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<https://doi.org/10.18297/etd/44>

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FRAGMENTATION, SPRAWL AND ECONOMIC DEVELOPMENT

By

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M.A., Perm State University, Russia, 1995

A Dissertation
Submitted to the Faculty of the
Graduate School of the University of Louisville
In Partial Fulfillment of the Requirements
For the Degree of

Doctor of Philosophy

Urban and Public Affairs
College of Business and Public Administration
University of Louisville
Louisville, Kentucky

May 2005

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A Dissertation Approved on

February 24, 2005

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ACKNOWLEDGEMENTS

First of all I would like to thank Dr. Hank Savitch for his guidance, help and patience. Thank you, Dr. Savitch! It was an honor working with you on this and other projects over the last several years.

I wish to thank all the members of my dissertation committee for their advice and support. In addition, I would like to thank Dr. Peter Meyer for his valuable comments and ideas for this research.

I would like to acknowledge the financial assistance of the School of Urban and Public Affairs, and the U.S. Department of Housing and Urban Development that made my education at the University of Louisville and this dissertation possible.

Finally, special thanks are given to my wife Julia for encouragement and understanding.

ABSTRACT

FRAGMENTATION, SPRAWL AND ECONOMIC DEVELOPMENT

Grigoriy V. Ardashev

February 24, 2005

Fragmentation of governments and urban sprawl has been a subject of debate for a considerable time. The discussion often centers on whether space (sprawl) and politics (fragmentation) make a difference in the economic development of metropolitan areas. The hypothesis was set to follow the argument of polycentric school of thought on the organization of metropolitan governance. It was expected that competitive local public economies would be beneficial to the economic performance of the regions. Regarding the effect of sprawl, the study assumed that following the lines of free-market defense of sprawl it would be positively associated with economic performance of the metropolitan areas. The aim of this study was to examine empirical evidence and find support for either of these theories.

The dissertation is organized in six chapters. The first chapter introduces the issues of metropolitan governance. Chapter II reviews dominant theories of metropolitan governance, defines fragmentation and sprawl, outlines the discussion on cost and benefits of urban sprawl, and examines theoretical and empirical research linking fragmentation and urban sprawl. Chapter III describes the research methodology by formulating specific models used for this investigation and outlining the variables used in the models. The results of the statistical analysis are presented in Chapter IV. Chapter V discusses the findings of the study in the context of the

previous knowledge in the field. Finally, I summarize the results of the research, and formulate policy implications and suggestions for future research in Chapter VI.

This study confirms the hypothesis of a positive link between metropolitan economic performance and fragmentation of metropolitan governance. Both correlations and regression models show positive link between fragmentation and economic performance for all metropolitan areas in the United States.

The hypothesis about the positive impact of sprawl on economic performance of metropolitan areas was not confirmed. In fact, the opposite is true at least for a large part of US metropolitan areas. Metropolitan areas with population between 200,000 and 1,000,000 with higher levels of sprawl demonstrate weaker economic performance.

The associations between sprawl, fragmentation and such desirable and beneficial to economic performance indicators as human capital, affluence and tax effort are statistically significant and they take the same direction as the ones with economic performance – positive for fragmentation and negative for sprawl.

Previous research suggests that the impacts of local governance structure on metropolitan economic performance may be secondary to the trends in state economic development. Regression analysis performed in this study reveals that the impact of fragmentation and sprawl on economic performance of metro areas is comparable to that of their states' economic performance.

While fragmentation and sprawl are weaker predictors of economic performance than economic development factors (human capital and tax effort), controlling for these factors did not render the relationships between fragmentation, sprawl and economic performance statistically insignificant. This emphasizes the notion that politics and space do play an important role in the regional economic outcomes.

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CHAPTER I

INTRODUCTION

The issues of regional governance, urban sprawl, and economic development have spawned a significant volume of both theoretical and empirical scholarship concerning linkages between the organization of governance in metropolitan areas and urban development. However, the exact nature of the relationship between governance and urban development is not specified and many questions remain unanswered. This research explores the relationships between political fragmentation, urban sprawl, and economic aspects of urban development. It is designed to complement the current knowledge on the issues of metropolitan governance and test the efficacy of research tools suggested in recent literature on the subject.

The most common indicator of the structure of metropolitan governance – fragmentation of governments – can be understood from different viewpoints. Research points out both negative consequences (inequitable development, urban sprawl) as well as positive sides (accountability, political representation) of fragmentation. Two major theories of metropolitan governmental organization dominate current discussion. Monocentric, or reform, theory stresses negative consequences of multi-centered development and views consolidation of government as a solution to urban ills. Supporters of polycentric, or public choice theory, tend to favor competitiveness and representation that are associated with multicentered development. The debate between the supporters of the two theories together with the

actual experiences of American communities with metropolitan reforms inspired a more recent theory of regionalism. Regionalism is “both a policy agenda and a genre of public sector interventions designed to deal with that agenda” (Savitch and Vogel, 2000). It offers both extensive, comprehensive reforms as well as more limited gradual incremental adjustments toward a metropolitan vision.

Today’s vision of metropolitan governance is a logical extension of more than a century of theoretical and practical efforts by urban scholars and city leaders to create mechanisms for governing fragmented American metropolitan regions. The first calls for metropolitan governance reform in the form of creating a single centralized authority appeared early in the last half of the 19th century. Since that time numerous attempts to understand the mechanisms of local public economies and create appropriate governance solutions were made (Stephens and Wikstrom, 2000). According to framework suggested by Wallis (1994a), the history of regionalism in the United States can be seen as the succession of the three waves. These waves correspond to the changing urban form – monocentric industrial city-region of the late 19th century through the first half of the 20th century, polycentric metropolis of the 1950s to the late 1970s, and today’s metropolitan regions in a post-industrial economy.

The first wave of regionalism appeared with the development of the monocentric industrial metropolis of the end of 19th century. At that time the need to reorganize city government structures was caused by the realization that a city had to adjust in order to compete with other fast-growing communities (Norris, 2001). Metropolitan government was viewed as a way to balance the level of services throughout the city, to increase government efficiency, and to resist the influence of political machines (Wallis, 1994b). The research was focused on optimization of

government functions, on increasing accountability and on the application of scientific management principles to municipal government (Stephens & Wikstrom, 2000). Perhaps the best-known example of this era is the consolidation of Manhattan and surrounding counties that in 1898 formed the current city of New York.

The second wave of regionalism in the United States corresponds to the development of polycentric metropolis. While a number of cities, especially in the South and West, were able to capture some share of booming suburban growth by annexing adjacent territories, this process was quickly suppressed by suburban political interests (Stephens & Wikstrom, 2000). This period is characterized by the influence of federal policies that required regional cooperation for transportation planning and environmental protection. Due to this support, almost all metropolitan areas established Councils of Government designed to promote cooperation between local governments. By the end of 1970s federal funding of regional initiatives had shrunk and most of them were abandoned.

Not all researchers agreed with the vision of centralized government for metropolitan areas. Public choice theory scholars following the principles of classical economics viewed the fragmented metropolis as a local public economy operating according to the same market principles as businesses do (Tiebout, 1956; Ostrom, Tiebout, & Warren, 1961). According to this theory, multiple local governments offer voter/consumer a choice of services and taxes. Residents act in rational economic sense and chose the best community according to their desires and financial resources (“vote with their feet”). Local government can achieve greater efficiency by distinguishing between provision and production of public services. Local governments are not required to deliver routine services and can hire outside contractors and benefit from the competition between the producers of services.

This third wave of regionalism reflects the realities of today's post-industrial metropolitan regions that compete in a service-oriented global economy (Wallis, 1994a). The rise of interest and public awareness in community problems of regional scale reappeared in the early 1990s. The new quest for regional solutions to urban problems was initiated with the publications of such authors as David Rusk (1993) and Anthony Downs (1994). Alarmed by the Census statistics that demonstrated disturbing trends of environmental degradation, suburban sprawl, growing disparities between central city and suburbs, increasing concentration of poverty in central cities, and suburban residential segregation (Kasarda, 1993; Ledebur & Barnes, 1992; Nathan and Adams, 1976, Nathan and Adams, 1989), these authors advocated the creation of regional authorities with wide areas of responsibility. While a variety of competing views on the peculiarities of organization of metropolitan governance exists today, there are some common themes. Among them are the interdependence of cities and suburbs (Savitch & Collins, 1993); a need to promote voluntary cooperation between local governments in metropolitan areas; a desire to minimize social disparities; and a search for ways to strengthen "the ability of older core cities to participate in and contribute to regional economic growth" (Friskin and Norris, 2001, p. 474).

The logic of local governmental arrangements reflecting the values of American citizens had created a unique urban form – the multi-centered metropolis. To put the focuses of this research in perspective it is important to understand the historical logic of multicentered development in the United States.

Development of Multicentered Metropolis in the US

The development of the multi-centered metropolis and associated formation of fragmented political systems did not happen at once. This process was shaped by a number of factors throughout the history of the United States. Different studies focus on various economic and political impacts that shaped urban development, but the most commonly recognized are economic restructuring, central city decline and suburbanization (Vogel, 1998).

As noted above, the study by Wallis (1994) presents an important framework for understanding urban development in America. The previously described three waves of regionalism correspond to the three clearly discernible phases of metropolitan development in the United States. Wallis (1994) calls the first phase of metropolitan development in the United States the monocentric industrial city-region. While this first stage was characterized by economic dominance of central cities with concentric design of settlements and radiating commuting patterns, as early as in the middle of the 19th century the first patterns of metropolitanization have begun to emerge. This was the time when, as a response to the concentration of poverty and degrading environment in urban cores, a good part of the middle class began to move to the suburbs. The development of the first mass-transit lines allowed elites to commute from their suburban residences to places of work in central business districts. In the 1920s through early 1950s, changes in the technology of transportation, increased immigration, along with migration of Southern blacks to Northern central cities, deepened patterns of social segregation and made suburbs a place of residence of choice for the affluent (Abu-Lughod, 1999).

The second stage – the polycentric metropolis of the 1950s to 1970s is characterized by the emergence of multiple centers along transportation corridors (Wallis, 1994). By that time, the American urban system was undergoing significant changes. Decentralization triggered by federally subsidized suburban housing, highways, and air travel hubs was further intensified by changes in the international economy and changes in the spatial configuration of places of employment (Abu-Lughod, 1999).

Economic restructuring, globalization, changes in geographical locations of industries, and increasing suburbanization continue to change the image of urban America. The current third stage – “postindustrial pattern”, is characterized by higher spatial dispersion of economic activities along with higher integration through communication and transportation networks. The existence of multiple jurisdictions is a result of economic transformations of 19th and 20th centuries. Wallis calls polycentric organization of regions “an expression of the maturation of industrial production”.

One common point that unites followers of different perspectives on metropolitan governance is the assessment of the role of federal government in the suburbanization of America. According to one study, postwar urban development was determined by national suburban policy, whose elements include low-cost home mortgages, the secondary mortgage market, pro-homeowner tax policies, urban renewal, federal transportation policy, and sewage plant expansion (Rusk, 1999). All of the programs and policies mentioned above were initiated by the federal government and implemented by or with substantial assistance from the federal level. However, the impact of the federal government on urban form cannot be reduced only to its role in the decentralization of American regions. As research shows oftentimes

local political jurisdictions are forced to cooperate and deal with regional issues only under pressure of federal environmental and transportation regulation (Wachs & Dill, 1999; Savitch & Vogel, 1996; Rusk, 1999).

The aforementioned patterns of urban growth and corresponding patterns in the development of urban government have led to a condition where according to one study “the average metropolitan area contains roughly 117 governing units, making America one of most fragmented nations on Earth” (Savitch & Vogel, 1996, p.11).

While the organization of localities in multiple political jurisdictions does not necessarily mean a flawed system of governance, a number of urban problems are traditionally associated with it. The list often includes “lack of coordination and cooperation among municipal police departments which results in difficulties in apprehending criminals who cross municipal boundaries; municipal enclaves containing heavy industry which pollutes the air over surrounding communities which are trying to implement pollution controls; and the land use zoning practices directed solely by local interests which promote social and racial residential segregation” (Barlow, 1981, p.21). The study by Phares and Louishomme (1996, p.72) suggests that “although taking a literal stance against fragmentation per se would be without basis, there are substantive problems associated with the fragmentation, uncoordinated regional governance, and self-interest-driven ad hoc annexations and incorporations.” Another study hypothesizes that “fragmentation and lower levels of central-city annexation contribute to (1) a gap in personal income between the central city and the suburb, (2) the fiscal hardship of the core city, and (3) racial separation and isolation within the metropolitan area” (Morgan, & Mareschal, 1999, p.583). In fact, some scholars feel so strongly about this relationship that they call the

organization of localities in multiple jurisdictions “Balkanization” of America (Rusk, 1999; Warren, 1964).

There is no simple solution to the problems of reorganization of the current fragmented system. Difficulty in the organization of metropolitan governance arises, in the words of Ostrom, Tiebout and Warren (1961, p. 831), because the “metropolitan region is a legal non-entity [...] the people of a metropolitan region have no general instrumentality of government available to deal directly with the range of problems which they share in common.” Local government “has no firm place within the framework of US law” (Poindexter, 1996, p.1824). Until the reorganization experiences of Miami and Jacksonville there was no contemporary model for formal metropolitan government.¹ Even formal city-county arrangements represented by Miami-Dade and Charlotte-Mecklenburg do not present a viable model for regional-level decision-making, coordination and economic development.

With this background in mind I now recapitulate the problem to be investigated and discuss it in relation to the investigation contained in subsequent chapters.

Goals of this Research and an Overview of the Study

Differing and often contradictory models of metropolitan governance require an empirical analysis for assessing their relative strengths and weaknesses. An Advisory Commission on Intergovernmental Relations (ACIR) report (1987) suggests

¹ Earlier consolidations in the 19th century such New York’s or New Orleans’ were exceptions and bear little relevance to contemporary problems.

that we need to know which provision and production arrangements are optimal in different levels of governance. Another report by the National Research Council stresses the importance of research on metropolitan governance and its effects, on development and policy options (Altshuler et al., 1999). P. Lewis (1996, p.48) recommends that “we need to seek an appropriate quantitative measure of urban political fragmentation”. A substantial body of research is already dedicated to the development and evaluation of various quantitative measures of metropolitan governance. Despite the work done on this subject, Nelson and Foster (1999, p.310) point out that “empirical evidence linking governance structure to income growth is scant and inconclusive”.

This study is designed to provide such an empirical analysis for the part of the debate on metropolitan governance that links politics and space with metropolitan economic performance. As observed by Norris (2001) the argumentation for governmental reforms is increasingly based on the claims to the benefits to metropolitan prosperity that may realize from public policy corresponding to either of the sides in this debate. So, an empirical statistical analysis could help determine appropriate directions in public policy.

The results of such analysis may indicate the following. If the results support the argument of the polycentric theory it may be suggested that competition among multiple local governments should be encouraged. On the other hand, if the results offer support for the monocentric theory, corresponding changes to public policy advancing regional governments are warranted. If the results are mixed, this calls for a careful mix of policies designed to accommodate negative and positive sides of both arguments, and for additional research. The results that are not statistically significant would indicate that politics and space do not directly impact metropolitan

performance and thus public policy aimed at increasing regional welfare should focus on more traditional measures of economic development. The conceptual framework is outlined in the Table 1.

Table 1.

Conceptual Framework: Possible Policy Response to Results of this Research

		<i>Results:</i>			
		<i>Polycentric / Market</i>	<i>Monocentric / Centralized</i>	<i>Mixed</i>	<i>No Statistically Significant Link</i>
<i>Fragmentation and Economic Performance</i>		Encourage competition among local governments	Formal regional government	Mixed policies; Additional research	Focus on economic development tools
<i>Sprawl and Economic Performance</i>		“Let markets plan”	Growth controls	Mixed policies; Additional research	Focus on economic development tools

In addition, even if the argument for or against particular government structures based on the potential benefits to economic performance is powerful, it is not sufficient without the evaluation of the possible social costs and benefits. While this is not the central question of this research, a particular attention will be paid to the possible relationship between sprawl, fragmentation and racial residential segregation in order to illustrate this.

Essentially this study deals with the relationship between the structure of local governance and economic performance of metropolitan areas. This research offers a way of measuring governmental fragmentation as it relates to urban sprawl and economic performance. It seeks answers to a number of questions. First, the dissertation examines evidence linking sprawl with fragmentation of governments. Second, the interaction between political fragmentation and economic performance is studied and discussed. Third, the links between sprawl and economic performance are analyzed. The study relies on quantitative methods in both operationalizing the variables and analyzing the relationships between them.

The study employs two theories of local economic development as benchmarks for comparison of fragmentation and sprawl as the factors of metropolitan economic performance with a more traditional measures designed to improve metropolitan performance. This methodology allows for a better understanding of the political components of urban growth. It is possible to evaluate the possible links between fragmentation and sprawl in correlation models. Modeling metropolitan performance as a function of fragmentation, sprawl and economic development factors can show whether fragmentation and sprawl can act as proxies for each other.

The dissertation is organized in six chapters. The first chapter introduces the issues of metropolitan governance. Chapter II is divided into three distinct sections. The first section reviews dominant theories of metropolitan governance and defines fragmentation. The second section defines urban sprawl and examines the literature on urban sprawl by exploring evidence about its costs and benefits. The third section examines theoretical and empirical research linking fragmentation and urban sprawl. This chapter concludes with a more specific statement of the problem and a

formulation of hypotheses for analysis. Chapter III describes the research methodology by formulating specific models used for this investigation. Next, I outline the variables used in the models. The results of the statistical analysis are presented in Chapter IV. Here I present tables and maps illustrating the range of variation in structure of governance and the degree of urban sprawl across metropolitan areas in the United States as measured by the indicators used in this study. Correlation coefficients are calculated to examine the association between the variables. Next, I present the results of the regression models. Chapter V discusses the findings of the study in the context of the previous knowledge in the field. Finally, I summarize the results of the research, and formulate policy implications and suggestions for future research in Chapter VI.

CHAPTER II

LITERATURE REVIEW, PROBLEM STATEMENT AND HYPOTHESIS

The questions of fragmentation, sprawl and economic development should be considered within the framework of previous theoretical and empirical knowledge. The discussion on the issues of governmental efficiency and organization of metropolitan governance goes back to the end of the 19th century. Essentially, the discussion centers on the dialogue between the monocentric versus polycentric approaches to metropolitan government. The focus of discussion on urban sprawl tends to concentrate on its negative consequences; however, more recently researchers have started to investigate possible justifications of such pattern of development.

In this chapter I describe two dominant theories of metropolitan governance as they relate to the fragmentation of governments. Second, I discuss the definitions and measurement of urban sprawl, and review the arguments about its costs and benefits. Later, I present the findings of studies linking sprawl and fragmentation. Chapter II concludes with the statement of the problem and formulation of hypothesis for this research.

Monocentric Theory of Metropolitan Governance

Definition

Stephens and Wikstrom (2000, p.48) in their summary of theory and practice of metropolitan governance define the monocentric theory as following:

1) the *fundamental* problem of the metropolis is the decentralized, or fragmented, character of local government, with its multiple number of local government; 2) the fragmented nature of local government results in inefficiency and ineffectiveness; 3) due to the disparity of wealth among communities, local public services are marked by inequality and lack of equity; 4) services that should be provided on a metropolitanwide basis are delivered by a multitude of local governments; 5) there is a lack of metropolitanwide political leadership, sensitive to the well-being and interests of the entire region, responsive to socioeconomic problems, and planning for the future; and 6) therefore should be established in every large urban region a metropolitanwide governmental structure.

Ostrom (1998, p.6) formulates the basic assumptions of the monocentric theory:

1. Urban public goods and services are relatively homogeneous and similarly affect all neighborhoods within a metropolitan area.
2. Urban voters share relative similar preferences for urban goods and services.
3. Voters effectively articulate their preferences for diverse urban goods and services through a single electoral mechanism.
4. Large scale is needed to finance high quality services.
5. Elected officials can best specify the levels of urban goods and services that should be produced to public bureaus and determine tax revenues to achieve these objectives.
6. Heads of public bureaus have effective command over street-level bureaucrats who then produce the highest level of public goods and services given the budget they receive.
7. Street-level bureaucrats deliver these goods and services to passive clients.

Theory

As noted in Chapter I, the roots of monocentric theory of metropolitan governance go back to the earliest attempts of metropolitan reforms in the late 19th century. The theory incorporates the ideas of the good government movement and

applies the principles of scientific management to urban governance. While a number of governmental reforms were conducted in the 19th century, it was not until the 1930s that the ideas of the monocentric theory were first articulated in the research literature. The main principles of the monocentric theory were first comprehensively formulated and discussed by Paul Studenski in his 1930 book *The Government of the Metropolitan Areas in the United States*. The author makes a claim about inefficiency of fragmented system of government and refers to it as a chaotic and accidental to past legislative decisions. He attributes to governmental fragmentation the inability of municipal authorities to make coherent decisions on issues of metropolitan scale.

The study examines a variety of possible approaches to governmental reorganization and service delivery arrangement in metropolitan areas: consolidation, separation, urban service county, voluntary cooperation between local governments, and special districts established to address problems of regional scale. The author points out the strengths and weaknesses of these approaches as well as their applicability to future governmental reforms. He dismisses voluntary cooperation because of its limited effectiveness, and he is cautious about political obstacles facing mergers and annexations. He views special districts as a useful, but temporary solution. Studenski argues that a more viable alternative to consolidation given the political obstacles to comprehensive reforms is a federated city. In this model “the constituent municipalities are not completely merged but continue to exist as separate entities exercising a degree of local control within their boundaries” (Studenski, 1930, p.367). The federated city model entails a distribution of powers between local governments and delegation of authority to a federative metropolitan government. The author stresses that “recent experience appears to demonstrate that for the time being at least complete consolidation is not a practicable solution for any region as a

whole” (Studenski, 1930, p.386). Thus, the federated city model may help overcome difficulties in implementation of metropolitan government reform.

Studenski summarizes his discussion in several points. He states that 1) the organization of governance in each region presents a special case and the solutions for governmental reforms will differ between metropolitan areas; 2) various models leading to comprehensive metropolitan government are complementary and can coexist; 3) consolidated metropolitan government does not necessarily lead to the elimination of small local governments, because it is possible to create federative and two-tiered arrangements; 4) local political leadership should pay more attention to the issues of regional scale rather than individual projects catering to the needs of small groups of constituents; and 5) state governments and the federal government should emphasize metropolitan reforms. According to Stephens and Wikstrom (2000), Studenski’s work constitutes an important benchmark in the analysis of metropolitan government because first, it set forth a systematic discussion of metropolitan governance; second, it created a central working premise for scholarly discussion on the subject for the next 30 years and third, it was a vehicle for the subsequent efforts of government reforms.

The thesis of Studenski’s work recurred in Victor Jones’ 1942 book *Metropolitan Government*. Jones characterizes the problem of metropolitan government as “the need for servicing a large population scattered under the jurisdiction of many units of local government, most of which are crippled by limited powers over a restricted area, by inadequate tax resources, and by such consequences of premature subdivision as heavy indebtedness and extensive tax arrears” (Jones, 1942, p.24). The author describes the two sets of solutions for the problem of metropolitan government: solutions involving no structural changes and solutions

requiring fundamental structural changes. The first set of solutions includes the provision of services by central city to the surrounding territories, establishment of special districts, intergovernmental arrangements, and transfers of metropolitan functions to states and the federal government. Similarly to Studenski, Jones sees intergovernmental contracts and special districts not as tools of cooperation but rather as encouragement of excessive competition and reduced transparency of local government. He argues that the only viable answer to political fragmentation are permanent solutions requiring fundamental structural changes, including annexations, mergers, federated government, and establishment of urban county government.

Jones highlights a number of political issues surrounding comprehensive metropolitan government. Starting with the politics of integration in central cities, Jones shows that major political players with business interests on the agenda often times support consolidation efforts. Businesses consider consolidation as a positive development because in their view it leads to the higher census rankings of the city, reduced costs of government and better service delivery. Describing the politics of integration in the suburbs, Jones points out the sources of opposition to the reforms - suburban municipal consciousness and distrust in central city. He advocates securing political support in suburbs by making concessions and by the guarantees of legislative representation. Finally, Jones shows the difficulties of getting metropolitan government reforms approved by state legislatures. He urges reform proponents to concentrate on well planned and technically sophisticated political campaigns with the focus on “symbol-reinforcing propaganda”. According to Stephens and Wikstrom (2000), it is the investigation of the political aspects of metropolitan reforms that makes Jones’s study an important milestone in the study of metropolitan government.

The renewed interest in the issues of metropolitan governance in the current urban research literature is often attributed to the new work on the premises of reform theory. The first publication that has started the current wave of concern was David Rusk's 1993 book *Cities without Suburbs*. *Cities without Suburbs* raises questions about inequities in metropolitan economic development and examines the links between the socioeconomic disparities, the economic welfare of metropolitan areas, and the annexation policies of central cities. Rusk argues that aggressive annexation policies leading to the decrease in fragmentation can alleviate disparities between central cities and suburbs. To understand the relationship between central-city expansion and economic development Rusk introduced the concept of elasticity. City elasticity is a measure calculated as initial city density times the rate of boundary expansion. The cities are thus divided into elastic and inelastic:

The cities with the greatest elasticity had vacant land to develop and the political and legal tools to annex new land....At the other end of the spectrum were the "inelastic cities" – typically older cities already built out at higher than average densities and, for a variety of reasons, unable or unwilling to expand their city limits (Rusk, 1993, p.10).

Rusk links metropolitan economic development with city elasticity and argues that elastic cities perform better economically, show lower racial segregation patterns and have fewer economic disparities between central cities and suburbs. Based on the analysis of elasticity the author recommends reorganizing metropolitan governance favoring consolidation, annexations by central cities and restrictions on suburban incorporations.

In his later book, the *Inside Game/ Outside Game* published in 1999, Rusk expands his argument and outlines what in his view are the more effective mechanisms of addressing central city problems. While the city elasticity concept is still central to the analysis, the author concentrates on a number of practices used by

communities throughout the nation to solve urban problems. Rusk emphasizes the limited effectiveness of the measures that he calls the “inside game” – small scale programs aimed at revitalizations of urban neighborhoods. The examples of the “inside game” mechanisms are community action programs, model cities programs, community development block grants, urban development action grants, empowerment community and enterprise zone funds and tax credits (Rusk, 1999). In his view, only the “outside game” – regional-scale measures such as legislative changes to zoning practices, urban growth boundaries and revenue sharing will enhance the fortunes of central cities. Because small fragmented local governments (the “little box” governments) are either unwilling or incapable of dealing with issues of regional scale, Rusk urges the creation of the “big box” governments. These governments can take various forms, but in general they act as an umbrella over existing structures coordinating regional-scale initiatives. They should change the attitudes of the public towards a more coherent regional vision and create new laws regarding economic and racial segregation of the neighborhoods.

In another recent publication following the tradition of monocentric theory, Anthony Downs (1994) argues that fragmented decentralized metropolis leads to a number of social inconsistencies. These inconsistencies are the result of failure to transfer social costs from those who incur them to those who benefit from them the most. Downs describes the dominant vision of how American metropolitan areas ought to grow. The elements of the dominant vision include: 1) ownership of detached single-family homes on spacious lots; 2) ownership of automobiles; 3) working in low-rise workplaces; 4) residence in small communities with strong local governments; and 5) environment free from signs of poverty. He sees the solution to the urban problems in changing the dominant vision to a more socially responsible

model. Although Downs does not insist on single areawide government as being the only answer to the undesirable consequences of the dominant vision, he argues that more centralized decision-making would benefit metropolitan areas. Alternative visions of growth, as Downs points out, must include ways to reduce fragmentation of land-use powers.

Empirical Support

A number of attempts at empirical evaluation of the claims of the monocentric theory have been made, however the evidence presented does not provide sufficient proof to close the discussion. For example, Lions and Lowery (1989) compare the results of surveys of citizen satisfaction with urban services in a consolidated metropolitan area and in a metropolitan area with a fragmented system of governance. The study challenges the claims of the public choice theory to a greater citizen satisfaction and better knowledge about local service providers resulting from the competition between municipalities. The authors compare the responses of the residents in five matched pairs of suburban neighborhoods to a survey of their knowledge about and satisfaction with various government services. They found that for the most part the residents living in a consolidated metropolitan area were more satisfied and felt better informed than their counterparts living in a fragmented metropolitan area. While the study could have raised questions about the citizen satisfaction in a fragmented metropolis, the limitations in its methodology substantially lessen the conclusiveness of its findings. The study relied on comparison between the two metropolitan areas with substantial differences in population (Louisville-Jefferson County with 1980 population of 685,004 and Lexington-Fayette County with 1980 population of 204,000). Also, the differences of means in the sets

of results were very small and could as well have been attributed to the factors other than the structure of governance.

One of the more compelling arguments for the monocentric theory in a study examining the links between economic performance of metropolitan areas and the structure of governance was made by Nelson and Foster (1999). In this study of 287 metropolitan areas the authors analyzed the impact of metropolitan governance structure on income growth controlling for a variety of additional factors. The authors specified personal income change as a function of a comprehensive set of variables.² Among the controlling factors the most notable impact on the change in per capita personal income was made by the variables for the labor force characteristics with the measures of unionization and right-to-work state causing a significant negative impact, and educational attainment causing a significant positive impact.

The variables for local governance structure demonstrate a statistically significant positive impact of elastic central cities and suburban municipalities with a large population. A statistically significant negative impact was associated with the variables for the percent of the population living in central city and the ratio of special purpose governments to general-purpose governments. The most notable result in the variables for the regional governance structure included the presence of regional multipurpose government in metropolitan areas, which was significant and positively associated with income growth. The two-tiered government structure was linked to a

² The list of variables includes: local ecology (proximity to a large metro area, age of metro, heating and cooling degree days), local socioeconomic conditions (population base, percent of population in poverty, number of violent crimes per capita), labor force characteristics (personal per capita income, percent labor force employed, right-to-work state, percent union membership), economic structure (metropolitan economic capture rate, local effective tax rate, and separate variables for the percent of income from construction, manufacturing, transportation, wholesale trade, retail trade, FIRE, and services), regional location (according to Census divisions), local governance (percent central city population, central city annexation ratio, percent unincorporated population, suburban city average population, special service district dominance, school district density, elected general purpose density, elected special district density), and regional governance (city county consolidation, single-county two-tier federation, regional utility district, regional multipurpose district).

large and statistically significant decrease in per capita income growth; however, the authors acknowledge the possibility of this result being due to another factor unaccounted for in the research design. The association between the variable for the city-county consolidation and income growth was not statistically significant. The results of the analysis suggest that “elastic central cities supplemented by large suburban municipalities operating in a climate where resource allocation decision affecting the region are coordinated through cross-jurisdictional, multipurpose regional governance arrangements may satisfy individual welfare best” (Nelson & Foster, 1999, p.320). Overall, the study provides only a limited proof for the monocentric theory.

To summarize the preceding discussion, the followers of monocentric theory emphasize economies of scale and benefits to urban development due to “regulatory consistency, a professionalized bureaucracy, and fewer interactions” of investors with government (Nelson & Foster, 1999, p.311) associated with centralized metropolitan government. Followers of the monocentric theory argue that a single jurisdiction can provide better services than a fragmented system. Traditional criticism of the reform approach is based on several flaws in the argument, mainly the assumptions that “one size fits all”; that consolidation of services necessarily leads to economies of scale; that provision units can not be distinguished from production units; and that benefits of consolidation will exceed benefits from competition (Miller et al., 1995). The empirical evidence in support of the monocentric theory is limited and partial. For the most part, the arguments are subjective and based on value judgments. When empirical support does emerge (Nelson and Foster, 1999), the analysis suggests solutions that are closer to the regional cooperation and planning than to the ideas of government consolidation.

Polycentric Theory of Metropolitan Governance

While the intellectual debate on the organization of metropolitan governance in the first half of twentieth century was dominated by the monocentric, or “reform” school of thought, by the mid-twentieth century an opposing view had emerged.

Where the metropolitan reform proponents viewed the current organization of governance as “a maze, a jungle, a crazy quilt, a stew, or other metaphor indicating an absence of rational organization”, public choice scholars suggested that fragmented system of governance is best described as “a complex local public economy” (Parks and Oakerson, 1989, p.19).

Definition

Summed up by Stephens and Wikstrom (2000, p.117), the argument of public choice school can be presented as follows:

(1) a variety of local governments is more responsive to diverse service needs and preferences than a single metropolitan government; (2) citizens, acting on a rational and self-interested basis, are able, by “voting with their feet”, to reside in a community that best meets their service and tax preferences; (3) services may be delivered by a variety of governments and private vendors in terms of geographical size, thereby realizing the benefits of more efficient, effective, and responsive services and economies of scale; (4) multiple number of governments and private vendors providing services diminishes the problems associated with monopoly providers; (5) multiple governments provide more opportunities for citizens to become involved in government and to assist in the production of public services; and (6) the frequency and regular interactions between governments constitute a system of metropolitan governance that can successfully respond to metropolitanwide service and policy challenges.

Ostrom (1998, p.8) puts together the following assumptions of the polycentric theory:

1. Urban public goods and services differ substantially in regard to their production functions and the number of people who are simultaneously

affected. Public services, like education and policing, require the active coproduction of citizen-consumers to complement the inputs of those formally called producers.

2. Individuals with relatively similar, but always evolving, preferences for public goods and services tend to cluster in neighborhoods. Preferences will be more homogeneous within neighborhoods than across an entire metropolitan area.

3. Citizens who live in an urban area served by multiple jurisdictions learn more about the performance of any one jurisdiction by seeing or hearing about how problems are handled in other jurisdictions.

4. Multiple jurisdictions with different scopes and scales of organization allow citizens more effective choice in selecting the package of services most important to them, in articulating their preferences and concerns, and, if necessary, in moving to other jurisdictions.

5. Multiple jurisdictions enable fiscal equivalence to be accomplished so that beneficiaries are primarily responsible for costs. Redistribution is best assigned to very large units of government - at a state or national level.

6. The presence of large numbers of potential producers of urban goods and services in a metropolitan area allows elected officials more effective choice of producers for their citizens as well as a way to discipline low-performing producers by contracting with another producer.

7. Producers who are competing for continued contracts will be more likely to search out innovative technologies, to operate at close to optimal scale of production, and to encourage effective team production as well as coproduction, so as to enhance their own performance.

Theory

The public choice concept was introduced by Tiebout in 1956. In his seminal article “A Pure Theory of Local Expenditures”, he proposed a framework for optimizing the balance between a community size, level of public expenditures and levels of services in communities. The model uses a political economy approach for understanding the patterns of local governmental expenditures. Tiebout viewed citizens as consumer-voters that move to communities “which best satisfies [their] preference pattern for public goods. [...] The greater the number of communities and the greater the variance among them, the closer the consumer will come to fully realizing his preference position” (Tiebout, 1956, p.418). The desired balance of public goods and local expenditures in a local public economy is achieved by

promoting residential mobility and increasing the public knowledge about the available packages of taxes and services offered by different communities.

Tiebout acknowledged the limitations of his model and pointed out a number of assumptions implied in it. These assumptions include full mobility of citizens, their full knowledge about different patterns of public expenditures and services, a large number of communities to choose from, and independence of place of residence from place of work (all citizens are assumed to be living on dividends). While pointing out that public preferences are best satisfied at the local level, Tiebout recognized that in some cases “in which the external economies and diseconomies are of sufficient importance, some form of integration may be indicated” (Tiebout, 1956). He concludes that while the model does not perfectly mirror the political economy model of competitive markets, still it provides a conceptual solution to provision of public goods in a fragmented metropolitan setting.

The original public choice model was expanded and applied to the issues of organization of government in metropolitan areas by Ostrom, Tiebout and Warren in their 1961 study. The authors opposed the criticism of the metropolitan reform proponents regarding the absence of order and logic in fragmented arrangement of system of governance:

The assumption that each unit of local government acts independently without regard for other public interests in the metropolitan community has only a limited validity. The traditional pattern of government in a metropolitan area with its multiplicity of political jurisdictions may more appropriately be conceived as a “polycentric political system” (Ostrom, Tiebout & Warren, 1961, p.831).

The authors point out that the nature of public goods differs from the nature of goods provided privately. First, governments act upon market failures and their function is “to internalize the externalities – positive and negative – for those goods

which the producers and consumers are unable or unwilling to internalize for themselves” (Ostrom, Tiebout & Warren, 1961, p.832). Second, some public goods, such as for example police and fire protection, are not easily packageable (users that are not willing to pay cannot be excluded from benefiting from them), and it is a function of government to provide them. Third, by viewing public goods as “the maintenance of preferred states of community affairs” it is possible to determine appropriate levels for provision of services in a community.

While it is a function of government to provide the described above services, this does not necessarily mean that local governments are required to produce them. The authors make an important claim that “the *production* of goods and services needs to be distinguished from their *provision* at public expense” (Ostrom, Tiebout & Warren, 1961, p.834). Governments take advantage of competition among private providers, and “patterns of competition among producers of public services in a metropolitan area, just as among firms in the market, may produce substantial benefits by inducing self-regulating tendencies with pressure for the more efficient solution in the operation of the whole system” (Ostrom, Tiebout & Warren, 1961, p.838).

The research by Ostrom, Tiebout & Warren contributed to the understanding of organization of metropolitan governance by pointing out the logic behind the seemingly chaotic organization of governance in a fragmented metropolis. The authors introduced the concept of distinguishing between provision and production of public goods. Their research argued that optimum configuration of government in metropolitan area can be achieved without comprehensive single government.

An important contribution to the public choice school was made by Peterson in his 1981 book *City Limits*. Peterson relaxed the constraints of Tiebout model and introduced a concept of the unitary interest of a city. According to the author local

governments operate in three policy arenas: developmental, redistributive, and allocational. “Developmental policies enhance the economic position of the city. Redistributive policies benefit low-income residents but at the same time negatively affect the local economy. Allocational policies are more or less neutral in their economic effect. [...] Allocational policies are neither developmental nor redistributive; [...] the housekeeping services of local government are the best example” (Peterson, 1981, p.41, p.44). The pursuit of competitive advantages and the organization of governance in cities that reflects this pursuit are best suited to address the issues corresponding to allocational and developmental policies. Cities tend to ignore redistributive policies due to the limited resources and the perception that such policies undermine their economic strengths. According to Peterson, redistribution is best achieved at the federal or state level of government. When private citizens and businesses act according to Tiebout sorting behavior, local governments act similarly to business firms and respond with competition to attract and retain their desirable tax bases. Thus, the unitary interest of the city is the pursuit of developmental policies.

Empirical Support

The earliest empirical support for Tiebout hypothesis was offered by Hamilton, Mills, and Puryear (1975). The authors examined the effects of range of public service offerings and intergovernmental aid to education on income segregation. The study found that Tiebout mechanisms work best in suburban municipalities. Central cities lack effective pricing system to closely resemble the market model described by Tiebout. Overall, “the degree to which households segregate themselves by demand for public service depends upon the degree to which

the local public service delivery resembles a market” (Hamilton, Mills and Puryear, 1975, p.114).

Expanding the theses of Tiebout and Peterson, Schneider (1989) in his important empirical investigation of the public choice argument creates a model of polycentric government in suburban cities. Schneider constructs numerous regression models of suburban municipal expenditures as a function of demographic, intergovernmental, economic composition and fiscal factors. He demonstrated that suburban cities prioritize developmental policies to boost their attractiveness for the above-average income residents. Suburban municipalities tend to avoid redistribution that seems undesirable for middle and upper income residents – the type of taxpayers those communities pursue. Schneider’s analysis extends Peterson’s argument and demonstrates how suburban cities compete for the maximization of their tax base through the pursuit of the developmental policies.

Empirical research literature provides a number of examples of studies supporting the public choice argument. In one of such studies, Benton and Gamble (1984) conducted a time-series analysis of the effects of city/county consolidation in Jacksonville, Florida. They examined the changes in property tax revenues, total expenditures and public safety expenditures prior and after the consolidation of government. The authors found that “city/county consolidation has produced no measurable impact on the taxing and spending policies of the consolidated government” (Benton and Gamble, 1984, p.196). Contrary to the arguments of the proponents of mergers, the study observed increases in both taxes and expenditures following governmental consolidation. The authors suggest that while promoting mergers as a tool of improving urban services and streamlining the government may be convincing, the tax savings and expenditure reduction arguments are not valid.

In a time-series study, Carr and Feiock (1999) measure changes in the number of manufacturing, retail, and service establishments before and after consolidation in nine metropolitan areas over 40 years. The results demonstrated no evidence of a relationship between government consolidation and economic development. The authors point out that these findings are important because the economic development argument is one of the major selling points for the reform advocates. Similarly to Benton and Gamble, they point out that metropolitan government may result in desirable consequences for metropolitan areas; however, the evidence that these consequences relate to economic development does not emerge.

Traditionally, one of the stronger arguments of the supporters of governmental consolidation has been the relationship between political fragmentation and inequality. The study by Morgan and Mareschal (1999) uses multiple regression models to examine the links between central city/suburban inequality and metropolitan governance structure represented by various measures of fragmentation. The authors found no evidence of any impact of governmental fragmentation on income disparity and central-city fiscal health. However, even when the claims to the links between fragmentation and inequality were not revealed by the analysis, the authors found that fragmentation indeed played a role in segregation of black and white residents in metropolitan areas. Thus, the study did in fact partially substantiate the claims to the negative social consequences of fragmentation; however, the authors suggested that blaming the central-city/suburban economic disparities solely on governmental fragmentation is without basis.

To summarize the preceding discussion, the followers of the public choice approach recognize the distinction between provision and production of public goods, the difference between fragmentation and complex organization, and finally the

necessity of citizens' choice (Parks & Oakerson, 1989). Researchers following the public choice tradition argue that polycentric system offers closer match for public preferences in taxes and services. Competition between jurisdictions in fragmented systems ensures better quality and lower costs of the services provided, and it offers investors economic inducements that are not achievable in centralized setting (Nelson & Foster, 1999). Variations in size and number of governments better reflect differences in economies of scale for labor-intensive and capital intensive types of services (ACIR, 1987). While the studies discussed above show some degree of support for the polycentrists' arguments, similarly to the monocentric theory, it is relatively indirect and not conclusive.

Defining and Measuring Fragmentation

Most often the discussion about metropolitan government and governance revolves around the concept of fragmentation. Fragmentation, defined as a ratio of number of jurisdictions to population, is a common measure used as a proxy for metropolitan governance (ACIR, 1987, Parks & Oakerson, 1989). While a majority of studies of fragmentation are focused on issues of distribution and inequality, some studies of local governance quantitatively examine the effects of political fragmentation on urban growth and metropolitan outcomes.

Along with traditional measures such as ratio of number of governments to population, some researchers use additional measures of fragmentation. Savitch et al. (1993) examined interdependency of cities and suburbs and introduced a measure of inclusion – the percentage of the population of a metropolitan area residing in the

central city. In another example, a study examines effects of central city/suburban fragmentation using such measures as “(1) the number of cities within the metropolis, (2) the percentage of MSA land area within the central city, and (3) a measure of central-city annexation” (Morgan & Mareschal, 1999).

D. Rusk’s book *Cities without Suburbs* introduced a new proxy for metropolitan governance and political fragmentation – city elasticity. City elasticity is measured as initial density of the central city times the rate of boundary expansion (Rusk, 1999). Today some scholars use the city elasticity score to substitute for fragmentation. A study by Hart et al.(1998, p.435) equates metropolitan governance with city annexation policy by measuring “the degree to which a metropolitan statistical area had a metropolitan government” using the elasticity score developed by Rusk. Critical analysis by Blair and Staley (1996) shows a number of flaws in the theory behind Rusk’s conclusions. To list a few, Blair and Staley demonstrate such weaknesses in Rusk’s argument as failure to justify the theoretical link between elasticity and metropolitan growth, failure to consider the possibility of land conversion and redevelopment, and failure to provide appropriate large-sample statistical tests of the elasticity hypothesis. The authors come to the conclusion that “central city elasticity by itself should not be viewed as a powerful tool for the enhancement of metropolitan economic welfare, although it may have modest effect in some circumstances” (Blair & Staley and Zhang, 1996, p.351).

In his 1996 book *Shaping Suburbia*, Lewis uses an interesting approach to operationalize political fragmentation. Instead of traditional measures of fragmentation, which the author shows to be limited due to the failure to reflect variation in power and degree of control over land use, Lewis develops a Political

Fragmentation Index. The index is based on total expenditures per capita by land-use related local governments. It is calculated according to the following formula:

$$PFI = TE (1-SSP),$$

where *TE* – total expenditures per capita by land use-related local governments, and *SSP* is the sum of squared percentages of *TE* accounted for by each local government.

Lewis (1996, p.49) explains the term (1-SSP) as “the probability that two randomly selected dollars of local public expenditure in a given metropolitan area were not spent by the same local government”.

This indicator differs from the traditional measure; in fact, correlation analysis shows no associations between the Political Fragmentation Index, number of governments, and ratio of governments to population. Lewis’ index allows researchers to observe important relationships that link the system of regional governance to spatial configuration of the metropolitan region. Table 2 presents a summary of measures of government fragmentation used in the current research literature.

<i>Table 2: Measures of Government Fragmentation or Decentralization</i>	
<i>Author</i>	<i>Fragmentation Measure</i>
Hawkins 1971	Governments per 100,000 persons
Hill 1974	1. Number of municipalities 2. Number of municipalities per capita
Goodman 1980	1. Number of general purpose units 2. Number of special purpose units
Zeigler and Brun 1980	Number per 100,000 persons
DiLorenzo 1983	Concentration of tax and expenditure in four largest jurisdictions in a county
Bollens 1986	1. Number of suburban units with more than 10,000 persons, per 100,000 persons in the MSA. 2. Percent of Metro residents in suburbs with more than 10,000 people
Schneider 1986	Municipalities per 100,000 people
Oakerson 1987	Total number of governments per 10,000
Dolan 1990	Fiscal dispersion – standard deviation of expenditure by governments within a county
Barlow 1991	1. Number of municipalities 2. Differences in population and area of municipalities 3. Scope of municipal responsibility 4. Sources of revenue (property tax dependence) 5. Prevalence of inter-municipal arrangements
Parks and Oakerson 1992	Governments per 10,000 persons
Savitch et. al 1993	Inclusion – percent of metropolitan population held within the borders of a central city
Lewis 1996	Herfindahl index of expenditures for land use governments
Morgan and Mareschal 1999	1. Cities > 10,000 persons per 1 million MSA population 2. Central-city population share 3. Central-city area growth 1970-1990
Carr and Feiock 1999	Incremental Dummy variable that phases in the consolidation effect over five years (start at 0 = not consolidated, then increase 0.2 per year for five years, to 1=consolidated)
Post and Stein 2000	Total number of city governments per 10,000
Miller 2000	Reverse Herfindahl index of expenditures for all governments

Source: Partially drawn from Paytas, 2001

Mitchell-Weaver, Miller and Deal (2000) expanded the concept of the indicator of political fragmentation measuring relative political power of local governments according to their share of local expenditures suggested by Lewis. Their Metropolitan Fragmentation Index (MFI) (also called Metropolitan Power Diffusion Index (MPDI) in Miller, 2002; Paytas, 2001) modifies the measure that is commonly used in the business world to account for a market share of several firms in a competitive arena and is known as a Hirsh-Herfindal index. The Hirsh-Herfindal index uses squared percentages of market shares to arrive at the final value. However, this approach exaggerates contributions of the large players in the marketplace. To adjust this methodology to local public economy, the authors substituted square roots of the percentages of contributions of each local government. This reverses the scale of index from 0 to 1 for the Hirsh-Herfindal index, to the 1 to infinity for the fragmentation index, with the value of 1 indicating the total control of one local government, and increasing values corresponding to higher degrees of fragmentation. This approach allows capturing the contributions of smaller local governments more adequately. Where the original Herfindal index gives more weight to the larger contributors, Miller's square root modification is more sensitive to the smaller contributors to the pool of total expenditures. The differences in these approaches to measuring fragmentation are illustrated on Figure 1.

The Metropolitan Fragmentation Index (MFI or MPDI) index is formulated as a sum of square roots of each government's percentage of the total spending in the metro area. The use of square roots of summed percentages of expenditures represents "market share" of units of government, substituting for the measure of political and economic power. In the words of Miller (2002, p.80), "expenditures serve as an excellent surrogate for political powering a metropolitan region [...]. The act of

Figure 1. Comparing Measures of Fragmentation

Source: Based on Miller (2002), Table 5.10, p 97.

making expenditures is a representation of choice in that it reflects not only the expenditures being made, but also the universe of expenditures that could have been made somewhere else. At a broader level, they also represent a choice of who or what will make those expenditures". The expenditures included in the calculation of the fragmentation index represent a traditional mix of services in the domain of local governments, and are listed in Table 3 (since Census of Governments expenditure codes are constant throughout the Census years, the item codes are listed in the table to make this research easier to replicate in future). This research defines and measures

fragmentation following the methodology by suggested by Mitchell-Weaver, Miller and Deal (2000).

Table 3. Operational Expenditures Used in the Calculation of Fragmentation Index	
<i>Description</i>	<i>Item Code</i>
Financial Administration	E23
Fire Protection	E24
Central Staff Services	E29
General Public Buildings	E31
Health Services - Other	E32
Own Hospitals	E36
Other Hospitals	E38
Regular Highways	E44
Housing & Community Development	E50
Libraries	E52
Parking Facilities	E60
Police Protection	E62
Welfare, Federal Categorical Assistance Programs	E67
Welfare, Cash Assistance - Other	E68
Welfare, Vendor Payments for Medical Care	E74
Welfare, Vendor Payments for Other Purposes	E75
Welfare Institutions	E77
Welfare - Other	E79
Sewerage	E80
Solid Waste Management	E81
General - Other	E89
Water Utilities	E91
Electric Utilities	E92
Gas Utilities	E93
Sources: U.S. Census Bureau, Governments Division. 2002. 1997 Census of Governments - Finances Technical Documentation; Mitchel-Weaver, Miller and Deal 2000; Miller, 2002; Paytas, 2001.	

Defining and Measuring Sprawl

In a number of studies and policy reports governmental fragmentation is frequently linked to urban sprawl either as its cause or as its manifestation. While technically separate phenomena, they appear together in virtually all debates on the issues of urban development. In this section, I focus on the definitions of urban sprawl. The next section outlines the discussion of costs and benefits of urban sprawl. Later in this chapter, I discuss the evidence on the linkages between sprawl and fragmentation.

Urban sprawl has been one of the central themes in both public and academic debate on urban policy issues in the second part of the twentieth century. Sprawl has oftentimes been referred to as the cause of a greater part of urban problems that American metropolises are facing today. Although sprawl has been the subject of debate for a long time, some researchers argue that until recently definitions of sprawl for the most part were based on subjective criteria (Galster et al. 2001, Wolman et al 2002, 2004). For example, Lopez and Hynes (2003, p.326) point out that traditionally sprawl has been defined as a sum of all or some of the following elements – “low density development; separation of land uses; leapfrog development; strip retail development; automobile-dependent development; development at the periphery of an urban area at the expense of its core; employment decentralization; loss of peri-urban, rural agriculture, and open space; and fragmented governmental responsibility and oversight”. In a benchmark study, Galster et al. (2001, p.682) classify traditional definitions of sprawl into the following categories:

1. Sprawl is defined by an example, which is seen to embody the characteristics of sprawl, such as Los Angeles.

2. Sprawl is used as an aesthetic judgment about general urban development pattern.
3. Sprawl is a cause of an externality, such as high dependence on the automobile, isolation of the poor in the inner city, the spatial mismatch between jobs and housing, or loss of environmental qualities.
4. Sprawl is the consequence or effect of some independent variable, such as fragmented local government, poor planning, or exclusionary zoning.
5. Sprawl is defined as one or more existing patterns of development. Those most frequently mentioned are low density, leapfrogging, distance to central facilities, dispersion of employment and residential development, and continuous strip development.
6. Sprawl is defined as a process of development that occurs over some period of time as an urban area expands.

While the definitions listed above describe the attributes of the phenomena, scientific research requires a working operational definition. Galster et. al (2001, p.685) described sprawl as a condition characterizing an urban area and suggested the following conceptual definition of sprawl:

Sprawl (n.) is a pattern of land use in a urban area that exhibits low levels of some combination of eight distinct dimensions: density, continuity, concentration, clustering, centrality, nuclearity, mixed uses, and proximity. [Where:] *Density* is the average number of residential units per square mile of developable land in an urban area. *Continuity* is the degree to which developable land has been built upon at urban densities in an unbroken fashion. *Concentration* is the degree to which development is located disproportionately in relatively few square miles of the total urban area rather than spread evenly throughout. *Clustering* is the degree to which development has been tightly bunched to minimize the amount of land in each square mile of developable land occupied by residential or nonresidential uses. *Centrality* is the degree to which residential or nonresidential development (or both) is located close to the central business district of an urban area. *Nuclearity* is the extent to which an urban area is characterized by a mononuclear (as opposed to a polynuclear) pattern of development. *Mixed uses* means the degree to which two different land uses commonly exist within the same small area, and this is common across the urban area. *Proximity* is the degree to which different land uses are close to each other across an urban area.

Even if the studies examining sprawl are numerous, until recently there were only a few attempts to measure it. Wolman et al. (2004) call the common definition of sprawl “ambiguous” and “idiosyncratic”, which in their view prevented researchers from its quantitative operationalization. The common misconception of density as an

acceptable measure of sprawl is flawed, which can be illustrated by a well-known example of Los Angeles as a typical showcase for urban sprawl with one of the highest densities in the United States.

The measure of sprawl described above suggested by Galster (2001) is based on standardized objective criteria. The calculation of the sprawl index is based on carefully operationalized dimensions. The index is calculated with the use of geographic information systems techniques. However, in its current form the method requires the knowledge of peculiarities of local geography. Moreover, the methodology is not finalized and is currently being redesigned with regard to the units of analysis and the methods of identifying land areas included in the calculations (Wolman, et. al., 2002; 2004). With this in mind, currently the methodology suggested by Galster is best suited to in-depth analysis of sprawl in a particular area, and it is not feasible to employ this measure for statistical analysis across all the metropolitan areas.

Lopez and Hynes (2003) proposed an index of sprawl aimed at making the indicator measurable and applicable, objective, and independent of scale (not influenced by the size of metropolitan areas). The index is based on Census residential population density data. While population density itself cannot serve as a measure of sprawl, Lopes and Hynes operationalize sprawl by measuring it as the difference between the population living in high-density census tracts and population living in low density census tracts. The index is calculated by the following formula:

$$SI_i = 50((S\%_i - D\%_i)) + 1),$$

where SI_i = sprawl index of metropolitan area i ,

$D\%_i$ = percentage of the total population in high-density census tracts i ,

$S\%_i$ = percentage of the total population in low-density tracts i .

The cutoff for the high density tracts is at 3,500 persons per square mile and for the low density census tracts is between 3,500 and 200 persons per square mile. Census tracts with density below 200 persons per square mile are considered rural tracts and are excluded from calculations. These cutoffs represents the thresholds in the continuum of modes of transportation from sustainable pedestrian traffic to the support for mass transit and, finally, to the reliance on private vehicle trips. They are consistent with the density thresholds used in other studies of sprawl.

For the purposes of this research sprawl is conceptually defined following the definition by Galster et al. (2001) and operationally measured by using Lopez and Hynes methodology which approximates two dimensions suggested by Galster – density and concentration. Figure 2 shows the example of urban sprawl in Louisville, KY metropolitan area according to the Lopez—Hynes definition.

**Figure 2: Map of Sprawl in Louisville, KY MSA:
high-density, sprawled, and rural census tracts.**

Costs and Benefits of Urban Sprawl

The overwhelming majority of research literature tends to agree on a number of consequences of unlimited suburban sprawl that hurt American cities. The problems typically attributed to sprawl are well known and include, among others “inner-city abandonment, racial segregation, income inequality, destruction of open space, loss of farmland, excess energy use, overdependence on cars, high taxes, poor health, crime, destruction of community, water pollution and air pollution” (Lopes and Hynes, 2003, p.325).

For example, in a case study of Memphis MSA, Ciscel (2001) points out that sprawl plays a major role in a number of inefficiencies of metropolitan growth. He shows a disproportion in the central location of jobs and the peripheral places of residence of workers. Similar inefficiencies are observed in educational attainment. The author outlines significant costs of commuting, expressed both in opportunity costs of time lost commuting and environmental damage caused by pollution. Finally, Ciscel stresses the significant capital expenditures on infrastructure that could have been saved in a more compact development pattern.

Infrastructure inefficiencies outlined in the case study above are confirmed by the mathematical models. Speir and Stephenson (2002) construct engineering cost models for public expenditures on water and sewer systems. The study produces the expected results that confirmed the findings of previous research in the field – “smaller lots, shorter distances between existing centers, and lower tract dispersions reduce water and sewer costs” (Speir and Stephenson, 2002, p.64). Burchell and Mukherji (2003) examine the cost of sprawl using mathematical impact models. The 25-year projections of conventional development patterns versus managed growth

demonstrated significant increases in conversion of undeveloped land, higher spending on new road construction, substantial local fiscal deficits and higher housing occupancy costs associated with the sprawl scenario. The authors conclude that limiting growth to an existing urbanized area will result in significant savings of both human and natural resources.

At the same time as the majority of research literature on the subject associate sprawl with negative externalities, some authors are less critical. In 1963 Melvin Webber in his article “Order in Diversity: Community without Propinquity” defends the private benefits that sprawl offers to American consumers. He suggests that regardless of the efforts that planners may take to curtail spatial dispersion of cities it’s unlikely to fade away – “all Americans are coming to share very similar cultural traits; the physical boundaries of settlements are disappearing; and the networks of interdependence among various groups are becoming functionally intricate and spatially widespread” (Webber, 1963,p.24).

Webber points out the logic of spatially dispersed patterns of development. Characterizing the traditional qualities of cities, he demonstrates how agglomeration economies led to creation of compact cities during the period of industrialization. Businesses chose central locations because of the speed and ease of personal contact that they offered. With the progress of modern technology, this comparative advantage of the centralized location has begun to diminish. Traditionally, location decisions of businesses and individuals in a city were influenced by a balance of lowering rents and increasing communication costs while locating further from the city center. In the modern world, the decreasing transportation costs together with low communication costs allow cities to spread out. Rapidly declining communication costs make central location less valuable, while the amenities offered by peripheral

locations gain more significance. Webber stresses the centrality of communication costs to development of metropolitan settlements. He suggests that the only binding forces that keep cities compact today are personal communication networks, and social and cultural ties of its residents.

The author urges urban planners to acknowledge the changing spatial character of cities and “seek that spatial distribution of urban populations and urban activities that will permit greater freedom for human interaction while, simultaneously, providing freer access to natural amenities and effective management of the landscape and of mineral resources” (Webber, 1963, p.54). Although Webber’s work can hardly be characterized as a sprawl advocacy, it does indicate a direction toward “pragmatic, problem solving approach in which the spatial aspects of the metropolis are viewed as continuous with and defined by the progress of urban society – in which space is distinguished from place, in which human interaction rather than land is seen as the fruitful focus of attention, and in which plans limited to the physical form of the urban settlement are no longer put forth as synoptic statements of our goals” (Webber, 1963, p.25).

In a frequently cited article Gordon and Richardson (1997) discuss the desirability of compact cities as a planning goal and defend sprawl as a spatial phenomenon reflecting consumer preferences and economic efficiencies. The authors evaluate a number of traditional claims to the undesirable consequences of uncontrolled low-density development.

The arguments discussed in their study can be grouped into three categories – the shortage of natural resources (energy and prime agricultural land), the efficiency of urban settlements (traffic congestion, feasibility of mass transit system), and the political factors (politics of downtown development, social equity, preferences of the

consumers). The authors dismiss the arguments based on the shortage of natural resources, citing the evidence to the contrary. Acknowledging the congestion problems, the study suggests introducing congestion pricing and emission fees. The subsidies for mass transit are not recommended due to the lack of evidence to their efficiency. The authors emphasize the evidence that current mass transit systems are underutilized and their expansion in today's low-density cities is economically unfeasible. The study challenges the dependence of downtown redevelopment efforts on city political climates. The authors suggest that only few of the highly visible projects with an expensive price tag deliver the promised results. The funding of these projects is influenced by the political power of downtown real estate developers. There is no evidence to either enhanced social equity or efficient use of public finances in regard to subsidized downtown construction. Gordon and Richardson are highly skeptical at linking social equity with compact development. They point out that the only direct remedy to social inequities is income redistribution. The authors argue that while the suburbanization does show the signs of economic and racial segregation, "the link between interventions to increase compactness by promoting higher densities and improvements in equity is obscure at best" (Gordon and Richardson, 1997). Finally, the study suggests an overwhelming preference of the American consumers toward the low-density development, proven by both consumer surveys and actual development patterns. If compact cities may have a boutique appeal for some residents, the attempts to impose these preferences on everybody by command-and-control regulation run contrary to the principles of free market economy and consumer sovereignty. In Gordon and Richardson's view, either the alleged negative externalities of urban sprawl are far from reality or they represent consumer demand in the marketplace. The authors find "the alternative of attempting

a reversal of existing urban trends neither feasible nor desirable” (Gordon and Richardson, 1997). While Gordon and Richardson’s assertions can be criticized³, the study provides an important outlook on an alternative approaches to the study of urban sprawl.

As the discussion above outlines some of the lines of argument in the discussion on the alleged positive and negative impacts of sprawl, the comprehensive discussion is a topic for separate research. Burchell et. all (1998), for example, present such a comprehensive review. Their summary of the alleged cost and benefits of sprawl discussed in the research and public policy literature is presented in the Table 4.

³ The first part of this section outlined a number of arguments against sprawl that serve as the counter-claims to the Gordon and Richardson’s assertions. These arguments are based primarily on the costs of sprawl. Ewing (1997) presented a specific response to Gordon and Richardson views of sprawl as a desirable product of market forces. He summarizes the different views on the causes of sprawl, the costs of sprawl, and the possible cures. Ewing argues that sprawl is impossible without the government subsidies, and that it is a product of market imperfections. He makes a case that “the costs of sprawl are borne by all of us, not just those creating it, and include inflated public spending, loss or resource lands, and a waning sense of community” (Ewing, 1997).

Table 4. Costs and Benefits of Sprawl.

<i>Substantive Concern</i>	<i>Alleged Negative Impacts</i>	<i>Alleged Positive Impacts</i>
Public-Private Capital and Operating Costs	Higher infrastructure costs Higher public operating costs More expensive private residential and nonresidential development costs More adverse public fiscal impacts Higher aggregate land costs	Lower public operating costs Less expensive private residential and nonresidential development costs Fosters efficient development of “leapfrogged” areas
Transportation and Travel Costs	More vehicle miles traveled (VMT) Longer travel times More automobile trips Higher household transportation spending Less cost-efficient and effective transit Higher social costs of travel	Shorter commuting times Less congestion Lower governmental costs for transportation Automobiles most efficient mode of transportation
Land/Natural Habitat Preservation	Loss of agricultural land Reduced farmland productivity Reduced farmland viability (water constraints) Loss of fragile environmental lands Reduced regional open space	Enhanced personal and public open space
Quality of Life	Aesthetically displeasing Weakened sense of community Greater stress Higher energy consumption More air pollution Lessened historic preservation	Preference for low-density living Lower crime rates Enhanced value or reduced costs of public and private goods Fosters greater economic well-being
Social Issues	Fosters suburban exclusion Fosters spatial mismatch Fosters residential segregation Worsens city fiscal stress Worsens inner-city deterioration	Fosters localized land use decisions Enhances municipal diversity and choice
Source: Burchell et al, 1998.		

Are Fragmentation and Sprawl Interlinked?

Literature on urban policy issues oftentimes tends to link sprawl and fragmentation. For example, Downs (1994), when examining policies of metropolitan development equates fragmentation with sprawl and argues that cohesive strategies of metropolitan governance require offsetting fragmented land use powers. In a more recent study, Downs (1998) included governmental fragmentation in the definition of suburban sprawl. While the association between fragmentation and sprawl may be widely accepted, it is not clear whether fragmentation stimulates sprawl, or sprawl creates the need to incorporate new land developments into separate jurisdictions. Whereas until recently there were no specific studies empirically explaining cause-and-effect relationship between the two phenomena, current urban research suggests some important linkages.

Razin and Rosentraub (2000) examined an association between political fragmentation and suburban sprawl in a sample of 98 U.S. and Canadian metropolitan areas with population of their urbanized areas of at least 500,000 people. The authors question whether fragmentation and sprawl are interlinked and frame the following public policy dilemma:

If governmental fragmentation is unrelated to sprawl—people may simply prefer smaller governing units or they may prefer low-density developments independent of governing structures—then those addressing any perceived negative consequences from sprawl will have to look at policy responses other than reducing the number of governmental units. If fragmentation does indeed lead to sprawl, and if it can be determined that sprawl is indeed negative, changing governance systems may be the right step to change land use-patterns (Razin and Rosentraub, 2000, p.822).

The study measured sprawl for residential land uses using the following indicators: the percentage of dwellings in single-unit detached houses, population per square kilometer and housing units per square kilometer. Among the measures of

fragmentation included in the study are the total number of governments per capita, the number of general-purpose governments per capita, the indicator showing the presence of consolidated metropolitan government, and the proportion of population in the largest city. The association between fragmentation and sprawl was examined in correlation and regression models.

The authors found that while correlation coefficients between sprawl and fragmentation are positive and significant, they are not very strong (0.38 for the sample of U.S. and Canadian metropolitan areas, 0.27 for U.S. metropolitan areas alone). The authors note that if examined individually, a large number of metropolitan areas display substantial levels of sprawl despite low levels of fragmentation. Regression models indicated a significant impact of sprawl on fragmentation; however, fragmentation did not predict sprawl. The authors elaborate:

Low levels of fragmentation do not guarantee compact development. In contrast, the combination of high levels of fragmentation and low levels of sprawl is rare. Compact forms of development do not coexist with most fragmented municipal patterns, perhaps because fragmentation precludes the control of sprawl or because compact residential development reduces prospects for fragmentation (Razin and Rosentraub, 2000, p.834).

Razin and Rosentraub conclude that lack of excessive fragmentation is a necessary but not sufficient condition for compact development. Given the weak association between fragmentation and sprawl, it is incorrect to always assume that fragmentation is an integral aspect of sprawl.

In a recent research, Caruthers and Ulfarsson (2002) investigate the relationship between fragmentation and sprawl in 283 counties of 14 states with the highest rates of state population growth. The study covers the time period between 1982 and 1992. The authors point out that the main purpose of current urban policy is the reduction of “urban sprawl by promoting jurisdictional cooperation and regulatory

consistency across metropolitan areas” (Caruthers and Ulfarsson, 2002, p.313). The study evaluates fragmentation and sprawl according to such a policy goal.

Two separate measures of sprawl are used: density and urbanized land area. Fragmentation is measured as per capita municipalities, and per capita special districts. Caruthers and Ulfarsson hypothesize the character of a cause-and-effect relationship between fragmentation and sprawl. According to the study, the relationship between fragmentation and sprawl occurs in a recursive pattern:

(...) political structure of a metropolitan area at time $t-1$ affects the outcome of development at time t . In turn, urban sprawl leads to additional fragmentation in a later period ($t+1$) as new jurisdictions form around growth centers in unincorporated areas and/or separate from existing communities. Although the exact duration of the time periods remains unknown, they exist to represent the time it takes for development to materialize and new jurisdictions to form (Caruthers and Ulfarsson, 2002, p.317).

Using a system of simultaneous equations in a regression model the study has found that sprawl is associated with large amounts of urbanized land, lower property values and greater infrastructure expenditures. Fragmentation is associated with lower density and lesser amounts of urbanized land. The authors found that fragmentation is positively correlated with urban property values. There is no evidence that fragmentation affects infrastructure expenditures.

Having found that governmental fragmentation fosters such manifestations of sprawl as lower densities and greater land consumption, the study recommends the reinforcement of “the objectives of centralized form of land use governance, including state planning programs, regional planning organization, and elastic cities” (Caruthers and Ulfarsson, 2002, p.337).

As illustrated by the examples above, and similarly to the discussion on fragmentation of governments between proponents of monocentric and polycentric theory, there is only a limited consensus on the linkages between sprawl and

fragmentation. The studies discussed here demonstrate with a varying degree of statistical significance that the linkages between fragmentation and sprawl do exist. However, the cause-and-effect relationship between political fragmentation and urban sprawl has not been firmly established.

Problem Statement and Hypotheses

As noted in Chapter I, numerous studies call for additional investigation into the issues of metropolitan governance, fragmentation and sprawl (ACIR, 1987; Altshuler et al., 1999, Lewis, 1996; Nelson and Foster, 1999). Discussion earlier in this chapter shows that empirical research provides support for both monocentric and polycentric theories of metropolitan governance; however, this evidence is limited and contradictory. Aesthetic preferences aside, we need to examine empirical evidence linking sprawl with metropolitan outcomes to understand whether sprawl, or at least its elements, are beneficial to metropolitan growth.

The investigation of the possible relationships between the above-mentioned variables may help explain the variation in performance and development of different metropolitan areas. Some of the questions that this research seeks to answer are:

- Does fragmentation discourage economic development?
- Does urban sprawl promote higher rates of economic development?

In exploring the answers to these questions, I employ fragmentation of government and urban sprawl as independent variables and metropolitan economic

performance as a dependent variable. Following the public choice argument it is hypothesized that:

1. Higher levels of governmental fragmentation are positively associated with economic performance.
2. Higher levels of urban sprawl are positively associated with economic performance⁴.

⁴ It is possible to make an argument that the opposite direction of the relationship may be true - high levels of economic performance may tend to result in greater sprawl. The hypotheses is formulated in this way primarily to examine whether economic performance may serve as a valid justification for advocating sprawled patterns of development and/or fragmented organization of metropolitan governance

CHAPTER III

METHODS AND DATA

Multiple linear regression analysis is a commonly used tool for analyzing links between metropolitan governance and performance of metropolitan areas. This research examines the links between governance in metropolitan areas, urban geography and economic performance. It is hypothesized that governmental fragmentation and urban sprawl will be positively associated with economic performance. Previous studies and theories of economic development suggest that a number of additional factors will influence economic performance of metro areas. Such factors are included in regression models as controls. In addition, two economic development variables are used in the regression analysis as a benchmark for analyzing relative importance of fragmentation and sprawl while comparing them with other possible tools of economic development. A derived goal of my research is testing of new measures of governmental fragmentation and urban sprawl proposed in recent urban research literature. These indicators discussed in the previous chapter are the index of fragmentation (Mitchell-Weaver et al, 2000), and the sprawl index by Lopez and Hynes (2003).

Units of Analysis

The units of analysis of the dissertation are metropolitan areas (Metropolitan Statistical Areas (MSA) and Primary Metropolitan Statistical Areas (PMSA)). The choice of metropolitan areas as units of analysis is not accidental. Standard & Poors's DRI 1999 report calls metropolitan areas "the engines of America's growth" and shows that more than 80 percent of the nation's employment, income, and production of goods and services is generated by metro economies. Barnes and Ledebur (1998) argue that metropolitan regions are the most important elements of the US economy. To better understand the impacts of fragmentation and sprawl on economic performance it is necessary to evaluate the performance of a metropolitan region, rather than analyze central city data alone or in combination with a central county. While an argument may be made in support of studying Consolidated Metropolitan Statistical Areas (CMSA) as geographic areas reflecting continuous regional economies, for the purposes of examining sprawl patterns it is more useful to concentrate on smaller parts of CMSAs (however, as they are not free standing and independent, an additional variable controlling for whether a metropolitan area is a part of a larger region is included as a control). The study includes 334 MSAs and PMSAs as defined by the United States Office of Management and Budget. Table A1 (presented in the Appendix) lists metropolitan areas included in the study ranked by population in 2000.

Models

To answer the hypotheses, economic performance is modeled as a function of government fragmentation, sprawl and other controlling factors. The hypotheses are tested in three separate models. In the first equation, metropolitan performance is modeled as a function of fragmentation, sprawl and socioeconomic controls. The second model estimates the impact of economic development variables together with socioeconomic controls on metropolitan economic performance. Theories of economic development examine a multitude of factors affecting economic growth; however, the variables relating to the organization of governance in metropolitan areas are rarely included in analysis. My research is designed to complement the argument of these theories by analyzing whether inclusion of the variables corresponding to governance structure of a metropolitan area will enhance the explanatory power of the models. So, the third model includes the policy variables (fragmentation and sprawl), economic development variables (described later in this chapter) and the controls. The three-model design is used to compare relative importance of fragmentation and sprawl versus the variables controlling for economic development by tracking changes in explanatory power (R^2) of the models when entering additional variables.

It is realistic to assume that metropolitan areas of different size may demonstrate different patterns of interaction between space, politics and economic development. To observe these possible differences all models are calculated four times: for all the metropolitan areas in the database, and separately for the population-ranked subsets of the database – small metropolitan areas (population less than 250,000 persons), medium metro areas (population between 250,000 and 1,000,000

persons), and large metro areas (population above 1,000,000 persons). These population cutoffs are standard and are used, for example, by the Federal Reserve Bank, and by the Economic Research Service of the US Department of Agriculture (USDA, 2004).

Model 1: Economic Performance = f (Fragmentation; Sprawl; Socioeconomic Controls);

Model 2: Economic Performance = f (Economic Development Variables; Socioeconomic Controls);

Model 3: Economic Performance = f (Fragmentation; Sprawl; Economic Development Variables; Socioeconomic Controls)

Variables

Dependent Variable: Economic Performance. Economic performance of metro areas is measured as Gross Metropolitan Product per capita. The data for the year 1999 is used to match Census of Population data used for the other variables. The data is obtained from DRI-WEFA (2002). A table ranking metropolitan areas by economic performance is presented in the Appendix (Table A1).

Policy Variables: Fragmentation. This study uses a political fragmentation index formulated by Mitchell-Weaver, Miller and Deal and discussed in Chapter II. The data is obtained from the 1997 Census of Governments. A table ranking metropolitan areas by the political fragmentation index is presented in the Appendix (Table A2)

Policy Variables: Urban Sprawl. This study uses an urban sprawl index as formulated by Lopez and Hynes and discussed in Chapter II. Data is obtained from Lopez and Hynes (2003). A table ranking metropolitan areas by the sprawl index is presented in the Appendix (Table A3).

Economic Development Controls: Human Capital. Theories of economic development provide important insights into the causes of metropolitan economic performance. This research employs two variables suggested by the literature on theories of local economic development as benchmarks to evaluate the importance of politics and urban development patterns on metropolitan outcomes.

One such theory is human capital. Numerous studies have stressed an importance of human capital for city growth (Romer, 1986, Lucas, 1988, Mathur, 1999). Fitzgerald (1993) equates education and training with economic development. Blakely (1994, p.206) calls human capital “pivotal to the economic development process”, and lists human resource development programs as an important tool of economic development professionals. Glaeser (1994) demonstrates a positive relationship between the percentage of population with higher education and income growth. Porter (1997) stresses the importance of job training as a source of inner-city economic development. Gottlieb and Fogarty (2003) pointed out that educational attainment is a driver of regional economic growth. Through regression analysis, these authors demonstrated statistically a significant positive relationship between educational attainment and per capita income growth. The study recommends human capital development strategy as one of the most accessible instruments of local economic development. Drawing upon the research of Gottlieb and Fogarty (2003),

the independent variable representing human capital economic development theory in my study is educational attainment at the bachelor's degree level and higher for population older than 25 years. Data for educational attainment is obtained from the Bureau of the Census, 2000 Census of Population & Housing. A table ranking metropolitan areas by educational attainment is presented in the Appendix (Table A5).

Economic Development Controls: Supply-side Theory. Eisinger (1988) distinguishes supply-side and demand-side approaches to economic development. The supply-side approach to economic development emphasizes policies aimed at the increase in local production of goods and services through the increases in local productive input, including capital, labor, entrepreneurial talent, external economies, infrastructure, and natural amenities (Howland, 1993). Economic development policies corresponding to the solutions suggested by the human capital theory enhance local labor inputs and can be recognized as supply-side policies. Nevertheless, the traditional supply-side incentives typically used by communities tend to focus on capital. Macroeconomic theory suggests that changes in the tax structure have an effect on capital accumulation (Lucas, 1990). While metropolitan regions do not have direct control over taxation of capital income, a number of supply-side policies are often used in local economic development practice in pursuit of economic growth. These supply-side measures typically include tax and financial inducements, infrastructure improvement, and land assembly and development (Reese and Fassenfest, 1997).

The task of estimating the prevalence of supply-side incentives in economic development practices of metropolitan areas can be a topic of a separate research. For the purposes of this study it can be assumed that the low-tax jurisdictions represent the supply-side approach to local economic development. As an indicator of supply-

side policy, I use a specific variable called fiscal effort of local government. The fiscal effort measure has been used by the Advisory Commission on Intergovernmental Relations and consists of “locally raised government revenue as a percent of personal income received by residents” (ACIR, 1967). Data for personal income is obtained from the Bureau of the Census, 2000 Census of Population & Housing. Data for the local tax revenue is obtained from the Bureau of the Census, 1997 Census of Governments. The 1999 Census of Population and Housing income data is adjusted to match 1997 dollars used in Census of Governments according to the Implicit Price Deflator obtained from the Bureau of Economic Analysis. A table ranking metropolitan areas on the fiscal effort is presented in the Appendix (Table A6).

Socioeconomic Controls. Research literature dealing with issues of metropolitan performance and governance indicates a number of additional factors that are important for this analysis. Apart from the main variables, the study controls for these additional factors.

State economic performance. Metropolitan development does not occur independently of a larger economic system. As such, it is important to control for the influence of external economic processes. State economic performance net of economic performance of the corresponding metropolitan areas per capita is used as a proxy for measuring these external influences. A method of adjusting state data is suggested by Blair, Staley, and Zhan (1996) and later used by Post and Stein (2000). State economic performance per capita net of metropolitan area economic performance per capita variable is calculated separately for each metro following:

$$SEPi = (GSPi - GMPi) / (SPi - MPi),$$

where $SEPi$ = state economic performance net of i th metro area economic performance; GSP = gross state product for the i th state; $GMPi$ = gross metro product for the i th metro area; SPi = state population for the i th state; MPi = metro population for the i th metro area.

Gross state product net of individual metropolitan area contribution [$(GSPi - GMPi)$] is reported for each metro area in DRI-WEFA, 2002. Population adjustment calculations [$(SPi - MPi)$] were performed by the author. For metropolitan areas geographically covering areas in more than one state, adjustment of the state level variable is made according to the state of central city in MSA. Although this may introduce some degree of inaccuracy in the analysis it is difficult to allocate precisely each state's share of economic performance. Data for gross state product and gross metropolitan product for the year 1999 are obtained from DRI-WEFA, 2002. Data for state and metropolitan population for the year 1999 is obtained from the Bureau of the Census, 2000 Census of Population & Housing.

Age of the Metro. Studies suggest that age can be a predictor for the economic performance of metropolitan areas. The proxy for measuring age of metropolitan areas is suggested by Razin and Rosentraub (2000). The age of metropolitan areas is measured via a proxy of the percent of housing built before 1939. Data for age of the metro is obtained from the Bureau of the Census, 2000 Census of Population & Housing. The data for age of the metro is presented in the Appendix (Table A7).

Average household size. Smaller average household size is traditionally associated with the patterns of postindustrial development. To control for these patterns I use the average household size as a proxy for post-industrial demographic changes. Data is obtained from the Bureau of the Census, 2000 Census of Population & Housing. The data for average household size is presented in the Appendix (Table A7).

Affluence. Affluence is measured as the percent of households earning in excess of \$100,000. Data for affluence is obtained from the Bureau of the Census, 2000 Census of Population & Housing. The data for affluence is presented in the Appendix (Table A7).

Racial Segregation. Racial segregation is measured via the White-Black dissimilarity index⁵. Dissimilarity indices are often used in research literature to account for sorting by race and income. Data for racial segregation is obtained from the Lewis Mumford Center for Comparative Urban and Regional Research. The index is based on 2000 Census of Population data. The data for White-Black dissimilarity index is presented in the Appendix (Table A7).

In CMSA. As previously indicated, the units of analysis in this study are metropolitan areas (MSA and PMSA). However, Primary MSAs by definition are a part of a larger regional economy and thus are not independent. To control for this, a

⁵ “The dissimilarity index measures whether one particular group is distributed across census tracts in the metropolitan area in the same way as another group. A high value indicates that the two groups tend to live in different tracts. D ranges from 0 to 100. A value of 60 (or above) is considered very high. It means that 60% (or more) of the members of one group would need to move to a different tract in order for the two groups to be equally distributed. Values of 40 or 50 are usually considered a moderate level of segregation, and values of 30 or below are considered to be fairly low” (Lewis Mumford Center for Comparative Urban and Regional Research, 2002).

dummy variable with a value of “1” indicating that a metropolitan area belongs to a larger region and “0” if it does not is introduced. The list of metropolitan areas that are a part of a larger region is presented in the Appendix (Table A8)

Geographic Location. Previous studies suggest the influence of natural conditions such as climate and geography on regional economic performance. Classifying metropolitan areas according to geographic location allows me to control for region-specific trends of development. This is done by introducing three dummy variables coding metropolitan areas according to the U.S Census regions of MSA’s location: Midwest, South and West. The region of Northeast is the reference category. A table listing regional location of metropolitan areas is presented in the Appendix (Table A9).

CHAPTER IV

RESULTS

As indicated in the previous chapters, this study examines the links between governmental fragmentation, urban sprawl, and economic development while controlling for a number of additional socioeconomic factors. It is hypothesized that, following the argument of the public choice school regarding governmental fragmentation, and the market-oriented approach to urban sprawl, both sprawl and fragmentation will be positively associated with economic performance of metropolitan areas.

The following chapter is arranged in three sections. The first section presents the descriptive statistics on fragmentation and sprawl. The second section examines the bivariate linear associations between fragmentation, sprawl, economic development variables, and other controls. The chapter concludes with testing the hypotheses using multiple regression analysis.

Fragmentation of Metropolitan Areas

The fragmentation index indicates the degree of decentralization of control over expenditures by individual local governments in metropolitan regions. The full list of metropolitan areas ranked by the fragmentation score is included in the

appendix (Table A2). The ten metropolitan areas with the lowest fragmentation scores are:

Table 5. Descriptive Statistics

Variable	N	Minimum	Maximum	Mean	Std. Deviation
Economic Performance	313	17032.16	74169.55	35340.65	8245.06
Fragmentation Score	318	1.13	18.10	4.30	2.24
Sprawl Score	329	3.94	100.00	68.14	20.10
Human Capital	331	11.05	52.38	23.74	7.46
Tax Effort	318	1.66	20.27	4.45	1.60
Average Household Size	331	2.18	3.75	2.56	0.20
Age of Metro	331	0.44	47.28	14.14	10.27
Segregation	331	20.24	84.72	51.43	13.70
Affluence	331	3.82	39.20	10.52	5.12
State EP	313	12637.93	52649.94	34559.42	5398.53

Honolulu, HI (1.13), Anchorage, AK (1.16), Punta Gorda, FL (1.46), Danville, VA (1.49), Laredo, TX (1.60), Owensboro, KY (1.61), San Angelo, TX (1.66), Santa Fe, NM (1.69), Las Cruces, NM (1.72), and Jacksonville, NC (1.77).

The ten metropolitan areas with the highest fragmentation scores are: Boston, MA-NH (18.10), Chicago, IL (15.09), Pittsburgh, PA (14.42), St. Louis, MO-IL (14.10), Philadelphia, PA-NJ (12.23), Scranton-Wilkes-Barre-Hazleton, PA (10.41), Minneapolis-St. Paul, MN-WI (10.09), Detroit, MI (9.20), Houston, TX (9.07), and Newark, NJ (9.01). Mean value for the fragmentation index was 4.30 with the standard deviation of 2.24 (Table 5).

Miller (2002) suggests categorizing metropolitan areas into the six groups according to their fragmentation scores: centralized (fragmentation score between 1 and 2), slightly centralized (2-3), slightly decentralized (3-4), moderately decentralized (4-5), highly decentralized (5-7.5), and super decentralized (above 7.5). Figure 3 illustrates the geographical variation of fragmentation among the metropolitan areas. Metropolitan areas are color-coded according to the classification described above.

Figure 3. Metropolitan Areas: Fragmentation Index

Comparing the fragmentation scores in Census regions reveals the highest mean fragmentation scores in the Northeast and the Midwest. The mean value of fragmentation index for the 60 metropolitan areas (18.1% of all metropolitan areas) in the Northeast is 6.54. The next highest mean fragmentation score of 4.82 is in the Midwest (calculated for 80, or 24.2% of the total number). The mean value of the fragmentation index in the West (for 65 MSAs, or 19.6% of the total number) is 3.78. The most centralized metropolitan areas can be found in the South with the mean fragmentation index score of 3.39 (for 126 MSAs, or 38.1% of the total number).

While the direct comparison of individual metropolitan areas on the metropolitan power diffusion index (MPDI) scores by Miller and fragmentation index values calculated in this study are not appropriate due to changing definitions of metropolitan areas from one census year to another, aggregate comparisons can be made. The data indicates that the American metropolitan areas are continuously decentralizing.

In the year 1997, of a 318 metropolitan areas for which the fragmentation index could be calculated, roughly one-third (30.5%) falls into the centralized and the slightly centralized categories. Miller (2002) calculations of the fragmentation scores for the 1972 and 1992 have 37.6 percent and 31.8 percent of the metropolitan areas in the two centralized categories respectively. The absolute rate of the decline in the percentage of centralized metropolitan areas was 5.8 percentage points over the 20 years, corresponding to the decline of 0.29 percentage points a year. Between the years 1992 and 1997 the absolute change in the percent of centralized metropolitan areas was 1.3 percent, which corresponds to the decline at an absolute rate of 0.26 percentage points a year. While the rate of decline is slower than in the previous 20

years, the majority of the metropolitan areas are fragmented (moderately decentralized to super decentralized), and the decentralization trend continues.

Sprawl: Descriptive Statistics

The Lopez-Hynes Sprawl index used in this study approximates the two dimensions of sprawl discussed in Chapter II: density and concentration. The values of the index vary from 0 to 100, with a value of 0 meaning that entire population of a metropolitan area lives in low-density census tracts, a value of 100 indicating that the entire population of a metro area lives in high-density census tracts (an index score of 50 means that the population of a metropolitan area lives equally distributed between high and low-density census tracts).

Mean value for the sprawl index was 68.14 with the standard deviation of 20.10 (Table 5). Thirteen metropolitan areas have a sprawl index score of 100 with no people living in the census tracts with density higher than 3,500 persons per square mile: Anniston, AL, Clarksville-Hopkinsville, TN-KY, Decatur, AL, Dothan, AL, Florence, SC, Goldsboro, NC, Hickory-Morganton-Lenoir, NC, Jonesboro, AR, Myrtle Beach, SC, Ocala, FL, Rocky Mount, NC, Sherman-Denison, TX, and Sumter, SC.

The ten least sprawled metropolitan areas are: Jersey City, NJ (3.94), New York, NY (6.72), Los Angeles-Long Beach, CA (10.61), San Jose, CA (14.89), Miami, FL (15.73), San Francisco, CA (16.96), Fort Lauderdale, FL (20.77), Stockton-Lodi, CA (21.52), Las Vegas, NV-AZ (25.54), San Diego, CA (26.85).

Overall, 81.5 percent of metropolitan areas are characterized by sprawl scores of 50 and above. Metropolitan areas with sprawl scores between 25 and 50 represent 16.1 percent of the metropolitan areas in the United States. Only 2.1 percent are relatively dense with the sprawl scores below 25.

Comparing the sprawl scores in Census regions reveals higher sprawl in the South and the Midwest. The mean value of sprawl index for the 126 metropolitan areas (38.1% of all metropolitan areas) in the South is 78.67. Following the South with both the next highest number of metropolitan areas (80, or 24.2%) and the highest sprawl index scores is the Midwest with the mean sprawl score of 67.13. The mean value of the sprawl index in the Northeast (for 60 MSAs, or 18.1% of the total number) is 63.19. The most dense metropolitan areas can be found in the West with the mean sprawl index score of 53.06 (for 65 MSAs, or 19.6% of the total number). This pattern can be observed on the Figure 4, which illustrates the geographical variation of sprawl among the metropolitan areas.

Figure 4. Metropolitan Areas: Sprawl Index

Bivariate Relationships

Tables 6-9 show the correlation matrices for all the variables used in the analysis. While bivariate correlations do not imply causality, they can hint of the possible relationships, show their strength and directions, and help focus further research. The correlation matrices are calculated both for all the metropolitan areas in the database, and separately for the population-ranked subsets of the database – small metropolitan areas (population less than 250,000 persons), medium metro areas (population between 250,000 and 1,000,000 persons), and large metro areas (population above 1,000,000 persons). The groups of metropolitan areas ranked by population are listed in the Appendix, Table A1.

Most of the bivariate correlations are statistically significant, and, with a few exceptions, range from weak to moderate. Most of associations between the dependent variable and the independent variables are statistically significant. The following is a detailed description of bivariate relationships related to the research questions (fragmentation, sprawl and economic performance) accompanied by the scatterplots. Also, a number of additional notable associations between fragmentation, sprawl and the control variables are described below.

Table 6. Correlation Matrix. All Metropolitan Areas. N=331

		X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11	X12	X13	X14	X15
X1	Economic Performance	1														
X2	Fragmentation Score	.297 (**)	1													
X3	Sprawl Score	-.310 (**)	-.269 (**)	1												
X4	Human Capital	.456 (**)	.166 (**)	-.335 (**)	1											
X5	Tax Effort	.347 (**)	.317 (**)	-.238 (**)	.094	1										
X6	Average Household Size	-.079	.003	-.345 (**)	-.146 (**)	.006	1									
X7	Age of Metro	.219 (**)	.402 (**)	-.140 (*)	-.061	.375 (**)	-.261 (**)	1								
X8	Segregation	.093	.481 (**)	-.101 (*)	-.116 (*)	.304 (**)	-.121 (*)	.247 (**)	1							
X9	Affluence	.514 (**)	.380 (**)	-.463 (**)	.674 (**)	.207 (**)	.198 (**)	.008	.189 (**)	1						
X10	State EP	.214 (**)	.002	-.262 (**)	.010	.328 (**)	.263 (**)	.142 (*)	-.002	.243 (**)	1					
X11	In CMSA	.214 (**)	.317 (**)	-.382 (**)	.282 (**)	.260 (**)	.215 (**)	.144 (**)	.200 (**)	.636 (**)	.233 (**)	1				
X12	Northeast	.268 (**)	.418 (**)	-.116 (*)	.111 (*)	.540 (**)	-.069	.639 (**)	.187 (**)	.273 (**)	.273 (**)	.279 (**)	1			
X13	Midwest	.013	.136 (*)	-.028	.003	-.028	-.216 (**)	.317 (**)	.150 (**)	-.110 (*)	-.113 (*)	-.096	-.266 (**)	1		
X14	South	-.217 (**)	-.328 (**)	.413 (**)	-.210 (**)	-.188 (**)	-.047	-.562 (**)	.089	-.257 (**)	-.271 (**)	-.237 (**)	-.369 (**)	-.443 (**)	1	
X15	West	.018	-.116 (*)	-.365 (**)	.146 (**)	-.216 (**)	.357 (**)	-.275 (**)	-.452 (**)	.168 (**)	.218 (**)	.122 (*)	-.233 (**)	-.279 (**)	-.388 (**)	1

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Table 7. Correlation Matrix. Small Metropolitan Areas. N=149

	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11	X12	X13	X14	X15
X1	Economic Performance	1													
X2	Fragmentation Score	.237 (**)	1												
X3	Sprawl Score	-.109	-.074	1											
X4	Human Capital	.288 (**)	-.057	-.250 (**)	1										
X5	Tax Effort	.455 (**)	.297 (**)	-.200 (*)	.019	1									
X6	Average Household Size	-.121	-.197 (*)	-.181 (*)	-.285 (**)	.001	1								
X7	Age of Metro	.128	.578 (**)	-.266 (**)	-.161 (*)	.359 (**)	-.280 (**)	1							
X8	Segregation	.000	.169 (*)	.151	-.364 (**)	.110	-.124	.224 (**)	1						
X9	Affluence	.446 (**)	.003	-.116	.599 (**)	.124	.056	-.114	.133	1					
X10	State EP	.286 (**)	.102	-.129	-.044	.223 (**)	.174 (*)	.011	.133	.121	1				
X11	In CMSA	-.065	.058	-.097	.064	.024	.178 (*)	.155	.510 (**)	.091	.327 (**)	1			
X12	Northeast	.278 (**)	.504 (**)	-.130	.076	.525 (**)	-.119	.034	.274 (**)	.091	.327 (**)	.269 (**)	1		
X13	Midwest	.072	.282 (**)	-.257 (**)	.093	.008	.361 (**)	.130	.017	-.083	-.093 (**)	-.269 (**)	.328 (**)	1	
X14	South	-.144	-.497 (**)	.433 (**)	-.233 (**)	-.189 (*)	.075	.206 (*)	-.249 (**)	-.122	-.196 (*)	-.328 (**)	-.510 (**)	.1	
X15	West	-.124	-.108	-.126	.115	-.188 (*)	.256 (**)	-.451 (**)	.043	.180 (*)	.057 (*)	-.191 (*)	-.298 (**)	-.362 (**)	1

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Table 8. Correlation Matrix. Medium Metropolitan Areas. N=121

		X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11	X12	X13	X14	X15
X1	Economic Performance	1														
X2	Fragmentation Score	.073	1													
X3	Sprawl Score	-.342 (**)	.073	1												
X4	Human Capital	.468 (**)	-.157	-.259 (**)	1											
X5	Tax Effort	.161	.348 (**)	-.134	.053	1										
X6	Average Household Size	-.203 (*)	-.138	-.393 (**)	-.185 (*)	-.040	1									
X7	Age of Metro	.347 (**)	.678 (**)	-.195 (*)	.042	.370(**)	-.216 (*)	1								
X8	Segregation	-.057	.446 (**)	.298 (**)	-.246 (**)	.276 (**)	-.330 (**)	.353 (**)	1							
X9	Affluence	.460 (**)	-.111	-.346 (**)	.720 (**)	.131	.082	.118	-.047	1						
X10	State EP	.304 (**)	.077	-.479 (**)	.025	.528 (**)	.311 (**)	.333 (**)	-.125	.328 (**)	1					
X11	In CMSA	.133	.015	-.217 (*)	.324 (**)	.279 (**)	.105	.220 (*)	.039	.636 (**)	.335 (**)	1				
X12	Northeast	.274 (**)	.524 (**)	-.102	.117	.504 (**)	-.072	.750 (**)	.255 (**)	.298 (**)	.442 (**)	.329 (**)	1			
X13	Midwest	.050	.210 (*)	-.030	-.004	-.018	-.207 (*)	.279 (**)	.289 (**)	-.087	-.081	-.018	-.260 (**)	1		
X14	South	-.328 (**)	-.328 (**)	.611 (**)	-.238 (**)	-.195 (*)	-.119	-.594 (**)	.076	-.357 (**)	-.509 (**)	-.327 (**)	-.400 (**)	-.400 (**)	1	
X15	West	.104	-.292 (**)	-.601 (**)	.172	-.204 (*)	.421 (**)	-.316 (**)	-.635 (**)	.217 (*)	.309 (**)	.081	-.260 (**)	-.260 (**)	-.400 (**)	1

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Table 9. Correlation Matrix. Large Metropolitan Areas. N=61

		X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11	X12	X13	X14	X15
X1	Economic Performance	1														
X2	Fragmentation Score	.276 (*)	1													
X3	Sprawl Score	-.202	.083	1												
X4	Human Capital	.705 (**)	.188	-.150	1											
X5	Tax Effort	.235	.255 (*)	-.281 (*)	.130	1										
X6	Average Household Size	.042	-.057	-.423 (**)	.013	-.013	1									
X7	Age of Metro	.372 (**)	.518 (**)	-.093	.194	.593 (**)	-.280 (*)	1								
X8	Segregation	.004	.358 (**)	-.063	-.099	.574 (**)	-.273 (*)	.556 (**)	1							
X9	Affluence	.620 (**)	.172	-.362 (**)	.796 (**)	.191	.365 (**)	.120	-.039	1						
X10	State EP	-.070	-.223	-.218	.055	.203	.337 (**)	.013	.040	.346 (**)	1					
X11	In CMSA	.356 (**)	.224	-.556 (**)	.338 (**)	.321 (*)	.359 (**)	.167	.236	.566 (**)	.254	1				
X12	Northeast	.208	.369 (**)	-.035	.138	.647 (**)	-.057	.663 (**)	.312 (*)	.268 (*)	.315 (*)	.129	1			
X13	Midwest	-.086	.345 (**)	.177	-.133	-.032	-.197	.210	.403 (**)	-.174	-.219	-.120	-.244	1		
X14	South	-.243	-.456 (**)	.320 (*)	-.134	-.191	-.162	-.526 (**)	-.103	-.300 (*)	-.193	-.224	-.405 (**)	-.365 (**)	1	
X15	West	.161	-.149	-.509 (**)	.141	-.380 (**)	.423 (**)	-.232	-.553 (**)	.244	.135	.243	-.284 (*)	-.256 (*)	-.425 (**)	1

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Fragmentation and sprawl

For all the metropolitan areas in the database, correlation between fragmentation and sprawl is negative and statistically significant ($r = -.269$). In the population-ranked subsets of the database the associations are not statistically significant and are close to zero (small: $r = -0.074$; medium: $r = 0.073$; large: $r = 0.083$). Figure 5 illustrates the bivariate associations between the fragmentation index scores and the sprawl index scores. As can be noticed from the first scatterplot, while the relationship is not very strong, the regression line has a negative slope.⁶

⁶ As it can be seen on the scatterplot for all metropolitan areas, a straight line may not be a very good fit. To test for the possible negative exponential relationship, the sprawl score was correlated with the natural log of the fragmentation score. Correlation coefficient was negative and its value was close to the linear correlation (-0.254 ; statistically significant at 0.01 level). The equation for the regression line was: Sprawl Score = $83.34 - 11.31 * \ln(\text{Fragmentation Score})$; $R^2 = 0.06$.

Figure 5. Fragmentation Index and Sprawl Index Scores: Scatterplots

Fragmentation and economic performance

For all the metropolitan areas in the database, correlation between fragmentation and economic performance is positive and statistically significant ($r = 0.297$). Similar positive and statistically significant associations were observed for the small ($r = 0.237$) and large metropolitan areas ($r = 0.276$). For the medium metropolitan areas the relationship was not statistically significant and is close to zero

($r = 0.073$). Figure 6 illustrates the bivariate associations between the fragmentation index scores and economic performance. The regression slope on all the scatterplots is positively inclined.

Figure 6. Fragmentation Score and Economic Performance: Scatterplots

Sprawl and economic performance

The correlation coefficients for sprawl and economic performance variables are negative. Statistically significant relationships were observed for all the metropolitan areas ($r = -0.310$) and the medium metropolitan areas ($r = -0.342$). Correlation coefficients in small and large metro areas are not statistically significant. Figure 7 illustrates the bivariate associations between the sprawl index scores and economic performance. A nearly flat regression line and a highly dispersed dot pattern indicate a lack of statistical significance and a weak relationship in the subsets of database for small and large metro areas. However, for the medium metro areas and for all the regions in the database the association is negative and pronounced.

Figure 7. Sprawl Score and Economic Performance: Scatterplots

Fragmentation, sprawl, and individual control variables

Aside from the described above associations related to the main research questions, a number of additional notable associations characterizing fragmentation and sprawl were observed. The associations between human capital, tax effort, affluence and economic performance, and the associations between the policy variables (fragmentation, sprawl) and the above mentioned control variables suggest that the policy variables in their turn may serve as the confounding factors with both direct and indirect links to economic performance.

Some associations between the control variables and the policy variables reveal additional characteristics of sprawl and fragmentation of metropolitan areas. These associations include correlations between the policy variables and segregation, age of metropolitan areas, metro areas belonging to a larger agglomeration, and geographic location of metropolitan areas.

Fragmentation, sprawl, and human capital.

The variable for human capital is measured as a percent of population 25 years old and higher with a bachelor degree and above. The variable is consistently positively correlated with economic performance. A statistically significant correlation coefficient of 0.116 indicates only a weak if present link between fragmentation and human capital (the association is not confirmed in the population ranked subsets of the database either). However, the association between sprawl and human capital is more notable. Overall, highly sprawled areas tend to score lower on a human capital scale. The correlation coefficient for all metro areas in the database is statistically significant and it equals -0.335. While not confirmed for the large metro

areas, the similar negative association is observed in small ($r = -0.250$) and medium ($r = -0.259$) regions.

Fragmentation, sprawl, and tax effort.

Tax effort, measured as the total local government tax revenue collected in the metro area as a percent of the personal income (see Chapter III), is positively associated with economic performance. Correlation coefficients for fragmentation and tax effort are statistically significant, positive, and moderate (all: $r = 0.317$, small: $r = 0.297$, medium: $r = 0.348$, large: $r = 0.255$). The opposite association is observed between tax effort and sprawl (all: $r = -0.238$; small: $r = -0.200$; medium: not statistically significant; large: $r = -0.423$).

Fragmentation, sprawl, and affluence.

Affluence, measured as a percentage of households with income in excess of \$100,000, had the highest correlation coefficients with the dependent variable. Due to the fact that this variable is also highly correlated with human capital it is not used later in the regression analysis to avoid multicollinearity. However, it is important to note here its relationships with sprawl and fragmentation.

While the examination of the relationship between fragmentation and affluence in the individual subsets of the database did not produce a statistically significant result, among all the metropolitan areas this association was positive and statistically significant ($r = 0.380$).

On the sprawl side, a statistically significant negative link was found between the sprawl index and the percentage of the affluent households ($r = -0.463$). This link

is not evident for the small metropolitan areas, but it is observed in medium ($r = -0.346$) and large ($r = -0.362$) regions.

Fragmentation, sprawl, and racial segregation.

Racial segregation was measured as the White-Black dissimilarity index. The association between racial segregation and fragmentation is positive and statistically significant for all the metropolitan areas ($r = 0.481$). The relationship is strongest for the medium metro areas ($r = 0.446$) and the large metropolitan areas ($r = 0.358$). Small metropolitan areas demonstrate only a weak if present association ($r = 0.169$). All correlation coefficients are statistically significant.

A positive association between sprawl and racial segregation was confirmed only for the medium metropolitan areas ($r = 0.298$).

Fragmentation, sprawl, and age of metro areas.

Age of metropolitan areas is measured via a proxy of the percentage of housing built before 1939. The correlation coefficients for the bivariate association between the sprawl index and the age of the region is statistically significant, very weak and negative ($r = -0.140$). Similar relationships are found for the small areas ($r = -0.266$) and the medium areas ($r = -0.195$). Analysis of the relationship in the large metropolitan areas does not demonstrate links between sprawl and the age of the region.

The relationship of age on the metropolitan areas with the fragmentation index is more profound. All the correlation coefficients are statistically significant. Older metropolitan areas tend to have higher fragmentation scores (all: $r = 0.402$). The most support for this association was found among the medium metro areas ($r = 0.678$),

followed by the small metropolitan areas ($r = .578$), and the large metropolitan areas ($r = 0.518$).

Fragmentation, sprawl, and large regional agglomerations.

Correlation coefficients were calculated to examine whether belonging to a larger agglomeration of metropolitan areas was linked to the sprawl and fragmentation scores. Metropolitan areas located within the Consolidated Metropolitan Statistical Areas (CMSAs) demonstrate a weak tendency to have a higher fragmentation scores (all metro areas: $r = 0.317$; small: not statistically significant, medium: not statistically significant, large: not statistically significant). Metropolitan areas in CMSAs have lower sprawl scores (all: $r = -0.382$). This was the most evident for the large metro areas ($r = -0.556$), followed by the medium metro areas ($r = -0.217$). The relationship in the group of small metro areas is not statistically significant.

Regression Models

To analyze the relationships between fragmentation, sprawl, and economic performance of the metropolitan areas, and to compare the strength of these relationships with the effects of economic development variables on the independent variable, multiple linear regression analysis was conducted. Similar to the analysis of the bivariate correlations, the four sets of models were created for all metropolitan areas in the database, and separately for the small, the medium and the large metropolitan areas.

Three regression models were created for each subset of the database. This design allows tracking the explanatory power of the models with different sets of independent variables and comparing which set offers the best explanation of variation in metropolitan economic performance. The first model estimates the impact on economic performance of the main policy variables – fragmentation index and sprawl index, while controlling for a number of socioeconomic factors. The second model is introduced to compare and contrast the effects of policy variables with the effects of economic development variables. It estimates the impacts on economic performance of economic development variables – human capital and tax effort. It employs the same set of socioeconomic controls as the first model. The third model combines policy variables, economic development variables, and socioeconomic controls. It creates a fuller set of controls for evaluating the relationships between fragmentation, sprawl and economic performance. The differences in the explanatory power with the first two models reveals stronger predictors of the metropolitan economic performance. The following are the tables with the results of the analysis accompanied by individual descriptions.

Multiple regression analysis for all metropolitan areas.

Table 10 presents the results of the ordinary least squares regression for the 310 MSA in the database. Twenty metropolitan areas were excluded from the analysis due to unavailable and/or incompatible data⁷.

Model 1. Economic Performance = f(Fragmentation, Sprawl, Controls)

Model 1 tests the relationship between economic performance, fragmentation, and sprawl, while controlling for a number of socioeconomic factors. The model explains 21.5 percent of the variance (adjusted $R^2=0.215$) in the dependent variable. The regression indicates a positive and statistically significant (at .01 level) relationship between fragmentation score and economic performance. The relationship between sprawl score and economic performance is negative and statistically significant at .01 level.

Only two of the socioeconomic control variables indicate a statistically significant relationship. Average household size possesses a negative sign. The value of the regression estimate for the state economic performance net of the metro area is positive and statistically significant at 0.01 level.

The dummy variable for the Western Census region indicates the negative link with economic performance. The statistical significance level of this relationship is low (.1). Neither the other two regional location dummy variables nor CMSA control reach a statistically significant relationship.

⁷ Metropolitan areas excluded from the analysis are: Waterbury, CT PMSA, Portsmouth-Rochester, NH-ME PMSA, New Bedford, MA PMSA, Nashua, NH PMSA, Manchester, NH PMSA, Fitchburg-Leominster, MA PMSA, Danbury, CT PMSA, Yolo, CA PMSA, Bridgeport, CT PMSA, Stamford-Norwalk, CT PMSA, Lowell, MA-NH PMSA, Brockton, MA PMSA, Lawrence, MA-NH PMSA, Worcester, MA-CT PMSA, Honolulu, HI MSA, Stockton-Lodi, CA MSA, New London-Norwich, CT-RI MSA, New Haven-Meriden, CT PMSA, Hartford, CT MSA, Orange County, California PMSA.

Table 10. Regression Models. Dependent Variable: Economic performance. All Metropolitan Areas.

	Model 1					Model 2					Model 3				
	B	St. Error	Beta	t	Sig.	B	St. Error	Beta	t	Sig.	B	St. Error	Beta	t	Sig.
(Constant)	60985.130	7878.70		7.741	0.000	5555.478	7754.77		.716	.474	13106.466	9614.39		1.363	0.174
<i>Policy Variables</i>															
Fragmentation Score	890.040	250.21	.245	3.557	0.000						582.448	233.29	.160	2.497	0.013
Sprawl Score	-125.917	26.15	-.314	-4.815	0.000						-31.540	26.89	-.079	-1.173	0.242
<i>Economic Dev. Variables</i>															
Human Capital						532.644	61.29	.477	8.691	.000	463.234	67.07	.419	6.906	0.000
Tax Effort						1219.949	380.62	.199	3.205	.001	1202.426	378.10	.199	3.180	0.002
<i>Control Variables</i>															
Average Household Size	-9630.012	2362.42	-.243	-4.076	.000	222.046	2274.26	.006	.098	.922	-2144.254	2448.64	-.054	-.876	0.382
Age of Metro	-18.333	71.10	-.023	-.258	.797	178.289	70.21	.218	2.539	.012	153.011	69.99	.190	2.186	0.030
Segregation	-64.107	40.86	-.108	-1.569	.118	40.303	34.86	.067	1.156	.249	1.308	39.06	.002	.033	0.973
State EP	.269	.09	.176	2.934	.004	.180	.09	.116	2.123	.035	.223	.09	.146	2.608	0.010
In CMSA	361.824	1260.57	.017	.287	.774	-272.158	1171.24	-.013	-.232	.816	-1356.220	1175.62	-.065	-1.154	0.250
Midwest	-2551.977	1635.43	-.137	-1.560	.120	-331.286	1594.15	-.018	-.208	.836	381.828	1608.94	.021	.237	0.813
South	-1699.632	2233.19	-.103	-.761	.447	1279.500	2114.36	.076	.605	.546	2759.807	2156.07	.167	1.280	0.202
West	-3911.518	2166.95	-.191	-1.805	.072	1354.517	2152.40	.066	.629	.530	1510.542	2200.34	.074	.687	0.493
N				310					312					310	
R2				0.240					.349					0.367	
Adj. R2				0.215					.327					.342	
F				9.45					16.106					14.359	
Sig.F				0.000					0.000					0.000	

Model 2. Economic Performance = f (Human Capital, Tax Effort, Controls)

Model 2 tests the relationship between economic performance, human capital, and tax effort, controlling for a number of socioeconomic factors. It accounts for 32.7 percent of variance in the dependent variable (adjusted $R^2=0.327$). The combination of the two economic development variables with the controls produces the model with higher explanatory power than Model 1. Both human capital and tax effort variables are positively related to economic performance and are statistically significant at 0.01 level. Among the controls, age of metro, and state economic performance variables are positive and statistically significant (at .01 and .05 levels respectively).

Model 3. Economic Performance = f (Fragmentation, Sprawl, Human Capital, Tax Effort, Controls)

This regression model combines all the variables used in this analysis in the model of economic performance. The model explains 34.2 percent of the variance in the dependent variable. This is a difference of 12.7 percentage points comparing with Model 1, and of only 1.5 percentage points with Model 2.

The relationship between fragmentation and economic performance is positive statistically significant (at 0.01 level). The coefficient on sprawl is negative but not statistically significant. Comparing the statistical significance of the sprawl variable in Model 1 and Model 3 shows that its statistical significance in Model 1 is explained by its relationships with other variables. Both human capital and tax effort variables possess positive signs and are statistically significant at .01 level.

Similar to Model 2, only the controls for age of metro and state economic performance reach statistical significance. Both variables are positively linked to economic performance.

Multiple regression analysis for small metropolitan areas.

Table 11 presents the results of the multiple regression analysis for metropolitan areas with population less than 250,000 (Small MSAs). The sample includes 141 out of 149 metropolitan areas of this size⁸.

Model 1. Economic Performance = f(Fragmentation, Sprawl, Controls)

Model 1 tests the relationship between economic performance, fragmentation, and sprawl, controlling for a number of socioeconomic factors. The model explains 20.9 percent of the variance in the dependent variable (adjusted $R^2=0.209$). Neither fragmentation nor sprawl coefficients are statistically significant.

Six out of eight control variables are statistically significant. The only positive relationship observed is for the state economic performance (statistically significant at .01 level). Negative signs for geographic location variables for the small metropolitan areas in the Midwest, South and West indicate their lower economic performance comparing with similarly sized Northeastern metro areas. Also at a disadvantage are the older small metro areas and those located in CMSAs.

Model 2. Economic Performance=f(Human Capital, Tax Effort, Controls)

Model 2 tests the relationship between economic performance, human capital, and tax effort, controlling for a number of socioeconomic factors. It accounts for 30.9 percent of the variance in the dependent variable (adjusted $R^2=0.309$). The combination of the two economic development variables with controls produces the

⁸ Eight metropolitan areas excluded areas due to unavailable and/or incompatible data: Waterbury, CT PMSA, Portsmouth-Rochester, NH-ME PMSA, New Bedford, MA PMSA, Nashua, NH PMSA, Manchester, NH PMSA, Fitchburg-Leominster, MA PMSA, Danbury, CT PMSA, Yolo, CA PMSA.

Table 11. Regression Models. Dependent Variable: Economic performance. Small Metropolitan Areas.

	Model 1					Model 2					Model 3				
	B	St. Error	Beta	t	Sig.	B	St. Error	Beta	t	Sig.	B	St. Error	Beta	t	Sig.
(Constant)	42650.138	12410.97		3.436	.001	11199.660	13576.80		.825	.411	2,863.10	16463.94		0.17	0.862
<i>Policy Variables</i>															
Fragmentation Score	1065.215	759.93	.148	1.402	.163						1,161.18	692.88	0.16	1.68	0.096
Sprawl Score	-48.831	48.09	-.092	-1.015	.312						18.64	47.82	0.04	0.39	0.697
<i>Economic. Dev. Variables</i>															
Human Capital						276.815	101.65	.255	2.723	.007	276.33	106.87	0.26	2.59	0.011
Tax Effort						2464.547	590.68	.361	4.172	.000	2,519.24	563.57	0.38	4.47	0.000
<i>Control Variables</i>															
Average Household Size	-5711.349	3948.97	-.124	-1.446	.151	-1959.310	4166.98	-.042	-.470	.639	-1,180.29	4389.58	-0.03	-0.27	0.788
Age of Metro	-255.142	101.49	-.323	-2.514	.013	-106.323	108.28	-.131	-.982	.328	-114.23	107.01	-0.14	-1.07	0.288
Segregation	-3.362	63.13	-.005	-.053	.958	18.751	61.46	.027	.305	.761	23.55	59.13	0.03	0.40	0.691
State EP	.519	.13	.316	3.915	.000	.438	.13	.261	3.414	.001	0.42	.12	0.25	3.43	0.001
In CMSA	-6180.817	2672.12	-.182	-2.313	.022	-3363.681	2445.87	-.101	-1.375	.171	-6,012.89	2433.99	-0.18	-2.47	0.015
Midwest	-5395.460	2595.74	-.301	-2.079	.040	-1250.136	2592.89	-.068	-.482	.631	89.53	2588.81	0.00	0.03	0.972
South	-9015.426	3711.18	-.532	-2.429	.016	-3327.558	3489.61	-.192	-.954	.342	-1,131.47	3694.99	-0.07	-0.31	0.760
West	-11821.024	3474.46	-.543	-3.402	.001	-4960.178	3496.88	-.226	-1.418	.158	-3631.29	3515.70	-0.17	-1.03	0.304
N					141					141					141
R2					.266					.358					0.400
Adj. R2					.209					.309					0.344
F					4.706					7.300					7.12
Sig.F					.000					.000					0.000

model with higher explanatory power than Model 1. Both human capital and tax effort variables are positively related to economic performance and are statistically significant at 0.01 level. Among the controls, only the state economic performance variable is positive and statistically significant at .01 level.

Model 3. Economic Performance = f(Fragmentation, Sprawl, Human Capital, Tax Effort, Controls)

This regression model combines all the variables used in this study in the model of economic performance. The model explains 34.4 percent of the variance in the dependent variable. This is a difference of 13.5 percentage points comparing with Model 1, and of only 3.5 percentage points with Model 2.

The relationship between fragmentation and economic performance is positive and statistically significant (at 0.1 level). The coefficient on sprawl is not statistically significant. Both the human capital and the tax effort variables possess positive signs and are statistically significant at .01 level.

As in all the previous models, the coefficient for the state economic performance is statistically significant. The regression model confirms the finding of Model 1 indicating a negative relationship between CMSA location of small metropolitan areas and their economic performance. No influence of the geographic location on economic performance is observed in this model.

Multiple regression analysis for medium metropolitan areas

Table 12 presents the results of the multiple regression analysis for the metropolitan areas with population between 250,000 and 1,000,000 persons (Medium MSAs). The sample includes 111 out of 121 areas of this size.⁹ To avoid multicollinearity, the control variables set in these models excludes the age of metro which has a high zero-order correlation with fragmentation score ($r = 0.678$).

Model 1. Economic Performance = f (Fragmentation, Sprawl, Controls)

Model 1 tests the relationship between economic performance, fragmentation, and sprawl, controlling for a number of socioeconomic factors. The model explains 24 percent of the variance (adjusted $R^2=0.240$). Coefficient on the fragmentation score is not statistically significant. The model reveals a statistically significant negative link (at .01 level) between the sprawl scores and economic performance.

Among the control variables, a positive and statistically significant (at .1 level) relationship was observed for the state economic performance, and a statistically significant (at .01 level) negative relationship between the average household size and metropolitan economic performance was also found.

Model 2. Economic Performance= f (Human Capital, Tax Effort, Controls)

Model 2 tests the relationship between economic performance, human capital, and tax effort, controlling for a number of socioeconomic factors. It accounts for 32.5 percent of the variance in the dependent variable (adjusted $R^2=0.325$). The combination

⁹ Ten metropolitan areas are excluded due to the unavailable and/or incompatible data: Bridgeport, CT PMSA, Stamford-Norwalk, CT PMSA, Lowell, MA-NH PMSA, Brockton, MA PMSA, Lawrence, MA-NH PMSA, Worcester, MA-CT PMSA, Honolulu, HI MSA, Stockton-Lodi, CA MSA, New London-Norwich, CT-RI MSA, New Haven-Meriden, CT PMSA.

of the two economic development variables with the controls produces the model with higher explanatory power than Model 1. In this subset of the database only human capital variable is positively associated with economic performance. It is statistically significant at 0.01 level. Among the controls, average household size is significant at .1 level and possesses negative sign. State economic performance variable is positive and statistically significant at .01 level.

Model 3. Economic Performance = f (Fragmentation, Sprawl, Human Capital, Tax Effort, Controls)

This regression model combines all the variables used in the previous two models in the model of economic performance. The model explains 34.7 percent of the variance in the dependent variable. This is a difference of 10.7 percentage points comparing with Model 1, and of only 2.2 percentage points with Model 2.

As in Model 1, the relationship between sprawl and economic performance is negative and statistically significant (at 0.05 level). The coefficient on fragmentation is not statistically significant. As in Model 2, only human capital is linked to economic performance. The coefficient possesses positive sign and is statistically significant at .01 level.

As in all the previous models, the coefficient for the state economic performance is positive and statistically significant (at .01 level). Average household size is negatively linked to metropolitan economic performance (statistical significance at 0.05 level).

Multiple regression analysis for large metropolitan areas

Table 13 presents the results of the multiple regression analysis for the metropolitan areas with population higher than 1,000,000 persons (Large MSAs). The sample includes 59 out of 61 areas of this size (excluded areas are Hartford, CT MSA and Orange County, California PMSA). The sample size in these series of models is low and thus the results should be interpreted with caution. Statistical insignificance could as well be a statistical artifact due to small sample size and multicollinearity among independent variables. The only control variables used in these series of models are average household size, segregation, state economic performance net of metro area and CMSA.

Model 1. Economic Performance = f (Fragmentation, Sprawl, Controls)

Model 1 tests the relationship between economic performance, fragmentation, and sprawl, controlling for a number of socioeconomic factors. The model explains only 12.1 percent of the variance (adjusted $R^2=0.121$). Coefficient for the sprawl score is not statistically significant. The model reveals a statistically significant positive link (at .1 level) between the fragmentation score and economic performance.

Among the control variables, only the coefficient for CMSA was statistically significant (at .1 level). The sign is positive, and the large metropolitan areas, as opposed to the small regions described above, benefit from the location within a CMSA.

Table 13. Regression Models. Dependent Variable: Economic performance. Large Metropolitan Areas.

	Model 1					Model 2					Model 3				
	B	St. Error	Beta	t	Sig.	B	St. Error	Beta	t	Sig.	B	St. Error	Beta	t	Sig.
(Constant)	72284.855	21411.59		3.376	.001	17829.662	16896.61		1.055	.296	23761.033	18163.64		1.308	.197
<i>Policy Variables</i>															
Fragmentation Score	693.120	363.46	.279	1.907	.062						259.600	284.23	.105	.913	.366
Sprawl Score	-62.260	64.73	-.154	-.962	.341						-30.779	50.34	-.076	-.611	.544
<i>Economic Dev. Variables</i>															
Human Capital						869.293	140.69	.650	6.179	.000	845.823	144.19	.638	5.866	.000
Tax Effort						1000.894	648.82	.186	1.543	.129	922.133	667.35	.171	1.382	.173
<i>Control Variables</i>															
Average Household Size	-9499.790	7209.82	-.199	-1.318	.194	1164.473	5324.47	.025	.219	.828	-1266.528	5632.82	-.027	-.225	.823
Age of Metro*															
Segregation	-140.031	102.41	-.201	-1.367	.178	-37.363	87.60	-.055	-.427	.672	-34.691	94.06	-.050	-.369	.714
State EP	-.075	.19	-.056	-.398	.692	-.237	.14	-.177	-1.747	.087	-.198	.15	-.149	-1.366	.178
In CMSA	4861.886	2601.04	.311	1.869	.067	1659.166	1859.67	.106	.892	.376	689.531	2089.36	.044	.330	.743
Midwest*															
South*															
West*															
N				58					59					58	
R2				.214					.551					.566	
Adj. R2				.121					.500					.495	
F				2.310					10.649					7.991	
Sig.F				.048					.000					.000	

*excluded due to low number of MSAs in the sample, and to avoid multicollinearity

Model 2. Economic Performance = f (Human Capital, Tax Effort, Controls)

Model 2 tests the relationship between economic performance, human capital, and tax effort, controlling for a number of socioeconomic factors. It accounts for 50 percent of the variance in the dependent variable (adjusted $R^2=0.500$). The combination of the two economic development variables with the controls produces a model with a much higher explanatory power than Model 1. In this subset of the database only human capital variable is a positively associated with economic performance. It is statistically significant at 0.01 level. The tax effort variable is not statistically significant. In the group of control variables, state economic performance coefficient which demonstrated positive relationship in the other subsets of the database, reverses its sign to a negative. It is statistically significant at .1 level.

Model 3. Economic Performance = f (Fragmentation, Sprawl, Human Capital, Tax Effort, Controls)

This regression model combines all the variables used in the previous two models in the model of economic performance. The model explains 49.5 percent of the variance in the dependent variable. This is a difference of 37.4 percentage points comparing with Model 1, and of a negative 0.5 percentage points with Model 2.

The only statistically significant coefficient (at.01 level) in this model is for the human capital variable, which is positively linked to the economic performance.

CHAPTER V

DISCUSSION

Chapter IV presented the results of the correlation analysis and the regression analysis. The following chapter examines the most important findings of the analyses and puts them into context of broader discussion on the links between metropolitan governance, urban sprawl, and economic performance and social equity.

Links between Fragmentation and Sprawl

The central question of this research is the relationship between economic performance of metropolitan areas, their structure of governance (represented by fragmentation) and spatial form (represented by the degree of urban sprawl). Still, the question of whether there is a link between fragmentation and sprawl, and what is its magnitude and direction underlies any investigation of the extent to which economic performance is affected by the two abovementioned variables. The often-assumed causal link between fragmentation and sprawl substantiates policies of governmental reforms, which are expected to alleviate negative social and environmental externalities of urban sprawl. Little empirical evidence, however, exists to prove this causal link. If this link is absent, or if the relationship is due to other external factors,

fighting sprawl with government centralization may only eliminate the possible economic benefits of intergovernmental competition.

Conceptually, the link between fragmentation and sprawl seems self-evident. Nevertheless, the empirical support of the causal link between fragmentation and sprawl is either limited or contradictory. For example, Lewis (1996) used the Political Fragmentation Index (described earlier in Chapter II) and density gradients measuring the decline in density with the increase in distance from the city center to test the hypothesis about the link between fragmentation and sprawl. He has found that fragmentation was linked to lower densities. However, recognizing the small sample size (14 metropolitan areas) and nonrandom character of the sample, he warns about drawing conclusions from the model and suggests that fragmentation may act as a proxy for other variables correlated with it. He concludes that “while it cannot be conclusively stated that political fragmentation is associated with less compact urban areas, neither did the analysis of density gradients disprove such a thesis” (Lewis, 1996).

The study by Razin and Rosentraub (2000) discussed earlier in Chapter II suggest that sprawl may be a necessary, but not sufficient condition for fragmentation. The authors have found no statistically significant impact of fragmentation on sprawl. Razin and Rosentraub conclude that fragmentation and sprawl are not “inherent attributes” of each other, and that the “assessments of sprawl and fragmentation should address these phenomena separately (p.835)”. In another study discussed in the Chapter II, Carruthers and Ulfarsson (2002) examined the relationship between governmental fragmentation and density, urbanized land area, property values and public expenditures on infrastructure in a simultaneous equations framework. Their results link fragmentation with both lower density and lesser amounts of urbanized

land. The authors explain this mathematical anomaly as a result of the efforts of suburban municipalities to limit densities and preserve open spaces, while the annexation policies of consolidated governments that lead to greater urbanized land. Given the well-documented political difficulties that annexation efforts face in the most metropolitan areas (Rusk, 1999) the argumentation seems uncertain. Additionally, recent research questions the efficacy of using county-level data for analysis of sprawl (Lang, 2003 cited in Wolman et al., 2004).

Statistical analysis performed here provides a different outlook on this issue compared with the previous research literature. The results of this analysis suggest a weak to moderate negative correlation between fragmentation and sprawl when calculated for all the metropolitan areas in the US. None of the correlation coefficients between fragmentation and sprawl have reached statistical significance when calculated separately for small, medium and large metropolitan areas. This finding contradicts the traditional view of fragmentation as at least the necessary condition for sprawl. Because correlation analysis cannot establish a causal link, this result can be viewed from three perspectives. First, research literature suggested that low density sprawled development reduces the sense of community (Ewing, 1997). It may be possible that sprawl distances residents of communities to the degree that it is impossible to create a sustainable grass-roots effort for incorporation of new municipalities. Second, the link can be interpreted as following. Strong local governments in fragmented metropolitan areas attract residents with their independent packages of tax and services thus keeping the residents within the boundaries of the existing jurisdictions and reducing new sprawling developments. However keeping in mind the results of the previous empirical literature, a third perspective on the issue may explain the dissimilarities in the findings. It is likely that fragmentation and

sprawl are not direct consequences of one another, but are the manifestations of other trends in urban development. Additional confirmation for this is offered by European research, which suggests that fragmentation and sprawl are not a uniquely American phenomenon. Bäck (2004) discussed sprawl and fragmentation in Swedish metropolitan areas using the methodology similar to the one used in this research. Sprawl was measured using the Lopez and Hynes index, and fragmentation was measured via a modification of Herfindahl's index slightly different from the one used here. Bäck demonstrated the presence of both sprawl and fragmentation in Swedish metropolitan areas. In fact, using the same density cutoff as suggested by Lopez and Hynes and used here, the author found sprawl level of Swedish cities to be comparable to American regions (Stockholm's sprawl index score was above 40, while the sprawl index value for Göteborg has reached 100). If European cities demonstrate the comparable levels of sprawl and fragmentation with American metropolitan areas, while operating in an obviously different political context, it might as well be possible that both phenomena reflect global trends of suburbanization and citizen's preferences in the post-industrial world.

If sprawl and fragmentation are not causes of each other, but are in fact the results of a different external processes they should be treated as such and deserve separate policy responses. Additional research is needed to understand the factors that link the two phenomena together. What is important however is that that the negative relationship between the two variables enforced by the absence of statistically significant correlations in the population-ranked subsets of the database, points out that the assumption of the firm interdependency of sprawl and fragmentation may be incorrect. Also, while the link between sprawl and fragmentation observed in the correlation analysis was not strong, the regression models suggest that the impact of

sprawl and fragmentation on economic performance of metropolitan areas is indeed reverse. This underscores the dissimilarities between the two variables and brings us to the questions of the links between economic performance fragmentation, and sprawl.

Fragmentation and Economic Performance of Metropolitan Areas

The questions of the possible impacts of regional governance structure on metropolitan outcomes are central to the discussion of the optimal configuration of governance in metropolitan areas and to this research. Whether it is the efficiency of local governments, social equity, economic growth, or productivity, the supporters of different theories often attribute the desired outcomes to their preferred governmental arrangements. This discussion invariably leads to the necessity of statistical analysis to substantiate these claims. There are several ways to evaluate the advantages of the specific governmental arrangements or the needs for governmental reforms in regard to both the optimal service-delivery and the possible effect of such reforms on various measures of economic well-being of metropolitan areas. This research examines whether the structure of governance affects economic performance of the metro areas. To put the discussion of the results of statistical analysis presented in Chapter IV in a broader context of research literature I discuss here the previous empirical evidence on the links between the structure of government and metropolitan outcome and compare their findings with the results of my analysis.

Since the 19th century the argumentation for metropolitan reforms has constantly shifted, but the underlining assumptions of economic benefits were always

present. Initially the argument for introducing metropolitan-level government structures was largely based on the desires to reduce the influence of political machines. At the same time the assertion that streamlined government would bring a competitive edge to a city was always a common theme. In the 1990s the renewed attention to the possible regional-level solutions to urban problems was substantiated by growing central-city/suburban disparities and unequal opportunities embedded in the spatial arrangements of American metropolis. However, the political climate of the decentralized metropolis makes it very difficult to get approval by the majority-suburban constituencies of any measures that may threaten to reduce their power to exclude the undesirable land uses or to avoid sharing fiscal resources throughout the region. So, as observed by Norris (2001), the argumentation for metropolitan reform has recently shifted from the emphasis on government efficiency and social equity to the perceived benefits to economic development and metropolitan competitiveness that may be realized following governmental reforms.

Recent studies illustrate this trend. For example, Fleischmann (2000) conducted a survey of local political and business leaders of four small metropolitan areas considering city-county consolidation. Survey respondents viewed economic development as a regional issue; and expected that consolidation of city and county governments would boost economic growth and reduce competition between city and county for economic development. Additional evidence that city-county consolidations today are promoted based on the assumption that governmental reforms will bring better economic growth and prosperity is offered by Savitch and Vogel (2004). In a case study of governmental reorganization of Louisville and Jefferson County, KY they pointed out the argumentation of reform proponents: “consolidated government [...] would enable the community to adopt a “single

vision” so that Louisville could speak with “one voice” in recruiting companies; [...] consolidated government would help Louisville negotiate incentives or convince businesses that a “streamlined” government would facilitate development (Savitch and Vogel, 2004).”

A number of studies examined various aspects of the relationships between the structure of governance and metropolitan outcomes. The questions of government efficiency often underline the discussion on the optimal configuration of governance in metropolitan regions. It is often assumed that the “streamlined” consolidated government is more efficient which should translate to better economic performance of the regions. Research literature offers an ample evidence to challenge this claim. For example, Benton and Gamble (1984) refute the claim that consolidation lead to less costly government by pointing out the increases in both taxes and expenditures after consolidation in Jacksonville, Florida. Schneider (1986a) shows that competition between suburban municipalities result in slower growth of local government expenditures and service levels. Eberts and Gronberg (1988) demonstrate that fragmentation constrains government spending and argue that competition increases efficiency in public service provision.

Where the relationship between the competitiveness in public sector and its efficiency finds empiric support, the evidence to the effect of fragmented government on metropolitan economic outcomes is less consistent. The difficulty in comparing the results of different studies lies in the variety of both the measures of government structure, and the economic performance employed. As such, empirical research offers a degree of support both for the public choice theory, and for the proponents of metropolitan governments. To provide a few example of the support for the public choice argument, for example, Feiock and Carr (1999) used the annual growth in

manufacturing, retail and service establishment to evaluate the relationship between economic development and city-county consolidation. The effect of consolidation was accounted for by using a time-lagged dummy variable. The authors have not found any support for the claims that consolidation enhances economic development. No statistically significant relationship between fragmentation (the per capita number of governments and the geographic density of city governments within a metropolitan area) and economic growth (the change in suburban per capita income 1985 – 1989) was found in the study by Post and Stein (2000). On the other side of the debate, Nelson and Foster (1999) used a number of variables capturing local and regional governance structure to estimate changes in metropolitan per capita income in a period of 1976-1996. The results of their study provide mixed evidence that can be interpreted to support either argument. The local government structure variables positively associated with income growth included central city annexation ratio, and suburban city average population. The variables for the percentage of central city population, the ratio of special purpose to general-purpose governments, and the number of elected special purpose district officials per capita were negatively linked. The statistically significant positive impact of regional multipurpose governments found by Nelson and Foster suggests the benefits from regional planning and coordination. However, the “single-county, two tier” federated form of metropolitan governance was shown to be linked to substantial declines in income growth. In addition, no statistically significant impact of city-county consolidation on income growth was found.

In the context of this study the research by Paytas (2001) warrants a special attention because the fragmentation index used in his study allows direct comparison with my findings (more on this follows the summary of both results). Paytas used the

shift-share technique to operationalize metropolitan economic performance. This technique breaks down the change in employment into the three components – national trends, local industry mix and the residual that is attributed to the competitive strength of local economy. The shift-share residual – “metropolitan competitiveness” was used as the measure of economic performance. The data analyzed was for the 1972-1997 time period. The study controlled for the centralization of state-local relations, and accounted for whether the metropolitan area was a state capital. Paytas found a significant negative impact of fragmentation on metropolitan competitiveness. State capital location was only a weak predictor of economic performance. In regard to the state-local relations, Paytas observed that the combination of unified metropolitan region with decentralized state powers offered the best advantages to metropolitan competitiveness. The worst performers were the fragmented metropolitan regions in centralized states. Overall, this study offers an important insight into the link between governance and metropolitan economic performance. Most importantly, it confirms that the patterns of governance do matter.

While understanding the links between governance and the measures of growth used in the described above studies is important, these measures of growth alone do not paint the complete picture of the interaction of governance with metropolitan outcomes. As argued by Gottlieb (2002), not all metropolitan areas are interested in growth, because population growth and employment growth can be associated with a number of negative consequences: increased resource use, increased infrastructure costs, growth of low-paying jobs reducing average pay in the region, etc. My analysis looks at the relative standing of metropolitan areas on the scales of economic performance at a point in time. As Blair and Zhang (1996) put it, “economic theory holds that productivity is a key to increasing incomes and reducing

poverty”. The measure of economic performance employed here – gross metropolitan product per capita is at its core a measure of productivity.

Correlation analysis presented in Chapter IV suggests the presence of positive link between economic performance of metropolitan areas and their levels of fragmentation. Statistically significant positive correlations were observed across all metropolitan areas and in large and small metropolitan areas. The correlation coefficient for medium metropolitan areas was not statistically significant. Regression analysis validated the positive links between fragmentation and economic performance. For the full dataset, fragmentation was positively associated and statistically significant at 0.01 levels in all the models. Similar, but weaker relationship was found in small and large metropolitan areas. Additionally, fragmentation was found to be moderately and positively correlated with the other factors positively associated with economic performance of metropolitan areas: human capital, tax effort, and affluence.

The use of the same operational measure of fragmentation allows direct comparison of this study with the results of Paytas’ (2001) investigation. While the results of the two studies seem contradictory, this can be explained by the differences in the measures of economic performance. As Miller (2002, p. 129) elaborates on the findings by Paytas: “The more diffused (high scores on the MPDI) power is in a metropolitan region, the less likely economic expansion in that region will be a function of local policies. Clearly, highly diffuse metropolitan regions could still see considerable economic expansion”. Essentially, fragmented regions exert less control over job creation via their own policies and are more susceptible to the macroeconomic trends. My results suggest that, while fragmented regions may lag

behind other metro areas in terms of their control over rates of growth, they still are more productive when compared with other regions.

Does decentralized control over expenditures by local governments enhance economic performance of the metropolitan areas? The results of the analysis in this study suggest that that may be the case. While the use of cross-sectional data does not allow for drawing conclusions about causation, the results show that in the year 2000 fragmented metropolitan areas were more productive. Comparing the regression models with the different set of control reveals a relatively lesser role that both fragmentation and sprawl play in predicting the economic performance of metropolitan regions. However, judging by the values of the standardized regression coefficients, the influence of fragmentation, while not a match for the impact of the human capital, is substantial and ranks close to the effects of state economic performance. Consistent with the arguments of polycentric theory, metropolitan areas with more decentralized governance and competition between local governments show better economic performance.

Urban Sprawl and Economic Performance of Metropolitan Areas

As discussed earlier, there is a considerable disagreement in research literature on the issues of costs and benefits of urban sprawl. Nonetheless, the positive relationship between economic well-being, economic development and sprawl is implicitly assumed by the defenders of sprawl. The defense of sprawl is usually based on the neoclassical economic theory, which as some argue is not a neutral methodology but “a political theory favoring individual self-interest and consumerism

over public-spirited behavior and deliberative political choices” (Ellis, 2002). In the free-market economics view sprawl is perceived as an outcome of individual consumer choices that maximize individual’s welfare thus maximizing welfare of the society as a whole (Burchell et al, 1998). It is argued that that sprawl is a welcomed product of a market forces. It reduces congestion, provides housing that is relatively more affordable than in high density and/or planned communities, and most importantly, represents an overwhelming consumer preference for low-density detached housing (Gordon and Richardson, 1993, 1997, 2000, and 2001). What is missing from the argument however, is the empirical evidence of the impact of sprawl on metropolitan economic outcomes. My research attempted to examine one aspect of the possible relationship between urban sprawl and economic well-being of metropolitan areas – the relationship between urban sprawl and economic performance. The sprawl advocates assume that, as a product of free market, sprawl should be beneficial to economic performance. My findings, however, suggest that some sprawled metropolitan areas are less productive when compared with denser regions. Excessive levels of sprawl may hurt, rather than enhance economic performance in metropolitan areas.

Correlation analysis performed in this study suggests that the link between sprawl and economic performance is negative and moderate. Statistically significant correlations were found in for all metropolitan areas in the United States and for the subset of medium metropolitan areas. However, regression analysis shows that only in medium metropolitan areas this relationship stands after controlling for other factors. Medium metropolitan areas with higher levels of sprawl rank lower on the scale of economic performance. In these metropolitan areas a one-point increase in the sprawl index corresponded to \$109 drop in per capita gross metropolitan product. Not only

sprawl have been shown here to have the direct negative effect on economic performance of one subset of metropolitan areas, but it was found to be negatively correlated with human capital, tax effort and affluence. High scores on all the three variables mentioned above are positively associated with regional economic performance.

These findings are consistent with previous research literature linking density and economic performance. For example, Ciccone and Hall (1996) show that increase in employment density at county level leads to increase in state productivity. Cervero (2001) examined metropolitan-level data linking economic output with the shape of metropolis. Using regression models for macro-scale and micro-scale (intra-metropolitan) analysis, he found that employment densities are positively associated with productivity levels. Both studies point out the cause-and-effect relationship between employment densities and economic performance. The sprawl index used in my research, however, relies on measures of population density. The link between population density and employment density is illustrated by Glaeser and Kahn (2001). Their study demonstrates a strong correlation between the two variables. Because the question of causation is not critical in this context it may be concluded that the negative link between residential sprawl and economic performance found in this study closely conforms to the previous literature on the linkages between the concentration of employment and economic productivity.

Additional empirical evidence to the relationship between urban sprawl and economic performance is provided in a recent study by Nelson and Peterman (2000). The authors investigated the impact of growth management programs on economic performance. The sample included 182 metropolitan areas with the population between 100,000 and 500,000 people. Economic performance was measured as a

region's share of total income in the pool of all metropolitan areas in the sample. Growth management measures such as urban growth boundaries, urban service limits, and state or regional oversight of local planning were represented as dummy variables indicating the presence of such programs in a metropolitan area. The regression model controlled for the economic structure (initial share of income in the pool of studied regions, share of income from manufacturing, proximity to major metropolitan areas, and location in right-to-work states), socioeconomic ecology (metro age and central city elasticity), and regional location. Nelson and Peterman found that metropolitan areas that implement growth controls measures are able to capture larger market share (measured by personal income). The findings of Nelson and Peterman study are important in the context of my research because they demonstrate that while, as indicated here, sprawled metropolitan areas perform worse than denser regions, proactive metropolitan efforts as well as the state and regional measures aimed at curtailing sprawl result in an enhanced economic performance.

Overall, the results of this research question the free-market defense of sprawl. Metropolitan areas with higher sprawl scores are less productive. In addition, without implying causation, sprawl was found to be associated with lower percentages of college-educated population, lower percentages of affluent households, and lower local tax effort, all of which are positively linked to economic performance. Comparing the economic performance impact of sprawl and fragmentation shows that the two variables work in the opposite directions. Given the negative association between fragmentation and sprawl discussed before, it can be concluded that the two phenomena require separate considerations and policy responses.

Fragmentation, Sprawl and Racial Segregation

Having discussed the impacts of fragmentation and sprawl on metropolitan economic performance, it is important to look at the social costs of the variables. Whereas a comprehensive discussion of social costs of fragmentation and sprawl is not the primary goal of this study, a brief examination of their links with racial residential segregation serves as an indication of their social impacts.

Urban sprawl has been often been suspected to be a contributor to residential segregation (Downs, 1994; Lopez and Hynes, 2003). Burchell et al (1998) however note that there is no clear consensus in the literature on whether sprawl fosters residential segregation. When sprawl is assumed to be the driving force behind residential segregation, oftentimes it is also implied that there is necessarily a causal relationship between sprawl and fragmentation, and that it is the fragmented local governance that fosters segregation. The data analyzed here suggests that sprawl by itself is not a major contributor to racial residential segregation. Correlation coefficients between sprawl and Black-White dissimilarity index were not statistically significant for all metropolitan areas, and for both the small and the large regions. Only medium metropolitan areas confirmed the link, and correlation coefficient indicates only a weak association. It appears that sprawl, as the predominant mode of suburban development in the United States is equally attractive to both White and Black Americans.

The link between fragmentation and segregation is more apparent. Correlation coefficients demonstrate a positive association between the index of fragmentation and the dissimilarity index. This association was observed across all the regions in the United States as well as in the population-ranked subsets of the database. This result

is consistent with previous literature on the subject. Miller (2002) calculated correlation coefficients for the association between White-Black dissimilarity index and fragmentation (Metropolitan Power Diffusion) index for 1990. Calculations were made with both the composite fragmentation index and using three separate components of the fragmentation index (county governments, municipal governments, and special purpose governments). While all the measures of fragmentation were positively linked to the dissimilarity index, the strongest link was attributed to municipal governments. Additionally, regression models of Black dissimilarity index controlling for size of metropolitan areas and regional location validated the relationship between fragmentation and sorting by race in metropolitan areas. The correlation coefficient calculated in this study for the 2000 data is close to Miller's calculations and it shows that this link persisted over the last decade.

Empirical studies of the relationship between race and political structure using other measures of fragmentation also back up the results observed here. For example, Morgan and Mareschal (1999) used three measures of fragmentation to examine the relationship between political fragmentation and inequality. Residential segregation was measured using a Black-White dissimilarity index. Of the three measures of fragmentation, two (central-city population share, and central-city area growth, 1970-1990) did not reach statistical significance. The third measure of fragmentation – the number of suburban municipalities in the metropolitan area was statistically significantly linked to higher racial residential segregation. The authors conclude that “fragmentation does appear to facilitate efforts by white urban dwellers to minimize contact with black residents” (Morgan and Mareschal, 1999).

A strong empirical confirmation for the relationship between fragmented governance and residential segregation is offered by Burns (1994). Burns examined

the formation of new local governments in the United States from 1959s to 1980s. A simple random sample of 200 counties was used in a series of a regression models to examine the role which service provision needs, desires for racially segregated living, and drive to lower taxes played in the formation of both general purpose governments and special service districts. The results of the analysis have shown that in the 1950s and 1960s new municipalities were incorporated primarily for the purposes of racial exclusion. After controlling for the impact of lower-income populations on the formation of new municipalities, she concluded that, “the operative concern here was race, and not simply the presence of lower-income populations. The founders’ goal, it seems, was the exclusion if African-Americans” (Burns, 1994, p.91). Burns’ statistical analysis has conclusively proved the role that race played in explaining new municipal incorporations.

Overall, the clear link between fragmentation and segregation here reinforces the notion that governmental fragmentation is often used as a tool of racial residential segregation. Burns’ analysis of the formation of local governments in 1950-1980s, Miller’s use of Metropolitan Power Diffusion Index to demonstrate the links between fragmentation and segregation in the beginning of 1990s, and the calculations performed in this study point out that the desires for racially segregated living are revealed by the proliferation of multiple jurisdictions in metropolitan areas. These trends were sustained over the second half of the 20th century and are still evident today.

The discussion above does not cover of course all the social costs of fragmentation and sprawl. However, the example of residential segregation should draw the attention to the possible negative consequences of the decisions that deal with governance. Economic performance argument in substantiation of government

reforms does not address the issues of inequality and therefore does not represent a fully sufficient argument for or against particular public policies. Public policy on the issue of metropolitan governance should carefully balance economic benefits of particular political arrangements with the social costs of such policies.

CHAPTER VI

CONCLUSIONS

The final chapter presents the summary of the findings, and outlines the policy implications of the study. In addition, the limitations of the study and the recommendations for future research are discussed.

Summary of the findings

Fragmentation of governments and urban sprawl has been a subject of a debate for a considerable time. The discussion often centers on whether space (sprawl) and politics (fragmentation) make a difference in the economic development of metropolitan areas. The operational hypothesis was set to follow the argument of the polycentric school of thought on the organization of metropolitan governance. It was expected that competitive local public economies would be beneficial to the economic performance of the regions. Regarding the effect of sprawl, the study assumed that following the lines of free-market defense of sprawl, it would be positively associated with economic performance of the metropolitan areas. The aim of this study was to examine empirical evidence and find support for either of these theories.

Research data have confirmed the hypothesis of the positive link between economic performance and fragmentation of metropolitan governance. On the other

hand, the hypothesis about the positive impact of sprawl on economic performance of metropolitan areas was not validated. Aside from the direct linkages to economic performance, both sprawl and fragmentation were found to be associated with human capital, affluence and tax effort, which, in turn, are positively linked to economic performance. These associations took the same direction as the ones with economic performance – positive for fragmentation and negative for sprawl.

A number of controls allow observing some other important linkages. While previous research suggests that the impacts of local governance structure may be secondary to the trends in state economic development (Blair and Zhang, 1994; Blair, Staley and Zhang 1996), regression analysis performed here shows that the importance of the link between economic performance, fragmentation, and sprawl is comparable to that of the link between state and metropolitan economic performance.

The impact of fragmentation and sprawl on economic performance is not as strong as the impact of human capital and tax effort. However, inclusion of these economic development controls together with socioeconomic controls did not render the relationships between fragmentation and economic performance (for all metropolitan areas) and sprawl and economic performance (medium metropolitan areas) statistically insignificant. This emphasizes the notion that politics and space do play significant role in regional economic outcomes.

It must be noted that the regression models used in this study are not meant to be comprehensive models of economic performance in metropolitan areas. They are designed to evaluate the links between fragmentation, sprawl and economic performance. The models also serve a purpose of comparing the impacts of these policy variables with the impacts of some possible economic development measures available to local governments. This demonstrates whether policy choices concerning

the structure of governance or configuration of urban space can be as useful as the direct economic development measures such as the investment in human capital or tax reform, if productivity is a goal.

The summary of the findings of the statistical analysis is presented in tables 14 and 15.

Table 14. Summary of the Findings.

Question	Method	Relationship			
		<i>All Metro Areas</i>	<i>Small Metro Areas</i>	<i>Medium Metro Areas</i>	<i>Large Metro Areas</i>
Fragmentation and Sprawl	Correlation	<ul style="list-style-type: none"> Negative Weak to moderate 	Not statistically significant	Not statistically significant	Not statistically significant
Fragmentation and Economic Performance	Correlation	<ul style="list-style-type: none"> Positive Weak to moderate 	<ul style="list-style-type: none"> Positive Weak 	Not statistically significant	<ul style="list-style-type: none"> Positive Weak to moderate
	Regression (F,S,Controls)	<ul style="list-style-type: none"> Positive B: \$890; β: .245 St. significance level: 0.01 	Not statistically significant	Not statistically significant	<ul style="list-style-type: none"> Positive B: \$693; β: .279 St. significance level: 0.1
	Regression (F, S, ED, Controls)	<ul style="list-style-type: none"> Positive B: \$582; β: .160 St. significance level: 0.01 	<ul style="list-style-type: none"> Positive B: \$1,161; β: .16 St. significance level: 0.1 	Not statistically significant	Not statistically significant
Sprawl and Economic Performance	Correlation	<ul style="list-style-type: none"> Negative Weak to moderate 	Not statistically significant	<ul style="list-style-type: none"> Negative Weak to moderate 	Not statistically significant
	Regression (F,S,Controls)	<ul style="list-style-type: none"> Negative B: -\$126; β: -.314 St. significance level: 0.01 	Not statistically significant	<ul style="list-style-type: none"> Negative B: -\$143; β: -.374 St. significance level: 0.01 	Not statistically significant
	Regression (F, S, ED, Controls)	Not statistically significant	Not statistically significant	<ul style="list-style-type: none"> Negative B: -\$109; β: -.288 St. significance level: 0.05 	Not statistically significant

Table 15. Additional Findings.

	Policy Variable	Correlation			
		<i>All Metro Areas</i>	<i>Small Metro Areas</i>	<i>Medium Metro Areas</i>	<i>Large Metro Areas</i>
Segregation	Fragmentation	<ul style="list-style-type: none"> • Positive • Moderate 	<ul style="list-style-type: none"> • Positive • Weak 	<ul style="list-style-type: none"> • Positive • Moderate 	<ul style="list-style-type: none"> • Positive • Weak to moderate
	Sprawl	Not statistically significant	Not statistically significant	<ul style="list-style-type: none"> • Positive • Weak to moderate 	Not statistically significant
Human Capital	Fragmentation	<ul style="list-style-type: none"> • Positive • Weak 	Not statistically significant	Not statistically significant	Not statistically significant
	Sprawl	<ul style="list-style-type: none"> • Negative • Weak to moderate 	<ul style="list-style-type: none"> • Negative • Weak 	<ul style="list-style-type: none"> • Negative • Weak 	Not statistically significant
Tax Effort	Fragmentation	<ul style="list-style-type: none"> • Positive • Weak to moderate 	<ul style="list-style-type: none"> • Positive • Weak to moderate 	<ul style="list-style-type: none"> • Positive • Weak to moderate 	<ul style="list-style-type: none"> • Positive • Weak to moderate
	Sprawl	<ul style="list-style-type: none"> • Negative • Weak 	<ul style="list-style-type: none"> • Negative • Weak 	Not statistically significant	<ul style="list-style-type: none"> • Negative • Weak to moderate
Affluence	Fragmentation	<ul style="list-style-type: none"> • Positive • Weak to moderate 	Not statistically significant	Not statistically significant	Not statistically significant
	Sprawl	<ul style="list-style-type: none"> • Negative • Moderate 	Not statistically significant	<ul style="list-style-type: none"> • Negative • Weak to moderate 	<ul style="list-style-type: none"> • Negative • Weak to moderate

Policy Implications

The results of this research suggest several implications for public policy. They can provide policymakers with information on the patterns of interaction between politics, space and economic performance in the metropolitan regions of the United States. However, because the cross-sectional design of the study does not establish causal relationships, these implications are best viewed as topics for public policy discussion and additional research.

As suggested by the National Research Council, “First, even the least fragmented urban areas display high levels of segregation and inequality. Second, the fragmented system of local government has many positive features – involving efficiency, choice, and grass-roots accountability – that might be lost in a more consolidated system. In short, there may be very real trade-offs between these benefits of a fragmented local government system and the equity gains of a more consolidated system (Altschuller et al, 1999).” The models in my study point out that there may be another possible trade-off – economic performance. Thus the major policy implication following this result should be a caution in implementing government reforms, as centralizing governance may hurt economic productivity. However, because the units of analysis in this study are metropolitan areas, the observation above is applicable only at the metropolitan level. It would be incorrect to assume without additional research that exactly the same effect will be observed for government centralization on a scale other than metropolitan (for example, city-county consolidation). Also, another warning must be added. No variables in the analysis specifically account for cooperative interlocal agreements or regional-level institutions providing coordination and planning. Wong (1998) suggests, for example, that implementation of economic development programs in fragmented and divisive Miami has been undermined by the

lack of effective coordination and planning. This requires additional research as to whether the economic performance advantages demonstrated by decentralized metropolitan regions would be even better, if a level of cooperation was accounted for.

The results emphasize the dilemmas of higher economic performance and consumer choice, and greater social costs. As numerous researches suggests, local governments are either unwilling or unable to address these problems. However, if the exclusive municipalities are beneficial for the prosperity of metropolitan areas, it may be the role of state and federal governments to mitigate the misbalances in the distribution of cost and benefits of urban development.

The examination of the links between economic performance and sprawl has shown its possible negative effects. If, as it is often argued, sprawl represents an overwhelming consumer preference, additional research is needed to determine whether the supply of alternatives to sprawled residential housing can make a difference. While, as revealed by the regression models, this issue may not concern all the metropolitan areas, it may be especially important for metropolitan areas with population between 250,000 and 1,000,000 where the negative link between sprawl and economic performance was apparent.

Finally, the results suggest that together with the traditional tools of economic development, policies influencing urban space and governance may have an impact on economic performance. The research literature offers some examples that the former do not always work as designed. For example, if the human capital development strategy seems logical and easier to implement than the governance or sprawl strategy, recent research suggests that states' investment in education do not guarantee retaining highly educated professionals (Florida, 2002; Stephan et al.,

2004). In these cases a sprawl or governance strategy may be an attractive proposition.

Limitations of this Study and Directions for Future Research

Limitations of this study can be generally put into three categories: limitations relating to the cross-sectional design, limitations due to the metropolitan area definitions, and limitations due to operationalization of some variables. Future research should address these limitations, and improve upon the methodological strengths of the measures used in this study to add to the knowledge on the linkages between governance and metropolitan outcomes.

First, being a cross-sectional study, the results should be interpreted accordingly. The analysis describes the state of metropolitan regions in the year 2000. It cannot be used to predict future changes. The study examines static, rather than dynamic variables. There is no way to determine from its results that fragmentation is positively associated with growth in the gross metropolitan product, or sprawl is negatively associated with it. The results only reflect relative standings of metropolitan areas compared to each other. This means that the findings can be more useful for metropolitan areas more interested in productivity than in growth. While the comparative cross-sectional research design has its advantages, future research should also consider using future Census data to update the indices of sprawl and fragmentation and examine the effects of their change on changes in metropolitan economic performance.

The second limitation is related to metropolitan area definitions. Metropolitan area definitions are not constant. This makes the analysis difficult to replicate. Even if it is possible to recalculate, for example, the fragmentation index using the earlier and the latest definitions of metropolitan areas, this still does not allow for an adequate comparison (it either includes the recently added counties in the old metropolitan area definitions, or ignores the newest changes). However, the metropolitan definitions are determined for the specific political purposes rather than for their suitability for research. Unfortunately, this is most likely to be the case in future.

The third limitation relates to operationalization of some variables. The measure of sprawl used in this study relies on a certain density cutoff for determining whether a given census tract belongs to a “sprawled” part of a metropolitan area or not. There may be a substantial disagreement among metropolitan areas as to what represents their desired density thresholds. Also, the Lopez-Hynes sprawl index captures only two conceptual dimensions of sprawl suggested by Galster and outlined in Chapter II. While currently the calculation of sprawl scores for all the aforementioned dimensions requires the knowledge of local geography, the technological advances and the increased availability of satellite imagery should soon make the calculation of an index reflecting all the conceptual dimensions possible. With the availability of such data, future research should incorporate additional dimensions of sprawl in the index.

In addition, alternative measures of economic performance of metropolitan areas may be used. For example, P. Gottlieb (2002) suggested a “growth without growth” measure that should approximate how successful a given metropolitan area is in achieving income growth while avoiding possible negative consequences of the population growth. This measure reflects a goal of an accumulation of wealth in a

metropolitan area while avoiding deterioration of quality of life often associated by constituents with increasing population. Whether this goal is appropriate for all metropolitan areas is debatable; however, this concept is gaining increased attention in a number of urban areas. As a result, currently not all metropolitan areas focus their development goals and efforts on increasing population and employment. Gottlieb suggests the way of calculating growth without growth index in a metropolitan region by subtracting the population growth rate from the real per-capita income growth. While this way of operationalizing this concept has its mathematical problems, if the “growth-without growth” measure formulated in a mathematically correct way can be an adequate dependent variable for the relationship in question.

Finally, the fragmentation index used in this study measures the degree of decentralization of control over expenditures by local governments in a metropolitan area. Given the findings that metropolitan areas with decentralized expenditure patterns are characterized by higher economic performance and the nature of the index itself, it may be useful to decompose the index and measure the degrees of decentralization separately for different expenditures or different sets of expenditures. This may reveal the single articles of expenditures with possible linkages to higher economic performance, and which may be targeted separately as a tool of economic development. A similar methodological technique may also be used to analyze other links between elements of local government finances (for example, distribution of revenues, intergovernmental aid etc.) and social and economic characteristics of metropolitan regions.

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APPENDICIES

Table A1: Metropolitan Areas Ranked by Population (2000).

Rank	Metropolitan Area	Population	Rank	Metropolitan Area	Population
LARGE			40	Columbus, OH	1,540,157
1	Los Angeles--Long Beach, CA	9,519,338	41	Milwaukee--Waukesha, WI	1,500,741
2	New York, NY	9,314,235	42	Charlotte--Gastonia--Rock Hill, NC--SC	1,499,293
3	Chicago, IL	8,272,768	43	Bergen--Passaic, NJ	1,373,167
4	Philadelphia, PA--NJ	5,100,931	44	New Orleans, LA	1,337,726
5	Washington, DC--MD--VA--WV	4,923,153	45	Salt Lake City--Ogden, UT	1,333,914
6	Detroit, MI	4,441,551	46	Greensboro--Winston-Salem--High Point, NC	1,251,509
7	Houston, TX	4,177,646	47	Austin--San Marcos, TX	1,249,763
8	Atlanta, GA	4,112,198	48	Nashville, TN	1,231,311
9	Dallas, TX	3,519,176	49	Providence--Fall River--Warwick, RI--MA	1,188,613
10	Boston, MA--NH ;	3,406,829	50	Raleigh--Durham--Chapel Hill, NC	1,187,941
11	Riverside--San Bernardino, CA	3,254,821	51	Hartford, CT	1,183,110
12	Phoenix--Mesa, AZ	3,251,876	52	Buffalo--Niagara Falls, NY	1,170,111
13	Minneapolis--St. Paul, MN--WI	2,968,806	53	Middlesex--Somerset--Hunterdon, NJ	1,169,641
14	Orange County, CA	2,846,289	54	Memphis, TN--AR--MS	1,135,614
15	San Diego, CA	2,813,833	55	West Palm Beach--Boca Raton, FL	1,131,184
16	Nassau--Suffolk, NY	2,753,913	56	Monmouth--Ocean, NJ	1,126,217
17	St. Louis, MO--IL	2,603,607	57	Jacksonville, FL	1,100,491
18	Baltimore, MD	2,552,994	58	Rochester, NY	1,098,201
19	Seattle--Bellevue--Everett, WA	2,414,616	59	Grand Rapids--Muskegon--Holland, MI	1,088,514
20	Tampa--St. Petersburg--Clearwater, FL	2,395,997	60	Oklahoma City, OK	1,083,346
21	Oakland, CA	2,392,557	61	Louisville, KY--IN	1,025,598
22	Pittsburgh, PA	2,358,695	MEDIUM		
23	Miami, FL	2,253,362	62	Richmond--Petersburg, VA	996,512
24	Cleveland--Lorain--Elyria, OH	2,250,871	63	Greenville--Spartanburg--Anderson, SC	962,441
25	Denver, CO	2,109,282	64	Dayton--Springfield, OH	950,558
26	Newark, NJ	2,032,989	65	Fresno, CA	922,516
27	Portland--Vancouver, OR--WA	1,918,009	66	Birmingham, AL	921,106
28	Kansas City, MO--KS	1,776,062	67	Honolulu, HI	876,156
29	San Francisco, CA	1,731,183	68	Albany--Schenectady--Troy, NY	875,583
30	Fort Worth--Arlington, TX	1,702,625	69	Tucson, AZ	843,746
31	San Jose, CA	1,682,585	70	Tulsa, OK	803,235
32	Cincinnati, OH--KY--IN	1,646,395	71	Ventura, CA	753,197
33	Orlando, FL	1,644,561	72	Syracuse, NY	732,117
34	Sacramento, CA	1,628,197	73	Omaha, NE--IA	716,998
35	Fort Lauderdale, FL	1,623,018	74	Albuquerque, NM	712,738
36	Indianapolis, IN	1,607,486	75	Tacoma, WA	700,820
37	San Antonio, TX	1,592,383	76	Akron, OH	694,960
38	Norfolk--Virginia Beach--Newport News, VA--NC	1,569,541	77	Knoxville, TN	687,249
39	Las Vegas, NV--AZ	1,563,282	78	El Paso, TX	679,622

Table A1: Metropolitan Areas Ranked by Population (2000).

Rank	Metropolitan Area	Population	Rank	Metropolitan Area	Population
79	Bakersfield, CA	661,645	120	Flint, MI	436,141
80	Allentown--Bethlehem--Easton, PA	637,958	121	Boise City, ID	432,345
81	Gary, IN	631,362	122	Madison, WI	426,526
82	Harrisburg--Lebanon--Carlisle, PA	629,401	123	Spokane, WA	417,939
83	Scranton--Wilkes-Barre--Hazleton, PA	624,776	124	Pensacola, FL	412,153
84	Toledo, OH	618,203	125	Canton--Massillon, OH	406,934
85	Jersey City, NJ	608,975	126	Saginaw--Bay City--Midland, MI	403,070
86	Baton Rouge, LA	602,894	127	Salinas, CA	401,762
87	Youngstown--Warren, OH	594,746	128	Santa Barbara--Santa Maria--Lompoc, CA	399,347
88	Springfield, MA	591,932	129	Lawrence, MA--NH	396,230
89	Sarasota--Bradenton, FL	589,959	130	Shreveport--Bossier City, LA	392,302
90	Wilmington--Newark, DE--MD	586,216	131	Newburgh, NY--PA	387,669
91	Little Rock--North Little Rock, AR	583,845	132	Lafayette, LA	385,647
92	Ann Arbor, MI	578,736	133	Beaumont--Port Arthur, TX	385,090
93	McAllen--Edinburg--Mission, TX	569,463	134	York, PA	381,751
94	Stockton--Lodi, CA	563,598	135	Corpus Christi, TX	380,783
95	Charleston--North Charleston, SC	549,033	136	Reading, PA	373,638
96	Wichita, KS	545,220	137	Rockford, IL	371,236
97	New Haven--Meriden, CT	542,149	138	Provo--Orem, UT	368,536
98	Mobile, AL	540,258	139	Visalia--Tulare--Porterville, CA	368,021
99	Columbia, SC	536,691	140	Biloxi--Gulfport--Pascagoula, MS	363,988
100	Vallejo--Fairfield--Napa, CA	518,821	142	Davenport--Moline--Rock Island, IA--IL	359,062
101	Colorado Springs, CO	516,929	143	Appleton--Oshkosh--Neenah, WI	358,365
102	Worcester, MA--CT	511,389	144	Atlantic--Cape May, NJ	354,878
103	Fort Wayne, IN	502,141	145	Stamford--Norwalk, CT	353,556
104	Daytona Beach, FL	493,175	146	Trenton, NJ	350,761
105	Lakeland--Winter Haven, FL	483,924	147	Peoria--Pekin, IL	347,387
106	Johnson City--Kingsport--Bristol, TN--VA	480,091	148	Salem, OR	347,214
107	Lexington, KY	479,198	149	Huntsville, AL	342,376
108	Augusta--Aiken, GA--SC	477,441	150	Hickory--Morganton--Lenoir, NC	341,851
109	Melbourne--Titusville--Palm Bay, FL	476,230	151	Reno, NV	339,486
110	Lancaster, PA	470,658	152	Brownsville--Harlingen--San Benito, TX	335,227
111	Chattanooga, TN--GA	465,161	153	Montgomery, AL	333,055
112	Bridgeport, CT	459,479	154	Hamilton--Middletown, OH	332,807
113	Santa Rosa, CA	458,614	155	Springfield, MO	325,721
114	Des Moines, IA	456,022	156	Eugene--Springfield, OR	322,959
115	Kalamazoo--Battle Creek, MI	452,851	157	Macon, GA	322,549
116	Lansing--East Lansing, MI	447,728	158	Fort Pierce--Port St. Lucie, FL	319,426
117	Modesto, CA	446,997	159	Huntington--Ashland, WV--KY--OH	315,538
118	Fort Myers--Cape Coral, FL	440,888	160	Killeen--Temple, TX	312,952
119	Jackson, MS	440,801	161	Fayetteville--Springdale--	311,121

Table A1: Metropolitan Areas Ranked by Population (2000).

Rank	Metropolitan Area	Population	Rank	Metropolitan Area	Population
	Rogers, AR		202	Amarillo, TX	217,858
162	Fayetteville, NC	302,963	203	Lynchburg, VA	214,911
163	Lowell, MA--NH	301,686	204	Waco, TX	213,517
164	Utica--Rome, NY	299,896	205	Merced, CA	210,554
165	Evansville--Henderson, IN--KY	296,195	206	Longview--Marshall, TX	208,780
166	New London--Norwich, CT--RI	293,566	207	Olympia, WA	207,355
167	Savannah, GA	293,000	208	Fort Smith, AR--OK	207,290
168	Boulder--Longmont, CO	291,288	209	Clarksville--Hopkinsville, TN--KY	207,033
169	Tallahassee, FL	284,539	210	Chico--Paradise, CA	203,171
170	Erie, PA	280,843	211	Springfield, IL	201,437
171	Dutchess County, NY	280,150	212	Manchester, NH	198,378
172	Columbus, GA--AL	274,624	213	Myrtle Beach, SC	196,629
173	South Bend, IN	265,559	214	Houma, LA	194,477
174	Anchorage, AK	260,283	215	Laredo, TX	193,117
175	Ocala, FL	258,916	216	Richland--Kennewick--Pasco, WA	191,822
176	Santa Cruz--Watsonville, CA	255,602	217	Cedar Rapids, IA	191,701
177	Brockton, MA	255,459	218	Nashua, NH	190,949
178	Mayaguez, PR	253,347	219	Racine, WI	188,831
179	Binghamton, NY	252,320	220	Lake Charles, LA	183,577
180	Charleston, WV	251,662	221	Lafayette, IN	182,821
181	Fort Collins--Loveland, CO	251,494	222	Elkhart--Goshen, IN	182,791
182	Naples, FL	251,377	223	Medford--Ashland, OR	181,269
183	Lincoln, NE	250,291	224	Greeley, CO	180,936
184	Galveston--Texas City, TX	250,158	225	Champaign--Urbana, IL	179,669
	SMALL		226	Mansfield, OH	175,818
185	San Luis Obispo--Atascadero--Paso Robles, CA	246,681	227	New Bedford, MA	175,198
186	Duluth--Superior, MN--WI	243,815	228	Tyler, TX	174,706
187	Portland, ME	243,537	229	Las Cruces, NM	174,682
188	Lubbock, TX	242,628	230	Fargo--Moorhead, ND--MN	174,367
189	Brazoria, TX	241,767	231	Sioux Falls, SD	172,412
190	Portsmouth--Rochester, NH--ME	240,698	232	Fort Walton Beach, FL	170,498
191	Odessa--Midland, TX	237,132	233	Topeka, KS	169,871
192	Roanoke, VA	235,932	234	Burlington, VT	169,391
193	Wilmington, NC	233,450	235	Yolo, CA	168,660
194	Johnstown, PA	232,621	236	St. Cloud, MN	167,392
195	Bremerton, WA	231,969	237	Bellingham, WA	166,814
196	Waterbury, CT	228,984	238	Tuscaloosa, AL	164,875
197	Green Bay, WI	226,778	239	Redding, CA	163,256
198	Asheville, NC	225,965	240	Barnstable--Yarmouth, MA	162,582
199	Yakima, WA	222,581	241	Benton Harbor, MI	162,453
200	Danbury, CT	217,980	242	Yuma, AZ	160,026
201	Gainesville, FL	217,955	243	Charlottesville, VA	159,576
			244	Jackson, MI	158,422
			245	Joplin, MO	157,322

Table A1: Metropolitan Areas Ranked by Population (2000).

Rank	Metropolitan Area	Population	Rank	Metropolitan Area	Population
246	Lima, OH	155,084	290	Flagstaff, AZ--UT	122,366
247	Athens, GA	153,444	291	Albany, GA	120,822
248	Wheeling, WV--OH	153,172	292	Bloomington, IN	120,563
249	Bryan--College Station, TX	152,415	293	Sharon, PA	120,293
250	Janesville--Beloit, WI	152,307	294	Williamsport, PA	120,044
251	Parkersburg--Marietta, WV--OH	151,237	295	Muncie, IN	118,769
252	Bloomington--Normal, IL	150,433	296	Grand Junction, CO	116,255
253	Jacksonville, NC	150,355	297	Auburn--Opelika, AL	115,092
254	Kenosha, WI	149,577	298	Lawton, OK	114,996
255	Terre Haute, IN	149,192	299	Decatur, IL	114,706
256	Eau Claire, WI	148,337	300	Goldsboro, NC	113,329
257	Panama City, FL	148,217	301	Sheboygan, WI	112,646
258	Santa Fe, NM	147,635	302	Anniston, AL	112,249
259	Monroe, LA	147,250	303	Hattiesburg, MS	111,674
260	Vineland--Millville--Bridgeton, NJ	146,438	304	Iowa City, IA	111,006
262	Decatur, AL	145,867	305	Sherman--Denison, TX	110,595
263	Rocky Mount, NC	143,026	306	Danville, VA	110,156
264	Florence, AL	142,950	307	Jackson, TN	107,377
265	Fitchburg--Leominster, MA	142,284	308	Sumter, SC	104,646
266	Punta Gorda, FL	141,627	309	San Angelo, TX	104,010
267	Pueblo, CO	141,472	310	Kankakee, IL	103,833
268	Wichita Falls, TX	140,518	311	Gadsden, AL	103,459
269	Jamestown, NY	139,750	312	St. Joseph, MO	102,490
270	Yuba City, CA	139,149	313	Cumberland, MD--WV	102,008
271	Dothan, AL	137,916	314	Kokomo, IN	101,541
272	State College, PA	135,758	315	Lawrence, KS	99,962
273	Columbia, MO	135,454	316	Grand Forks, ND--MN	97,478
274	Greenville, NC	133,798	317	Missoula, MT	95,802
275	Steubenville--Weirton, OH--WV	132,008	318	Bismarck, ND	94,719
276	Hagerstown, MD	131,923	319	Owensboro, KY	91,545
277	Texarkana, TX--Texarkana, AR	129,749	320	Elmira, NY	91,070
278	Billings, MT	129,352	321	Bangor, ME	90,864
279	Altoona, PA	129,144	322	Lewiston--Auburn, ME	90,830
280	Waterloo--Cedar Falls, IA	128,012	323	Dubuque, IA	89,143
281	La Crosse, WI--MN	126,838	324	Rapid City, SD	88,565
282	Dover, DE	126,697	325	Pittsfield, MA	84,699
283	Abilene, TX	126,555	326	Pine Bluff, AR	84,278
284	Alexandria, LA	126,337	327	Victoria, TX	84,088
285	Wausau, WI	125,834	328	Jonesboro, AR	82,148
286	Florence, SC	125,761	329	Cheyenne, WY	81,607
287	Glens Falls, NY	124,345	330	Great Falls, MT	80,357
288	Rochester, MN	124,277	331	Corvallis, OR	78,153
289	Sioux City, IA--NE	124,130	332	Pocatello, ID	75,565
			333	Casper, WY	66,533
			334	Enid, OK	57,813

Table A2: Metropolitan Areas Ranked by Fragmentation Index.

Rank	Metro Area	F	Rank	Metro Area	F
1	Boston, MA-NH PMSA	18.10	40	Louisville, KY-IN MSA	6.49
2	Chicago, IL PMSA	15.09	41	Los Angeles-Long Beach, CA PMSA	6.45
3	Pittsburgh, PA MSA	14.42	42	Reading, PA MSA	6.44
4	St. Louis, MO-IL MSA	14.10	43	Salt Lake City-Ogden, UT MSA	6.42
5	Philadelphia, PA-NJ PMSA	12.23	44	Huntington-Ashland, WV-KY-OH MSA	6.42
6	Scranton--Wilkes-Barre--Hazleton, PA MSA	10.41	45	Utica-Rome, NY MSA	6.41
7	Minneapolis-St. Paul, MN-WI MSA	10.09	46	Oakland, CA PMSA	6.36
8	Detroit, MI PMSA	9.20	47	Milwaukee-Waukesha, WI PMSA	6.24
9	Houston, TX PMSA	9.07	48	Youngstown-Warren, OH MSA	6.21
10	Newark, NJ PMSA	9.01	49	Ann Arbor, MI PMSA	6.20
11	Harrisburg-Lebanon-Carlisle, PA MSA	8.94	50	Rockford, IL MSA	6.14
12	Kansas City, MO-KS MSA	8.85	51	Dayton-Springfield, OH MSA	6.12
13	Nassau-Suffolk, NY PMSA	8.59	52	Bangor, ME MSA	6.07
14	Cincinnati, OH-KY-IN PMSA	8.58	53	Orange County, CA PMSA	6.06
15	Monmouth-Ocean, NJ PMSA	8.37	54	Omaha, NE-IA MSA	5.98
16	Albany-Schenectady-Troy, NY MSA	8.32	55	Fort Wayne, IN MSA	5.96
17	Cleveland-Lorain-Elyria, OH PMSA	8.32	56	Kalamazoo-Battle Creek, MI MSA	5.93
18	Atlanta, GA MSA	8.30	57	Atlantic-Cape May, NJ PMSA	5.86
19	Johnstown, PA MSA	8.14	58	Greenville-Spartanburg-Anderson, SC MSA	5.85
20	Riverside-San Bernardino, CA PMSA	7.95	59	Birmingham, AL MSA	5.84
21	Bergen-Passaic, NJ PMSA	7.85	60	Newburgh, NY-PA PMSA	5.82
22	Denver, CO PMSA	7.84	61	Sacramento, CA PMSA	5.72
23	New Haven-Meriden, CT PMSA	7.70	62	Grand Forks, ND-MN MSA	5.62
24	Middlesex-Somerset-Hunterdon, NJ PMSA	7.67	63	Burlington, VT MSA	5.59
25	Allentown-Bethlehem-Easton, PA MSA	7.47	64	Appleton-Oshkosh-Neenah, WI MSA	5.54
26	Hartford, CT MSA	7.45	65	San Francisco, CA PMSA	5.51
27	Rochester, NY MSA	7.44	66	Springfield, MA MSA	5.51
28	Seattle-Bellevue-Everett, WA PMSA	7.28	67	Pittsfield, MA MSA	5.47
29	Dallas, TX PMSA	7.15	68	Little Rock-North Little Rock, AR MSA	5.44
30	Peoria-Pekin, IL MSA	7.12	69	Fort Worth-Arlington, TX PMSA	5.41
31	Indianapolis, IN MSA	6.99	70	St. Cloud, MN MSA	5.35
32	Portland-Vancouver, OR-WA PMSA	6.98	71	Duluth-Superior, MN-WI MSA	5.33
33	Grand Rapids-Muskegon-Holland, MI MSA	6.91	72	Gary, IN PMSA	5.31
34	Columbus, OH MSA	6.86	73	Williamsport, PA MSA	5.26
35	Lancaster, PA MSA	6.68	74	Saginaw-Bay City-Midland, MI MSA	5.23
36	Syracuse, NY MSA	6.62	75	Wheeling, WV-OH MSA	5.22
37	Providence-Fall River-Warwick, RI-MA MSA	6.55	76	Barnstable-Yarmouth, MA MSA	5.13
38	Davenport-Moline-Rock Island, IA-IL MSA	6.53	77	Tulsa, OK MSA	5.12
39	York, PA MSA	6.50	78	Buffalo-Niagara Falls, NY MSA	5.11

Table A2: Metropolitan Areas Ranked by Fragmentation Index.

Rank	Metro Area	F	Rank	Metro Area	F
79	Sharon, PA MSA	5.06	118	Beaumont-Port Arthur, TX MSA	4.52
80	Fargo-Moorhead, ND-MN MSA	5.04	119	Altoona, PA MSA	4.52
81	Greensboro--Winston-Salem--High Point, NC MSA	5.04	120	Fort Lauderdale, FL PMSA	4.52
82	Wichita, KS MSA	5.02	121	Joplin, MO MSA	4.49
83	New London-Norwich, CT-RI MSA	5.00	122	Phoenix-Mesa, AZ MSA	4.44
84	Oklahoma City, OK MSA	4.98	123	Boise City, ID MSA	4.42
85	Washington, DC-MD-VA-WV PMSA	4.98	124	Dutchess County, NY PMSA	4.40
86	Mobile, AL MSA	4.97	125	Lima, OH MSA	4.39
87	San Diego, CA MSA	4.92	126	Binghamton, NY MSA	4.38
88	Charlotte-Gastonia-Rock Hill, NC-SC MSA	4.92	127	Brazoria, TX PMSA	4.37
89	Orlando, FL MSA	4.90	128	Provo-Orem, UT MSA	4.33
90	Akron, OH PMSA	4.89	129	Charleston-North Charleston, SC MSA	4.33
91	Portland, ME MSA	4.89	130	Fort Smith, AR-OK MSA	4.32
92	Tampa-St. Petersburg-Clearwater, FL MSA	4.88	131	Salem, OR PMSA	4.27
93	Champaign-Urbana, IL MSA	4.87	132	Mansfield, OH MSA	4.27
94	Steubenville-Weirton, OH-WV MSA	4.86	133	Galveston-Texas City, TX PMSA	4.26
95	State College, PA MSA	4.83	134	Vallejo-Fairfield-Napa, CA PMSA	4.25
96	Toledo, OH MSA	4.82	135	Lexington, KY MSA	4.25
97	Johnson City-Kingsport-Bristol, TN-VA MSA	4.81	136	Eau Claire, WI MSA	4.23
98	Bloomington-Normal, IL MSA	4.80	137	Terre Haute, IN MSA	4.23
99	Raleigh-Durham-Chapel Hill, NC MSA	4.79	138	Jamestown, NY MSA	4.22
100	Benton Harbor, MI MSA	4.76	139	Wausau, WI MSA	4.22
101	West Palm Beach-Boca Raton, FL MSA	4.73	140	Evansville-Henderson, IN-KY MSA	4.20
102	Greeley, CO PMSA	4.72	141	Augusta-Aiken, GA-SC MSA	4.20
103	Austin-San Marcos, TX MSA	4.71	142	Des Moines, IA MSA	4.16
104	Visalia-Tulare-Porterville, CA MSA	4.68	143	Salinas, CA MSA	4.14
105	McAllen-Edinburg-Mission, TX MSA	4.66	144	Fayetteville-Springdale-Rogers, AR MSA	4.05
106	Glens Falls, NY MSA	4.66	145	Bellingham, WA MSA	4.05
107	Lansing-East Lansing, MI MSA	4.64	146	Jackson, MS MSA	4.01
108	Bakersfield, CA MSA	4.64	147	Macon, GA MSA	4.00
109	Madison, WI MSA	4.64	148	Decatur, IL MSA	3.98
110	Canton-Massillon, OH MSA	4.60	149	Norfolk-Virginia Beach-Newport News, VA-NC MSA	3.94
111	Nashville, TN MSA	4.59	150	Killeen-Temple, TX MSA	3.89
112	Fresno, CA MSA	4.58	151	Hickory-Morganton-Lenoir, NC MSA	3.88
113	Springfield, IL MSA	4.58	152	Modesto, CA MSA	3.87
114	Kankakee, IL PMSA	4.58	153	La Crosse, WI-MN MSA	3.85
115	Knoxville, TN MSA	4.54	154	Yakima, WA MSA	3.84
116	Erie, PA MSA	4.53	155	Santa Rosa, CA PMSA	3.83
117	Charleston, WV MSA	4.53	156	Ventura, CA PMSA	3.81
			157	Tacoma, WA PMSA	3.80
			158	Sherman-Denison, TX MSA	3.79
			159	Lafayette, LA MSA	3.77

Table A2: Metropolitan Areas Ranked by Fragmentation Index.

Rank	Metro Area	F	Rank	Metro Area	F
160	Bremerton, WA PMSA	3.76	201	Yuba City, CA MSA	3.27
161	Lewiston-Auburn, ME MSA	3.73	202	Springfield, MO MSA	3.27
162	Richland-Kennewick-Pasco, WA MSA	3.73	203	Richmond-Petersburg, VA MSA	3.26
163	Daytona Beach, FL MSA	3.72	204	Eugene-Springfield, OR MSA	3.24
164	Longview-Marshall, TX MSA	3.72	205	San Antonio, TX MSA	3.23
165	Santa Barbara-Santa Maria-Lompoc, CA MSA	3.69	206	Memphis, TN-AR-MS MSA	3.19
166	Trenton, NJ PMSA	3.66	207	Chico-Paradise, CA MSA	3.17
167	Cumberland, MD-WV MSA	3.65	208	Santa Cruz-Watsonville, CA PMSA	3.17
168	Biloxi-Gulfport-Pascagoula, MS MSA	3.64	209	Fort Myers-Cape Coral, FL MSA	3.17
169	Bismarck, ND MSA	3.59	210	Jersey City, NJ PMSA	3.16
170	Parkersburg-Marietta, WV-OH MSA	3.59	211	Savannah, GA MSA	3.16
171	San Luis Obispo-Atascadero-Paso Robles, CA MSA	3.58	212	New Orleans, LA MSA	3.15
172	Boulder-Longmont, CO PMSA	3.57	213	Merced, CA MSA	3.14
173	Sheboygan, WI MSA	3.56	214	Racine, WI PMSA	3.12
174	Sioux Falls, SD MSA	3.55	215	Casper, WY MSA	3.09
175	Melbourne-Titusville-Palm Bay, FL MSA	3.54	216	Grand Junction, CO MSA	3.09
176	Lafayette, IN MSA	3.54	217	Dothan, AL MSA	3.09
177	Waco, TX MSA	3.53	218	Jackson, MI MSA	3.09
178	San Jose, CA PMSA	3.52	219	Corpus Christi, TX MSA	3.06
179	Green Bay, WI MSA	3.50	220	Fort Walton Beach, FL MSA	3.06
180	Fort Collins-Loveland, CO MSA	3.50	221	Vineland-Millville-Bridgeton, NJ PMSA	3.01
181	Chattanooga, TN-GA MSA	3.49	222	Redding, CA MSA	3.00
182	Flint, MI PMSA	3.48	223	Kokomo, IN MSA	2.99
183	Texarkana, TX-Texarkana, AR MSA	3.43	224	Hamilton-Middletown, OH PMSA	2.98
184	St. Joseph, MO MSA	3.41	225	Rapid City, SD MSA	2.96
185	Baltimore, MD PMSA	3.41	226	South Bend, IN MSA	2.96
186	Las Vegas, NV-AZ MSA	3.39	227	Sioux City, IA-NE MSA	2.91
187	Wilmington-Newark, DE-MD PMSA	3.35	228	Lakeland-Winter Haven, FL MSA	2.88
188	Olympia, WA PMSA	3.35	229	Shreveport-Bossier City, LA MSA	2.88
189	Janesville-Beloit, WI MSA	3.34	230	Fort Pierce-Port St. Lucie, FL MSA	2.88
190	Spokane, WA MSA	3.34	231	Myrtle Beach, SC MSA	2.85
191	Brownsville-Harlingen-San Benito, TX MSA	3.33	232	Florence, SC MSA	2.85
192	Elkhart-Goshen, IN MSA	3.33	233	Miami, FL PMSA	2.85
193	Sarasota-Bradenton, FL MSA	3.33	234	Anniston, AL MSA	2.84
194	Florence, AL MSA	3.32	235	Pine Bluff, AR MSA	2.81
195	Medford-Ashland, OR MSA	3.32	236	Wichita Falls, TX MSA	2.78
196	New York, NY PMSA	3.32	237	Elmira, NY MSA	2.78
197	Montgomery, AL MSA	3.31	238	Colorado Springs, CO MSA	2.77
198	Flagstaff, AZ-UT MSA	3.30	239	Wilmington, NC MSA	2.77
199	Stockton-Lodi, CA MSA	3.28	240	Yolo, CA PMSA	2.77
200	Gadsden, AL MSA	3.27	241	Muncie, IN MSA	2.77
			242	Decatur, AL MSA	2.76

Table A2: Metropolitan Areas Ranked by Fragmentation Index.

Rank	Metro Area	F	Rank	Metro Area	F
243	Goldsboro, NC MSA	2.75	288	Lake Charles, LA MSA	2.20
244	Baton Rouge, LA MSA	2.74	289	Albany, GA MSA	2.16
245	Jacksonville, FL MSA	2.73	290	Cheyenne, WY MSA	2.13
246	Topeka, KS MSA	2.73	291	Tallahassee, FL MSA	2.09
247	Columbus, GA-AL MSA	2.73	292	Roanoke, VA MSA	2.07
248	Columbia, SC MSA	2.72	293	Greenville, NC MSA	2.07
249	Asheville, NC MSA	2.69	294	Auburn-Opelika, AL MSA	2.07
250	Odessa-Midland, TX MSA	2.69	295	Bryan-College Station, TX MSA	2.07
251	Rocky Mount, NC MSA	2.65	296	Lubbock, TX MSA	2.02
252	Panama City, FL MSA	2.64	297	Amarillo, TX MSA	2.00
253	Pensacola, FL MSA	2.61	298	Hattiesburg, MS MSA	1.99
254	Naples, FL MSA	2.59	299	Corvallis, OR MSA	1.99
255	Bloomington, IN MSA	2.58	300	Yuma, AZ MSA	1.94
256	Tuscaloosa, AL MSA	2.58	301	Lawton, OK MSA	1.93
257	Dover, DE MSA	2.56	302	Ocala, FL MSA	1.92
258	Tyler, TX MSA	2.54	303	Sumter, SC MSA	1.89
259	Athens, GA MSA	2.54	304	Victoria, TX MSA	1.82
260	Kenosha, WI PMSA	2.54	305	Monroe, LA MSA	1.80
261	Huntsville, AL MSA	2.52	306	Fayetteville, NC MSA	1.80
262	Waterloo-Cedar Falls, IA MSA	2.51	307	Houma, LA MSA	1.79
263	Pueblo, CO MSA	2.50	308	Jackson, TN MSA	1.77
264	Lynchburg, VA MSA	2.49	309	Jacksonville, NC MSA	1.77
265	Cedar Rapids, IA MSA	2.48	310	Las Cruces, NM MSA	1.72
266	Dubuque, IA MSA	2.46	311	Santa Fe, NM MSA	1.69
267	Jonesboro, AR MSA	2.43	312	San Angelo, TX MSA	1.66
268	Columbia, MO MSA	2.42	313	Owensboro, KY MSA	1.61
269	Billings, MT MSA	2.40	314	Laredo, TX MSA	1.60
270	Missoula, MT MSA	2.39	315	Danville, VA MSA	1.49
271	Gainesville, FL MSA	2.38	316	Punta Gorda, FL MSA	1.46
272	Reno, NV MSA	2.37	317	Anchorage, AK MSA	1.16
273	Albuquerque, NM MSA	2.34	318	Honolulu, HI MSA	1.13
274	Lawrence, KS MSA	2.34			
275	Clarksville-Hopkinsville, TN-KY MSA	2.34			
276	Tucson, AZ MSA	2.31			
277	Great Falls, MT MSA	2.30			
278	Lincoln, NE MSA	2.30			
279	Enid, OK MSA	2.29			
280	Charlottesville, VA MSA	2.29			
281	Pocatello, ID MSA	2.27			
282	Hagerstown, MD PMSA	2.25			
283	Alexandria, LA MSA	2.23			
284	El Paso, TX MSA	2.23			
285	Abilene, TX MSA	2.21			
286	Iowa City, IA MSA	2.20			
287	Rochester, MN MSA	2.20			

Table A3: Metropolitan Areas Ranked by Sprawl Index

<i>Rank</i>	<i>Metropolitan Area</i>	<i>Sprawl</i>	<i>Rank</i>	<i>Metropolitan Area</i>	<i>Sprawl</i>
1	Anniston, AL MSA	100.00	31	Texarkana, TX-Texarkana, AR MSA	92.15
1	Clarksville-Hopkinsville, TN-KY MSA	100.00	32	Hattiesburg, MS MSA	91.92
1	Decatur, AL MSA	100.00	33	Fort Pierce-Port St. Lucie, FL MSA	91.86
1	Dothan, AL MSA	100.00	34	Joplin, MO MSA	91.79
1	Florence, SC MSA	100.00	35	Fayetteville-Springdale-Rogers, AR MSA	91.78
1	Goldsboro, NC MSA	100.00	36	Greensboro--Winston-Salem--High Point, NC MSA	91.77
1	Hickory-Morganton-Lenoir, NC MSA	100.00	37	Lafayette, LA MSA	91.60
1	Jonesboro, AR MSA	100.00	38	Portsmouth-Rochester, NH-ME PMSA	91.58
1	Myrtle Beach, SC MSA	100.00	39	Pine Bluff, AR MSA	91.44
1	Ocala, FL MSA	100.00	40	Redding, CA MSA	90.86
1	Rocky Mount, NC MSA	100.00	41	Grand Junction, CO MSA	90.63
1	Sherman-Denison, TX MSA	100.00	42	Roanoke, VA MSA	90.55
1	Sumter, SC MSA	100.00	43	Wheeling, WV-OH MSA	90.14
2	Greenville-Spartanburg-Anderson, SC MSA	98.76	44	Fort Myers-Cape Coral, FL MSA	88.98
3	Barnstable-Yarmouth, MA MSA	98.23	45	Charlotte-Gastonia-Rock Hill, NC-SC MSA	88.06
4	Augusta-Aiken, GA-SC MSA	97.36	46	Elkhart-Goshen, IN MSA	87.78
5	Jacksonville, NC MSA	97.32	47	Alexandria, LA MSA	87.68
6	Gadsden, AL MSA	97.27	48	Lakeland-Winter Haven, FL MSA	87.38
7	Johnson City-Kingsport-Bristol, TN-VA MSA	97.27	49	McAllen-Edinburg-Mission, TX MSA	87.31
8	Dover, DE MSA	97.21	50	Wichita Falls, TX MSA	87.31
9	Asheville, NC MSA	96.95	51	Cumberland, MD-WV MSA	87.26
10	Panama City, FL MSA	96.86	52	Steubenville-Weirton, OH-WV MSA	87.20
11	Brazoria, TX PMSA	96.63	53	Lake Charles, LA MSA	87.05
12	Longview-Marshall, TX MSA	96.26	54	Columbia, SC MSA	87.02
13	Punta Gorda, FL MSA	96.22	55	Cheyenne, WY MSA	86.99
14	Albany, GA MSA	96.13	56	New London-Norwich, CT-RI MSA	86.72
15	Florence, AL MSA	96.13	57	Tyler, TX MSA	86.32
16	Chattanooga, TN-GA MSA	95.86	58	Little Rock-North Little Rock, AR MSA	85.93
17	Pensacola, FL MSA	95.71	59	Montgomery, AL MSA	85.65
18	Huntsville, AL MSA	94.84	60	Charleston-North Charleston, SC MSA	85.64
19	Lynchburg, VA MSA	94.78	61	Bremerton, WA PMSA	85.46
20	Benton Harbor, MI MSA	94.76	62	Houma, LA MSA	84.96
21	Knoxville, TN MSA	94.17	63	Danville, VA MSA	84.91
22	Fayetteville, NC MSA	94.09	64	Daytona Beach, FL MSA	84.74
23	Rapid City, SD MSA	93.72	65	Fort Walton Beach, FL MSA	84.67
24	Olympia, WA PMSA	93.39	66	Melbourne-Titusville-Palm Bay, FL MSA	84.38
25	Monroe, LA MSA	93.11	67	Danbury, CT PMSA	84.01
26	Auburn-Opelika, AL MSA	92.59	68	Enid, OK MSA	83.75
27	Macon, GA MSA	92.53	69	Athens, GA MSA	83.64
28	Biloxi-Gulfport-Pascagoula, MS MSA	92.46			
29	Wilmington, NC MSA	92.39			
30	Jackson, TN MSA	92.26			

Table A3: Metropolitan Areas Ranked by Sprawl Index

<i>Rank</i>	<i>Metropolitan Area</i>	<i>Sprawl</i>	<i>Rank</i>	<i>Metropolitan Area</i>	<i>Sprawl</i>
70	Parkersburg-Marietta, WV-OH MSA	83.64	111	Gainesville, FL MSA	76.61
71	Columbus, GA-AL MSA	83.60	112	Saginaw-Bay City-Midland, MI MSA	76.15
72	Springfield, MO MSA	83.50	113	St. Cloud, MN MSA	76.14
73	Charleston, WV MSA	83.00	114	Williamsport, PA MSA	75.81
74	Dutchess County, NY PMSA	82.77	115	Jackson, MI MSA	75.55
75	Mobile, AL MSA	82.72	116	Fort Wayne, IN MSA	75.49
76	Birmingham, AL MSA	82.67	117	Jacksonville, FL MSA	75.35
77	Jackson, MS MSA	82.54	118	Fitchburg-Leominster, MA PMSA	75.20
78	Raleigh-Durham-Chapel Hill, NC MSA	81.91	119	Greenville, NC MSA	75.10
79	Wausau, WI MSA	81.52	120	Naples, FL MSA	75.04
80	Pocatello, ID MSA	81.19	121	Eau Claire, WI MSA	74.91
81	Beaumont-Port Arthur, TX MSA	81.15	122	Portland, ME MSA	74.86
82	Kokomo, IN MSA	81.08	123	Owensboro, KY MSA	74.78
83	Atlanta, GA MSA	80.65	124	Harrisburg-Lebanon-Carlisle, PA MSA	74.63
84	Tuscaloosa, AL MSA	80.23	125	Flint, MI PMSA	74.60
85	Fort Smith, AR-OK MSA	80.06	126	Chico-Paradise, CA MSA	74.41
86	Columbia, MO MSA	79.88	127	Flagstaff, AZ-UT MSA	74.35
87	Pittsfield, MA MSA	79.60	128	Great Falls, MT MSA	74.08
88	Nashville, TN MSA	79.36	129	Sarasota-Bradenton, FL MSA	73.28
89	Huntington-Ashland, WV-KY-OH MSA	79.04	130	Evansville-Henderson, IN-KY MSA	73.04
90	Nashua, NH PMSA	79.02	131	Lima, OH MSA	72.92
91	Hamilton-Middletown, OH PMSA	78.94	132	Canton-Massillon, OH MSA	72.84
92	Terre Haute, IN MSA	78.87	133	Waco, TX MSA	72.58
93	Tallahassee, FL MSA	78.60	134	Grand Forks, ND-MN MSA	72.47
94	Baton Rouge, LA MSA	78.46	135	Burlington, VT MSA	72.39
95	San Angelo, TX MSA	78.25	136	Ann Arbor, MI PMSA	72.15
96	Bellingham, WA MSA	77.75	137	Hagerstown, MD PMSA	71.93
97	Mansfield, OH MSA	77.70	138	Galveston-Texas City, TX PMSA	71.71
98	Kalamazoo-Battle Creek, MI MSA	77.67	139	Indianapolis, IN MSA	71.69
99	Killeen-Temple, TX MSA	77.62	140	Topeka, KS MSA	71.67
100	Newburgh, NY-PA PMSA	77.62	141	Worcester, MA-CT PMSA	71.52
101	Richmond-Petersburg, VA MSA	77.60	142	Hartford, CT MSA	71.46
102	Sioux City, IA-NE MSA	77.60	143	San Luis Obispo-Atascadero-Paso Robles, CA MSA	71.36
103	Bangor, ME MSA	77.36	144	Muncie, IN MSA	71.31
104	Las Cruces, NM MSA	77.35	145	Utica-Rome, NY MSA	70.95
105	Shreveport-Bossier City, LA MSA	77.27	146	Springfield, IL MSA	70.87
106	Lancaster, PA MSA	77.13	147	Corvallis, OR MSA	70.71
107	Johnstown, PA MSA	77.09	148	Cedar Rapids, IA MSA	70.69
108	Youngstown-Warren, OH MSA	77.05	149	Peoria-Pekin, IL MSA	70.56
109	York, PA MSA	77.01	150	Lewiston-Auburn, ME MSA	70.40
110	Richland-Kennewick-Pasco, WA MSA	76.68	151	Glens Falls, NY MSA	70.23
			152	Abilene, TX MSA	70.14

Table A3: Metropolitan Areas Ranked by Sprawl Index

<i>Rank</i>	<i>Metropolitan Area</i>	<i>Sprawl</i>	<i>Rank</i>	<i>Metropolitan Area</i>	<i>Sprawl</i>
153	Jamestown, NY MSA	69.68	196	Memphis, TN-AR-MS MSA	62.78
154	Rockford, IL MSA	69.57	197	Merced, CA MSA	62.69
155	Gary, IN PMSA	69.51	198	Yuba City, CA MSA	62.48
156	Casper, WY MSA	69.35	199	Missoula, MT MSA	62.12
157	Billings, MT MSA	69.34	200	Louisville, KY-IN MSA	61.90
158	Duluth-Superior, MN-WI MSA	68.85	201	Wilmington-Newark, DE-MD PMSA	61.78
159	Akron, OH PMSA	68.75	202	Cincinnati, OH-KY-IN PMSA	61.64
160	Dayton-Springfield, OH MSA	68.57	203	Racine, WI PMSA	61.58
161	Lawrence, MA-NH PMSA	68.47	204	Binghamton, NY MSA	61.51
162	Dubuque, IA MSA	68.39	205	Sheboygan, WI MSA	61.38
163	Savannah, GA MSA	68.35	206	Boise City, ID MSA	61.37
164	Brockton, MA PMSA	68.18	207	Charlottesville, VA MSA	61.36
165	Kansas City, MO-KS MSA	68.05	208	Tacoma, WA PMSA	61.06
166	Decatur, IL MSA	67.90	209	Sioux Falls, SD MSA	61.06
167	Grand Rapids-Muskegon-Holland, MI MSA	67.82	210	Scranton--Wilkes-Barre--Hazleton, PA MSA	61.04
168	Medford-Ashland, OR MSA	67.49	211	Des Moines, IA MSA	60.99
169	Yakima, WA MSA	67.49	212	South Bend, IN MSA	60.72
170	Waterbury, CT PMSA	67.39	213	Rochester, MN MSA	60.11
171	La Crosse, WI-MN MSA	67.24	214	Brownsville-Harlingen-San Benito, TX MSA	59.89
172	Manchester, NH PMSA	67.13	215	Yuma, AZ MSA	59.36
173	Albany-Schenectady-Troy, NY MSA	66.79	216	Minneapolis-St. Paul, MN-WI MSA	59.11
174	Vineland-Millville-Bridgeton, NJ PMSA	66.70	217	Lawton, OK MSA	58.97
175	Lowell, MA-NH PMSA	66.61	218	Allentown-Bethlehem-Easton, PA MSA	58.70
176	Monmouth-Ocean, NJ PMSA	66.34	219	Oklahoma City, OK MSA	58.15
177	Green Bay, WI MSA	65.88	220	St. Louis, MO-IL MSA	57.98
178	Waterloo-Cedar Falls, IA MSA	65.22	221	Appleton-Oshkosh-Neenah, WI MSA	57.84
179	St. Joseph, MO MSA	65.08	222	Pittsburgh, PA MSA	57.74
180	Rochester, NY MSA	65.02	223	New Haven-Meriden, CT PMSA	57.64
181	Wichita, KS MSA	64.91	224	Lexington, KY MSA	57.43
182	Kankakee, IL PMSA	64.74	225	Eugene-Springfield, OR MSA	57.01
183	Lansing-East Lansing, MI MSA	64.68	226	Erie, PA MSA	57.01
184	Elmira, NY MSA	64.35	227	Bryan-College Station, TX MSA	56.74
185	Orlando, FL MSA	64.34	228	Madison, WI MSA	56.53
186	Reading, PA MSA	64.30	229	Austin-San Marcos, TX MSA	56.50
187	Janesville-Beloit, WI MSA	64.20	230	Providence-Fall River-Warwick, RI-MA MSA	56.50
188	Davenport-Moline-Rock Island, IA-IL MSA	64.06	231	Fargo-Moorhead, ND-MN MSA	56.20
189	Santa Fe, NM MSA	63.88	232	Trenton, NJ PMSA	56.13
190	Sharon, PA MSA	63.82	233	Toledo, OH MSA	55.92
191	Atlantic-Cape May, NJ PMSA	63.81	234	Lawrence, KS MSA	55.64
192	Tulsa, OK MSA	63.78	235	Santa Rosa, CA PMSA	55.44
193	Bloomington, IN MSA	63.45	236	Salem, OR PMSA	55.25
194	Springfield, MA MSA	63.43			
195	Syracuse, NY MSA	62.85			

Table A3: Metropolitan Areas Ranked by Sprawl Index

<i>Rank</i>	<i>Metropolitan Area</i>	<i>Sprawl</i>	<i>Rank</i>	<i>Metropolitan Area</i>	<i>Sprawl</i>
237	Lafayette, IN MSA	55.25	277	San Antonio, TX MSA	45.04
238	Stamford-Norwalk, CT PMSA	54.20	278	Dallas, TX PMSA	44.34
239	Bridgeport, CT PMSA	54.02	279	Anchorage, AK MSA	44.19
240	Odessa-Midland, TX MSA	53.81	280	Omaha, NE-IA MSA	43.96
241	Reno, NV MSA	53.60	281	Greeley, CO PMSA	43.70
242	Columbus, OH MSA	53.16	282	Philadelphia, PA-NJ PMSA	43.36
243	Kenosha, WI PMSA	53.01	283	Washington, DC-MD-VA-WV PMSA	42.45
244	Bismarck, ND MSA	52.89	284	Vallejo-Fairfield-Napa, CA PMSA	41.99
245	Provo-Orem, UT MSA	52.12	285	Seattle-Bellevue-Everett, WA PMSA	41.97
246	Champaign-Urbana, IL MSA	51.80	286	Detroit, MI PMSA	41.76
247	Fort Collins-Loveland, CO MSA	51.77	287	Portland-Vancouver, OR-WA PMSA	40.99
248	State College, PA MSA	51.62	288	Fresno, CA MSA	40.21
249	Bloomington-Normal, IL MSA	51.08	289	Lubbock, TX MSA	39.65
250	Amarillo, TX MSA	51.02	290	Santa Barbara-Santa Maria-Lompoc, CA MSA	37.87
251	Fort Worth-Arlington, TX PMSA	50.95	291	Newark, NJ PMSA	37.41
252	New Bedford, MA PMSA	50.59	292	Salinas, CA MSA	36.01
253	Tampa-St. Petersburg-Clearwater, FL MSA	50.13	293	Honolulu, HI MSA	35.46
254	Middlesex-Somerset-Hunterdon, NJ PMSA	50.11	294	Modesto, CA MSA	34.84
255	Boulder-Longmont, CO PMSA	50.05	295	Salt Lake City-Ogden, UT MSA	34.80
256	Corpus Christi, TX MSA	49.79	296	Nassau-Suffolk, NY PMSA	34.80
257	Milwaukee-Waukesha, WI PMSA	49.41	297	Ventura, CA PMSA	34.57
258	Victoria, TX MSA	49.19	298	El Paso, TX MSA	34.18
259	Riverside-San Bernardino, CA PMSA	48.74	299	Lincoln, NE MSA	33.88
260	Cleveland-Lorain-Elyria, OH PMSA	48.50	300	Sacramento, CA PMSA	32.89
261	Colorado Springs, CO MSA	48.14	301	New Orleans, LA MSA	32.20
262	Spokane, WA MSA	48.05	302	Denver, CO PMSA	32.19
263	Santa Cruz-Watsonville, CA PMSA	47.95	303	Laredo, TX MSA	31.50
264	Bakersfield, CA MSA	47.86	304	Phoenix-Mesa, AZ MSA	31.46
265	Visalia-Tulare-Porterville, CA MSA	47.70	305	Chicago, IL PMSA	30.71
266	Buffalo-Niagara Falls, NY MSA	47.69	306	Oakland, CA PMSA	27.78
267	Baltimore, MD PMSA	47.63	307	Bergen-Passaic, NJ PMSA	27.52
268	Norfolk-Virginia Beach-Newport News, VA-NC MSA	47.42	308	San Diego, CA MSA	26.85
269	Albuquerque, NM MSA	46.87	309	Las Vegas, NV-AZ MSA	25.54
270	West Palm Beach-Boca Raton, FL MSA	46.86	310	Stockton-Lodi, CA MSA	21.52
271	Tucson, AZ MSA	46.61	311	Fort Lauderdale, FL PMSA	20.77
272	Boston, MA-NH PMSA	46.57	312	San Francisco, CA PMSA	16.96
273	Pueblo, CO MSA	46.53	313	Miami, FL PMSA	15.73
274	Altoona, PA MSA	46.13	314	San Jose, CA PMSA	14.89
275	Houston, TX PMSA	45.87	315	Los Angeles-Long Beach, CA PMSA	10.61
276	Iowa City, IA MSA	45.15	316	New York, NY PMSA	6.72
			317	Jersey City, NJ PMSA	3.94

Table A4: Metropolitan Areas Ranked by Economic Performance (Gross Metropolitan Product per Capita)

Rank	Metro Area	GMPPC	Rank	Metro Area	GMPPC
1	Boston, MA-NH PMSA	\$74,170	41	Bergen-Passaic, NJ PMSA	\$43,877
2	Barnstable-Yarmouth, MA MSA	\$71,942	42	Lafayette, LA MSA	\$43,849
3	San Francisco, CA PMSA	\$65,084	43	Madison, WI MSA	\$43,744
4	Bloomington-Normal, IL MSA	\$62,961	44	San Luis Obispo-Atascadero-Paso Robles, CA MSA	\$42,750
5	Portland, ME MSA	\$57,888	45	Rochester, NY MSA	\$42,704
6	Yolo, CA PMSA	\$56,892	46	Buffalo-Niagara Falls, NY MSA	\$42,541
7	Pittsfield, MA MSA	\$55,543	47	Syracuse, NY MSA	\$42,528
8	Springfield, IL MSA	\$55,380	48	Redding, CA MSA	\$42,464
9	Odessa-Midland, TX MSA	\$55,278	49	Cedar Rapids, IA MSA	\$42,408
10	Trenton, NJ PMSA	\$54,754	50	Minneapolis-St. Paul, MN-WI MSA	\$42,339
11	Middlesex-Somerset-Hunterdon, NJ PMSA	\$54,485	51	Longview-Marshall, TX MSA	\$42,132
12	San Jose, CA PMSA	\$54,086	52	Chicago, IL PMSA	\$41,653
13	Wilmington-Newark, DE-MD PMSA	\$53,789	53	Hagerstown, MD PMSA	\$41,144
14	Burlington, VT MSA	\$53,063	54	Binghamton, NY MSA	\$41,092
15	Roanoke, VA MSA	\$52,903	55	Atlanta, GA MSA	\$41,092
16	Anchorage, AK MSA	\$51,181	56	Atlantic-Cape May, NJ PMSA	\$40,852
17	Seattle-Bellevue-Everett, WA PMSA	\$50,785	57	Columbus, OH MSA	\$40,806
18	Boulder-Longmont, CO PMSA	\$50,005	58	Elmira, NY MSA	\$40,726
19	Orange County, CA PMSA	\$49,268	59	Utica-Rome, NY MSA	\$40,683
20	New York, NY PMSA	\$49,175	60	Oakland, CA PMSA	\$40,614
21	Jersey City, NJ PMSA	\$48,555	61	Jacksonville, FL MSA	\$40,467
22	Newark, NJ PMSA	\$48,070	62	Houma, LA MSA	\$40,391
23	Elkhart-Goshen, IN MSA	\$47,887	63	Los Angeles-Long Beach, CA PMSA	\$40,361
24	Dallas, TX PMSA	\$46,418	64	Nassau-Suffolk, NY PMSA	\$40,254
25	Rochester, MN MSA	\$45,976	65	Spokane, WA MSA	\$40,242
26	Santa Rosa, CA PMSA	\$45,876	66	Chattanooga, TN-GA MSA	\$40,025
27	Green Bay, WI MSA	\$45,323	67	Santa Cruz-Watsonville, CA PMSA	\$39,721
28	Washington, DC-MD-VA-WV PMSA	\$45,148	68	Grand Rapids-Muskegon-Holland, MI MSA	\$39,674
29	Albany-Schenectady-Troy, NY MSA	\$45,126	69	Tyler, TX MSA	\$39,659
30	Richmond-Petersburg, VA MSA	\$45,042	70	Hickory-Morganton-Lenoir, NC MSA	\$39,643
31	Reno, NV MSA	\$44,869	71	Chico-Paradise, CA MSA	\$39,535
32	Victoria, TX MSA	\$44,726	72	San Diego, CA MSA	\$39,514
33	Bangor, ME MSA	\$44,668	73	Topeka, KS MSA	\$39,500
34	Denver, CO PMSA	\$44,577	74	Sacramento, CA PMSA	\$39,448
35	Santa Barbara-Santa Maria-Lompoc, CA MSA	\$44,422	75	Decatur, IL MSA	\$39,386
36	Sioux Falls, SD MSA	\$44,418	76	Greensboro--Winston-Salem--High Point, NC MSA	\$39,311
37	Harrisburg-Lebanon-Carlisle, PA MSA	\$44,364	77	Peoria-Pekin, IL MSA	\$39,255
38	Houston, TX PMSA	\$44,254	78	Wausau, WI MSA	\$39,229
39	Des Moines, IA MSA	\$44,003	79	Louisville, KY-IN MSA	\$38,994
40	Charlotte-Gastonia-Rock Hill, NC-SC MSA	\$43,912	80	Baltimore, MD PMSA	\$38,888
			81	Raleigh-Durham-Chapel Hill,	\$38,805

Table A4: Metropolitan Areas Ranked by Economic Performance (Gross Metropolitan Product per Capita)

Rank	Metro Area	GMPPC	Rank	Metro Area	GMPPC
	NC MSA				
82	Macon, GA MSA	\$38,796	122	Salt Lake City-Ogden, UT MSA	\$36,252
83	St. Cloud, MN MSA	\$38,773	123	Charlottesville, VA MSA	\$36,090
84	Kansas City, MO-KS MSA	\$38,462	124	Lima, OH MSA	\$36,029
85	Waco, TX MSA	\$38,323	125	Lancaster, PA MSA	\$35,928
86	Florence, SC MSA	\$38,311	126	Salinas, CA MSA	\$35,865
87	Nashville, TN MSA	\$38,285	127	Detroit, MI PMSA	\$35,864
88	Jackson, TN MSA	\$38,279	128	Joplin, MO MSA	\$35,814
89	Lincoln, NE MSA	\$38,138	129	Colorado Springs, CO MSA	\$35,782
90	Cincinnati, OH-KY-IN PMSA	\$38,065	130	Las Vegas, NV-AZ MSA	\$35,737
91	Milwaukee-Waukesha, WI PMSA	\$37,937	131	Pittsburgh, PA MSA	\$35,631
92	Lubbock, TX MSA	\$37,936	132	Savannah, GA MSA	\$35,623
93	Appleton-Oshkosh-Neenah, WI MSA	\$37,897	133	Columbus, GA-AL MSA	\$35,605
94	San Angelo, TX MSA	\$37,786	134	Tallahassee, FL MSA	\$35,562
95	Austin-San Marcos, TX MSA	\$37,712	135	Abilene, TX MSA	\$35,510
96	Casper, WY MSA	\$37,690	136	Toledo, OH MSA	\$35,456
97	Cleveland-Lorain-Elyria, OH PMSA	\$37,619	137	St. Louis, MO-IL MSA	\$35,435
98	Omaha, NE-IA MSA	\$37,525	138	Ventura, CA PMSA	\$35,350
99	La Crosse, WI-MN MSA	\$37,495	139	Dubuque, IA MSA	\$35,340
100	Rockford, IL MSA	\$37,491	140	Williamsport, PA MSA	\$35,324
101	Portland-Vancouver, OR-WA PMSA	\$37,447	141	Glens Falls, NY MSA	\$35,316
102	Fort Worth-Arlington, TX PMSA	\$37,410	142	Phoenix-Mesa, AZ MSA	\$35,267
103	Lansing-East Lansing, MI MSA	\$37,368	143	Asheville, NC MSA	\$35,244
104	Albuquerque, NM MSA	\$37,343	144	Wichita Falls, TX MSA	\$35,139
105	Indianapolis, IN MSA	\$37,335	145	Amarillo, TX MSA	\$35,136
106	Evansville-Henderson, IN-KY MSA	\$37,300	146	San Antonio, TX MSA	\$35,029
107	Sheboygan, WI MSA	\$37,263	147	Duluth-Superior, MN-WI MSA	\$34,895
108	Lexington, KY MSA	\$37,232	148	Erie, PA MSA	\$34,856
109	Fort Wayne, IN MSA	\$37,231	149	Richland-Kennewick-Pasco, WA MSA	\$34,845
110	Albany, GA MSA	\$37,227	150	Vineland-Millville-Bridgeton, NJ PMSA	\$34,806
111	Monroe, LA MSA	\$37,021	151	Jamestown, NY MSA	\$34,799
112	Columbia, SC MSA	\$36,959	152	Dutchess County, NY PMSA	\$34,789
113	Columbia, MO MSA	\$36,906	153	Fargo-Moorhead, ND-MN MSA	\$34,719
114	Philadelphia, PA-NJ PMSA	\$36,836	154	Dayton-Springfield, OH MSA	\$34,708
115	Lynchburg, VA MSA	\$36,803	155	New Orleans, LA MSA	\$34,696
116	Memphis, TN-AR-MS MSA	\$36,777	156	Rocky Mount, NC MSA	\$34,632
117	Orlando, FL MSA	\$36,759	157	Flagstaff, AZ-UT MSA	\$34,580
118	Davenport-Moline-Rock Island, IA-IL MSA	\$36,705	158	Bryan-College Station, TX MSA	\$34,566
119	Gainesville, FL MSA	\$36,565	159	Reading, PA MSA	\$34,537
120	Birmingham, AL MSA	\$36,377	160	Kalamazoo-Battle Creek, MI MSA	\$34,476
121	Tampa-St. Petersburg-	\$36,324	161	Huntsville, AL MSA	\$34,365

Table A4: Metropolitan Areas Ranked by Economic Performance (Gross Metropolitan Product per Capita)

Rank	Metro Area	GMPPC	Rank	Metro Area	GMPPC
162	Wilmington, NC MSA	\$34,289	203	Owensboro, KY MSA	\$32,161
163	Kokomo, IN MSA	\$34,280	204	Tulsa, OK MSA	\$32,121
164	Wichita, KS MSA	\$34,190	205	Dothan, AL MSA	\$32,086
165	Corpus Christi, TX MSA	\$34,182	206	State College, PA MSA	\$32,032
166	Myrtle Beach, SC MSA	\$34,179	207	Saginaw-Bay City-Midland, MI MSA	\$31,969
167	Springfield, MO MSA	\$34,044	208	Lafayette, IN MSA	\$31,768
168	Rapid City, SD MSA	\$33,962	209	Danville, VA MSA	\$31,758
169	Athens, GA MSA	\$33,942	210	Sherman-Denison, TX MSA	\$31,726
170	Scranton--Wilkes-Barre--Hazleton, PA MSA	\$33,891	211	Eugene-Springfield, OR MSA	\$31,663
171	Baton Rouge, LA MSA	\$33,878	212	Corvallis, OR MSA	\$31,654
172	Charleston, WV MSA	\$33,841	213	Greenville-Spartanburg-Anderson, SC MSA	\$31,459
173	Jackson, MS MSA	\$33,832	214	Beaumont-Port Arthur, TX MSA	\$31,438
174	Altoona, PA MSA	\$33,787	215	Kankakee, IL PMSA	\$31,409
175	Norfolk-Virginia Beach-Newport News, VA-NC MSA	\$33,611	216	Augusta-Aiken, GA-SC MSA	\$31,382
176	Waterloo-Cedar Falls, IA MSA	\$33,562	217	Missoula, MT MSA	\$31,331
177	Miami, FL PMSA	\$33,556	218	St. Joseph, MO MSA	\$31,207
178	Modesto, CA MSA	\$33,448	219	Bakersfield, CA MSA	\$31,173
179	Boise City, ID MSA	\$33,442	220	West Palm Beach-Boca Raton, FL MSA	\$31,123
180	Champaign-Urbana, IL MSA	\$33,390	221	Fort Smith, AR-OK MSA	\$31,048
181	Sioux City, IA-NE MSA	\$33,266	222	Fort Walton Beach, FL MSA	\$30,946
182	Allentown-Bethlehem-Easton, PA MSA	\$33,222	223	Panama City, FL MSA	\$30,894
183	Iowa City, IA MSA	\$33,147	224	Bloomington, IN MSA	\$30,796
184	Cheyenne, WY MSA	\$33,117	225	Springfield, MA MSA	\$30,668
185	Fort Collins-Loveland, CO MSA	\$33,031	226	Fayetteville-Springdale-Rogers, AR MSA	\$30,644
186	Bellingham, WA MSA	\$33,007	227	Parkersburg-Marietta, WV-OH MSA	\$30,494
187	Greenville, NC MSA	\$33,007	228	Tuscaloosa, AL MSA	\$30,464
188	Laredo, TX MSA	\$32,950	229	Texarkana, TX-Texarkana, AR MSA	\$30,357
189	Little Rock-North Little Rock, AR MSA	\$32,935	230	Johnson City-Kingsport-Bristol, TN-VA MSA	\$30,350
190	Canton-Massillon, OH MSA	\$32,910	231	Oklahoma City, OK MSA	\$30,349
191	Ann Arbor, MI PMSA	\$32,886	232	Olympia, WA PMSA	\$30,335
192	Knoxville, TN MSA	\$32,851	233	Fresno, CA MSA	\$30,222
193	Grand Junction, CO MSA	\$32,807	234	Billings, MT MSA	\$30,185
194	South Bend, IN MSA	\$32,770	235	Sharon, PA MSA	\$29,999
195	Shreveport-Bossier City, LA MSA	\$32,733	236	Fort Lauderdale, FL PMSA	\$29,978
196	York, PA MSA	\$32,676	237	Muncie, IN MSA	\$29,927
197	Mansfield, OH MSA	\$32,589	238	Visalia-Tulare-Porterville, CA MSA	\$29,853
198	Eau Claire, WI MSA	\$32,525	239	Santa Fe, NM MSA	\$29,740
199	Akron, OH PMSA	\$32,483	240	Goldsboro, NC MSA	\$29,721
200	Lake Charles, LA MSA	\$32,455	241	Sarasota-Bradenton, FL MSA	\$29,571
201	Montgomery, AL MSA	\$32,407	242	Alexandria, LA MSA	\$29,449
202	Benton Harbor, MI MSA	\$32,195			

Table A4: Metropolitan Areas Ranked by Economic Performance (Gross Metropolitan Product per Capita)

Rank	Metro Area	GMPPC	Rank	Metro Area	GMPPC
243	Johnstown, PA MSA	\$29,391	284	Steubenville-Weirton, OH-WV MSA	\$26,140
244	Yakima, WA MSA	\$29,249	285	Flint, MI PMSA	\$26,093
245	Dover, DE MSA	\$29,228	286	Pine Bluff, AR MSA	\$25,825
246	Vallejo-Fairfield-Napa, CA PMSA	\$29,130	287	Gary, IN PMSA	\$25,697
247	Bismarck, ND MSA	\$29,096	288	Hattiesburg, MS MSA	\$25,598
248	Jonesboro, AR MSA	\$29,019	289	Providence-Fall River-Warwick, RI-MA MSA	\$25,597
249	Janesville-Beloit, WI MSA	\$28,939	290	Naples, FL MSA	\$25,597
250	Monmouth-Ocean, NJ PMSA	\$28,918	291	Pocatello, ID MSA	\$25,558
251	Fayetteville, NC MSA	\$28,791	292	Pensacola, FL MSA	\$25,535
252	Hamilton-Middletown, OH PMSA	\$28,700	293	Decatur, AL MSA	\$25,402
253	Tacoma, WA PMSA	\$28,684	294	Galveston-Texas City, TX PMSA	\$25,136
254	Pueblo, CO MSA	\$28,679	295	Brazoria, TX PMSA	\$24,691
255	Terre Haute, IN MSA	\$28,553	296	Killeen-Temple, TX MSA	\$24,480
256	Greeley, CO PMSA	\$28,537	297	Huntington-Ashland, WV-KY-OH MSA	\$24,478
257	Anniston, AL MSA	\$28,517	298	Clarksville-Hopkinsville, TN-KY MSA	\$24,180
258	Newburgh, NY-PA PMSA	\$28,496	299	Florence, AL MSA	\$23,676
259	Yuba City, CA MSA	\$28,419	300	Brownsville-Harlingen-San Benito, TX MSA	\$23,418
260	Merced, CA MSA	\$28,329	301	Provo-Orem, UT MSA	\$22,919
261	Enid, OK MSA	\$28,293	302	Gadsden, AL MSA	\$22,442
262	Jackson, MI MSA	\$28,026	303	Ocala, FL MSA	\$22,338
263	Grand Forks, ND-MN MSA	\$27,929	304	Las Cruces, NM MSA	\$22,063
264	Charleston-North Charleston, SC MSA	\$27,905	305	Lawton, OK MSA	\$22,046
265	Medford-Ashland, OR MSA	\$27,849	306	Jacksonville, NC MSA	\$21,954
266	Wheeling, WV-OH MSA	\$27,848	307	Kenosha, WI PMSA	\$20,976
267	El Paso, TX MSA	\$27,773	308	Daytona Beach, FL MSA	\$20,701
268	Biloxi-Gulfport-Pascagoula, MS MSA	\$27,646	309	Auburn-Opelika, AL MSA	\$20,566
269	Youngstown-Warren, OH MSA	\$27,583	310	Fort Pierce-Port St. Lucie, FL MSA	\$20,469
270	Tucson, AZ MSA	\$27,376	311	McAllen-Edinburg-Mission, TX MSA	\$20,328
271	Lakeland-Winter Haven, FL MSA	\$27,196	312	Yuma, AZ MSA	\$18,835
272	Salem, OR PMSA	\$27,014	313	Punta Gorda, FL MSA	\$17,032
273	Riverside-San Bernardino, CA PMSA	\$26,932			
274	Racine, WI PMSA	\$26,849			
275	Cumberland, MD-WV MSA	\$26,817			
276	Lewiston-Auburn, ME MSA	\$26,705			
277	Lawrence, KS MSA	\$26,614			
278	Sumter, SC MSA	\$26,546			
279	Fort Myers-Cape Coral, FL MSA	\$26,466			
280	Bremerton, WA PMSA	\$26,422			
281	Melbourne-Titusville-Palm Bay, FL MSA	\$26,410			
282	Great Falls, MT MSA	\$26,231			
283	Mobile, AL MSA	\$26,148			

Table A5: Metropolitan Areas Ranked by Human Capital (Percent of 25+ Year old Population with Education at Bachelor Level and Higher, 2000)

Rank	Metropolitan Area	HC	Rank	Metropolitan Area	HC
1	Boulder-Longmont, CO PMSA	52.38	43	Portsmouth-Rochester, NH-ME PMSA	32.19
2	Stamford-Norwalk, CT PMSA	49.43	44	Atlanta, GA MSA	32.05
3	Iowa City, IA MSA	47.60	45	Colorado Springs, CO MSA	31.76
4	Corvallis, OR MSA	47.39	46	Newark, NJ PMSA	31.54
5	San Francisco, CA PMSA	43.59	47	Provo-Orem, UT MSA	31.46
6	Lawrence, KS MSA	42.68	48	New Haven-Meriden, CT PMSA	31.43
7	Washington, DC-MD-VA-WV PMSA	41.82	49	Nassau-Suffolk, NY PMSA	31.34
8	Columbia, MO MSA	41.73	50	Huntsville, AL MSA	30.90
9	Madison, WI MSA	40.64	51	Orange County, CA PMSA	30.81
10	San Jose, CA PMSA	40.48	52	Chicago, IL PMSA	30.10
11	Charlottesville, VA MSA	40.08	53	Dallas, TX PMSA	29.97
12	Santa Fe, NM MSA	39.92	54	Olympia, WA PMSA	29.84
13	Bloomington, IN MSA	39.63	55	Hartford, CT MSA	29.79
14	Fort Collins-Loveland, CO MSA	39.53	56	San Diego, CA MSA	29.52
15	Boston, MA-NH PMSA	39.47	57	Flagstaff, AZ-UT MSA	29.46
16	Danbury, CT PMSA	39.38	58	Santa Barbara-Santa Maria-Lompoc, CA MSA	29.42
17	Raleigh-Durham-Chapel Hill, NC MSA	38.91	59	Fargo-Moorhead, ND-MN MSA	29.40
18	Gainesville, FL MSA	38.70	60	Lawrence, MA-NH PMSA	29.28
19	Champaign-Urbana, IL MSA	37.99	61	Richmond-Petersburg, VA MSA	29.21
20	Middlesex-Somerset-Hunterdon, NJ PMSA	37.43	62	Baltimore, MD PMSA	29.20
21	Burlington, VT MSA	37.18	63	Columbia, SC MSA	29.20
22	Bryan-College Station, TX MSA	36.99	64	New York, NY PMSA	29.16
23	Ann Arbor, MI PMSA	36.91	65	Columbus, OH MSA	29.05
24	Tallahassee, FL MSA	36.73	66	Anchorage, AK MSA	28.91
25	Austin-San Marcos, TX MSA	36.69	67	Portland-Vancouver, OR-WA PMSA	28.84
26	State College, PA MSA	36.28	68	Des Moines, IA MSA	28.72
27	Bloomington-Normal, IL MSA	36.17	69	Lexington, KY MSA	28.68
28	Seattle-Bellevue-Everett, WA PMSA	35.87	70	Santa Rosa, CA PMSA	28.54
29	Oakland, CA PMSA	34.95	71	Kansas City, MO-KS MSA	28.50
30	Rochester, MN MSA	34.71	72	Albuquerque, NM MSA	28.40
31	Denver, CO PMSA	34.24	73	Lansing-East Lansing, MI MSA	28.38
32	Santa Cruz-Watsonville, CA PMSA	34.18	74	Lafayette, IN MSA	28.23
33	Yolo, CA PMSA	34.14	75	Albany-Schenectady-Troy, NY MSA	28.21
34	Athens, GA MSA	34.08	76	Jackson, MS MSA	28.10
35	Trenton, NJ PMSA	33.96	77	Lowell, MA-NH PMSA	28.08
36	Portland, ME MSA	33.56	78	Springfield, IL MSA	28.05
37	Barnstable-Yarmouth, MA MSA	33.47	79	Omaha, NE-IA MSA	27.96
38	Minneapolis-St. Paul, MN-WI MSA	33.26	80	Bridgeport, CT PMSA	27.93
39	Nashua, NH PMSA	33.18	81	Naples, FL MSA	27.92
40	Missoula, MT MSA	32.80	82	Auburn-Opelika, AL MSA	27.91
41	Lincoln, NE MSA	32.57	83	Honolulu, HI MSA	27.87
42	Bergen-Passaic, NJ PMSA	32.50	84	Philadelphia, PA-NJ PMSA	27.75
			85	Cedar Rapids, IA MSA	27.73

Table A5: Metropolitan Areas Ranked by Human Capital (Percent of 25+ Year old Population with Education at Bachelor Level and Higher, 2000)

Rank	Metropolitan Area	HC	Rank	Metropolitan Area	HC
86	West Palm Beach-Boca Raton, FL MSA	27.71	127	Little Rock-North Little Rock, AR MSA	24.77
87	Worcester, MA-CT PMSA	27.66	128	Montgomery, AL MSA	24.72
88	Dutchess County, NY PMSA	27.63	129	Wichita, KS MSA	24.71
89	Wilmington-Newark, DE-MD PMSA	27.57	130	Birmingham, AL MSA	24.71
90	Monmouth-Ocean, NJ PMSA	27.57	131	Springfield, MA MSA	24.64
91	Bellingham, WA MSA	27.23	132	Sarasota-Bradenton, FL MSA	24.58
92	Houston, TX PMSA	27.16	133	La Crosse, WI-MN MSA	24.57
93	Rochester, NY MSA	27.10	134	Fort Lauderdale, FL PMSA	24.55
94	Manchester, NH PMSA	27.01	135	Asheville, NC MSA	24.48
95	Milwaukee-Waukesha, WI PMSA	26.95	136	Oklahoma City, OK MSA	24.45
96	Ventura, CA PMSA	26.95	137	Lubbock, TX MSA	24.37
97	Nashville, TN MSA	26.85	138	Hattiesburg, MS MSA	24.30
98	Tucson, AZ MSA	26.75	139	Akron, OH PMSA	24.28
99	San Luis Obispo-Atascadero-Paso Robles, CA MSA	26.70	140	Fort Walton Beach, FL MSA	24.24
100	Salt Lake City-Ogden, UT MSA	26.53	141	Grand Forks, ND-MN MSA	24.24
101	Boise City, ID MSA	26.48	142	Syracuse, NY MSA	24.08
102	Charlotte-Gastonia-Rock Hill, NC-SC MSA	26.47	143	Pittsfield, MA MSA	24.06
103	Bangor, ME MSA	26.42	144	Tuscaloosa, AL MSA	24.03
104	Greenville, NC MSA	26.40	145	Pittsburgh, PA MSA	23.84
105	Billings, MT MSA	26.38	146	Norfolk-Virginia Beach-Newport News, VA-NC MSA	23.80
106	Wilmington, NC MSA	26.07	147	Reno, NV MSA	23.72
107	Topeka, KS MSA	26.04	148	South Bend, IN MSA	23.63
108	Sioux Falls, SD MSA	25.91	149	Providence-Fall River-Warwick, RI-MA MSA	23.62
109	Sacramento, CA PMSA	25.85	150	Melbourne-Titusville-Palm Bay, FL MSA	23.55
110	Indianapolis, IN MSA	25.83	151	Hamilton-Middletown, OH PMSA	23.48
111	Bismarck, ND MSA	25.54	152	Knoxville, TN MSA	23.47
112	Eugene-Springfield, OR MSA	25.51	153	Kalamazoo-Battle Creek, MI MSA	23.46
113	St. Louis, MO-IL MSA	25.33	154	Cheyenne, WY MSA	23.45
114	Bremerton, WA PMSA	25.33	155	Richland-Kennewick-Pasco, WA MSA	23.32
115	Cincinnati, OH-KY-IN PMSA	25.32	156	Cleveland-Lorain-Elyria, OH PMSA	23.31
116	Jersey City, NJ PMSA	25.28	157	Tulsa, OK MSA	23.22
117	New London-Norwich, CT-RI MSA	25.13	158	Buffalo-Niagara Falls, NY MSA	23.21
118	Phoenix-Mesa, AZ MSA	25.08	159	Savannah, GA MSA	23.16
119	Fort Worth-Arlington, TX PMSA	25.07	160	Waterloo-Cedar Falls, IA MSA	22.98
120	Charleston-North Charleston, SC MSA	25.03	161	Grand Rapids-Muskegon-Holland, MI MSA	22.91
121	Spokane, WA MSA	25.02	162	Greensboro--Winston-Salem--High Point, NC MSA	22.88
122	Rapid City, SD MSA	24.98	163	Jacksonville, FL MSA	22.87
123	Pocatello, ID MSA	24.95	164	Detroit, MI PMSA	22.77
124	Baton Rouge, LA MSA	24.94	165	Monroe, LA MSA	22.73
125	Los Angeles-Long Beach, CA PMSA	24.86	166	Galveston-Texas City, TX PMSA	22.71
126	Orlando, FL MSA	24.80			

Table A5: Metropolitan Areas Ranked by Human Capital (Percent of 25+ Year old Population with Education at Bachelor Level and Higher, 2000)

Rank	Metropolitan Area	HC	Rank	Metropolitan Area	HC
167	Memphis, TN-AR-MS MSA	22.69	209	Tacoma, WA PMSA	20.59
168	Vallejo-Fairfield-Napa, CA PMSA	22.66	210	Lancaster, PA MSA	20.51
169	Harrisburg-Lebanon-Carlisle, PA MSA	22.61	211	Charleston, WV MSA	20.40
170	New Orleans, LA MSA	22.56	212	Muncie, IN MSA	20.38
171	Tyler, TX MSA	22.55	213	Racine, WI PMSA	20.27
172	Salinas, CA MSA	22.50	214	Davenport-Moline-Rock Island, IA-IL MSA	20.26
173	Green Bay, WI MSA	22.47	215	Jackson, TN MSA	20.07
174	Roanoke, VA MSA	22.46	216	Casper, WY MSA	20.02
175	Abilene, TX MSA	22.45	217	Mobile, AL MSA	19.87
176	San Antonio, TX MSA	22.45	218	Fort Pierce-Port St. Lucie, FL MSA	19.74
177	Appleton-Oshkosh-Neenah, WI MSA	22.43	219	Wichita Falls, TX MSA	19.70
178	Springfield, MO MSA	22.41	220	Atlantic-Cape May, NJ PMSA	19.70
179	Fayetteville-Springdale-Rogers, AR MSA	22.37	221	Chattanooga, TN-GA MSA	19.67
180	Las Cruces, NM MSA	22.29	222	Benton Harbor, MI MSA	19.62
181	Medford-Ashland, OR MSA	22.28	223	Brazoria, TX PMSA	19.61
182	Louisville, KY-IN MSA	22.17	224	Enid, OK MSA	19.55
183	Dayton-Springfield, OH MSA	22.15	225	San Angelo, TX MSA	19.50
184	Eau Claire, WI MSA	22.12	226	Fitchburg-Leominster, MA PMSA	19.49
185	Newburgh, NY-PA PMSA	22.08	227	Macon, GA MSA	19.48
186	Binghamton, NY MSA	22.04	228	Fort Wayne, IN MSA	19.38
187	Grand Junction, CO MSA	21.95	229	Lynchburg, VA MSA	19.26
188	Chico-Paradise, CA MSA	21.84	230	Kenosha, WI PMSA	19.20
189	Tampa-St. Petersburg-Clearwater, FL MSA	21.69	231	Lawton, OK MSA	19.11
190	Miami, FL PMSA	21.68	232	Fayetteville, NC MSA	19.11
191	Brockton, MA PMSA	21.67	233	Waco, TX MSA	19.10
192	Greeley, CO PMSA	21.65	234	Shreveport-Bossier City, LA MSA	19.07
193	Toledo, OH MSA	21.61	235	Glens Falls, NY MSA	18.90
194	Pensacola, FL MSA	21.53	236	Myrtle Beach, SC MSA	18.72
195	Great Falls, MT MSA	21.48	237	Florence, SC MSA	18.68
196	Waterbury, CT PMSA	21.42	238	Dover, DE MSA	18.64
197	Dubuque, IA MSA	21.33	239	Terre Haute, IN MSA	18.61
198	Allentown-Bethlehem-Easton, PA MSA	21.24	240	Elmira, NY MSA	18.58
199	Duluth-Superior, MN-WI MSA	21.23	241	Columbus, GA-AL MSA	18.56
200	Peoria-Pekin, IL MSA	21.14	242	Rockford, IL MSA	18.52
201	Fort Myers-Cape Coral, FL MSA	21.10	243	Evansville-Henderson, IN-KY MSA	18.49
202	Amarillo, TX MSA	21.00	244	Reading, PA MSA	18.49
203	St. Cloud, MN MSA	20.96	245	Odessa-Midland, TX MSA	18.38
204	Jonesboro, AR MSA	20.94	246	York, PA MSA	18.38
205	Augusta-Aiken, GA-SC MSA	20.92	247	Pueblo, CO MSA	18.34
206	Erie, PA MSA	20.87	248	Wausau, WI MSA	18.30
207	Salem, OR PMSA	20.80	249	Saginaw-Bay City-Midland, MI MSA	18.13
208	Greenville-Spartanburg-Anderson, SC MSA	20.73	250	Killeen-Temple, TX MSA	18.07

Table A5: Metropolitan Areas Ranked by Human Capital (Percent of 25+ Year old Population with Education at Bachelor Level and Higher, 2000)

Rank	Metropolitan Area	HC	Rank	Metropolitan Area	HC
251	Daytona Beach, FL MSA	18.03	294	Anniston, AL MSA	15.22
252	Sheboygan, WI MSA	17.91	295	Parkersburg-Marietta, WV-OH MSA	15.16
253	Sioux City, IA-NE MSA	17.88	296	Youngstown-Warren, OH MSA	15.08
254	Corpus Christi, TX MSA	17.80	297	Williamsport, PA MSA	15.06
255	Utica-Rome, NY MSA	17.74	298	Texarkana, TX-Texarkana, AR MSA	15.03
256	Gary, IN PMSA	17.70	299	Goldsboro, NC MSA	14.99
257	Panama City, FL MSA	17.68	300	Kankakee, IL PMSA	14.96
258	Albany, GA MSA	17.65	301	Lakeland-Winter Haven, FL MSA	14.92
259	Punta Gorda, FL MSA	17.58	302	Jacksonville, NC MSA	14.77
260	Biloxi-Gulfport-Pascagoula, MS MSA	17.55	303	Beaumont-Port Arthur, TX MSA	14.71
261	Lafayette, LA MSA	17.55	304	Wheeling, WV-OH MSA	14.64
262	Scranton--Wilkes-Barre--Hazleton, PA MSA	17.37	305	Hagerstown, MD PMSA	14.63
263	Canton-Massillon, OH MSA	17.32	306	Stockton-Lodi, CA MSA	14.53
264	Sharon, PA MSA	17.29	307	Huntington-Ashland, WV-KY-OH MSA	14.38
265	New Bedford, MA PMSA	17.25	308	Lewiston-Auburn, ME MSA	14.35
266	Sherman-Denison, TX MSA	17.24	309	Modesto, CA MSA	14.05
267	St. Joseph, MO MSA	17.18	310	Laredo, TX MSA	13.93
268	Kokomo, IN MSA	17.14	311	Rocky Mount, NC MSA	13.88
269	Owensboro, KY MSA	17.02	312	Altoona, PA MSA	13.88
270	Clarksville-Hopkinsville, TN-KY MSA	16.98	313	Fort Smith, AR-OK MSA	13.79
271	Jamestown, NY MSA	16.94	314	Ocala, FL MSA	13.69
272	Decatur, IL MSA	16.92	315	Hickory-Morganton-Lenoir, NC MSA	13.62
273	Dothan, AL MSA	16.89	316	Bakersfield, CA MSA	13.52
274	Lake Charles, LA MSA	16.86	317	Cumberland, MD-WV MSA	13.44
275	Longview-Marshall, TX MSA	16.82	318	Lima, OH MSA	13.44
276	Florence, AL MSA	16.78	319	Gadsden, AL MSA	13.42
277	Fresno, CA MSA	16.76	320	Brownsville-Harlingen-San Benito, TX MSA	13.36
278	Janesville-Beloit, WI MSA	16.68	321	Yuba City, CA MSA	13.22
279	El Paso, TX MSA	16.61	322	McAllen-Edinburg-Mission, TX MSA	12.91
280	Johnson City-Kingsport-Bristol, TN-VA MSA	16.60	323	Johnstown, PA MSA	12.71
281	Redding, CA MSA	16.60	324	Houma, LA MSA	12.30
282	Alexandria, LA MSA	16.55	325	Steubenville-Weirton, OH-WV MSA	12.07
283	Las Vegas, NV-AZ MSA	16.39	326	Yuma, AZ MSA	11.84
284	Joplin, MO MSA	16.37	327	Mansfield, OH MSA	11.82
285	Riverside-San Bernardino, CA PMSA	16.27	328	Vineland-Millville-Bridgeton, NJ PMSA	11.75
286	Jackson, MI MSA	16.26	329	Visalia-Tulare-Porterville, CA MSA	11.50
287	Victoria, TX MSA	16.25	330	Danville, VA MSA	11.27
288	Flint, MI PMSA	16.23	331	Merced, CA MSA	11.05
289	Sumter, SC MSA	15.82			
290	Decatur, AL MSA	15.81			
291	Pine Bluff, AR MSA	15.68			
292	Elkhart-Goshen, IN MSA	15.51			
293	Yakima, WA MSA	15.30			

Table A6: Metropolitan Areas Ranked by Tax Effort (Tax Revenue as a Percent of
Personal Income, 1997)

Rank	Metro Area	TE	Rank	Metro Area	TE
1	New Haven-Meriden, CT PMSA	20.27	44	Victoria, TX MSA	5.76
2	New York, NY PMSA	10.59	45	Milwaukee-Waukesha, WI PMSA	5.73
3	Atlantic-Cape May, NJ PMSA	9.73	46	Philadelphia, PA-NJ PMSA	5.70
4	Nassau-Suffolk, NY PMSA	9.53	47	Rapid City, SD MSA	5.66
5	Barnstable-Yarmouth, MA MSA	8.37	48	Columbus, OH MSA	5.66
6	Jamestown, NY MSA	8.36	49	Longview-Marshall, TX MSA	5.65
7	Glens Falls, NY MSA	8.30	50	Monroe, LA MSA	5.63
8	Bangor, ME MSA	8.19	51	Houston, TX PMSA	5.54
9	Binghamton, NY MSA	7.96	52	Kenosha, WI PMSA	5.53
10	Utica-Rome, NY MSA	7.80	53	Kokomo, IN MSA	5.52
11	Syracuse, NY MSA	7.79	54	Middlesex-Somerset-Hunterdon, NJ PMSA	5.52
12	Buffalo-Niagara Falls, NY MSA	7.65	55	Hartford, CT MSA	5.48
13	Lake Charles, LA MSA	7.62	56	Dayton-Springfield, OH MSA	5.48
14	Galveston-Texas City, TX PMSA	7.61	57	Madison, WI MSA	5.44
15	Boston, MA-NH PMSA	7.55	58	Albany, GA MSA	5.44
16	Pittsfield, MA MSA	7.48	59	Shreveport-Bossier City, LA MSA	5.41
17	Rochester, NY MSA	7.41	60	Jersey City, NJ PMSA	5.37
18	Newburgh, NY-PA PMSA	7.38	61	Lincoln, NE MSA	5.33
19	Albany-Schenectady-Troy, NY MSA	7.28	62	Bryan-College Station, TX MSA	5.29
20	Dutchess County, NY PMSA	7.15	63	Brazoria, TX PMSA	5.28
21	Beaumont-Port Arthur, TX MSA	6.80	64	Roanoke, VA MSA	5.22
22	Lewiston-Auburn, ME MSA	6.73	65	Pittsburgh, PA MSA	5.21
23	Elmira, NY MSA	6.69	66	Sioux Falls, SD MSA	5.20
24	Cleveland-Lorain-Elyria, OH PMSA	6.61	67	McAllen-Edinburg-Mission, TX MSA	5.19
25	Corpus Christi, TX MSA	6.47	68	Reading, PA MSA	5.16
26	Portland, ME MSA	6.44	69	Topeka, KS MSA	5.12
27	Laredo, TX MSA	6.40	70	Omaha, NE-IA MSA	5.09
28	Chicago, IL PMSA	6.36	71	Cincinnati, OH-KY-IN PMSA	5.09
29	Toledo, OH MSA	6.29	72	Dallas, TX PMSA	5.07
30	Gary, IN PMSA	6.26	73	Mansfield, OH MSA	5.06
31	Miami, FL PMSA	6.11	74	Norfolk-Virginia Beach-Newport News, VA-NC MSA	5.04
32	Newark, NJ PMSA	6.09	75	Allentown-Bethlehem-Easton, PA MSA	5.04
33	Burlington, VT MSA	6.01	76	Flagstaff, AZ-UT MSA	4.98
34	Bergen-Passaic, NJ PMSA	5.98	77	Vineland-Millville-Bridgeton, NJ PMSA	4.96
35	Trenton, NJ PMSA	5.95	78	Kansas City, MO-KS MSA	4.91
36	Odessa-Midland, TX MSA	5.94	79	Williamsport, PA MSA	4.87
37	Washington, DC-MD-VA-WV PMSA	5.88	80	Rockford, IL MSA	4.86
38	Monmouth-Ocean, NJ PMSA	5.88	81	West Palm Beach-Boca Raton, FL MSA	4.85
39	New Orleans, LA MSA	5.88	82	New London-Norwich, CT-RI MSA	4.85
40	Alexandria, LA MSA	5.81	83	Columbus, GA-AL MSA	4.84
41	Akron, OH PMSA	5.80			
42	Savannah, GA MSA	5.79			
43	El Paso, TX MSA	5.78			

Table A6: Metropolitan Areas Ranked by Tax Effort (Tax Revenue as a Percent of
Personal Income, 1997)

Rank	Metro Area	TE	Rank	Metro Area	TE
84	Fort Pierce-Port St. Lucie, FL MSA	4.83	125	Brownsville-Harlingen-San Benito, TX MSA	4.46
85	Pueblo, CO MSA	4.79	126	Birmingham, AL MSA	4.43
86	Baltimore, MD PMSA	4.79	127	Punta Gorda, FL MSA	4.42
87	San Luis Obispo-Atascadero-Paso Robles, CA MSA	4.79	128	Lubbock, TX MSA	4.42
88	Baton Rouge, LA MSA	4.78	129	Champaign-Urbana, IL MSA	4.41
89	Denver, CO PMSA	4.77	130	Macon, GA MSA	4.40
90	Grand Forks, ND-MN MSA	4.74	131	Fort Myers-Cape Coral, FL MSA	4.40
91	Bakersfield, CA MSA	4.74	132	Evansville-Henderson, IN-KY MSA	4.39
92	Fort Lauderdale, FL PMSA	4.73	133	Myrtle Beach, SC MSA	4.39
93	Fort Worth-Arlington, TX PMSA	4.72	134	Erie, PA MSA	4.37
94	Duluth-Superior, MN-WI MSA	4.72	135	Green Bay, WI MSA	4.37
95	Grand Junction, CO MSA	4.67	136	Fort Collins-Loveland, CO MSA	4.36
96	Greeley, CO PMSA	4.67	137	Dubuque, IA MSA	4.31
97	Abilene, TX MSA	4.66	138	Houma, LA MSA	4.31
98	Sioux City, IA-NE MSA	4.65	139	Daytona Beach, FL MSA	4.30
99	Bloomington-Normal, IL MSA	4.63	140	Seattle-Bellevue-Everett, WA PMSA	4.30
100	Wichita Falls, TX MSA	4.63	141	Canton-Massillon, OH MSA	4.30
101	Scranton--Wilkes-Barre--Hazleton, PA MSA	4.61	142	Los Angeles-Long Beach, CA PMSA	4.29
102	Waco, TX MSA	4.61	143	Springfield, MA MSA	4.29
103	Sheboygan, WI MSA	4.61	144	Davenport-Moline-Rock Island, IA-IL MSA	4.29
104	Providence-Fall River-Warwick, RI-MA MSA	4.60	145	San Angelo, TX MSA	4.28
105	Portland-Vancouver, OR-WA PMSA	4.59	146	Lancaster, PA MSA	4.28
106	Fort Wayne, IN MSA	4.59	147	Atlanta, GA MSA	4.27
107	Lima, OH MSA	4.57	148	Sherman-Denison, TX MSA	4.26
108	Missoula, MT MSA	4.56	149	Appleton-Oshkosh-Neenah, WI MSA	4.26
109	Wausau, WI MSA	4.55	150	Kankakee, IL PMSA	4.25
110	Indianapolis, IN MSA	4.54	151	Knoxville, TN MSA	4.19
111	Richmond-Petersburg, VA MSA	4.53	152	Eugene-Springfield, OR MSA	4.19
112	Elkhart-Goshen, IN MSA	4.53	153	Athens, GA MSA	4.18
113	Boulder-Longmont, CO PMSA	4.53	154	Tucson, AZ MSA	4.17
114	San Antonio, TX MSA	4.52	155	Lafayette, IN MSA	4.15
115	Harrisburg-Lebanon-Carlisle, PA MSA	4.52	156	Tyler, TX MSA	4.15
116	St. Louis, MO-IL MSA	4.50	157	Minneapolis-St. Paul, MN-WI MSA	4.14
117	Austin-San Marcos, TX MSA	4.49	158	Redding, CA MSA	4.14
118	Youngstown-Warren, OH MSA	4.48	159	Nashville, TN MSA	4.14
119	Des Moines, IA MSA	4.48	160	Steubenville-Weirton, OH-WV MSA	4.14
120	La Crosse, WI-MN MSA	4.47	161	Cedar Rapids, IA MSA	4.12
121	Waterloo-Cedar Falls, IA MSA	4.47	162	Yuma, AZ MSA	4.11
122	Terre Haute, IN MSA	4.47	163	Salinas, CA MSA	4.09
123	Orlando, FL MSA	4.47	164	Eau Claire, WI MSA	4.08
124	Amarillo, TX MSA	4.47			

Table A6: Metropolitan Areas Ranked by Tax Effort (Tax Revenue as a Percent of
Personal Income, 1997)

Rank	Metro Area	TE	Rank	Metro Area	TE
165	Johnstown, PA MSA	4.08	206	Tallahassee, FL MSA	3.78
166	Hagerstown, MD PMSA	4.08	207	Wichita, KS MSA	3.77
167	Yuba City, CA MSA	4.07	208	Bismarck, ND MSA	3.77
168	Tampa-St. Petersburg- Clearwater, FL MSA	4.07	209	Chattanooga, TN-GA MSA	3.76
169	Janesville-Beloit, WI MSA	4.07	210	Fargo-Moorhead, ND-MN MSA	3.76
170	Memphis, TN-AR-MS MSA	4.06	211	Altoona, PA MSA	3.76
171	South Bend, IN MSA	4.05	212	Stockton-Lodi, CA MSA	3.76
172	Panama City, FL MSA	4.05	213	Greensboro--Winston-Salem-- High Point, NC MSA	3.76
173	San Francisco, CA PMSA	4.02	214	Oklahoma City, OK MSA	3.75
174	Bellingham, WA MSA	4.02	215	Charleston-North Charleston, SC MSA	3.75
175	Fresno, CA MSA	4.01	216	Louisville, KY-IN MSA	3.73
176	St. Joseph, MO MSA	4.00	217	Detroit, MI PMSA	3.73
177	Hamilton-Middletown, OH PMSA	4.00	218	Mobile, AL MSA	3.72
178	Oakland, CA PMSA	3.99	219	Anchorage, AK MSA	3.70
179	Lawrence, KS MSA	3.98	220	Enid, OK MSA	3.69
180	Jackson, TN MSA	3.98	221	Reno, NV MSA	3.69
181	York, PA MSA	3.97	222	Las Vegas, NV-AZ MSA	3.67
182	Peoria-Pekin, IL MSA	3.95	223	Tulsa, OK MSA	3.67
183	State College, PA MSA	3.94	224	Olympia, WA PMSA	3.65
184	Biloxi-Gulfport-Pascagoula, MS MSA	3.92	225	Tacoma, WA PMSA	3.65
185	Santa Barbara-Santa Maria- Lompoc, CA MSA	3.92	226	Texarkana, TX-Texarkana, AR MSA	3.65
186	Corvallis, OR MSA	3.91	227	Wilmington, NC MSA	3.63
187	Muncie, IN MSA	3.91	228	Medford-Ashland, OR MSA	3.63
188	Springfield, IL MSA	3.90	229	Lynchburg, VA MSA	3.62
189	Racine, WI PMSA	3.90	230	Johnson City-Kingsport-Bristol, TN-VA MSA	3.62
190	Charlottesville, VA MSA	3.89	231	Columbia, MO MSA	3.62
191	Charleston, WV MSA	3.89	232	Sharon, PA MSA	3.62
192	Riverside-San Bernardino, CA PMSA	3.89	233	Augusta-Aiken, GA-SC MSA	3.59
193	Bloomington, IN MSA	3.88	234	Decatur, IL MSA	3.59
194	San Jose, CA PMSA	3.88	235	Vallejo-Fairfield-Napa, CA PMSA	3.57
195	Yolo, CA PMSA	3.87	236	Phoenix-Mesa, AZ MSA	3.57
196	Visalia-Tulare-Porterville, CA MSA	3.83	237	Jacksonville, FL MSA	3.57
197	Spokane, WA MSA	3.81	238	Iowa City, IA MSA	3.57
198	Pine Bluff, AR MSA	3.80	239	Salem, OR PMSA	3.54
199	St. Cloud, MN MSA	3.80	240	Merced, CA MSA	3.53
200	Cumberland, MD-WV MSA	3.80	241	Joplin, MO MSA	3.52
201	Parkersburg-Marietta, WV-OH MSA	3.79	242	Sacramento, CA PMSA	3.52
202	Wheeling, WV-OH MSA	3.79	243	Ventura, CA PMSA	3.52
203	Salt Lake City-Ogden, UT MSA	3.78	244	Santa Cruz-Watsonville, CA PMSA	3.52
204	Naples, FL MSA	3.78	245	Killeen-Temple, TX MSA	3.51
205	Sarasota-Bradenton, FL MSA	3.78	246	Gainesville, FL MSA	3.50

Table A6: Metropolitan Areas Ranked by Tax Effort (Tax Revenue as a Percent of Personal Income, 1997)

Rank	Metro Area	TE	Rank	Metro Area	TE
247	Modesto, CA MSA	3.50		OH MSA	
248	Kalamazoo-Battle Creek, MI MSA	3.49	287	Bremerton, WA PMSA	3.07
249	Gadsden, AL MSA	3.49	288	Boise City, ID MSA	3.07
250	Richland-Kennewick-Pasco, WA MSA	3.49	289	Danville, VA MSA	3.06
251	Asheville, NC MSA	3.48	290	Fayetteville-Springdale-Rogers, AR MSA	3.05
252	Yakima, WA MSA	3.47	291	Clarksville-Hopkinsville, TN-KY MSA	3.04
253	Billings, MT MSA	3.47	292	Montgomery, AL MSA	2.95
254	Colorado Springs, CO MSA	3.46	293	Flint, MI PMSA	2.92
255	Lexington, KY MSA	3.45	294	Ann Arbor, MI PMSA	2.92
256	Rochester, MN MSA	3.45	295	Florence, SC MSA	2.90
257	Saginaw-Bay City-Midland, MI MSA	3.41	296	Honolulu, HI MSA	2.84
258	Santa Rosa, CA PMSA	3.38	297	Albuquerque, NM MSA	2.84
259	Orange County, CA PMSA	3.38	298	Auburn-Opelika, AL MSA	2.83
260	Provo-Orem, UT MSA	3.36	299	Lawton, OK MSA	2.82
261	San Diego, CA MSA	3.35	300	Cheyenne, WY MSA	2.78
262	Lansing-East Lansing, MI MSA	3.35	301	Greenville, NC MSA	2.76
263	Melbourne-Titusville-Palm Bay, FL MSA	3.35	302	Columbia, SC MSA	2.74
264	Lafayette, LA MSA	3.34	303	Anniston, AL MSA	2.72
265	Charlotte-Gastonia-Rock Hill, NC-SC MSA	3.34	304	Huntsville, AL MSA	2.71
266	Florence, AL MSA	3.31	305	Wilmington-Newark, DE-MD PMSA	2.70
267	Chico-Paradise, CA MSA	3.29	306	Ocala, FL MSA	2.69
268	Sumter, SC MSA	3.26	307	Jonesboro, AR MSA	2.68
269	Jackson, MS MSA	3.26	308	Owensboro, KY MSA	2.64
270	Springfield, MO MSA	3.25	309	Hickory-Morganton-Lenoir, NC MSA	2.61
271	Benton Harbor, MI MSA	3.24	310	Las Cruces, NM MSA	2.61
272	Fort Smith, AR-OK MSA	3.22	311	Casper, WY MSA	2.59
273	Lakeland-Winter Haven, FL MSA	3.22	312	Goldsboro, NC MSA	2.53
274	Grand Rapids-Muskegon-Holland, MI MSA	3.20	313	Jackson, MI MSA	2.47
275	Little Rock-North Little Rock, AR MSA	3.16	314	Santa Fe, NM MSA	2.44
276	Fort Walton Beach, FL MSA	3.15	315	Decatur, AL MSA	2.37
277	Pensacola, FL MSA	3.15	316	Jacksonville, NC MSA	2.27
278	Great Falls, MT MSA	3.15	317	Tuscaloosa, AL MSA	2.14
279	Pocatello, ID MSA	3.13	318	Dover, DE MSA	1.66
280	Rocky Mount, NC MSA	3.13			
281	Greenville-Spartanburg-Anderson, SC MSA	3.12			
282	Fayetteville, NC MSA	3.12			
283	Hattiesburg, MS MSA	3.12			
284	Raleigh-Durham-Chapel Hill, NC MSA	3.11			
285	Dothan, AL MSA	3.09			
286	Huntington-Ashland, WV-KY-	3.08			

Table A7: Control Variables

Metro Area	Average Household Size	Age of Metro	Segregation	Affluence
Abilene, TX MSA	2.54	8.69	39.43	6.14
Akron, OH PMSA	2.47	20.74	65.85	11.02
Albany, GA MSA	2.64	3.48	63.19	8.33
Albany-Schenectady-Troy, NY MSA	2.41	32.91	60.91	11.33
Albuquerque, NM MSA	2.55	3.72	31.81	9.72
Alexandria, LA MSA	2.56	6.96	61.86	6.46
Allentown-Bethlehem-Easton, PA MSA	2.49	31.23	53.27	10.85
Altoona, PA MSA	2.43	39.93	47.78	4.64
Amarillo, TX MSA	2.55	7.73	63.38	7.49
Anchorage, AK MSA	2.67	0.61	35.92	18.79
Ann Arbor, MI PMSA	2.54	15.54	63.24	19.60
Anniston, AL MSA	2.42	8.76	54.85	5.93
Appleton-Oshkosh-Neenah, WI MSA	2.54	21.62	43.67	9.04
Asheville, NC MSA	2.33	13.69	59.52	7.52
Athens, GA MSA	2.47	6.94	45.79	9.23
Atlanta, GA MSA	2.68	4.21	65.61	17.53
Atlantic-Cape May, NJ PMSA	2.52	14.56	63.70	11.14
Auburn-Opelika, AL MSA	2.42	3.64	40.42	7.15
Augusta-Aiken, GA-SC MSA	2.61	5.95	45.46	8.81
Austin-San Marcos, TX MSA	2.57	3.87	52.28	15.78
Bakersfield, CA MSA	3.03	5.34	52.28	8.31
Baltimore, MD PMSA	2.55	16.01	67.93	15.91
Bangor, ME MSA	2.32	32.11	29.80	7.66
Barnstable-Yarmouth, MA MSA	2.29	9.15	39.57	12.48
Baton Rouge, LA MSA	2.63	3.97	66.93	9.74
Beaumont-Port Arthur, TX MSA	2.59	7.05	70.69	8.00
Bellingham, WA MSA	2.51	14.57	26.59	8.93
Benton Harbor, MI MSA	2.49	21.43	73.66	8.75
Bergen-Passaic, NJ PMSA	2.73	23.82	73.24	24.88
Billings, MT MSA	2.43	9.57	30.65	7.29
Biloxi-Gulfport-Pascagoula, MS MSA	2.60	4.84	51.62	6.72
Binghamton, NY MSA	2.42	32.66	48.85	7.83
Birmingham, AL MSA	2.49	8.36	72.92	11.04
Bismarck, ND MSA	2.44	9.94	24.04	7.07
Bloomington, IN MSA	2.27	8.58	34.28	8.65
Bloomington-Normal, IL MSA	2.45	19.39	34.97	13.55
Boise City, ID MSA	2.67	7.41	23.20	10.00
Boston, MA-NH PMSA	2.48	38.59	65.68	21.66
Boulder-Longmont, CO PMSA	2.47	6.86	23.17	21.67
Brazoria, TX PMSA	2.82	2.33	42.52	13.59
Bremerton, WA PMSA	2.60	9.40	41.95	11.63
Bridgeport, CT PMSA	2.63	23.10	73.59	20.68
Brockton, MA PMSA	2.78	28.15	63.60	15.09
Brownsville-Harlingen-San Benito, TX MSA	3.40	4.33	39.96	4.81
Bryan-College Station, TX MSA	2.52	2.67	48.81	8.29

Table A7: Control Variables

Metro Area	Average Household Size	Age of Metro	Segregation	Affluence
Buffalo-Niagara Falls, NY MSA	2.42	31.47	76.74	9.08
Burlington, VT MSA	2.48	22.61	31.08	12.04
Canton-Massillon, OH MSA	2.49	24.14	59.05	8.31
Casper, WY MSA	2.42	11.12	29.65	6.34
Cedar Rapids, IA MSA	2.43	20.73	40.76	10.18
Champaign-Urbana, IL MSA	2.33	13.68	47.36	9.01
Charleston, WV MSA	2.34	13.93	58.97	8.19
Charleston-North Charleston, SC MSA	2.55	5.90	47.42	9.50
Charlotte-Gastonia-Rock Hill, NC-SC MSA	2.55	6.08	55.16	13.11
Charlottesville, VA MSA	2.43	11.31	36.29	12.80
Chattanooga, TN-GA MSA	2.46	8.86	68.95	8.25
Cheyenne, WY MSA	2.45	13.36	31.88	6.48
Chicago, IL PMSA	2.73	21.34	80.85	18.21
Chico-Paradise, CA MSA	2.48	8.04	38.94	6.74
Cincinnati, OH-KY-IN PMSA	2.50	20.92	74.84	12.63
Clarksville-Hopkinsville, TN-KY MSA	2.69	5.20	39.25	5.61
Cleveland-Lorain-Elyria, OH PMSA	2.47	24.61	77.32	11.25
Colorado Springs, CO MSA	2.61	7.25	41.23	12.20
Columbia, MO MSA	2.38	6.79	40.30	9.24
Columbia, SC MSA	2.49	4.59	52.15	10.41
Columbus, GA-AL MSA	2.56	7.15	57.66	7.32
Columbus, OH MSA	2.45	14.24	63.10	12.28
Corpus Christi, TX MSA	2.82	4.59	43.80	7.59
Corvallis, OR MSA	2.43	9.41	31.20	12.50
Cumberland, MD-WV MSA	2.38	33.70	54.85	4.02
Dallas, TX PMSA	2.70	3.67	59.36	16.78
Danbury, CT PMSA	2.73	17.71	49.18	30.88
Danville, VA MSA	2.39	14.88	34.59	4.54
Davenport-Moline-Rock Island, IA-IL MSA	2.45	26.13	53.88	8.30
Daytona Beach, FL MSA	2.32	3.30	56.66	7.25
Dayton-Springfield, OH MSA	2.43	17.81	70.16	10.04
Decatur, AL MSA	2.52	5.16	58.47	7.91
Decatur, IL MSA	2.39	21.35	54.24	7.81
Denver, CO PMSA	2.52	8.96	61.76	16.52
Des Moines, IA MSA	2.48	19.87	55.50	11.66
Detroit, MI PMSA	2.58	13.91	84.72	16.14
Dothan, AL MSA	2.47	4.82	43.40	6.58
Dover, DE MSA	2.61	9.81	38.40	8.07
Dubuque, IA MSA	2.51	32.45	40.10	7.21
Duluth-Superior, MN-WI MSA	2.33	34.56	47.20	5.78
Dutchess County, NY PMSA	2.63	20.89	54.69	17.21
Eau Claire, WI MSA	2.49	23.31	40.23	6.68
El Paso, TX MSA	3.18	5.63	36.45	6.33
Elkhart-Goshen, IN MSA	2.72	19.17	58.40	9.01
Elmira, NY MSA	2.44	37.95	51.48	6.57

Table A7: Control Variables

Metro Area	Average Household Size	Age of Metro	Segregation	Affluence
Enid, OK MSA	2.42	16.75	31.38	5.08
Erie, PA MSA	2.51	29.72	64.26	6.44
Eugene-Springfield, OR MSA	2.42	7.98	29.65	7.85
Evansville-Henderson, IN-KY MSA	2.43	18.37	55.99	8.16
Fargo-Moorhead, ND-MN MSA	2.38	13.59	34.40	7.73
Fayetteville, NC MSA	2.65	2.86	33.26	6.32
Fayetteville-Springdale-Rogers, AR MSA	2.56	6.52	54.10	7.78
Fitchburg-Leominster, MA PMSA	2.54	37.93	33.99	9.65
Flagstaff, AZ-UT MSA	2.79	3.22	36.91	8.20
Flint, MI PMSA	2.54	12.88	76.71	10.69
Florence, AL MSA	2.40	7.35	44.46	6.60
Florence, SC MSA	2.59	4.59	42.97	7.33
Fort Collins-Loveland, CO MSA	2.52	7.95	28.74	13.88
Fort Lauderdale, FL PMSA	2.45	1.05	62.25	12.80
Fort Myers-Cape Coral, FL MSA	2.31	1.08	70.66	10.60
Fort Pierce-Port St. Lucie, FL MSA	2.37	1.45	62.10	10.34
Fort Smith, AR-OK MSA	2.56	7.42	54.55	5.79
Fort Walton Beach, FL MSA	2.49	1.12	33.48	9.07
Fort Wayne, IN MSA	2.57	22.10	70.88	9.12
Fort Worth-Arlington, TX PMSA	2.68	4.14	60.33	13.32
Fresno, CA MSA	3.10	6.19	54.30	8.55
Gadsden, AL MSA	2.44	10.50	71.45	5.58
Gainesville, FL MSA	2.34	3.67	44.71	8.72
Galveston-Texas City, TX PMSA	2.60	7.72	59.58	12.97
Gary, IN PMSA	2.63	15.00	84.14	10.20
Glens Falls, NY MSA	2.48	31.85	62.78	7.41
Goldsboro, NC MSA	2.55	7.76	45.68	5.38
Grand Forks, ND-MN MSA	2.44	20.31	43.60	5.66
Grand Junction, CO MSA	2.47	9.65	29.58	7.09
Grand Rapids-Muskegon-Holland, MI MSA	2.67	17.59	67.18	10.68
Great Falls, MT MSA	2.41	18.71	38.29	5.39
Greeley, CO PMSA	2.78	13.69	33.67	9.49
Green Bay, WI MSA	2.51	13.36	41.36	9.71
Greensboro--Winston-Salem--High Point, NC MSA	2.44	7.76	59.01	9.82
Greenville, NC MSA	2.43	5.86	35.88	7.48
Greenville-Spartanburg-Anderson, SC MSA	2.49	7.30	46.44	8.82
Hagerstown, MD PMSA	2.46	25.85	62.35	7.49
Hamilton-Middletown, OH PMSA	2.61	13.20	46.88	12.95
Harrisburg-Lebanon-Carlisle, PA MSA	2.43	23.10	70.62	9.90
Hartford, CT MSA	2.49	19.94	65.05	17.39
Hattiesburg, MS MSA	2.54	6.08	54.78	6.76
Hickory-Morganton-Lenoir, NC MSA	2.50	7.46	49.35	6.37
Honolulu, HI MSA	2.95	4.39	35.83	18.16
Houma, LA MSA	2.81	6.51	49.50	6.11
Houston, TX PMSA	2.82	3.37	67.49	15.36

Table A7: Control Variables

Metro Area	Average Household Size	Age of Metro	Segregation	Affluence
Huntington-Ashland, WV-KY-OH MSA	2.41	16.69	59.61	4.89
Huntsville, AL MSA	2.47	3.42	55.67	12.33
Indianapolis, IN MSA	2.50	15.51	70.66	12.60
Iowa City, IA MSA	2.34	14.51	36.09	11.88
Jackson, MI MSA	2.55	25.80	65.16	8.88
Jackson, MS MSA	2.64	3.28	62.25	9.90
Jackson, TN MSA	2.50	8.50	56.37	8.04
Jacksonville, FL MSA	2.54	4.78	53.94	10.97
Jacksonville, NC MSA	2.72	1.79	28.26	4.14
Jamestown, NY MSA	2.45	47.28	52.95	5.56
Janesville-Beloit, WI MSA	2.54	26.53	60.68	9.11
Jersey City, NJ PMSA	2.60	39.41	65.69	12.77
Johnson City-Kingsport-Bristol, TN-VA MSA	2.35	10.87	51.25	5.50
Johnstown, PA MSA	2.41	37.27	69.95	3.82
Jonesboro, AR MSA	2.46	5.23	48.01	6.17
Joplin, MO MSA	2.50	19.34	40.64	4.91
Kalamazoo-Battle Creek, MI MSA	2.48	20.32	53.04	9.48
Kankakee, IL PMSA	2.61	19.41	73.36	7.90
Kansas City, MO-KS MSA	2.51	12.92	69.12	12.49
Kenosha, WI PMSA	2.60	21.64	50.26	10.80
Killeen-Temple, TX MSA	2.72	3.87	41.85	6.13
Knoxville, TN MSA	2.38	7.50	58.05	8.89
Kokomo, IN MSA	2.43	24.42	49.45	10.27
La Crosse, WI-MN MSA	2.46	22.25	36.74	7.47
Lafayette, IN MSA	2.46	20.17	35.35	8.90
Lafayette, LA MSA	2.64	6.18	51.24	6.72
Lake Charles, LA MSA	2.61	6.38	62.03	7.60
Lakeland-Winter Haven, FL MSA	2.52	4.23	55.19	6.59
Lancaster, PA MSA	2.64	25.50	57.99	9.72
Lansing-East Lansing, MI MSA	2.48	19.03	57.06	11.20
Laredo, TX MSA	3.75	4.80	29.95	6.16
Las Cruces, NM MSA	2.85	4.40	28.13	5.32
Las Vegas, NV-AZ MSA	2.62	0.58	43.32	10.64
Lawrence, KS MSA	2.37	12.47	26.83	9.04
Lawrence, MA-NH PMSA	2.73	25.61	41.96	19.57
Lawton, OK MSA	2.63	6.59	32.04	5.18
Lewiston-Auburn, ME MSA	2.35	35.35	27.60	5.35
Lexington, KY MSA	2.39	9.85	47.75	10.21
Lima, OH MSA	2.55	26.66	65.21	7.03
Lincoln, NE MSA	2.40	16.43	37.29	9.38
Little Rock-North Little Rock, AR MSA	2.47	5.38	61.27	8.92
Longview-Marshall, TX MSA	2.57	6.41	45.28	6.63
Los Angeles-Long Beach, CA PMSA	2.98	12.90	67.55	15.10
Louisville, KY-IN MSA	2.44	13.84	64.49	10.47
Lowell, MA-NH PMSA	2.78	25.77	46.62	20.04

Table A7: Control Variables

Metro Area	Average Household Size	Age of Metro	Segregation	Affluence
Lubbock, TX MSA	2.52	3.46	55.15	7.01
Lynchburg, VA MSA	2.43	12.85	37.96	7.20
Macon, GA MSA	2.58	6.05	53.08	8.47
Madison, WI MSA	2.37	15.07	46.30	13.04
Manchester, NH PMSA	2.55	24.84	39.74	13.84
Mansfield, OH MSA	2.46	26.79	67.39	6.18
McAllen-Edinburg-Mission, TX MSA	3.60	2.12	49.47	4.74
Medford-Ashland, OR MSA	2.48	9.08	26.56	8.04
Melbourne-Titusville-Palm Bay, FL MSA	2.35	1.26	49.48	9.26
Memphis, TN-AR-MS MSA	2.63	6.37	68.72	10.83
Merced, CA MSA	3.25	6.96	34.39	6.89
Miami, FL PMSA	2.84	4.16	73.57	10.82
Middlesex-Somerset-Hunterdon, NJ PMSA	2.72	13.00	51.97	27.75
Milwaukee-Waukesha, WI PMSA	2.50	22.91	82.16	12.41
Minneapolis-St. Paul, MN-WI MSA	2.56	17.10	57.83	16.88
Missoula, MT MSA	2.40	12.40	20.24	6.21
Mobile, AL MSA	2.58	5.49	63.73	7.48
Modesto, CA MSA	3.03	6.52	34.84	9.08
Monmouth-Ocean, NJ PMSA	2.61	10.79	63.35	20.93
Monroe, LA MSA	2.58	4.49	70.88	7.56
Montgomery, AL MSA	2.53	6.54	56.33	9.14
Muncie, IN MSA	2.37	21.72	54.65	7.34
Myrtle Beach, SC MSA	2.37	1.81	49.82	7.12
Naples, FL MSA	2.39	0.44	66.20	18.12
Nashua, NH PMSA	2.66	16.73	32.26	20.55
Nashville, TN MSA	2.49	6.56	57.05	11.99
Nassau-Suffolk, NY PMSA	2.95	14.66	74.38	28.84
New Bedford, MA PMSA	2.48	39.22	47.48	8.94
New Haven-Meriden, CT PMSA	2.49	23.06	68.97	17.11
New London-Norwich, CT-RI MSA	2.47	26.78	54.07	13.70
New Orleans, LA MSA	2.59	13.69	69.25	9.27
New York, NY PMSA	2.61	34.71	81.82	16.00
Newark, NJ PMSA	2.73	25.05	80.42	23.80
Newburgh, NY-PA PMSA	2.83	20.30	50.78	15.21
Norfolk-Virginia Beach-Newport News, VA-NC MSA	2.60	6.44	46.20	9.69
Oakland, CA PMSA	2.71	13.76	62.81	24.00
Ocala, FL MSA	2.36	1.98	50.60	5.52
Odessa-Midland, TX MSA	2.70	2.25	51.54	8.51
Oklahoma City, OK MSA	2.47	7.81	54.45	8.12
Olympia, WA PMSA	2.50	7.08	36.81	10.81
Omaha, NE-IA MSA	2.55	19.05	64.69	11.24
Orange County, CA PMSA	3.00	2.54	36.80	23.48
Orlando, FL MSA	2.58	2.40	57.04	10.95
Owensboro, KY MSA	2.47	10.43	49.84	6.18
Panama City, FL MSA	2.43	2.45	53.22	6.62

Table A7: Control Variables

Metro Area	Average Household Size	Age of Metro	Segregation	Affluence
Parkersburg-Marietta, WV-OH MSA	2.41	20.89	35.86	6.13
Pensacola, FL MSA	2.50	4.22	52.32	7.70
Peoria-Pekin, IL MSA	2.47	19.30	71.39	9.78
Philadelphia, PA-NJ PMSA	2.58	25.30	72.33	15.89
Phoenix-Mesa, AZ MSA	2.67	1.42	43.72	12.90
Pine Bluff, AR MSA	2.59	6.17	61.50	5.55
Pittsburgh, PA MSA	2.37	30.52	67.27	9.20
Pittsfield, MA MSA	2.29	41.03	44.36	8.78
Pocatello, ID MSA	2.69	12.23	31.21	7.20
Portland, ME MSA	2.38	29.08	42.67	11.66
Portland-Vancouver, OR-WA PMSA	2.54	14.69	48.07	13.10
Portsmouth-Rochester, NH-ME PMSA	2.44	25.18	31.43	13.54
Providence-Fall River-Warwick, RI-MA MSA	2.49	30.70	58.69	11.05
Provo-Orem, UT MSA	3.59	7.77	26.44	11.10
Pueblo, CO MSA	2.52	19.25	39.37	5.79
Punta Gorda, FL MSA	2.18	0.83	40.55	7.26
Racine, WI PMSA	2.59	23.39	58.36	10.85
Raleigh-Durham-Chapel Hill, NC MSA	2.48	5.41	46.17	15.92
Rapid City, SD MSA	2.49	7.77	30.29	7.12
Reading, PA MSA	2.55	32.57	58.81	10.21
Redding, CA MSA	2.52	3.78	25.17	7.21
Reno, NV MSA	2.53	3.28	33.52	12.89
Richland-Kennewick-Pasco, WA MSA	2.81	3.20	38.45	10.80
Richmond-Petersburg, VA MSA	2.48	10.00	57.04	13.35
Riverside-San Bernardino, CA PMSA	3.07	3.31	46.28	11.54
Roanoke, VA MSA	2.33	13.72	63.55	8.55
Rochester, MN MSA	2.53	12.65	47.38	15.10
Rochester, NY MSA	2.51	30.76	66.32	11.41
Rockford, IL MSA	2.57	19.35	63.12	10.29
Rocky Mount, NC MSA	2.59	9.60	42.73	6.66
Sacramento, CA PMSA	2.64	5.27	55.97	14.08
Saginaw-Bay City-Midland, MI MSA	2.53	19.78	74.46	10.36
Salem, OR PMSA	2.68	10.00	34.11	7.92
Salinas, CA MSA	3.14	8.15	54.29	15.24
Salt Lake City-Ogden, UT MSA	3.04	9.38	36.91	12.62
San Angelo, TX MSA	2.52	7.37	34.64	5.82
San Antonio, TX MSA	2.78	6.22	50.40	9.91
San Diego, CA MSA	2.73	5.13	54.15	15.71
San Francisco, CA PMSA	2.47	29.62	60.87	29.03
San Jose, CA PMSA	2.92	5.27	40.51	34.61
San Luis Obispo-Atascadero-Paso Robles, CA MSA	2.49	6.21	49.14	12.04
Santa Barbara-Santa Maria-Lompoc, CA MSA	2.80	8.79	41.49	16.02
Santa Cruz-Watsonville, CA PMSA	2.71	12.94	27.07	21.91
Santa Fe, NM MSA	2.42	6.37	32.32	15.64

Table A7: Control Variables

Metro Area	Average Household Size	Age of Metro	Segregation	Affluence
Santa Rosa, CA PMSA	2.60	9.08	32.89	18.08
Sarasota-Bradenton, FL MSA	2.20	2.51	67.15	11.23
Savannah, GA MSA	2.56	9.87	57.07	10.40
Scranton--Wilkes-Barre--Hazleton, PA MSA	2.37	43.91	55.60	6.35
Seattle-Bellevue-Everett, WA PMSA	2.46	12.51	49.62	17.43
Sharon, PA MSA	2.44	32.05	66.28	5.45
Sheboygan, WI MSA	2.50	33.71	53.92	7.77
Sherman-Denison, TX MSA	2.51	10.88	47.86	7.48
Shreveport-Bossier City, LA MSA	2.53	6.18	57.37	7.35
Sioux City, IA-NE MSA	2.62	32.37	44.69	6.92
Sioux Falls, SD MSA	2.50	16.43	38.98	8.86
South Bend, IN MSA	2.50	22.00	60.28	8.90
Spokane, WA MSA	2.46	18.07	34.58	7.91
Springfield, IL MSA	2.37	18.38	58.88	10.42
Springfield, MA MSA	2.48	29.61	64.13	9.62
Springfield, MO MSA	2.41	11.23	46.74	6.76
St. Cloud, MN MSA	2.63	17.18	41.24	8.10
St. Joseph, MO MSA	2.45	31.74	41.60	5.82
St. Louis, MO-IL MSA	2.52	17.05	74.35	12.16
Stamford-Norwalk, CT PMSA	2.62	21.88	64.32	39.20
State College, PA MSA	2.45	17.40	48.72	8.49
Steubenville-Weirton, OH-WV MSA	2.36	24.77	59.88	4.46
Stockton-Lodi, CA MSA	3.00	8.13	54.45	10.65
Sumter, SC MSA	2.68	4.97	42.09	5.34
Syracuse, NY MSA	2.50	30.62	69.26	9.53
Tacoma, WA PMSA	2.60	12.58	45.95	10.43
Tallahassee, FL MSA	2.39	2.89	45.88	9.53
Tampa-St. Petersburg-Clearwater, FL MSA	2.33	3.55	64.47	9.40
Terre Haute, IN MSA	2.42	33.18	56.81	5.96
Texarkana, TX-Texarkana, AR MSA	2.50	6.66	45.37	6.16
Toledo, OH MSA	2.47	25.81	69.10	9.49
Topeka, KS MSA	2.39	15.74	47.80	8.35
Trenton, NJ PMSA	2.62	23.53	64.02	22.96
Tucson, AZ MSA	2.47	3.03	38.82	9.01
Tulsa, OK MSA	2.50	8.47	58.52	8.94
Tuscaloosa, AL MSA	2.42	4.57	54.81	7.82
Tyler, TX MSA	2.59	5.44	53.78	9.06
Utica-Rome, NY MSA	2.44	38.23	63.52	6.16
Vallejo-Fairfield-Napa, CA PMSA	2.83	7.00	50.90	17.02
Ventura, CA PMSA	3.04	3.97	45.52	22.79
Victoria, TX MSA	2.75	5.76	43.65	8.70
Vineland-Millville-Bridgeton, NJ PMSA	2.73	21.60	44.35	8.25
Visalia-Tulare-Porterville, CA MSA	3.28	6.28	41.59	7.64
Waco, TX MSA	2.59	8.44	52.43	7.47
Washington, DC-MD-VA-WV PMSA	2.61	9.59	63.12	25.11

Table A7: Control Variables

Metro Area	Average Household Size	Age of Metro	Segregation	Affluence
Waterbury, CT PMSA	2.54	23.66	60.61	13.66
Waterloo-Cedar Falls, IA MSA	2.45	22.22	65.41	7.07
Wausau, WI MSA	2.60	22.84	39.79	8.26
West Palm Beach-Boca Raton, FL MSA	2.34	2.03	66.68	16.23
Wheeling, WV-OH MSA	2.35	35.89	56.29	4.56
Wichita Falls, TX MSA	2.50	11.84	54.12	5.86
Wichita, KS MSA	2.54	12.55	58.21	8.97
Williamsport, PA MSA	2.44	36.03	61.44	5.66
Wilmington, NC MSA	2.32	4.75	50.13	9.61
Wilmington-Newark, DE-MD PMSA	2.58	12.23	53.55	16.57
Worcester, MA-CT PMSA	2.54	31.47	53.73	14.70
Yakima, WA MSA	2.96	12.77	40.64	6.97
Yolo, CA PMSA	2.71	6.58	23.21	12.99
York, PA MSA	2.52	24.04	67.01	8.76
Youngstown-Warren, OH MSA	2.47	23.42	72.85	6.66
Yuba City, CA MSA	2.87	7.38	32.03	7.16
Yuma, AZ MSA	2.86	1.82	42.08	5.96

Table A8. Metropolitan Areas that are a Part of the Larger Region (In CMSA)

<i>Metro Area</i>	<i>Metro Area</i>
Akron, OH PMSA	Newark, NJ PMSA
Ann Arbor, MI PMSA	Newburgh, NY-PA PMSA
Atlantic-Cape May, NJ PMSA	Oakland, CA PMSA
Baltimore, MD PMSA	Olympia, WA PMSA
Bergen-Passaic, NJ PMSA	Orange County, CA PMSA
Boston, MA-NH PMSA	Philadelphia, PA-NJ PMSA
Boulder-Longmont, CO PMSA	Portland-Vancouver, OR-WA PMSA
Brazoria, TX PMSA	Portsmouth-Rochester, NH-ME PMSA
Bremerton, WA PMSA	Racine, WI PMSA
Bridgeport, CT PMSA	Riverside-San Bernardino, CA PMSA
Brockton, MA PMSA	Sacramento, CA PMSA
Chicago, IL PMSA	Salem, OR PMSA
Cincinnati, OH-KY-IN PMSA	San Francisco, CA PMSA
Cleveland-Lorain-Elyria, OH PMSA	San Jose, CA PMSA
Dallas, TX PMSA	Santa Cruz-Watsonville, CA PMSA
Danbury, CT PMSA	Santa Rosa, CA PMSA
Denver, CO PMSA	Seattle-Bellevue-Everett, WA PMSA
Detroit, MI PMSA	Stamford-Norwalk, CT PMSA
Dutchess County, NY PMSA	Tacoma, WA PMSA
Fitchburg-Leominster, MA PMSA	Trenton, NJ PMSA
Flint, MI PMSA	Vallejo-Fairfield-Napa, CA PMSA
Fort Lauderdale, FL PMSA	Ventura, CA PMSA
Fort Worth-Arlington, TX PMSA	Vineland-Millville-Bridgeton, NJ PMSA
Galveston-Texas City, TX PMSA	Washington, DC-MD-VA-WV PMSA
Gary, IN PMSA	Waterbury, CT PMSA
Greeley, CO PMSA	Wilmington-Newark, DE-MD PMSA
Hagerstown, MD PMSA	Worcester, MA-CT PMSA
Hamilton-Middletown, OH PMSA	Yolo, CA PMSA
Houston, TX PMSA	
Jersey City, NJ PMSA	
Kankakee, IL PMSA	
Kenosha, WI PMSA	
Lawrence, MA-NH PMSA	
Los Angeles-Long Beach, CA PMSA	
Lowell, MA-NH PMSA	
Manchester, NH PMSA	
Miami, FL PMSA	
Middlesex-Somerset-Hunterdon, NJ PMSA	
Milwaukee-Waukesha, WI PMSA	
Monmouth-Ocean, NJ PMSA	
Nashua, NH PMSA	
Nassau-Suffolk, NY PMSA	
New Bedford, MA PMSA	
New Haven-Meriden, CT PMSA	
New York, NY PMSA	

Table A9. Regional Location of Metropolitan Areas

<i>Metro Area</i>	<i>Region</i>	<i>Metro Area</i>	<i>Region</i>
Abilene, TX MSA	South	Benito, TX MSA	
Akron, OH PMSA	Midwest	Bryan-College Station, TX MSA	South
Albany, GA MSA	South	Buffalo-Niagara Falls, NY MSA	Northeast
Albany-Schenectady-Troy, NY MSA	Northeast	Burlington, VT MSA	Northeast
Albuquerque, NM MSA	West	Canton-Massillon, OH MSA	Midwest
Alexandria, LA MSA	South	Casper, WY MSA	West
Allentown-Bethlehem-Easton, PA MSA	Northeast	Cedar Rapids, IA MSA	Midwest
Altoona, PA MSA	Northeast	Champaign-Urbana, IL MSA	Midwest
Amarillo, TX MSA	South	Charleston, WV MSA	South
Anchorage, AK MSA	West	Charleston-North Charleston, SC MSA	South
Ann Arbor, MI PMSA	Midwest	Charlotte-Gastonia-Rock Hill, NC-SC MSA	South
Anniston, AL MSA	South	Charlottesville, VA MSA	South
Appleton-Oshkosh-Neenah, WI MSA	Midwest	Chattanooga, TN-GA MSA	South
Asheville, NC MSA	South	Cheyenne, WY MSA	West
Athens, GA MSA	South	Chicago, IL PMSA	Midwest
Atlanta, GA MSA	South	Chico-Paradise, CA MSA	West
Atlantic-Cape May, NJ PMSA	Northeast	Cincinnati, OH-KY-IN PMSA	South
Auburn-Opelika, AL MSA	South	Clarksville-Hopkinsville, TN-KY MSA	South
Augusta-Aiken, GA-SC MSA	South	Cleveland-Lorain-Elyria, OH PMSA	Midwest
Austin-San Marcos, TX MSA	South	Colorado Springs, CO MSA	West
Bakersfield, CA MSA	West	Columbia, MO MSA	Midwest
Baltimore, MD PMSA	South	Columbia, SC MSA	South
Bangor, ME MSA	Northeast	Columbus, GA-AL MSA	South
Barnstable-Yarmouth, MA MSA	Northeast	Columbus, OH MSA	Midwest
Baton Rouge, LA MSA	South	Corpus Christi, TX MSA	South
Beaumont-Port Arthur, TX MSA	South	Corvallis, OR MSA	West
Bellingham, WA MSA	West	Cumberland, MD-WV MSA	South
Benton Harbor, MI MSA	Midwest	Dallas, TX PMSA	South
Bergen-Passaic, NJ PMSA	Northeast	Danbury, CT PMSA	Northeast
Billings, MT MSA	West	Danville, VA MSA	South
Biloxi-Gulfport-Pascagoula, MS MSA	South	Davenport-Moline-Rock Island, IA-IL MSA	Midwest
Binghamton, NY MSA	Northeast	Daytona Beach, FL MSA	South
Birmingham, AL MSA	South	Dayton-Springfield, OH MSA	Midwest
Bismarck, ND MSA	Midwest	Decatur, AL MSA	South
Bloomington, IN MSA	Midwest	Decatur, IL MSA	Midwest
Bloomington-Normal, IL MSA	Midwest	Denver, CO PMSA	West
Boise City, ID MSA	West	Des Moines, IA MSA	Midwest
Boston, MA-NH PMSA	Northeast	Detroit, MI PMSA	Midwest
Boulder-Longmont, CO PMSA	West	Dothan, AL MSA	South
Brazoria, TX PMSA	South	Dover, DE MSA	South
Bremerton, WA PMSA	West	Dubuque, IA MSA	Midwest
Bridgeport, CT PMSA	Northeast	Duluth-Superior, MN-WI MSA	Midwest
Brockton, MA PMSA	Northeast	Dutchess County, NY PMSA	Northeast
Brownsville-Harlingen-San	South		

Table A9. Regional Location of Metropolitan Areas

<i>Metro Area</i>	<i>Region</i>	<i>Metro Area</i>	<i>Region</i>
Eau Claire, WI MSA	Midwest	Harrisburg-Lebanon-Carlisle, PA MSA	Northeast
El Paso, TX MSA	South	Hartford, CT MSA	Northeast
Elkhart-Goshen, IN MSA	Midwest	Hattiesburg, MS MSA	South
Elmira, NY MSA	Northeast	Hickory-Morganton-Lenoir, NC MSA	South
Enid, OK MSA	South	Honolulu, HI MSA	West
Erie, PA MSA	Northeast	Houma, LA MSA	South
Eugene-Springfield, OR MSA	West	Houston, TX PMSA	South
Evansville-Henderson, IN-KY MSA	Midwest	Huntington-Ashland, WV-KY-OH MSA	South
Fargo-Moorhead, ND-MN MSA	Midwest	Huntsville, AL MSA	South
Fayetteville, NC MSA	South	Indianapolis, IN MSA	Midwest
Fayetteville-Springdale-Rogers, AR MSA	South	Iowa City, IA MSA	Midwest
Fitchburg-Leominster, MA PMSA	Northeast	Jackson, MI MSA	Midwest
Flagstaff, AZ-UT MSA	West	Jackson, MS MSA	South
Flint, MI PMSA	Midwest	Jackson, TN MSA	South
Florence, AL MSA	South	Jacksonville, FL MSA	South
Florence, SC MSA	South	Jacksonville, NC MSA	South
Fort Collins-Loveland, CO MSA	West	Jamestown, NY MSA	Northeast
Fort Lauderdale, FL PMSA	South	Janesville-Beloit, WI MSA	Midwest
Fort Myers-Cape Coral, FL MSA	South	Jersey City, NJ PMSA	Northeast
Fort Pierce-Port St. Lucie, FL MSA	South	Johnson City-Kingsport-Bristol, TN-VA MSA	South
Fort Smith, AR-OK MSA	South	Johnstown, PA MSA	Northeast
Fort Walton Beach, FL MSA	South	Jonesboro, AR MSA	South
Fort Wayne, IN MSA	Midwest	Joplin, MO MSA	Midwest
Fort Worth-Arlington, TX PMSA	South	Kalamazoo-Battle Creek, MI MSA	Midwest
Fresno, CA MSA	West	Kankakee, IL PMSA	Midwest
Gadsden, AL MSA	South	Kansas City, MO-KS MSA	Midwest
Gainesville, FL MSA	South	Kenosha, WI PMSA	Midwest
Galveston-Texas City, TX PMSA	South	Killeen-Temple, TX MSA	South
Gary, IN PMSA	Midwest	Knoxville, TN MSA	South
Glens Falls, NY MSA	Northeast	Kokomo, IN MSA	Midwest
Goldsboro, NC MSA	South	La Crosse, WI-MN MSA	Midwest
Grand Forks, ND-MN MSA	Midwest	Lafayette, IN MSA	Midwest
Grand Junction, CO MSA	West	Lafayette, LA MSA	South
Grand Rapids-Muskegon-Holland, MI MSA	Midwest	Lake Charles, LA MSA	South
Great Falls, MT MSA	West	Lakeland-Winter Haven, FL MSA	South
Greeley, CO PMSA	West	Lancaster, PA MSA	Northeast
Green Bay, WI MSA	Midwest	Lansing-East Lansing, MI MSA	Midwest
Greensboro--Winston-Salem--High Point, NC MSA	South	Laredo, TX MSA	South
Greenville, NC MSA	South	Las Cruces, NM MSA	West
Greenville-Spartanburg-Anderson, SC MSA	South	Las Vegas, NV-AZ MSA	West
Hagerstown, MD PMSA	South	Lawrence, KS MSA	Midwest
Hamilton-Middletown, OH PMSA	Midwest	Lawrence, MA-NH PMSA	Northeast
		Lawton, OK MSA	South

Table A9. Regional Location of Metropolitan Areas

<i>Metro Area</i>	<i>Region</i>	<i>Metro Area</i>	<i>Region</i>
Lewiston-Auburn, ME MSA	Northeast	Newburgh, NY-PA PMSA	Northeast
Lexington, KY MSA	South	Norfolk-Virginia Beach-Newport News, VA-NC MSA	South
Lima, OH MSA	Midwest	Oakland, CA PMSA	West
Lincoln, NE MSA	Midwest	Ocala, FL MSA	South
Little Rock-North Little Rock, AR MSA	South	Odessa-Midland, TX MSA	South
Longview-Marshall, TX MSA	South	Oklahoma City, OK MSA	South
Los Angeles-Long Beach, CA PMSA	West	Olympia, WA PMSA	West
Louisville, KY-IN MSA	Midwest	Omaha, NE-IA MSA	Midwest
Lowell, MA-NH PMSA	Northeast	Orange County, CA PMSA	West
Lubbock, TX MSA	South	Orlando, FL MSA	South
Lynchburg, VA MSA	South	Owensboro, KY MSA	South
Macon, GA MSA	South	Panama City, FL MSA	South
Madison, WI MSA	Midwest	Parkersburg-Marietta, WV-OH MSA	Midwest
Manchester, NH PMSA	Northeast	Pensacola, FL MSA	South
Mansfield, OH MSA	Midwest	Peoria-Pekin, IL MSA	Midwest
McAllen-Edinburg-Mission, TX MSA	South	Philadelphia, PA-NJ PMSA	Northeast
Medford-Ashland, OR MSA	West	Phoenix-Mesa, AZ MSA	West
Melbourne-Titusville-Palm Bay, FL MSA	South	Pine Bluff, AR MSA	South
Memphis, TN-AR-MS MSA	South	Pittsburgh, PA MSA	Northeast
Merced, CA MSA	West	Pittsfield, MA MSA	Northeast
Miami, FL PMSA	South	Pocatello, ID MSA	West
Middlesex-Somerset-Hunterdon, NJ PMSA	Northeast	Portland, ME MSA	Northeast
Milwaukee-Waukesha, WI PMSA	Midwest	Portland-Vancouver, OR-WA PMSA	West
Minneapolis-St. Paul, MN-WI MSA	Midwest	Portsmouth-Rochester, NH-ME PMSA	Northeast
Missoula, MT MSA	West	Providence-Fall River-Warwick, RI-MA MSA	Northeast
Mobile, AL MSA	South	Provo-Orem, UT MSA	West
Modesto, CA MSA	West	Pueblo, CO MSA	West
Monmouth-Ocean, NJ PMSA	Northeast	Punta Gorda, FL MSA	South
Monroe, LA MSA	South	Racine, WI PMSA	Midwest
Montgomery, AL MSA	South	Raleigh-Durham-Chapel Hill, NC MSA	South
Muncie, IN MSA	Midwest	Rapid City, SD MSA	Midwest
Myrtle Beach, SC MSA	South	Reading, PA MSA	Northeast
Naples, FL MSA	South	Redding, CA MSA	West
Nashua, NH PMSA	Northeast	Reno, NV MSA	West
Nashville, TN MSA	South	Richland-Kennewick-Pasco, WA MSA	West
Nassau-Suffolk, NY PMSA	Northeast	Richmond-Petersburg, VA MSA	South
New Bedford, MA PMSA	Northeast	Riverside-San Bernardino, CA PMSA	West
New Haven-Meriden, CT PMSA	Northeast	Roanoke, VA MSA	South
New London-Norwich, CT-RI MSA	Northeast	Rochester, MN MSA	Midwest
New Orleans, LA MSA	South	Rochester, NY MSA	Northeast
New York, NY PMSA	Northeast	Rockford, IL MSA	Midwest
Newark, NJ PMSA	Northeast	Rocky Mount, NC MSA	South

Table A9. Regional Location of Metropolitan Areas

<i>Metro Area</i>	<i>Region</i>	<i>Metro Area</i>	<i>Region</i>
Sacramento, CA PMSA	West	Terre Haute, IN MSA	Midwest
Saginaw-Bay City-Midland, MI MSA	Midwest	Texarkana, TX-Texarkana, AR MSA	South
Salem, OR PMSA	West	Toledo, OH MSA	Midwest
Salinas, CA MSA	West	Topeka, KS MSA	Midwest
Salt Lake City-Ogden, UT MSA	West	Trenton, NJ PMSA	Northeast
San Angelo, TX MSA	South	Tucson, AZ MSA	West
San Antonio, TX MSA	South	Tulsa, OK MSA	South
San Diego, CA MSA	West	Tuscaloosa, AL MSA	South
San Francisco, CA PMSA	West	Tyler, TX MSA	South
San Jose, CA PMSA	West	Utica-Rome, NY MSA	Northeast
San Luis Obispo-Atascadero-Paso Robles, CA MSA	West	Vallejo-Fairfield-Napa, CA PMSA	West
Santa Barbara-Santa Maria-Lompoc, CA MSA	West	Ventura, CA PMSA	West
Santa Cruz-Watsonville, CA PMSA	West	Victoria, TX MSA	South
Santa Fe, NM MSA	West	Vineland-Millville-Bridgeton, NJ PMSA	Northeast
Santa Rosa, CA PMSA	West	Visalia-Tulare-Porterville, CA MSA	West
Sarasota-Bradenton, FL MSA	South	Waco, TX MSA	South
Savannah, GA MSA	South	Washington, DC-MD-VA-WV PMSA	South
Scranton--Wilkes-Barre--Hazleton, PA MSA	Northeast	Waterbury, CT PMSA	Northeast
Seattle-Bellevue-Everett, WA PMSA	West	Waterloo-Cedar Falls, IA MSA	Midwest
Sharon, PA MSA	Northeast	Wausau, WI MSA	Midwest
Sheboygan, WI MSA	Midwest	West Palm Beach-Boca Raton, FL MSA	South
Sherman-Denison, TX MSA	South	Wheeling, WV-OH MSA	Midwest
Shreveport-Bossier City, LA MSA	South	Wichita Falls, TX MSA	South
Sioux City, IA-NE MSA	Midwest	Wichita, KS MSA	Midwest
Sioux Falls, SD MSA	Midwest	Williamsport, PA MSA	Northeast
South Bend, IN MSA	Midwest	Wilmington, NC MSA	South
Spokane, WA MSA	West	Wilmington-Newark, DE-MD PMSA	South
Springfield, IL MSA	Midwest	Worcester, MA-CT PMSA	Northeast
Springfield, MA MSA	Northeast	Yakima, WA MSA	West
Springfield, MO MSA	Midwest	Yolo, CA PMSA	West
St. Cloud, MN MSA	Midwest	York, PA MSA	Northeast
St. Joseph, MO MSA	Midwest	Youngstown-Warren, OH MSA	Midwest
St. Louis, MO-IL MSA	Midwest	Yuba City, CA MSA	West
Stamford-Norwalk, CT PMSA	Northeast	Yuma, AZ MSA	West
State College, PA MSA	Northeast		
Steubenville-Weirton, OH-WV MSA	Midwest		
Stockton-Lodi, CA MSA	West		
Sumter, SC MSA	South		
Syracuse, NY MSA	Northeast		
Tacoma, WA PMSA	West		
Tallahassee, FL MSA	South		
Tampa-St. Petersburg-Clearwater, FL MSA	South		

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Research Projects & Papers

Encyclopedia Article. "Regionalism." In Christensen, Karen and David Levinson (General Editors). (2003). Encyclopedia of Community: From the Village to the Virtual World. Thousand Oaks, CA: Sage.

Paper Presentation. "Political Fragmentation and Metropolitan Well-being: Quantitative evaluation of theories of metropolitan governance". Paper prepared for the conference "What's Right About Cities and an Urban Way of Life", Urban Affairs Association, 32nd Annual Meeting, Boston, Massachusetts -- March 20-23, 2002.

Research Associate. Assisted with research on a series of reports on sprawl, urban disinvestments and economic impacts of Ohio Rivers Bridge Project. "Report 1: Ohio River Bridges Project, Impact on Revenues of a Far East Bridge Alingment"; "Report 2: Ohio River Bridges Project: Response to the Al Chalabi Report and Selected Portions of The Draft Environmental Impact Statement (Socioeconomic Impact);

Report 3: Ohio River Bridges Project: Sprawl And Urban Disinvestment”. February 2002.

Co-author. H.V. Savitch, Grigoriy Ardashev. “Does Terror Have an Urban Future?”, *Urban Studies*, 2001, Vol. 38, No. 13, p. 2515-2533.

Co-author. “A Comparative Analysis of Social Segregation” Paper presented by Prof. H.V. Savitch at the conference “The New Face of the European City: Immigration in an Urban Perspective”, April 20, 2001 NYU Center for European Studies.

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