rank of the quintile in which their metropolitan areas were located. Bond rating categories were reduced to four (A and A-1 were combined) to compensate for the reduced number of central cities entering the analysis, only 122 cities. The significance levels and gamma values for the years of the 1970 to 1980 period are listed in Table 21. Chi-square tests indicated a statistically significant association during the first eight years of the decade. The predictive power of the index over bond ratings peaked in 1973 at .47293. After 1976 the value of gamma, and hence the strength of the association, declined rapidly; until 1976 gamma values were very similar to those from the Liu crosstabulation. Even with the fewer number of variables as compared to the overall Liu index, the average gamma value for the decade was .40.

#### Summary

The preceding examination of selected demographic, geopolitical, and social variables has identified some of the salient dimensions along

# Table 21.

# CROSSTABULATION ANALYSIS OF BOND RATINGS AND

# ZEIGLER'S QUALITY OF LIFE INDEX

Year	Raw Chi-square	Degrees of Freedom	Signif- icance	Gamma
1970	21.8	12	.0394	.39341
1971	24.4	12	.0181	.41638
1972	26.3	12	.0096	.45691
1973	26.1	12	.0103	.47293
1974	29.0	12	.0040	.45656
1975	28.1	12	.0053	.45986
1976	29.0	12	.0041	.46372
1977	24.1	12	.0200	.40082
1978	20.1	12	.0650	.33262
1979	19.0	12	.0881	. 29399
1980	15.6	12	.2121	.28299

Source: SPSS, CROSSTABS.

which central cities in Moody's bond ratings categories may be differentiated. A summary of variables and their strength of relationship with assigned credit ratings during the 1970s is provided in Table 22. It can be seen that only a few variables exhibited no statistically significant relationship with creditworthiness, specifically city population growth rate, the geopolitical fragmentation index, foreign born population, and owner-occupied housing. Among the demographic variables, the one most highly correlated with bond ratings was city population size, a variable whose strength of relationship seems to be increasing. Among the geopolitical variables, central city dominance and annexation activity, a dichotomous variable, both proved to have a high degree of association with credit ratings. Of the dominance variables examined, the proportion of the SMSA population living in the central city was the most significant. Among the social variables, per capita income, unemployment rate, black population, change in housing stock, and housing units in pre-1950 structures were the most highly associated with the ratings.

In addition to these univariate dimensions, several multivariate social indices were also tested and found to be significantly associated with municipal bond ratings. The Per Capita Needs Index not only exhibited a statistically significant relationship with bond ratings but also manifested an increasing correlation over the decade of the 1970s, illustrating the tendency of the rating agencies to discriminate against the neediest cities. Of the state quality of life indices, the one which best correlated with bond ratings was Smith's, the one which was restricted to carefully selected components of social well-being as compared to the all-encompassing indices of Wilson and Liu. As might have been expected, the quality of life indices computed at the metropolitan scale

# Table 22.

## SUMMARY OF VARIABLES ASSOCIATED WITH

### BOND RATINGS DURING THE 1970s

Variable	High Degree of Association	Moderate Degree of Association	No Significant Degree of Association
DEMOGRAPHIC VARIABLES			
City Population Size	x		
Metropolitan Population Size		x	
City Population Growth			x
Metropolitan Population Growth Rate	x <sup>1</sup>		**
GEOPOLITICAL VARIABLES			
Annexation Activity	x		
Central City Dominance Geopolitical Fragmen- tation Index	x		x
SOCIAL VARIABLES			
Per Capita Income	х		
Income Growth Families Below Poverty		X	
Level		Х	
Unemployment Rate Median Educational	X		
Attainment		Х	
Black Population	X		
Foreign Born Population			X X
Change in Housing Stock Housing Units in pre-1950	X		
Structures	Х		
Per Capita Needs Index	X		

<sup>1</sup>Slow and rapid growth SMSAs only.

proved to be even more closely associated with the ratings than the indices computed for states. Liu's overall metropolitan quality of life index exhibited an average gamma value of .43 with bond ratings during the 1970s; Zeiglers's index averaged a gamma value of .40. Of Liu's subcomponent indices of quality of life, his social index averaged a higher gamma value than any of his other aggregate subcomponents (economic, political, environmental, health and education). One of the conclusions which may be drawn from a comparison of all of the above quality of life indices is that indices which are more strictly confined to social variables (i.e., variables which characterize the well-being of people) are more closely associated with bond ratings. This may be seen in the superior performance of Smith's state level quality of life index and in the edge which Liu's social components in his metropolitan quality of life index had over his other components, even the economic ones. Indicators of social well-being seem to be important correlates of municipal bond ratings.

In the chapter which follows, the individual demographic, geopolitical, and social variables discussed in the first part of this chapter are entered into stepwise regression and discriminant models in order to determine how successfully the non-financial character of cities may be used to predict Moody's municipal bond ratings in 1974 and 1980.
### CHAPTER VI

# GEOGRAPHIC PREDICTORS OF MUNICIPAL CREDIT RATINGS: REGRESSION AND DISCRIMINANT ANALYSES

To determine how effectively the social, demographic, and geopolitical characteristics of cities may be used to predict the credit ratings assigned by Moody's Investors Service to central cities during the 1970-1980 decade, multiple regression and multiple discriminant analyses have been carried out on the nationwide set of central cities under investigation. Regional variables were introduced into each analysis in either of two ways: First, by including dummy variables to represent regional dichotomies; and second, by running separate analyses for each of the four Census regions.

Multiple regression analysis derives an equation which may be used to predict the value of a dependent variable based on a set of interacting independent variables. A stepwise procedure has been selected for use in the regression analyses so that separate predictor variables are entered into the equation step by step according to the order by which they contribute to the explanatory power of the equation. Multiple discriminant analysis, on the other hand, derives an equation which may be used to predict the group membership, i.e., bond rating, of a particular central city given a set of discriminating variables which are expected

to differ among predetermined rating groups. A stepwise procedure has also been used in the discriminant analyses; that is, independent variables are selected for inclusion in the discriminant equation on the basis of their discriminating power.

The research hypothesis tested in the regression procedure is that the bond rating of a city depends on a set of given and predictable social, demographic, and geopolitical characteristics of the city. The research hypothesis tested in the discriminant procedure is that the probability distribution of the predictor variables differs for each of the bond rating groups and that those variables can accurately discriminate between groups. The intuitive appeal of the regression hypothesis and its close alignment with the overall working hypothesis of this research is clouded only by the necessity to assume that the dependent variable, bond ratings, is measured on an interval scale or higher. While this assumption has been made in previous research on municipal bond ratings (Bahl, 1971), the problem of actually measuring the relative "distances" between rating categories remains to be solved. Since no technique for measuring these gaps has been developed thus far, the only alternative in employing the regression is to assume that they are equal. The discriminant model, on the other hand, makes no assumption about the level of measurement of bond ratings. It assumes instead that groups are but discrete assemblies of identically rated cities.

The same predictor variables were employed in both the regression and the discriminant analyses. In general, this set of variables comprises the continuous social, demographic, and geopolitical variables discussed in the previous chapter. It does not include any of the multidimensional need or quality of life indices. The variables from which

the prediction equations have been derived in each regression and discriminant analysis are presented in Table 23. In general, the same variables have been used in each analysis with only one exception, annexation activ-In the regression exercise the annexation variable was introduced ity. as a dummy variable by assigning all cities which annexed twenty or more square miles of territory between 1970 and 1977 a value of one and all other cities a value of zero. Similarly, for comparative purposes, regional variables were transformed into dummy variables to distinguish between cities in the Sunbelt and Frostbelt and to distinguish between cities in each of the four Census regions. The only other variables transformed involved substituting the natural logarithm of population size for actual population size. For comparative purposes, as well, the natural logarithms of debt per capita and revenue per capita were substituted for the original value since preliminary testing indicated a logarithmic transformation better approximated a linear relationship, an assumption of both the regression and discriminant models.

### A Multiple Regression Analysis of

#### Municipal Bond Ratings

The stepwise procedure used to construct the regression model was managed so that at each step in the regression procedure the variable with the highest partial correlation coefficient was introduced into the equation. The procedure was stopped when the statistical significance of the F ratio exceeded .05. In most cases, this constraint limited the number of variables in the prediction equation to between six and nine. Bond ratings for the years 1974 and 1980 were the focus of the nationwide regression analyses. For each year an equation was constructed both with and without regional variables.

### Table 23.

## PREDICTOR VARIABLES USED IN REGRESSION

### AND DISCRIMINANT ANALYSES

Variable	1974	1980
DEMOGRAPHIC VARIABLES		
City Population, 1970 (log)	X	
City Population, 1976 (log)		X
City Population Growth Rate, 1960-1970	X	v
Metropolitan Population 1970 (log)	x	Χ
Metropolitan Population, 1976 (log)		х
Metropolitan Population Growth Rate, 1970-1976		X
GEOPOLITICAL VARIABLES		
Central City to Urbanized Area Population, 1970 (ratio)	x	
Central City to SMSA Population, 1970 (ratio)	Х	
Central City to SMSA Population, 1976 (ratio)		X
Annexation Activity, 1970-1977 (Regression only)		X
SOCIAL VARIABLES		
Per Capita Income, 1974	х	Х
Per Capita Income Growth, 1969-1974	X	х
Families Below the Poverty Level, 1969	X	X
Unemployment Rate, 1970	X	X
Difference in Unemployment Rate, 1960-1970	X	X
Professional and Managerial Population, 1970	X	X
Median Educational Attainment, 1970	X	X
Difference in Median Educational Attainment, 1960-19/0	X	X
Black Population, 19/0	X	X
Difference in Black Population, 1960–1970	X	X
Foreign Stock Population, 1970	X	X
Owner Occupied Housing, 1970	X V	X
Difference in Owner Occupied Housing, 1960-1970	A V	A V
Change in Housing Stock, 1960-1970 Housing Units in Pre-1950 Structures 1970	X X	X X
nousing onits in Tre-1990 Structures, 1970	А	A
REGIONAL VARIABLES (Regression Only)		
Northeast (dichotomous)	х	X
North Central (dichotomous)	X	x
South (dichotomous)	X	X
West (dichotomous)	X	X

The results of the nationwide analyses for 1974 and 1980 are presented in Tables 24 and 25. The cross-section of social, demographic, and geopolitical variables selected for this analysis was able to explain only slightly more than one-third of the variation in bond ratings in 1974 and about 41 percent in 1980. The variables listed in each table are those which contributed a statistically significant amount to the explanatory power of the regression equation. In 1974, the most important variables were related to income, employment, housing age, central city dominance, and city population. In 1980, they were related to income, employment, racial-ethnic composition, city population, annexation activity, and housing occupancy status. The shift to different variables in 1980 and the improved predictive power of the 1980 equation highlights the increasing importance of social variables over the decade of the 1970s. In particular, racial-ethnic characteristics of cities exercised a greater influence on credit ratings, and financial well-being, in 1980 than in 1974. Since the annexation activity variable covered the years from 1970 to 1977, it is not surprising that it did not enter the regression equation in 1974. In 1980, however, annexation activity was selected as one of the most important variables in the determination of bond ratings.

As a basis for comparison, five financial ratios (percent of debt nonguaranteed, percent of revenues from own sources, log of debt per capita, log of revenue per capita, and ratio of debt to revenue) were used in a separate regression model and were able to explain only 1.5 percent of the variation in credit ratings among central cities. When per capita income was added to the financial equation, the adjusted  $R^2$ value was increased to only 10.0 percent. Given the theoretical

	R <sup>2</sup>	Adjusted R <sup>2</sup>	Signif- icance	Variables in the Equation	Change in R <sup>2</sup>
Regression Without Regional Variables	. 355	. 337	000.	Per Capita Income, 1974 Difference in Unemployment Rate, 1960-1970 Unemployment Rate, 1970 Housing Units in pre-1950 Structures, 1970 Central City to Urbanized Area Population, 1970 Income Growth, 1969-1974 Log of City Population, 1970	.10914 .06239 .06354 .03423 .03423 .03428 .02528
Regression With Regional Variables	.397	.375	000.	Per Capita Income, 1974 Difference in Unemployment Rate, 1960-1970 Unemployment Rate, 1970 South Central City to Urbanized Area Population, 1970 Log of City Population, 1970 Los in pre-1950 Structures, 1970 Northeast Central City to SMSA Population, 1970	.10914 .06354 .05486 .03553 .02082 .02088 .01361

RESULTS OF THE NATIONWIDE REGRESSION ANALYSES, 1974

Table 24.

Source: SPSS, REGRESSION.

	R <sup>2</sup>	Adjugted R <sup>2</sup>	Signif- icance	Variables in the Equation	Change in R <sup>2</sup>
Regression Without Regional Variables	411	. 393	000	Per Capita Income, 1974 Difference in Unemployment Rate, 1960-1970 Foreign Stock Population, 1970 Black Population, 1970 Log of City Population, 1976 Unemployment Rate, 1970 Annexation Activity, 1970-1977 Owner Occupied Housing, 1970	.19394 .07263 .04579 .03418 .02732 .02276 .01001
Regression With Regional Variables	.435	.416	000.	Per Capita Income, 1974 Northeast Difference in Unemployment Rate, 1960-1970 Unemployment Rate, 1970 Black Population, 1970 Annexation Activity, 1970-1977 Housing Units in pre-1950 Structures, 1970 Log of City Population, 1976	.19394 .08720 .04335 .04457 .02979 .01410 .01279

RESULTS OF THE NATIONWIDE REGRESSION ANALYSES, 1980

Table 25.

Source: SPSS, REGRESSION.

constructs which closely relate financial ratios to creditworthiness, it is surprising that such a small proportion of total variation in central city credit ratings can be accounted for by these factors. The social variables selected by the stepwise regression model were able to explain much more of the variation. This contrast suggests two possible conclusions. First, the theoretical relationships between financial ratios and bond ratings do not reflect the reality of the relationships. Second, social variables, that is, variables descriptive of the people and their living environment, need to be incorporated into models which propose to define the dimensions of creditworthiness and to predict credit ratings.

When a regional variable was added to the original regression equations for 1974 and 1980, explained variation as measured by the adjusted  $R^2$  increased by only 3.8 and 2.3 percentage points, respectively. The most powerful regional variables introduced into the equation were location in the Northeast and location in the South. In 1974 the South was the most important regional variable, whereas in 1980 it was the Northeast. This reversal illustrates the increasing diversity of ratings in the Southern states where central cities are being upgraded in their credit standing, and the increasing homogeneity of bond ratings in the Northeastern states where cities are being downgraded, in part, because they are less diverse than those in the South.

The relatively unsuccessful results of the nationwide classification exercise are presented in Tables 26 and 27. Expected bond ratings were computed by employing the variables and their partial regression coefficients presented in the previous tables. In 1974, the regression equation was able to predict correctly fewer than one-third of the central city bond ratings. The results for 1980 are somewhat better, but the

Actual Bond	(Regre	Exp. ssion V	ected Bor Without F	nd Rati Regiona	lngs ıl Variab	les)	(Regr	Expe ession	ected Bon With Reg	nd Rat: ;ional	ings Variable	(Si
Katings	Ааа	Аа	A-1	A	Baa-1	Baa	Ааа	Аа	A-1	A	Baa-1	Baa
Ааа	2	17	2	0	0	0	2	15	4	0	0	0
Aa	0	32	55	10	0	0	Ŋ	32	54	7	0	0
A-1	0	12	25	12	0	0	0	10	23	16	0	0
Α	Ч	ę	41	16	1	0	0	ŝ	32	24	7	0
Baa-1	0	0	9	1	0	0	0	0	4	ŝ	0	0
Baa	0	0	4	11	9	2	0	0	4	6	æ	2
	Correc	tly Pro	Total: edicted:	260 77 (	29.6 per	cent)	Correc	tly Pre:	Total: dicted:	260 83	(31.9 per	cent)

Source: Compiled by Author.

CLASSIFICATION RESULTS OF THE NATIONWIDE REGRESSION ANALYSES, 1974

Table 26.

Actual 3ond	(Regre	Exp. ssion 1	ected Bor Without F	nd Rat ≷egion	ings al Variab	les)	(Reg	Expe	ected Bor 1 With Re	nd Rat egiona	ings 1 Variabl	es)
Karıngs	Aaa	Aa	A-1	A	Baa-1	Baa	Aaa	Aa	A-1	Α	Baa-1	Baa
laa	- m	16	- L	0	0	0	t -	19	2	-	0	0
la	n	47	44	7	2	0	Q	42	45	10	0	0
1-1	ο	13	36	20	1	1	0	13	38	18	Ч	1
~	0	4	23	17	£	0	0	4	29	16	4	0
3aa-1	0	1	4	6	2	1	0	1	2	æ	9	0
3aa	0	1	e	14	9	2	0	0	4	12	6	ы
	Correc	tly Pre	Total: edicted:	296 107	(36.1 per	cent)	Correc	tly Pre	Total:	296 107	(36.1 per	cent)

CLASSIFICATION RESULTS OF THE NATIONWIDE REGRESSION ANALYSES, 1980

Table 27.

inclusion of regional variables did not improve the predictive accuracy of the 1980 equation. The proportion of cities correctly predicted by each equation was 36.1 percent. In 1974 the modal category provided a better estimate of bond ratings than either regression equation. In 1980, however, the predictive power of the modal category declined to 34.6 percent (from 37.8 percent in 1974) and the predictive power of the regression equations rose to 36.1 percent. The improved power of the 1980 regression equations suggests the emergence of more regular variation across social, demographic, and geopolitical characteristics of cities.

Separate regression equations were computed for each of the four Census regions using the same set of social, demographic, and geopolitical variables employed in the nationwide analysis. The results of these analyses are presented in Table 28. For the purposes of comparison, the number of variables allowed to enter the equations was limited to four and the equations calculated were used to predict bond ratings for the same two years, 1974 and 1980. Different factors emerged as the best predictors of bond ratings in each of the four Census regions. In the Northeast, unemployment variables, central city dominance, housing variables, and metropolitan population size and per capita income were the most important predictors. In the North Central there was a greater tendency for city population size and racial-ethnic variables to assume an important role. In the South and West, population size also emerged as a significant variable in both years. In the West alone the percentage of the population engaged in professional and managerial occupations and annexation activity surfaced as important predictors of bond ratings. The different factors which emerged for the different regions suggest either

Region	Year	R <sup>2</sup>	Variables in the Equation	Change in R <sup>2</sup>	Percent of Cities Correctly Classified
Northeast	1974	.302	Unemployment Rate, 1970 Difference in Unemployment Rate, 1960-1970 Central City to Urbanized Area Population, 1970 Difference in Owner Occupied Housing, 1960-1970	.14423 .04399 .04963 .06438	23.0
	1980	.310	Per Capita Income, 1974 Log of metropolitan population, 1976 Unemployment Rate, 1970 Difference in Unemployment Rate, 1960-1970	.10845 .12129 .03664 .04367	38.2
North Central	1974	.320	Difference in Black Population, 1960-1970 Log of City Population, 1970 Difference in Unemployment Rate, 1960-1970 Foreign Stock Population, 1970	.13225 .06481 .07126 .05120	41.4
	1980	.394	Families Below Poverty Level, 1969 Foreign Stock Population, 1970 Per Capita Income, 1974 Difference in Black Population, 1960-1970	.28888 .05244 .03242 .02006	52.3

Table 28.

RESULTS OF THE REGIONAL REGRESSION ANALYSES, 1974 and 1980

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Region	Year	R <sup>2</sup>	Variables in the Equation	Change in R <sup>2</sup>	Percent of Cities Correctly Classified
South	1974	.588	Unemployment Rate, 1970 Log of City Population, 1970 Difference in Unemployment Rate, 1960-1970 Housing Units in Pre-1950 Structures, 1970	.25639 .21234 .07149 .04783	41.6
	1980	.531	Log of City Population, 1976 Unemployment Rate, 1970 Difference in Unemployment Rate, 1960-1970 Change in Housing Stock, 1960-1970	.26010 .18133 .05025 .03950	45.4
West	1974	.452	Difference in Black Population, 1960-1970 Professional and Managerial Population, 1970 Housing Units in Pre-1950 Structures, 1970 City Population Growth Rate, 1960-1970	.15696 .07740 .10050 .11748	37.5
	1980	.484	Log of City Population, 1976 Difference in Unemployment Rate, 1960-1970 Professional and Managerial Population, 1970 Annexation Activity, 1970-1977	.14807 .12038 .12493 .09077	46.5

Source: SPSS, REGRESSION.

that bond rating analysts weight factors differently in different regions or that the social, demographic, and geopolitical characteristics of cities in different parts of the country impact differently on the financial well-being of the city. In all likelihood, it is a combination of both factors which accounts for these regional constrasts.

Using the regression equation to predict bond ratings for 1974 and 1980 in each of the four Census regions resulted in a considerable improvement over the nationwide analysis even though only four variables were used in each regional regression equation. In only one region, the North Central in 1980, however, did the number of correctly predicted ratings exceed 50 percent. In all cases, however, the classification accuracy of the regional equation improved between 1974 and 1980, by as little as 3.8 percent in the South and by as much as 15.2 percent in the Northeast. The differences in prediction accuracy indicate that social, demographic, and geopolitical characteristics of cities are more closely associated with (or are perceived to be more closely associated with) financial well-being in some parts of the country than in other parts. Moreover, the differences in prediction accuracy at the regional scale between 1974 and 1980 indicate that social, demographic, and geopolitical variables are becoming better predictors most rapidly in the Northeast and least rapidly in the South. Overall, the regional breakdown made it possible to correctly predict 46 percent of central city bond ratings in 1980, a 10 percent improvement over the nationwide regression analysis which yielded a predictive accuracy of only 36.1 percent.

### A Multiple Discriminant Analysis of

### Municipal Bond Ratings

Just as in the regression analysis, a stepwise discriminant analysis procedure has been used to construct the discriminant model and to predict central city bond ratings. In the stepwise procedure, variables enter the equation on the basis of their discriminating power. The stepwise selection criterion used in this analysis was the procedure which minimized Wilkes' lambda by maximizing the differences between group centroids. The number of discriminant functions in each of the analyses was limited to two because in each analysis the significance of Wilkes' lambda exceeded the .05 significance level when more than two factors were identified. The location of individual central cities on each of the two factors was then used to predict bond ratings of the central cities. These predictions also took into consideration the prior probabilities of being assigned to a particular rating category based on the actual distribution of ratings in the original sample.

The results of the nationwide discriminant analyses for 1974 and 1980 are presented in Table 29 which identifies the variables selected for inclusion in the discriminant equation, the standardized discriminant function coefficients for each variable, and both the eigenvalues and percent of variance accounted for by each function. The standardized discriminant function coefficients measure the relative contribution of each variable to each function; the unstandardized analogs of these scores are the values used in the computational discriminant formula. The sign of the standardized discriminant function coefficient reveals whether the variable is positively or negatively associated with the function. In 1974, it can be seen that the primary discriminant

Year	Variables in the Equation	Standardized Function Co	Discriminant oefficients	Eigenv (Percent of	alues 7 Variance)
		Function 1	Function 2	Function 1	Function 2
1974	Central City to Urbanized Area Popula-				
	tion, 1970	.63119	.33728	.77131	.15955
	Log of City Population, 1970	1.23460	1.69588	(73.2)	(15.2)
	Log of Metropolitan Population, 1970	71422	-1.86445		
	Foreign Stock Population, 1970	24922	.14477		
	Unemployment Rate, 1970	59098	.09872		
	Per Capita Income, 1974	.36028	.12964		
	Housing Units in pre-1950 Structures, 1970	.58428	.19701		
	Black Population, 1970	41871	11014		
	Owner Occupied Housing, 1970	.01831	38641		
	Difference in Median Educational Attain-				
	ment, 1960-1970	10621	46750		
	Difference in Unemployment Rate, 1960-1970	.68410	51843		
	Central City to SMSA Population, 1970	84922	-1.29864		
	Per Capita Income Growth, 1969-1974	17011	43073		
1980	Log of City Population, 1976	-1.17959	-1.24146	.88149	.28082
	Log of Metropolitan Population, 1976	.79681	.53132	(65.1)	(20.8)
	Foreign Stock Population, 1970	.41766	11786		
	Median Educational Attainment, 1970	.09533	.47917		
	Unemployment Rate, 1970	.31217	.08685		
	Professional and Managerial Population, 1970	)06474	46942		
	Housing Units in pre-1950 Structures, 1970	09884	65861		

RESULTS OF THE NATIONWIDE DISCRIMINANT ANALYSES, 1974 AND 1980

Table 29.

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Year	Variables in the Equation	Standardized   Function Co	Discriminant efficients	Eigenva (Percent of	ilues Variance)
		Function 1	Function 2	Function 1	Function 2
	Black Population, 1970	.57204	.29006		
	Central City to SMSA Population, 1976	.54575	.37627		
	Difference in Median Educational Attain- ment, 1960-1970	.07593	.34417		
	Difference in Unemployment Rate, 1960-1970	45399	.07336		
	Difference in Black Population, 1960-1970	07505	.00828		
	Per Capita Income, 1974	32975	.27462		

Source: SPSS, DISCRIMINANT.

function was basically determined by the relationships between central city, urbanized area, and metropolitan population size. Unemployment variables also exercised an important influence on the first function. In 1980, the demographic variables also proved to be the most influential discriminating variables but the racial-ethnic factors moved into place with the unemployment factors as the second most important group of vari-This indicates that as cities have been reassigned to rating ables. groups during the decade of the 1970s, the racial-ethnic factors have become more important characteristics in determining the financial wellbeing, either perceived or real, of central cities in the United States. This finding confirms the trend established in the previous chapter concerning the relationship between bond ratings and the Per Capita Needs Index which was found to be an increasingly better predictor of bond ratings with each successive year during the 1970s. It appears, therefore, that variables indicative of social structure may come to replace those indicative of economic structure as the major criteria of creditworthiness.

The eigenvalue associated with each function in the table denotes its relative ability to separate the groups. The percent of variance, which is also reported in the table, is based on the eigenvalue and is a measure of the relative importance of the function. It can be seen that the total percent of variance accounted for by both functions in 1974 is greater than the percent of variance accounted for by the 1980 equation indicating that the 1974 groups were more clearly differentiated along the discriminating variables than the 1980 groups. In both 1974 and 1980 regional variables, recoded as dummy variables, were injected into the analysis on a separate run; their discriminating power proved to be

either negative or negligible. In 1974, for instance, the addition of dummy regional variables reduced the discriminating power of the two main functions from 88 to 81 percent. In 1980 the discriminating power of the two main functions remained almost unchanged after the regional variables were included. Rather than indicating a lack of regional correlation, however, the poor performance of the regional variables simply indicates that dummy variables are not well suited to discriminant analysis. In 1974, as well, the five financial ratios were added to the original discriminant variable list on a separate run for comparative purposes. Only two of the financial ratios, percent of debt nonguaranteed and log of revenue per capita, were actually selected for inclusion in the discriminant equation. Their inclusion reduced the percent of variance explained by the two main discriminant functions from 88 to 86 percent. This finding supports the results of the regression discussed earlier in which financial variables were used. Once again, financial ratios have proven to be ineffective predictors of bond ratings and add virtually no power to the discrimination made possible by social variables alone.

Following the initial discriminant analyses, the equations derived were used to predict bond ratings for the central cities under investigation. The classification results for 1974 and 1980 are presented in Tables 30 and 31, which display the correlation between observed and expected bond ratings. In 1974, 52.8 percent of the central cities were classified correctly and in 1980, 48.7 percent were. These results represent a vast improvement over the predictions made by the regression equation, but the number of cities incorrectly classified betrays the wide range of variability within each bond rating group. These findings

# Table 30.

## CLASSIFICATION RESULTS OF THE

# NATIONWIDE DISCRIMINANT ANALYSIS, 1974

Actual		Ех	spected 1	Bond Rati	ngs	
Ratings	Aaa	Aa	A-1	A	Baa-l	Baa
Aaa	3	19	0	0	0	0
Aa	2	89	0	11	0	3
A-1	0	31	0	17	0	4
A	0	26	0	36	0	1
Baa-1	0	4	0	2	0	1
Baa	0	3	0	5	0	16
	Correct	tly Pred	Total: licted:	273 144 (52.8	8 percent)	)

Source: SPSS, DISCRIMINANT.

### Table 31.

### CLASSIFICATION RESULTS OF THE

# NATIONWIDE DISCRIMINANT ANALYSIS, 1980

Actual Bond	Expected Bond Ratings						
Ratings	Aaa	Aa	A-1	A	Baa-1	Baa	
Aaa	9	17	0	0	0	0	
Aa	4	74	13	1	0	3	
A-1	0	28	20	11	2	4	
Α	0	9	21	16	0	5	
Baa-1	0	3	2	4	4	3	
Baa	1	2	3	5	1	12	
	Correc	tly Pro	Total: edicted:	277 135 (48	.7 percent	t)	

Source: SPSS, DISCRIMINANT.

and the results of the discriminant analyses done by others call into question the assignment of central cities to the various bond rating groups by the rating agencies. If the differences within each group are greater than the differences between groups, an easily supported hypothesis, bond ratings themselves may not represent meaningful or easily interpreted categories of creditworthiness.

When the crosstabulated results of the 1974 and the 1980 analyses are compared, however, it is of significance that the A-1 and Baa-1 categories have begun to differentiate themselves from their nearest neighbors. The discriminant equation for 1974 assigned not a single central city to either the A-1 or Baa-1 category despite the fact that 22 percent of all cities classified carried one of these two ratings. In 1980, by contrast, the discriminant equation was able to make assignments to these two groups. It is obvious that even though the A-1 and Baa-1 categories were initiated in 1968, by 1974 they still had not distinguished themselves from the four major investment grade classifications along the social, demographic, and geopolitical dimensions under investigation in this analysis. By 1980, however, these groups had begun to take on separate distinguishing characteristics that separated them from other groups with the result that 31 percent of the A-1 cities and one-quarter of the Baa-1 cities were correctly classified by the discriminant equation. As these groups continue to set themselves apart from their nearest neighbors, it should be possible to increase the predictive accuracy of discriminant models.

The cities which were overrated and underrated by the 1974 discriminant equation are mapped in Figure 23. On this map, closed circles represent cities whose actual bond ratings were lower than their predicted





bond ratings (underrated cities), and open circles represent cities whose actual bond ratings were higher than their predicted bond ratings (overrated cities). Because almost half of the central cities included in the exercise were incorrectly classified, it is difficult to detect any strong regional patterns.

Several observations based on the spatial patterning of the overrated and underrated cities may be made, however. First, most of the Aaa cities show up on the map because the discriminant equation was decidedly unsuccessful in predicting Aaa bond ratings, suggesting the inclusion of a wide variety of central cities in this rating category. Second, the West shows up as the region with the fewest underrated and overrated cities indicating that in this region, social, demographic, and geopolitical characteristics of cities are most closely related to bond ratings. Third, underrated cities show up conspicuously in the manufacturing belt extending eastward from Wisconsin and Illinois to New Hampshire and Massachusetts. Given knowledge of these cities' social, demographic, and geopolitical structure, one would expect their credit ratings to be higher than they actually are. Fourth, many of the largest cities in the Northeast and North Central regions appear as underrated cities, possibly indicating that their size and associated social characteristics generate certain negative externalities which adversely impact bond ratings even though they are not measured in this analysis. Fifth, the South appears as a region of both overrated and underrated cities indicating the state of flux of credit ratings in this part of the country.

In the separate analyses conducted for each of the four Census regions, the predictive power of the discriminant equations computed for 1974 and 1980 was, in most cases, greatly improved. The results of the

regional discriminant analyses are presented in Table 32. Only in the Northeast in 1980 was the discriminant model unable to correctly predict more than half of the assigned credit ratings correctly; in 1974 the Northeast also fared the worst among the four regions, with only 51.6 percent of its central cities correctly classified. The relatively low prediction accuracy for the Northeast indicates that each bond rating category is poorly differentiated from the others in terms of the characteristics examined. The Northeast region of the country, therefore, seems to be the one in which the social, demographic, and geopolitical variables have the least to do with the evaluation of financial wellbeing by credit analysts. The region which yields the best results in the discriminant analysis is the West, which had the highest percentage of its central city bond ratings correctly predicted in 1974 and in 1980. In 1974, in fact, 87.5 percent of central cities in the West were correctly classified by the discriminant equations. The West therefore emerges as the region in which the social, demographic, and geopolitical characteristics of cities are the most closely associated with bond ratings. Overall, the regional breakdown made it possible to correctly classify 61.2 percent of the central cities in 1974 and 58.8 percent in 1980.

The fact that separate regional analyses greatly improve on the classification accuracy of the nationwide discriminant equations suggests two conclusions, either or both of which may hold. First, region by itself is directly considered by the rating analysts with the result that some parts of the United States are discriminated against while others are favored on the basis of "regional image." Second, additional variables which are highly regional in nature are examined by the bond analysts

		Eigenvi (Percent of	alues Variance)	Percent of Central City Bond Ratines
Keglon	Year	Function 1	Function 2	Correctly Predicted
Northeast	1974	,90965 (52.9)	.40614 (23.6)	51.6
	1980	.87247 (44.4)	.59798 (30.4)	45.3
North Central	1974	.84590 (49.0)	.51013 (29.6)	63.4
	1980	1.22986 (53.0)	.83470 (36.0)	62.8
South	1974	2.06279 (80.4)	.31053 (12.1)	54.6
	1980	1.91380 (73.9)	.32909 (12.7)	59.8
West	1974	3.26539 (57,1)	1.40481 (24.6)	87.5
	1980	1.61077 (60.6)	.65008 (24.4)	69.8
Source: SPSS,	DISCRIMINANT.			

RESULTS OF THE REGIONAL DISCRIMINANT ANALYSES, 1974 AND 1980

Table 32.

and it is these variables which account for the apparent differences among regions. If the second contention is true, the search for an even broader array of discriminating variables commends itself as a subject of further research.

#### Summary

A comparison of the stepwise multiple regression analysis and the stepwise multiple discriminant analysis reveals that while statistically significant results were obtained for each, the discriminant analysis yields a superior equation for the prediction of bond ratings. At the national scale in 1974, the regression procedure was able to correctly predict only 29.6 percent of all central city bond ratings in the analysis, whereas the discriminant procedure was able to correctly classify 52.8 percent. In 1980, the comparable percentages were 36.1 percent and 48.7 percent, respectively. The predictive power of the regression equation was improved slightly by the introduction of dummy variables representing Census regions in 1974 but not in 1980. Dummy regional variables had very little effect on either the nationwide discriminant or regression analyses.

When separate analyses were run for central cities in each of the four Census regions, however, the predictive accuracy of both regression and discriminant models improved. The discriminant procedure on 1974 bond ratings yielded far better results than the regression procedure in all of the regional analyses. In the regional discriminant analyses, 52 percent of the cities in the Northeast, 63 percent in the North Central, 55 percent in the South, and 88 percent in the West were assigned to the correct rating category in 1974. Overall, the regional breakdown in 1974

made it possible to correctly predict 61.2 percent of the nationwide set of bond ratings. Except in the South, these results were not as good when the discriminant procedure was used to predict 1980 bond ratings.

A study of municipal bond credit ratings which directly parallels the present one was done by Morton (1976). The basics of his investigation have been summarized in Table 5 of Chapter 3. He was also trying to discriminate among cities in the various rating classes by using multiple discriminant analysis at the national scale. His regression equation considered primarily financial variables (per capita debt, debt to estimated true value, tax per \$1000 assessed value, governmental expenditures to estimated true value, gross debt to assessed value) plus one demographic variable (SMSA population) and tourist-oriented communities. He was able to correctly classify 58 percent of his original sample cities into the correct 1972 rating category. The present study has demonstrated that using only social, demographic, and geopolitical variables, 61 percent of central cities could be assigned to the correct rating category by using a set of regional discriminant function equations in 1974.

Both Morton's analysis and the present one used central cities as cases but Morton selected only primary central cities and thus eliminated at least one confounding variable from his analysis. Another difference between the studies which tends to increase the predictive accuracy of Morton's model is that he attempted to discriminate among only four bond rating categories whereas the present study has attempted to discriminate among six. The A-1 and Baa-1 categories were included in this analysis but not in Morton's.

The comparison between these two studies clearly demonstrates that financial ratios are no better than social, demographic, and geopolitical

city characteristics when it comes to predicting municipal bond ratings. Yet, the non-traditional variables examined herein have received little attention in developing a theory of financial well-being and in the evaluation of creditworthiness. The types of variables used in this analysis need to join the financial characteristics of cities in order to identify the underlying dimensions of financial well-being and to provide a comprehensive base for urban financial geography.

### CHAPTER VII

#### SUMMARY AND CONCLUSIONS

The objectives of the foregoing research have been to examine the regional patterning of central city general obligation bond ratings over the past twenty years; to analyze the relationships between those ratings and selected demographic, geopolitical, and social variables; and to determine which variables best predict bond ratings in multivariate analyses of rating categories. Except for the preliminary study by Brunn and Zeigler (1979), the present investigation is the first to focus explicitly on the nationwide spatial variation in credit ratings. It is also the first to be based on the social characteristics rather than the financial characteristics of cities.

The three main sections of this research report have covered (1) the regional patterning of municipal bond credit ratings over the 1960 to 1980 period, (2) the demographic, geopolitical, and social correlates of municipal bond credit ratings, and (3) two multivariate models based on regression analysis and discriminant analysis which are designed to predict credit ratings. The sequence of these sections has permitted, first, the identification of regional patterns, second, the examination of selected variables which help account for these spatial dimensions of variation, and third, the construction of predictive models based on

these selected correlates of the ratings.

### Multivariate Analyses of

### Municipal Bond Ratings

Despite the fact that previous studies have attempted to predict municipal credit ratings using regression and discriminant models (Carleton and Learner, 1969; Horton, 1970; Michel, 1977; Morton, 1976; and Rubinfeld, 1973), all have used primarily financial ratios as independent variables because the relationship between creditworthiness and city finances has a supposedly solid theoretical base. The rather disappointing results of these models, as discussed in Chapter 3, however, suggest that many of the presumed relationships which have been theoretically justified must be called into question.

In contrast to the aforementioned financial investigations, the present study represents a departure in that the variables selected for examination have been what might be termed non-traditional correlates of general obligation credit ratings. The present undertaking has been the only effort to predict bond ratings based on the demographic, geopolitical, and social variables alone. Both regression and discriminant models were employed in this investigation to identify the underlying dimensions of credit standing and to predict bond ratings based on those dimensions. The discriminant analysis proved to be a more accurate predictor of ratings than the regression analysis. The results of using the region-specific discriminant models to classify cities into bond rating categories for 1974 yielded a predictive accuracy of 61 percent, and for 1980, 58 percent. This compares with a predictive accuracy of 58 percent in Morton's study (1976) of 1972 central city bond ratings using

a discriminant model. Whereas the present study used only social, demographic, geopolitical, and regional variables in the discriminant prediction equation, Morton's study used almost exclusively financial ratios. As can be seen, the prediction results were essentially the same. Despite the well-developed theoretical justification for using financial ratios to evaluate creditworthiness and its derivative, bond ratings, financial ratios did essentially no better in predicting ratings than the purely social, demographic, and geopolitical characteristics of cities as predictors. This suggests that more attention needs to be devoted to the theoretical relationships between the non-financial characteristics of cities and their metropolitan areas and credit status. The fact that both sets of variables, financial and non-financial, were able to correctly predict only slightly more than half of the bond ratings suggests that there are very few good dimensions of variation which may be used to distinguish among the bond rating categories used by Moody's. Is it that non-quantifiable factors grossly outweigh quantifiable ones in the assignment of credit ratings or is it that the quantifiable factors which are most effective in distinguishing among bond rating categories have yet to be discovered or developed?

In essence, the failure to identify even one very powerful discriminating variable or multivariate factor calls into question the meaning of the bond rating categories themselves. Theoretically, bond rating categories should minimize the differences among cities within a rating group and maximize the differences between groups. Any classificatory scheme should fulfill this expectation. The bond rating classification system might be criticized as one which is not based on any known set of variables which may be used for predictive purposes.

If bond rating categories are to be established so that variables, financial and non-financial, theoretically related to creditworthiness may be used to determine the credit standing of a particular city, it may be wise to replace the present subjective rating process with the cluster analysis procedure suggested by Morton and McLeavey (1978) and discussed in Chapter 3. They propose using a set of variables theoretically related to municipal bond quality to evaluate credit status and to assign credit ratings unless non-quantifiable factors may be cited to justify other ratings. The danger of this approach is that it would hopelessly lock many cities into low rating categories with little hope of improvement until their "statistics" improved. As a further avenue of reform, the cluster analysis method may offer much promise. The present investigation has indicated, however, that a wide variety of nonfinancial variables are related to credit quality even though the theoretical underpinnings for these relationships have not been fully developed. Before a cluster analysis or similar procedure can be equitably used to assign credit ratings, a theory of creditworthiness must be built on a foundation of not only financial factors but social, political, demographic, and other factors which seem to be related to credit standing.

### Spatial Correlates of

#### Municipal Bond Ratings

Results of the analyses performed in Chapter 5 indicate that a variety of demographic, geopolitical, and social characteristics of cities and their metropolitan areas are associated with municipal bond ratings. Both crosstabulation analysis and analysis of variance were used to identify these relationships. The most important demographic

correlate of bond ratings was found to be city population size, an association which has been increasing over the course of the past two decades. Only among the very largest cities of the industrial Northeast is the relationship between city size and bond ratings negated.

The geopolitical structure of metropolitan areas, particularly central city dominance, was found to be another important dimension of differentiation among the major bond rating categories. Central cities which contained a higher percentage of their metropolitan area's population were more likely to carry a higher bond rating than comparatively small central cities. The contention that central cities which can adjust their boundaries are more favorable risks and hence carry higher bond ratings is also confirmed by the distribution of credit ratings among the central cities which have annexed more than twenty square kilometers of territory between 1970 and 1977. Of those cities, over 60 percent carried a Aaa or a Aa rating. The failure to annex surrounding territory and maintain the dominance of the central city in the metropolitan area, in general, works against the assignment of high credit ratings. This may be considered one of the many costs of a highly fragmented and inflexible geopolitical structure, exemplified in the extreme by so many cities of the Northeastern United States. If the annexation of surrounding jurisdictions and their tax bases would result in a higher credit rating, savings in interest payments on borrowed funds by central cities would be considerable. In the absence of metropolitan consolidation, intergovernmental transfer payments flowing into the coffers of central cities in the manufacturing belt, simply serve to maintain the geopolitical status quo by subsidizing with public funds cities victimized by their political geography. Low bond ratings may be considered

one of the urban financial problems that could be alleviated by geopolitical reorganization as suggested by Bahl, Jump, and Schroeder (1979, 21-22) in the following statement:

> fragmented local government structure is at the very heart of the urban problem, particularly in the Northeast and industrial Midwest where one would presume the most significant amount of urban aid will be targeted. To provide such aid to these regions without insisting on a better balance between taxpaying capacity and expenditure requirements of local governments in metropolitan areas would be a mistake. It would implicitly reward suburban jurisdictions that have refused to share tax-paying wealth with central cities. Put another way, it would in effect constitute a penalty to governments elsewhere in the country that have taken positive steps toward the solution of urban problems through tax-base sharing, regional financing, or areawide governance.

The impact of central city boundaries is of utmost significance in the evaluation of creditworthiness when they isolate in the central city or any other jurisdiction those elements of the population with the greatest need for public services. In this respect, city boundaries have a dramatic impact on the social characteristics of the city, and these social characteristics have been demonstrated in Chapter 5 to be closely associated with credit ratings. The strong and increasing association with the Per Capita Needs Index developed in the Department of Housing and Urban Development (1976) re-emphasizes the conclusion of Sullivan (1976) that cities with the greatest need for funds because of their social structure are the ones which are most heavily penalized by low bond ratings and concomitant high interest costs. Since the neediest cities are the ones which have been favored in the disbursement of federal funds such as Community Development Block Grants, the flow of private funds works against the flow of public funds into the nation's neediest cities. The higher interest charges levied on borrowed funds as a result of low credit standing in essence reduces the amount of

federal and state aid which can be spent on solving the very real social problems of the neediest cities. The flows of public funds compared to the flows of private funds into and out of the nation's cities would constitute a logical sequel to this investigation since the geographic pattern of bond ratings is one of the factors which affect these flows.

The results of the crosstabulation analysis between selected quality of life indices and bond ratings indicate that social variables are some of the most significant correlates, perhaps determinants, of the ratings. Of the three state-level quality of life indices, the one which was designed to measure social well-being (Smith, 1973), rather than a broader and more diffuse conception of quality of life (Wilson, 1969; Liu, 1973), proved to be the most closely associated with assigned credit ratings. Similarly, not only did Liu's (1976) metropolitan quality of life index reveal a significant degree of association with the ratings, but his social subcomponents proved to be better predictors of the ratings than any of his economic, political, and other subcomponents during the decade of the 1970s. Once again, it appears as if the wellbeing of city populations as measured by carefully selected social variables needs to be considered in the analysis of creditworthiness, prospects for the financial well-being of urban areas, and the development of a sound theory of public finance.

### Regional Patterns of Municipal

#### Bond Ratings

In Chapter 4 the spatial and temporal dimensions of municipal bond ratings over the past two decades were charted. From this analysis, the North Central and West Census regions emerged as the home of the most highly rated central cities; more than 50 percent in each region were
rated Aa or Aaa in 1980. On the whole, the central cities of the Northeast and the South were rated in lower categories of creditworthiness. Among Northeastern cities more were rated in the Baa category and among Southern cities more were rated in A-1 category than in any other rating group. Cities in New England, cited in previous studies as a region of overall high credit standing (Rubinfeld, 1973), however, proved to distinguish themselves from other cities in the Northeast in that over onethird of the central cities in New England were rated Aa or Aaa in 1980.

Cities at either end of the bond rating continuum have been termed gilt edge cities if they carry a Aaa rating or grit edge cities if they carry a Baa or lower rating. In general, for any year during the 1960-1980 period, cities in either category number less than 10 percent of all rated cities. Cities in these two categories were also the most regionally concentrated. In 1980, for instance, half of the Aaa cities fell in the North Central region, and 60 percent of the Baa and lower rated cities were located in the Northeast. The mapping of these gilt edge and grit edge cities between 1960 and 1980 reveals well-defined spatial patterns of change, particularly in the Northeast and South. In the Northeast in 1960, the grit edge cities were largely confined to the easternmost cities of the region. From this core, the grit edge frontier spread westward to Detroit while many of the cities in between also sank to grit edge status. While gilt edge cities outnumbered grit edge cities in the Northeast in 1960, by 1980 there were only two gilt edge cities remaining in the region (both in New England) while the number of grit edge cities had increased to nineteen. The South has been another region of dramatic change. Throughout the 1960s it remained a hearth of grit edge central cities but during the 1970s the number of grit edge

cities steadily shrank and the number of gilt edge cities increased. In terms of overall bond rating dynamics, the South has been a region of steadily improving credit quality while the Northeast has been a region of steady decline. The North Central has been a region of considerable stability. These results are also illustrated by the temporal bond rating profiles which depict the credit histories of all central cities which carried a Aaa or a Baa or lower rating at any time during the two-decade period.

The crosstabulation analyses of bond ratings and both Census region and Census division indicated a stronger regional association has been developing over the decade of the 1970s so that by 1980, 22.6 percent of the variation in bond ratings could be explained by Census division. Had optimally structured bond rating regions replaced the a priori Census regions as the geographic base for the analysis, the degree of association would undoubtedly have been higher. The increasing regional character of bond ratings suggests that the American economic system is coming to be perceived by investors, at least in the municipal bond market, as more regional in character. The definition and characterization of these regional economies, particularly if they are coming to distinguish themselves one from another, may prove to be a major thrust of geographic research in the coming decade. Bond ratings need to be incorporated into these analyses particularly in the investigation of regional public economies.

## Directions for Future Research

In the introductory chapter to this research, four areas of contemporary concern were proposed as comprising the fields to which the foregoing research would contribute: (1) urban financial geography,

(2) money flows and allocations, (3) geography of the urban future, and (4) regional analysis. The results of the analyses conducted herein advances the frontiers of research and understanding in these four areas and also suggests future avenues of research.

Urban financial geography has been proposed as a new field of inquiry characterized by the study of the spatial patterns of revenue generation and allocation and their impacts on the urban environment and the metropolitan system. Municipal bond ratings and their study have been proposed as one of the elements of urban financial geography. As a regionally variable phenomenon, bond ratings should be one of the variables employed in advancing what could become one of the major research frontiers of this nascent field, that is, the identification, analysis, and understanding of regional public economies. The financial prospects and problems of municipalities in various parts of the country seem to exhibit the manifestations of a distinctly regional phenomenon, the problem of low bond ratings being an example. The characteristics of these problems and possibilities for their solution might best consider the regional dimensions of variation rather than treating the case of each individual municipality as a unique example of public sector success or suffering.

The second major avenue of research in urban financial geography is likely to develop around the concept of financial well-being, with the problem of definition and measurement being one of the first issues to be addressed. Financial well-being as a field of study must involve the contributions of social scientists and geographers since it is a spatially variable phenomenon which both affects and is affected by social well-being. Because the municipal public sector is directly

responsible for social well-being within its corporate limits, the interface between public finance and social geography is a logical focus of research attention in the field.

This study has shown municipal bond ratings to be not a random variable across the American metropolitan system but one which is spatially and temporally patterned. As a factor which is both impacted by and impacts social well-being, the study of bond ratings deserves to be the subject of further research. One of the applied outcomes of a greater understanding of the bond rating process and the factors considered by credit analysts should be a better methodology for assessing creditworthiness and a methodology which considers both the social well-being of city populations and the spatial variation nationwide in what it means to be a creditworthy jurisdiction. A more geographic methodology for rating the future financial prospects of cities in the United States would make it possible to tailor the evaluation of creditworthiness to regional conditions.

Topics for further research which are directly related to municipal bond ratings include comparisons between Moody's and Standard and Poor's ratings and contrasts with the ratings assigned to municipalities by various other investment firms for use by their clients. Spatial variation in municipal bond yields and the geographic preferences of investors are additional topics. Also, the temporal dimensions of bond ratings changes may be better understood through time-series analyses such as those developed by Bannister (1976), Bennett (1974, 1975), and King and Casetti (1969). Finally, the impact of major financial crises on bond ratings and bond yields nationwide, a process which may be hypothesized to exhibit characteristics of both regional and hierarchical diffusion, is another possibility for future investigations.

The second significant area of study to which the better understanding of municipal bond ratings may contribute has been identified as the area of money flows and allocations. In this field of inquiry ratings become significant as they affect borrowing costs and hence the flow of capital into and out of the local public sector. The spatial flows of debt service payments out of central cities and the flows of public sector transfer payments into central cities need to be examined and compared to identify the spatial inequalities in the municipal bond market and those cities which are comparatively advantaged and comparatively disadvantaged by the ratings in terms of cash flow balance.

The geography of the urban future has been identified as another area of promising research prospects. Assigned credit ratings are an index of the future financial well-being of central cities as perceived by the credit analysts who establish the ratings. As ratings are a reflection of market performance, they also serve to summarize the placespecific perceptions of the investment community as a whole. By further understanding the variables which are directly considered in rating municipal bonds and other variables which indirectly affect the rating process and city finances, it will be possible to identify the factors which are perceived to be significant in judging the long-term prospects of cities in the United States. Evaluating how important each of these factors should be in judging the future may comprise one focus of futuristic urban research; determining what policies need to be implemented to guide the future or prevent the outcome of negative trends in urban evolution constitutes a second focus.

The final area of significant research prospects is the area of

regional analysis. Most directly, bond ratings may and should be used as one of the variables in delineating the regional economic and financial structures of the nation. As perceptual indices of "urban goodness," credit ratings may also be combined with a multitude of other variables to identify the overall regional character of the American metropolitan system. Research in this area would begin by identifying optimal regions on the basis of bond ratings alone, progress through the incorporation of bond ratings into models designed to regionalize more comprehensive financial structures, and culminate in the identification of comprehensive urban regions for the nation.

## Conclusion

The foregoing investigation succeeds many which have considered the topic of municipal bonds from an economic and financial perspective, but it stands virtually alone in at least two respects. First, it comprises the first comprehensive study of the spatial and temporal dimensions and dynamics of municipal bond ratings; and second, it emphasizes the social, demographic, and geopolitical dimensions of variation from city to city as a basis for predicting credit ratings. The findings of this study have illustrated that municipal bond ratings are not regionally random variables but are patterned in space and time. The predictive models, particularly the one derived from a discriminant analysis of the data, have shown that non-financial characteristics of cities, as used in this study, can be used to predict central city bond ratings as successfully as financial characteristics. The fact that a very large number, almost half, of all central cities were misclassified in the discriminant analysis, calls into question the basis of credit rating categories and suggests the need for further research into the better understanding of

bond ratings as discrete categories of creditworthiness and of the broadbased theoretical underpinnings of financial well-being and prospects for the urban future. APPENDICES

APPENDIX A

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MUNICIPAL BOND CREDIT RATINGS BY CITY

APPENDIX A

Table Al.

MUNICIPAL BOND CREDIT RATINGS BY CITY

BR1966	4 4444 44 44 4 4 4444 44 44 4 040000400442400404444444444	. <b>4 4 4</b> 4 <b>4 4</b>
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APPENDIX B

CENSUS REGIONS AND CENSUS DIVISIONS

## APPENDIX B

## Table A2.

## CENSUS REGIONS AND CENSUS DIVISIONS

Census Region	<u>Census Division</u>	Component States
Northeast	New England	Maine, New Hampshire, Vermont, Massachusetts, Connecticut, Rhode Island
	Middle Atlantic	New York, New Jersey, Pennsylvania
North Central	East North Central	Ohio, Michigan, Indiana, Illinois, Wisconsin
	West North Central	Minnesota, Iowa, Missouri, Kansas, Nebraska, South Dakota, North Dakota
South	South Atlantic	Delaware, Maryland, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida
	East South Central	Kentucky, Tennessee, Mississippi, Alabama
	West South Central	Louisiana, Arkansas, Oklahoma, Texas
West	Mountain	Montana, Wyoming, Idaho, Nevada, Utah, Colorado, Arizona, New Mexico
	Pacific	Washington, Oregon, California, Alaska, Hawaii

BIBLIOGRAPHY

## BIBLIOGRAPHY

- Advisory Commission on Intergovernmental Relations (1977). <u>Trends in</u> <u>Metropolitan America</u>. Washington, D.C.: U.S. Government Printing Office, February.
- Allardice, David R. (1974). "Municipal Bonds in the Housing Market," Economic Perspectives, July/August, pp. 16-23.
- Amling, Frederick (1974). <u>Investments: An Introduction to Analysis and</u> Management. 3rd ed. Englewood Cliffs, N.J.: Prentice-Hall.
- Aronson, J. Richard, and Eli Schwartz, eds. (1975). <u>Management Policies</u> <u>in Local Government Finance</u>. Washington, D.C.: International City Management Association.
- Bahl, Roy W. (1971). "Measuring the Creditworthiness of State and Local Governments: Municipal Bond Ratings," <u>Proceedings of the National</u> Tax Association, pp. 600-622.
- Bahl, Roy W.; Bernard Jump, Jr.; and Larry Schroeder (1979). "Federal Policy and the Fiscal Outlook for Cities" in L. K. Hubbell, ed., <u>Fiscal Crisis in American Cities</u>. Cambridge, Mass.: Ballinger Publishing, pp. 3-26.
- Bannister, Geoffrey (1976a). "Space-Time Components of Urban Population Change," Economic Geography 52: 228-240.
- Bannister, Geoffrey (1976b). "Towards a Model of Impulse Transmissions for an Urban System," Environment and Planning A 8: 385-394.
- Bennett, R. J. (1974). "Process Identification for Time Series Modelling in Urban and Regional Planning," Regional Studies 8: 157-174.
- Bennett, R. J. (1975). "The Representation and Identification of Spatio-Temporal Systems: An Example of Population Diffusion in North West England," <u>Transactions of the Institute of British Geogra-</u> phers 66: 73-94.
- Berry, Brian J. L. (1980). "Inner City Futures: An American Dilemma Revisited," <u>Transactions of the Institute of British Geographers</u> 5: 1-28.
- Boddy, M. J. (1976). "The Structure of Mortgage Finance: Building Societies and the British Social Formation," <u>Transactions of the</u> Institute of British Geographers 1: 58-71

- Brunn, Stanley D., and Donald J. Zeigler (1979). "The Spatial Correlates of Municipal Bonds: A Geography of Assigned Credit Ratings," Paper presented at the 75th annual meeting of the Association of American Geographers, Philadelphia, Pa., April 23.
- Burke, D. Barlow, Jr. (1968). "Rating General Obligation Bonds," Municipal Finance 40 (May): 169-176.
- Calvert, Gordon L., ed. (1965). <u>Fundamentals of Municipal Bonds</u>. 4th ed. Washington, D.C.: Investment Bankers Association of America.
- Calvert, Gordon L., ed. (1969). <u>Fundamentals of Municipal Bonds</u>. 7th ed. Washington, D.C.: Investment Bankers Association of America.
- Campbell, Colin D. and Rosemary (1978). An Introduction to Money and Banking. 3rd ed. Hinsdale, Ill.: Dryden Press.
- Carleton, Willard T., and Eugene M. Lerner (1969). "Statistical Credit Scoring of Municipal Bonds," Journal of Money, Credit, and Banking 1 (November): 750-764.
- Christy, George A., and John C. Clendenin (1978). Introduction to Investments. New York: McGraw-Hill.
- Cox, Kevin R. (1978). "Local Interests and Urban Processess in Market Societies," in his <u>Urbanization and Conflict in Market Societies</u>. Chicago: Maaroufa Press, pp. 94-108.
- Darden, Joe T. (1977). "Redlining: A Concept for Study by Urban-Social Geographers," in H. A. and M. K. Winters, eds., <u>Applications of</u> <u>Geographic Research</u>. East Lansing: Michigan State University, Department of Geography, pp. 29-44.
- Darden, Joe T. (1980). "Lending Practices and Policies Affecting the American Metropolitan System," in S. D. Brunn and J. O. Wheeler, eds., <u>The American Metropolitan System: Present and Future</u>. New York: Wiley.
- Davis, Edmund H. (1958). Of the People, By the People, For the People. Chicago: John Nuveen and Company.
- Dingemans, Dennis (1979). "Redlining and Mortgage Lending in Sacramento," Annals of the Association of American Geographers 69 (June): 225-239.
- Dougall, Herbert E. (1973). <u>Investments</u>. 9th ed. Englewood Cliffs, N.J.: Prentice-Hall, pp. 81-108.
- Drott, Peter E. (1971). The Professional Investor's Guide to the Municipal Bond Market. Memphis, Tenn.: Municipal Market Publishing.

- Ellinwood, David M. (1957). "Factors in Municipal Bond Ratings," <u>Public</u> Management 39 (April): 74-77.
- Forbes, Ronald W., and John E. Petersen (1976). "Background Paper," in Twentieth Century Fund Task Force on the Municipal Bond Market, Building a Broader Market. New York: McGraw-Hill, pp. 27-174.
- Garcia, F. L. (1962). <u>Glenn G. Munn's Encyclopedia of Banking and Fin</u>ance. 6th ed. Boston: Bankers Publishing Company.
- Greenberg, Ronald David. (1977). "Municipal Securities: Some Basic Principles and Practices," The Urban Lawyer 9 (Spring): 338-363.
- Gup, Benton E. (1979). <u>The Basics of Investing</u>. New York: John Wiley & Sons.
- Haggett, Peter; Andrew D. Cliff, and Allan Frey (1977). Locational Analysis in Human Geography. 2nd ed. New York: Halsted Press.
- Harvey, David, and Lata Chatterjee (1974). "Absolute Rent and the Structuring of Space by Governmental and Financial Institutions," Antipode 6: 22-36.
- Hastie, K. Larry (1972). "Determinants of Municipal Bond Yields," Journal of Financial and Quantitative Analysis 7 (June): 1729-1748.
- Hempel, George H. (1967). <u>Measures of Municipal Bond Quality</u>. Ann Arbor: Bureau of Business Research, University of Michigan.
- Hirsch, Werner Z. (1971a). "The Fiscal Plight: Causes and Remedies," in <u>Fiscal Pressures on the Central City</u>. New York: Praeger, pp. 3-40.
- Hirsch, Werner Z., ed. (1971b). <u>Fiscal Pressures on the Central City</u>. New York: Praeger.
- Hoffland, D. L. (1972). "Price-Rating Structure of the Municipal Bond Market," Financial Analysts Journal 28 (March): 65-70.
- Horton, Joseph J., Jr. (1969). "A Statistical Rating Index for Municipal Bonds," <u>Financial Analysts Journal</u> 25 (March-April): 72-75.
- Horton, Joseph J., Jr. (1970). "Statistical Classification of Municipal Bonds," Journal of Bank Research, Autumn, pp. 29-40.
- Horrigan, James O. (1966). "The Determination of Long-Term Credit Standing with Financial Ratios," in <u>Empirical Research in Accounting</u>, <u>Selected Studies, 1966</u>, Supplement to <u>Journal of Accounting Re</u>search 4: 44-62.
- Hubbell, L. Kenneth, ed. (1979). <u>Fiscal Crisis in American Cities: The</u> <u>Federal Response</u>. Cambridge, Mass.: Ballinger Publishing.

- International City Management Association (1977). <u>Municipal Year Book</u> <u>1977</u>. Washington, D.C.: International City Management Association.
- Kirk, John (1967). "What's What in the World of Municipal Bond Ratings?" Banking, August, pp. 8-10.
- King, Leslie; E. Casetti, and D. Jeffrey (1969). "Economic Impulse in a Regional System of Cities: A Study of Spatial Interaction," <u>Region</u>al Studies 3: 213-218.
- Liu, Ben-Chieh (1973). The Quality of Life in the United States 1970. Kansas City, Mo.: Midwest Research Institute.
- Liu, Ben-Chieh (1975). Quality of Life Indicators in the U.S. Metropolitan Areas, 1970. Kansas City, Mo.: Midwest Research Institute.
- Liu, Ben-Chieh (1976). Quality of Life Indicators in U.S. Metropolitan Areas: A Statistical Analysis. New York: Praeger.
- Madrick, Jeffrey (1977). "Municipal Research is a Growth Industry," Business Week, March 14, p. 81.
- Matteson, Archibald C. (1968). "In Defense of General Obligation Municipal Bond Credit Ratings," <u>Financial Analysts Journal</u> 24 (July): 99-103.
- Mendelson, Morris, and Sydney Robbins (1976). <u>Investment Analysis and</u> Securities Markets. New York: Basic Books.
- Michel, Allen J. (1977). "Municipal Bond Ratings: A Discriminant Analysis Approach," Journal of Financial and Quantitative Analysis 12 (November): 587-598.
- Moak, Lennox L. (1970). Administration of Local Government Debt. Chicago: Municipal Finance Officers Association.
- Moody's Investors Service, Inc. (1960-1980). <u>Moody's Bond Record: Cor-</u> porates, Convertibles, Governments, Municipals. New York: Moody's Investors Service.
- Moody's Investors Service, Inc. (1974). <u>Pitfalls in Issuing Municipal</u> Bonds. New York: Moody's Investors Service.
- Moody's Investors Service, Inc. (1977). <u>Moody's Analytical Overview of</u> 25 Leading U.S. Cities. New York: Moody's Investors Service.
- Moody's Investors Service, Inc. (1978). <u>Moody's Municipal and Government</u> Manual 1978. New York: Moody's Investors Service.
- Moody's Investors Service, Inc. (1979). <u>Moody's Municipal and Government</u> Manual 1979. New York: Moody's Investors Service.

- Morton, T. Gregory (1975-76). "Comparative Analysis of Moody's and Standard and Poor's Municipal Bond Ratings," <u>Review of Business and Eco-</u> nomic Research 11 (Winter): 74-81.
- Morton, T. Gregory, and Dennis McLeavey (1978). "A Cluster Analysis of Municipal Bond Ratings," <u>Review of Business and Economic Research</u> 13 (Spring): 92-99.
- Mueller, John H.; Karl F. Schuessler; and Herbert L. Costner (1970). <u>Statistical Reasoning in Sociology</u>. 2nd ed. Boston: Houghton Mifflin.
- Muller, Thomas (1975a). "The Declining and Growing Metropolis--A Fiscal Comparison," in G. Sternleib and J. Hughes, eds., <u>Post-Industrial</u> <u>America: Metropolitan Decline and Inter-Regional Job Shifts</u>. New Brunswick, N.J.: Rutgers University, Center for Urban Policy Research, pp. 197-220.
- Muller, Thomas (1975b). Growing and Declining Urban Areas: A Fiscal Comparison. Washington, D.C.: The Urban Institute, November.
- Muller, Thomas, and Grace Dawson (1973). <u>The Impact of Annexation on City</u> <u>Finances: A Case Study in Richmond, Virginia</u>. Washington, D.C.: The Urban Institute, May.
- Muller, Thomas, and Grace Dawson (1976). <u>The Economic Effects of Annexa-</u> <u>tion: A Second Case Study in Richmond, Virginia</u>. Washington, D.C.: The Urban Institute, April.
- Nie, Norman H.; C. Hadlai Hull; Jean G. Jenkins; Karin Steinbrenner; and Dale H. Bent (1975). <u>Statistical Package for the Social Sciences</u>. 2nd ed. New York: McGraw-Hill.
- Newspaper Enterprise Association (1979). The World Almanac and Book of Facts 1980. New York: Newspaper Enterprise Association.
- Norton, R. D. (1979). <u>City Life-Cycles and American Urban Policy</u>. New York: Academic Press.
- Packer, Stephen B. (1968). "Municipal Bond Ratings," <u>Financial Analysts</u> Journal 24 (July): 93-97.
- Petersen, John E. (1974). "Background Paper," in Twentieth Century Fund Task Force, <u>The Rating Game</u>. New York: The Twentieth Century Fund, pp. 23-151.
- Petersen, John E. (1979). "Current Research in State and Local Government Debt Policy and Management," <u>Governmental Finance</u> 8 (March-June): 45-48.
- Peterson, George E. (1976). "Finance," in W. Gorham and N. Glazer, eds., <u>The Urban Predicament</u>. Washington, D.C.: The Urban Institute, pp. 35-118.

- Phillips, Philip D., and Stanley D. Brunn (1978). "Slow Growth: A New Epoch of American Metropolitan Evolution," <u>Geographical Review</u> 68: 274-292.
- Pinches, George E., and Kent A. Mingo (1973). "A Multivariate Analysis of Industrial Bond Ratings," Journal of Finance 28 (March): 1-18.
- Pogue, Thomas F., and Robert M. Soldofsky (1969). "What's in a Bond Rating?" Journal of Financial and Quantitative Analysis 4 (June): 201-228.
- Pred, Allan (1977). <u>City-Systems in Advanced Economies</u>. New York: John Wiley.
- Proctor, Mary, and Bill Matuszeski (1978). <u>Gritty Cities</u>. Philadelphia: Temple University Press.
- Rabinowitz, Alan (1969). <u>Municipal Bond Finance and Administration: A</u> <u>Practical Guide to the Analysis of Tax-Exempt Securities</u>. New York: Wiley--Interscience.
- Reilly, F. K., and M. D. Joehnk (1976). "Association Between Market-Determined Risk Measures for Bonds and Bond Ratings," <u>Journal of</u> <u>Finance 31</u>: 1387-1403.
- Riehle, Robert C. (1968). "Moody's Municipal Ratings," <u>Financial Analysts</u> Journal 24 (May): 71-73.
- Rose, Sanford (1975). "The Trouble With Municipal Bonds is not Just New York," <u>Fortune</u> (December): 104-107, 176-182.
- Rubinfeld, Daniel (1971). "Credit Ratings, Bond Defaults and Municipal Borrowing Costs: A New England Study," <u>Proceedings of the National</u> Tax Association, pp. 331-352.
- Rubinfeld, Daniel (1973). "Credit Ratings and the Market for General Obligation Municipal Bonds," National Tax Journal 26 (March): 17-28.
- Sale, Kirkpatrick (1975). <u>Power Shift: The Rise of the Southern Rim and</u> Its Challenge to the Eastern Establishment. New York: Random House.
- Sanders, Heywood T. (1979). "Governmental Structure in American Cities," in <u>Municipal Year Book 1979</u>. Washington, D.C.: International City Management Association, pp. 97-110.
- Smith, David M. (1973). <u>The Geography of Social Well-Being in the United</u> <u>States</u>. McGraw-Hill Problems Series in Geography. New York: McGraw-Hill.
- Smith, Wade S. (1979). <u>The Appraisal of Municipal Credit Risk</u>. New York: Moody's Investors Service.
- Steiss, Alan Walter (1974). <u>Models for the Analysis and Planning of</u> Urban Systems. Lexington, Mass.: Lexington Books.

- Steiss, Alan Walter (1975). Local Government Finance: Capital Facilities Planning and Debt Administration. Lexington, Mass.: Lexington Books.
- Stevenson, Richard A., and Edward H. Jennings (1976). <u>Fundamentals of</u> Investments. St. Paul: West Publishing Company.
- Stewart, Jane (1977). <u>Municipal Bonds, Municipal Finance</u>. Exchange Bibliography no. 1339. Monticello, Ill.: Council of Planning Librarians.
- Sullivan, Patrick (1976). <u>Municipal Bond Ratings Viewed as Implicit</u> <u>Grant/Tax Mechanisms</u>. Occasional Paper no. 30. Syracuse, N.Y.: <u>Maxwell School of Citizenship and Public Affairs, Syracuse Univer-</u> sity.
- The Tax Foundation (1979). <u>Facts and Figures on Government Finance</u>. 20th ed. Washington, D.C.: The Tax Foundation.
- Terrell, Henry S. (1971). "The Fiscal Impact of Nonwhites," in <u>Fiscal</u> Pressures on the Central City. New York: Praeger, pp. 144-240.
- Twentieth Century Fund Task Force on Municipal Bond Credit Ratings (1974). The Rating Game. New York: The Twentieth Century Fund.
- Twentieth Century Fund Task Force on the Municipal Bond Market (1976). Building a Broader Market. New York: McGraw-Hill.
- Tyler, Walter H. (1962). "Municipal Bond Ratings," <u>Michigan Municipal</u> Review 35 (November): 285-287.
- U.S. Bureau of the Census (1944-1977). <u>Census of Governments</u>. Washington, D.C.: U.S. Government Printing Office.
- U.S. Bureau of the Census (1962). <u>County and City Data Book 1962</u>. Washington, D.C.: U.S. Government Printing Office.
- U.S. Bureau of the Census (1967). <u>County and City Data Book 1967</u>. Washington, D.C.: U.S. Government Printing Office.
- U.S. Bureau of the Census (1972). <u>Census of Population: 1970</u>, Vol. 1, <u>Characteristics of the Population</u>, part A. Washington, D.C.: U.S. Government Printing Office.
- U.S. Bureau of the Census (1973). County and City Data Book 1972. Washington, D.C.: U.S. Government Printing Office.
- U.S. Bureau of the Census (1976). <u>Population of Urbanized Areas Estab-</u> <u>lished Since the 1970 Census, for the United States: 1970</u>. Supplementary Report, 1970 Census of Population. Washington, D.C.: U.S. Government Printing Office.
- U.S. Bureau of the Census (1978a). County and City Data Book 1977. Washington, D.C.: U.S. Government Printing Office.

- U.S. Bureau of the Census (1978b). "Estimates of the Population of Counties and Metropolitan Areas: July 1, 1975 and 1976," <u>Population</u> <u>Estimates and Projection</u>, Series P-25, no. 739. Washington, D.C.: U.S. Government Printing Office, November.
- U.S. Bureau of the Census (1979a). Boundary and Annexation Survey 1970-<u>1977</u>. Report GE30-3. Washington, D.C.: U.S. Government Printing Office, August.
- U.S. Bureau of the Census (1979b). "1976 Population Estimates and 1975 and Revised 1974 Per Capita Income Estimates for Counties and Incorporated Places," <u>Population Estimates and Projections</u>, Series P-25, nos. 740-789. Washington, D.C.: U.S. Government Printing Office, January.
- U.S. Congress, Joint Economic Committee (1967-1968). <u>Financing Muni-</u> <u>cipal Facilities</u>. Hearings. 2 vol. Washington, D.C.: U.S. Government Printing Office.
- U.S. Congress, Joint Economic Committee (1977). <u>Financing Municipal</u> <u>Needs</u>. Hearings. Washington, D.C.: U.S. Government Printing Office.
- U.S. Department of Housing and Urban Development (1976). An Evaluation of the Community Development Block Grant Formula by Harold Bunce. Washington, D.C.: Department of Housing and Urban Development.
- Weicher, J. C. (1972). "The Effects of Metropolitan Political Fragmentation on Central City Budgets," in D. C. Sweet, ed., <u>Models of</u> Urban Structure. Lexington, Mass.: Lexington Books.
- West, Richard R. (1970). "An Alternate Approach to Predicting Corporate Bond Ratings," Journal of Accounting Research 8 (Spring): 118-125.
- West, Richard R. (1973). "Bond Ratings, Bond Yields, and Financial Regulation: Some Findings," <u>Journal of Law and Economics</u> 16 (April): 159-168.
- White, Anthony G. (1977). <u>Municipal Securities: I. General Obligation</u> <u>Bonds</u>. Exchange Bibliography no. 1411. Monticello, Ill.: Council of Planning Librarians.
- Wilson, John O. (1969). <u>Quality of Life in the United States: An Ex-</u> <u>cursion into the New Frontier of Socio-Economic Indicators</u>. Kansas City, Mo.: Midwest Research Institute.
- Zeigler, Donald J. (1980). "Geopolitical Fragmentation and the Pattern of Growth and Need," in S. D. Brunn and J. O. Wheeler, eds., <u>The</u> <u>American Metropolitan System: Present and Future</u>. New York: Wiley.
- Zeigler, Donald J. (1976). "Selected Quality of Life Indicators and Demographic Characteristics of Standard Metropolitan Statistical Areas in the United States," Unpublished M.A. Thesis, University of Rhode Island.