

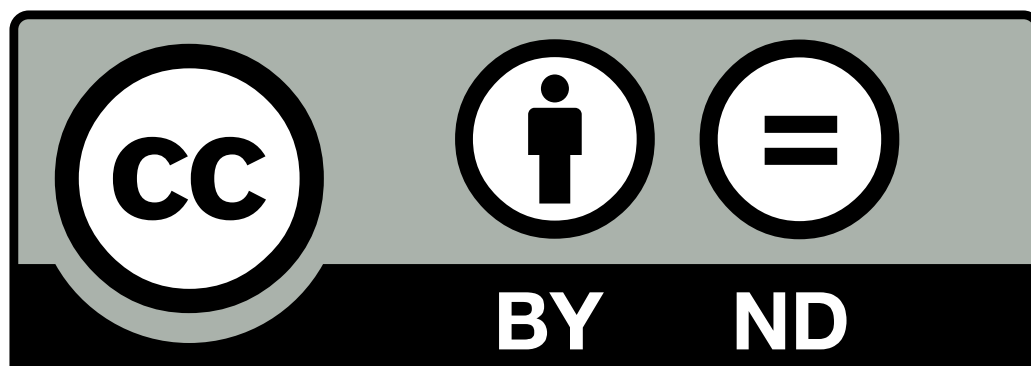
# **Tiebout Sorting and Jurisdictional Homogeneity: Empirical Validity and Ethical Implications**

by

Lee Hachadoorian

A dissertation submitted to the Graduate Faculty in Earth &  
Environmental Sciences in partial fulfillment of the requirements for  
the degree of Doctor of Philosophy, The City University of New York

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## Approval Page

This manuscript has been read and accepted for the Graduate Faculty in Earth and Environmental Sciences in satisfaction of the dissertation requirement for the degree of Doctor of Philosophy.

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## **Abstract**

Tiebout Sorting and Jurisdictional Homogeneity:  
Empirical Validity and Ethical Implications

by

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Advisor: Professor Jochen Albrecht

In a seminal paper, Tiebout (1956) argues that a large number of small local governments will function as a market in local services, leading to efficient allocation of local public goods. This result only obtains if households actually move in response to local fiscal differences. Spatial dependence of socioeconomic variables confounds attempts to infer Tiebout-motivated residential choice from observed socioeconomic homogeneity. I correct for this by focusing on socioeconomic difference across local government borders. In an investigation of socioeconomic sorting in Queens and Nassau Counties, NY, I find strong evidence of income sorting at the level of small suburban municipalities and of racial sorting across school districts. There is no evidence of income sorting across school districts, which I attribute to NYS school districts' lack of control over zoning.

This study design exploits the incongruent boundaries of municipalities and school districts in New York State. In neighboring

New Jersey, school districts are by law coterminous with municipalities. I hypothesize that, where boundaries are coterminous, sorting by school district and municipality will be mutually reinforcing. This hypothesis is tested in a comparison of income and racial heterogeneity in Nassau County, NY, with Bergen County, NJ, both suburban commuter counties within the New York MSA. Sorting is not found to be higher in Bergen than in Nassau. These negative results imply that the argued advantages of coterminous boundaries in terms of citizen oversight (Schwartz 2001) need not be traded off against increased segregation.

I conclude with a discussion of the scope of public services that may be allocated via the Tiebout mechanism. Education is a primary good of such importance to well-being and to democracy that a pure system of local finance violates Rawlsian principles of justice (Rawls 1971). If good reasons exist, in terms of efficiency and/or democratic participation, for supporting local control in public goods with such significant distributive impacts, equalizing transfers are necessary to achieve just outcomes. This policy of equalizing transfers is consistent both with a spatialized Rawlsian theory of justice, as well as with the welfare economist's concept of efficiency (Schwab, Oates 1991).

## **Acknowledgements**

During the course of my doctoral studies, my wife and I have been fortunate enough to see the birth of two beautiful daughters, Kallista and Rowan. This dissertation represents another birth, after long labor. Like a newborn, it is, I think, still more like a promising beginning than a fully fledged idea. I don't quite know what it will grow into, though I have my hopes. The Bibliography, its genome, represents my thanks to this dissertation's intellectual ancestors. This section is where I thank those who midwived these thoughts.

I could never fully express the gratitude I feel towards my advisor and committee members, and this otherwise pleasant task is made more difficult since the expectation of such a statement impeaches its intent. So let me say, wholeheartedly and unreservedly, that I could not in my wildest dreams imagine a finer collection of scholars to guide me toward the completion of this work. Not only did I benefit from their knowledge, but also from their generosity with their time, and from their basic human warmth and amicability. To Robin Leichenko (Geography, Rutgers University) and Howard Chernick (Economics, Hunter College) I owe a special thanks for stepping across institutional and disciplinary boundaries to take on this obligation. Howard's assistance and knowledge of the public finance literature was invaluable, considering that I, as a geographer, am working with a

model rarely studied by geographers. Juliana Maantay (Environmental, Geographic, and Geological Sciences, Lehman College) and Jochen Albrecht (Geography, Hunter College) both provided extensive commentary on a conference paper that would turn into chapter 3, which encouraged me to think that this topic could be turned into a respectable geography dissertation, as well as to ask Juliana to be on my committee and Jochen to be my advisor. Juliana, whose own work represents an ethically engaged application of technical expertise, helped me think about how to frame this project, and provided valuable commentary on my maps (which are still nowhere near as good as hers). Jochen was helpful in the ways a graduate student thinks he needs, but was also a mentor in more ways than I even knew were necessary. Not only did he provide extensive commentary on several drafts and sit down with me on many occasions to discuss structure, literature, and methods, but he also helped me keep the project manageable (curtailing every graduate student's desire to create a Theory of Everything), discussed career planning, provided advice on job search, and helped push me along when any number of other factors conspired to distract me. My sincerest wish is that every graduate student could have a Jochen in their field. Many more dissertations would get done, and be done well.

There is no formal PhD in Geography at the CUNY Graduate Center,

although many geographers, like me, are housed in the Geography track of the Program in Earth & Environmental Sciences. However, self-identified geographers are also enrolled in other programs, with a significant core in Environmental Psychology. Further, the way our program is organized, most of us take classes, teach, and work at other CUNY colleges. My first home was Hunter College, where I first started in the Geographic Information Systems Certificate Program, then matriculated in the Master's program, before I was asked to apply to the PhD Program at the Graduate Center by then-Executive Officer Jeffrey Osleeb. The reason I am recounting this administrative and biographical trivia is as preface to saying that I owe thanks to more people than I can recount, including the faculty, staff, and students of multiple institutions and departments. Out of this vast pool, I would like to specifically thank Allan Frei, a climatologist in the Department of Geography at Hunter College, with whom I had a crucial conversation when I was deciding to apply to the doctoral program. A class that I took with him in statistical hydrology (a subject which I never envisioned taking a class in), remains the best introduction to academic project planning that I had during graduate school. I would also like to thank Yehuda Klein, Executive Officer of the Program in Earth & Environmental Sciences, who is tasked with overseeing and growing a program scattered across several departments and several

campuses, yet still finds time to sit and talk with students and attend to our needs. And finally I would like to thank all of the doctoral students at the CUNY Graduate Center, including the geographers within and without my own program, the Space-Time Research Collective, the Graduate Urban Research Network, and the Doctoral Students' Council.

I have had the good fortune to be employed for the last four years at CUNY's Center for Urban Research. Graduate students often have to resort to whatever employment they can find, and I have been unbelievably lucky to have had the chance to work at this center with people who are passionate about urban research and whose special expertise in US Census data, GIS, and statistics I have had many occasions to call upon. I would like to thank our Director, John Mollenkopf, my current supervisor Lesley Hirsch, my former supervisor Steve Romalewski, and my colleagues Joe Pereira and Peter Frase for their contributions to such a supportive work environment.

Most people who have survived graduate school know the importance of the support of family and friends. Surviving cancer at the same time makes that support even more crucial. I have a large extended family to thank, not all of whom I will name here, but I would especially like to acknowledge the support of those who fought and survived cancer before me: my cousin Mary Ellen Sicoli, my aunt and

godmother Rose Prendergast, and my mother Mary Hachadoorian. I must thank my dear friend Robert Clough, for just happening to be a data analyst at a major cancer center, and for providing emotional support at the same time that he was helping me understand in minute detail the nature of my disease and my treatment. Rob, if you ever need any life-or-death geographical analysis, I'm your man. For continual emotional and logistical support over several months I would like to thank Peter Hamlen and Rachel Schwartz, Stephen Bent and Margie McEwen, my father Gil Hachadoorian, and my brother Jay Hachadoorian. I also owe a tremendous debt to several people who travelled hundreds or thousands of miles to help me and my family during my convalescence and treatment, including my sister Neva Jones, my cousin Lisa Hachadoorian, Jack Friedman, Susan Wilson, and Brian Dietrick. Thank you again to my supervisor at Center for Urban Research, Lesley Hirsch, for her support and understanding, for allowing me the flexibility to work when I could, and sleep when I needed to, during my treatment and recovery. Above all I must thank the person who lived this with me day in and day out, my wife Kim Keirnan. You have shouldered an utterly unreasonable burden over the last several years. More than once during my illness I felt lucky, never more so than when I thought about having you by my side.

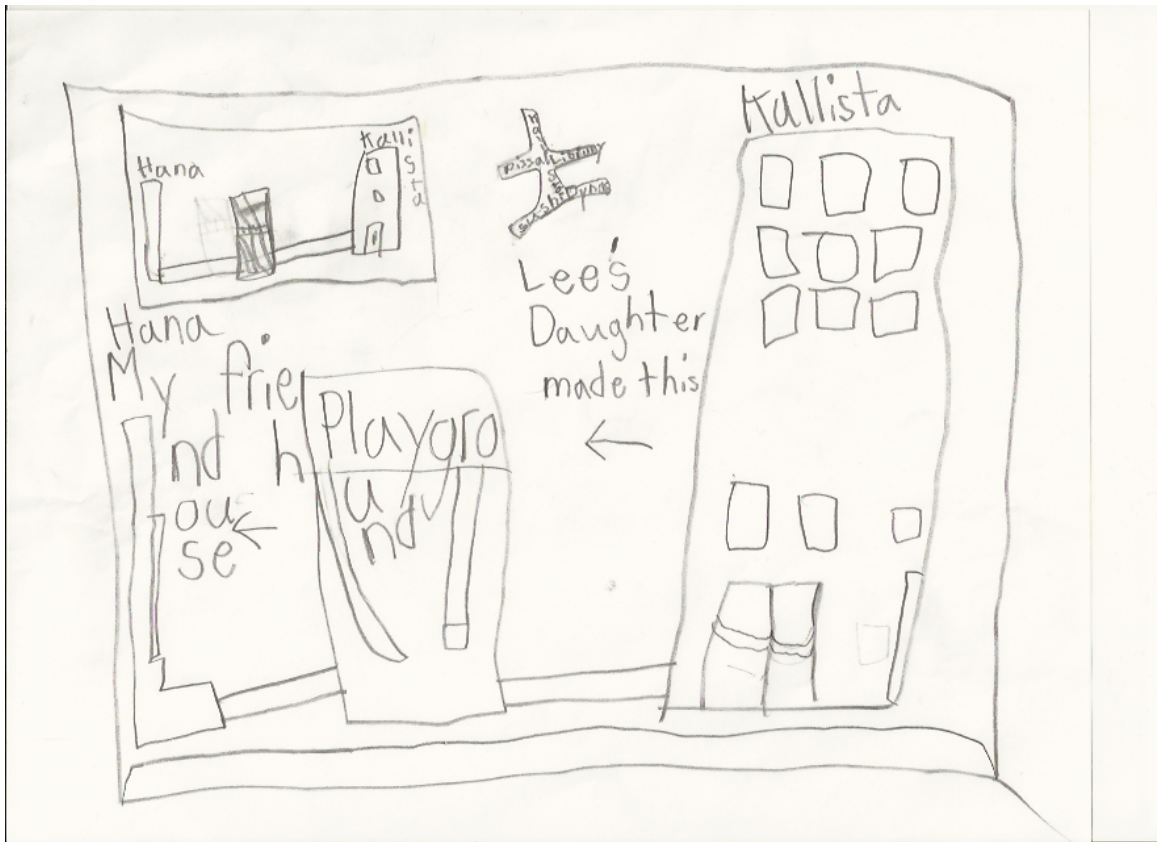
To Kim, and to a handful of others, I owe an additional, intellectual

debt. This debt goes beyond any specific subject matter, to the core of who I am as a person who values knowledge and inquiry. My relationships with these people have been so deep and so broad in their influence as to leave me unable to envision who I would even be in their absence. My mind, my beliefs, my worldview, have been shaped in conversation with Robert Clough, Jack Friedman, Brian Dietrick, Katherine Duffy Khanjar, and Kim Keirnan, as well as my high school philosophy teacher, Beverly Ali. I have not seen Beverly Ali in over two decades, and while my life remains graced by the others, I see them less often than I would wish. They have been heroic friends, who over the years have variously acted as teachers, gurus, therapists, intellectual sparring partners, martial arts sparring partners, and co-Principal Investigators into the Meaning of Life. I cannot imagine a world without them.

Finally, I would like to thank the FOSS (free and open source software) community. I began this project using typical proprietary tools for this kind of research. About 3½ years ago I began running open source software on a well-known proprietary operating system, software like the PostgreSQL database server, the PostGIS spatial database extension to PostgreSQL, and the Quantum GIS desktop geographic information system. About 2½ years ago I made the jump to Ubuntu (GNU/Linux) as my operating system. And last year I

switched to R for my statistical analysis, redoing the entire chapter 3 analysis. R has about 7 billion packages, but I would like to call out `sp` for spatial analysis and geovisualization, and the RKWard graphical user interface. I also used Mondrian for data visualization, and VirtualBox to run some software that only runs on proprietary operating systems, as well as to run Ubuntu on my computer at Center for Urban Research. This dissertation was composed in the mind mapping software FreeMind and exported for final formatting in OpenOffice.org Writer. While writing I listened to music on the Clementine music player. I would like to thank the developers of these packages and the many libraries, helper applications, and earlier incarnations that led to and support these packages. I would also like to thank the user communities, particularly the participants in the amazingly informative and supportive Ubuntu Forum and the mailing lists `pgsql-sql`, `R-help`, and `R-sig-geo`. The FOSS philosophy is, to my mind, a natural fit with academic inquiry, representing an effort by many participants with a commitment to producing and sharing knowledge for the common good. I hope to encourage more widespread use of open source software in academia, and hope that this dissertation will serve as an example of what is possible.

Dedicated to my first daughter, Kallista. May she find her calling earlier in life than I did.



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# **1 Introduction**

## **1.1 *The Public Goods Problem***

A central problem in the provision of public goods is accommodating taxpayers' varying levels of demand. For a private good like french fries or televisions, the consumption choices of one person are not constrained by the choices made by others. I may choose to eat more french fries than you, or fewer. But the person who wishes to consume more of a public good like parkland is constrained to consume whatever level is agreed to by the community. Public goods are in this sense jointly consumed. Public goods are also defined as nonexcludable, which means that it is difficult or impossible to control access to the good. The textbook example is a lighthouse, since the light of the lighthouse cannot be restricted to shine on only some ships (nonexcludability), and one ship using the lighthouse does not leave less light for other ships (joint consumption). Samuelson (1954) claimed that no decentralized market or voting system could determine the optimal level of a public good. Samuelson argued that, since voters can all enjoy the same uniform level of the public good no matter how much they have paid in taxes (by the definition of a public

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good), they have no incentive to reveal their preferences for the public good, information which is necessary to arrive at the optimal allocation decision.

One answer to this conundrum is the fiscal sorting model that begins with Charles Tiebout's "A Pure Theory of Local Expenditures", an influential 1956 paper that as of January 2011 had 2,454 citations in the Social Sciences Citation Index (Tiebout 1956). Developing his theory in response to Samuelson, Tiebout counters that for *local* public goods—i.e., public goods whose effects are confined to a small geographic area—the public goods consumer must reveal their preferences by actually *living in* the community that best matches their preferences. Since preferences are revealed in the residential location decision, the optimal level of public good provision can be determined. This outcome requires some assumptions, such as costless mobility, a large number of communities to select from, and full knowledge of taxes and services on the part of rational, utility-maximizing consumers. Considering its genesis as a counter to Samuelson's claim that no voting system could achieve the optimal result, Tiebout's fiscally induced mobility is often referred to as "voting with one's feet". The end result is homogeneous communities where all residents are getting exactly what they want, and public service

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provision will be efficient.

This conclusion might seem harmless if households of similar financial resources sorted into communities based on arbitrary differences in taste, such as wanting a community with more public museums versus wanting a community with more public parks. But the ability of the consumer household to realize its preferences is of course limited by income. Since microeconomic theory and common sense indicate that the wealthy will consume more than the poor, this consumer choice view of residential location implies that high-income and low-income households will stratify into high-consumption and low-consumption communities. High-income communities will purchase more or better public services (e.g., *more acres of parkland, better public education*) than lower-income communities, and this is backed up empirically (Inman 1979). If Tiebout is correct that this outcome is efficient, the model encourages complacency with regard to both income segregation and the public service differentials associated with this spatial inequality.

Despite an entry in the *Dictionary of Human Geography, 4th Ed.* (Johnston et al. 2000), and coverage in recent urban geography textbooks (Kaplan et al. 2004, Pacione 2005), Tiebout sorting has been little commented on by geographers (but see Harvey 1973, Clark 1981,

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Whiteman 1983, Johnston 1984). Searches of academic databases turn up articles in journals of economics, political science, and urban affairs. Several citations appear in articles in the journal *Political Geography* dealing with metropolitan fragmentation, but these citations appear *pro forma*.

This apparent indifference to a model which “stands dominant” in urban political economy (John, Dowding & Biggs 1995: 379) persists despite the relevance of the Tiebout model to areas of inquiry to which geographers *have* contributed. To take one example, the Tiebout literature has developed largely independently of the residential mobility literature (Kay, Marsh 2007). Geographers who have been asked to comment on preliminary research for this project have said that the reasons for household relocation documented in the residential mobility literature—life cycle (birth of children, marriage/divorce, retirement, etc.), class sorting, racial or ethnic clustering or avoidance (Rossi 1980)—must dominate fiscal sorting, if fiscal sorting is even happening at all. Conversely, the Tiebout literature has tended to take socioeconomic homogeneity as evidence for fiscal sorting without accounting for sorting due to life cycle, etc. While either position might happen to be more nearly correct, neither position is tenable absent dialogue between the residential mobility

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literature and the Tiebout literature. More generally, Tiebout's theory and the public choice model which underlies it must be taken seriously if we as geographers are to study urban spatial development, segregation, suburbanization and sprawl, urban inequality, environmental justice, and other processes which may be influenced by fiscal sorting. We must understand and quantify the relative significance of fiscal choice among other choice variables.

The Tiebout model generates claims regarding empirical validity, economic efficiency, and policy. Empirically, researchers have been interested in whether the assumptions of the model are met, and in particular whether evidence supports Tiebout's initial claim that households do in fact move in response to fiscal considerations. Regarding efficiency it is claimed that the sorting outcome cannot be improved upon. That is, the outcome is a Pareto optimum, a situation in which no household can be made better off without making another household worse off. Policy implications take the form of making sure that the assumptions of the model are met. In particular, the Tiebout model assumes the existence of a variety of communities for households to choose among, and Tiebout (1956) and later papers have therefore opposed metropolitan consolidation.

In subsequent chapters, this dissertation addresses the empirical

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validity of fiscal sorting as a factor in residential location, as well as the ethical implications of such sorting. First, I address the justice of a Tiebout landscape, with particular emphasis on urban-suburban inequality. In examining the geographic literature on social justice, I move from Rawls' influential theory of justice (Rawls 1971) to Harvey's early and underdeveloped "general characterization" of territorial social justice (Harvey 1973) to the recent flourishing of interest in "spatial justice" (Soja 2010). Two empirical chapters follow, addressing the question of whether households engage in fiscal sorting. I develop a new method of linking geographic homogeneity of household characteristics to the Tiebout mechanism. Comparing a fragmented suburban county and a unified central city county, I find empirical support for the claim that income and race influence the household's choice of local government, with income influencing choice of municipality and race influencing school district choice. Comparing suburban counties in different states, I then ask whether socioeconomic segregation is higher where different kinds of local governments are coterminous, e.g. where school districts borders are the same as the borders of general purpose municipalities. A concluding chapter ties together the empirical and ethical analyses with comments on educational finance and a discussion of the value of

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the Tiebout model.

### ***1.2 Empirical Investigation of the Tiebout Hypothesis***

As discussed earlier, Tiebout (1956) presents a “pure theory” that assumes certain behavior on the part of consumer-voters, but does not investigate whether these assumptions are met. Dowding and John (1994) survey over 200 studies that seek to empirically (dis)confirm the Tiebout hypothesis. They divide these studies into city-size interpretations, homogeneity interpretations, capitalization studies, studies of fiscally induced migration, and micro-level studies. City-size studies investigate the implications that smaller jurisdictions and more jurisdictions per capita in a metropolitan area are associated with (a) greater resident satisfaction with local government and local public services, (b) greater competition between jurisdictions, and (c) lower per capita expenditure—and therefore less waste—by local governments. The general conclusion of Dowding and John is that there is evidence for (a), no evidence for (b), and that it is wholly inappropriate to use expenditure as a proxy for efficiency as is done by previous investigations of (c). I leave off further discussion, as my empirical work will address household behavior rather than productive efficiency. As I will develop a new homogeneity test of the Tiebout model, I will discuss homogeneity interpretations last and in greater

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detail, while relying primarily on Dowding and John (1994) for discussion of the other categories of empirical study.

Capitalization studies look at the impact of taxes and public services on property values. In theory homebuyers should be less willing to pay for a house with a high tax burden (negative capitalization) while more willing to pay for a house with desired locational features including public services enjoyed by virtue of residence, such as education (positive capitalization). Using aggregate data Oates (1969) regresses median home values on communities' housing and neighborhood characteristics, effective property tax rates, and educational spending per pupil. Studies following this general approach are legion, though many use microdata (often real estate sales data) rather than aggregate data (such as median home value), and recent studies use microdata to focus on difference in home prices across jurisdictional boundaries (Black 1999, Bayer, Ferreira & McMillan 2007, Thorsnes, Reifel 2007). Oates (1969) is also influential in redirecting attention to the Tiebout model: following its publication, citations of Tiebout (1956) explode.

What exactly the finding of capitalization means in relation to the Tiebout hypothesis is unclear. While there is broad consensus within urban economics that tax differentials and service differentials within a

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metropolitan area are in fact capitalized into home prices, the Tiebout model seems to require tax capitalization and service capitalization to exactly offset each other. Since this implies collinearity in the variables measuring taxes and services, such capitalization would be statistically invisible (Ross, Yinger 1999). Thus, if capitalization is found, local taxes are not fulfilling the role intended by Tiebout as “prices ... of community services” (Tiebout 1956: 422), and the sorting cannot be efficient.

Studies of fiscally-induced migration generally use aggregate data to determine whether households with given characteristics are more or less likely to move to areas with a particular fiscal profile, for example, whether lower-income households are more likely to move to areas with particularly generous welfare benefits. These studies generally focus on interstate or intermetropolitan migration, and are therefore less relevant to the current investigation. Dowding and John stress that these aggregate level studies of fiscally-induced migration are at best corroborative of Tiebout sorting. They argue that confirming the existence of Tiebout sorting requires micro-level studies which use surveys to specifically query the reasons why households say they move. Households must be conscious of of fiscal (tax and service) differentials to take advantage of them (indeed, full

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knowledge is an assumption of the Tiebout model).

This full knowledge condition is what is under examination in micro-level studies. Dowding and John go so far as to claim that “[v]alidating the Tiebout model *requires* demonstrating a motivational link between tax-service packages and household movement [emphasis added],” further arguing that “[t]here has been very little empirical study of motivations of people in choosing a community” (Dowding, John 1994: §6), a situation which they intend to remedy with “a micro-level test of the behavioural assumptions of the Tiebout model” ( the subtitle of John, Dowding & Biggs 1995). Their claims seem to have sparked a battle over the epistemology of science underlying investigations of the Tiebout model (Kay, Marsh 2007, Newton 1997, Dowding, John 1997, Dowding 2008, Kay, Marsh 2008). Contrary to Kay and Marsh’s (2007) claim that the Tiebout literature has been insufficiently integrated with the residential mobility literature, John, et al. (John, Dowding & Biggs 1995) discuss push and pull factors and address family size, job location, and other factors in addition to taxes (*viz.* the poll tax in London boroughs) and services. They find that 43% of London movers consider services important as a pull factor. In contrast, the American Housing Survey 2007 reveals that, across the U.S., only 13% and 5% of households pick “Good schools” and “Other

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public services” as being *a reason at all* for their most recent move, and only 6% and 1% pick them as the *main reason*, in both cases lower than the categories “Other” and “Not reported”. At the very least, these housing and mobility surveys must engender some degree of skepticism towards the Tiebout model. A question of debate in the literature is whether *some* households choosing a community based on tax and service packages may be enough (and how many would be enough) to achieve the efficiency outcome that is the central claim of the Tiebout model.

Homogeneity studies test the Tiebout model by investigating the implication, already mentioned, that fiscal choice will lead to stratified communities. A typical research design is a cross-MSA study which tests the relationship between jurisdictional homogeneity and the number of local governments. The researchers begin by choosing the population characteristics of interest. Since higher-income jurisdictions spend more on public services (Inman 1979), household income is a frequently investigated characteristic. The researchers then develop a homogeneity measure and regress the measure on variables representing likely influences. These likely influences include the number and size of jurisdictions in the metropolitan area (Dowding, John 1994 and citations therein, Pack, Pack 1977, Eberts, Gronberg

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1981, Ottensmann 1982), as well as factors expected to interfere with the Tiebout mechanism, such as state aid to local governments (Stein 1987). If Tiebout sorting is taking place, greater jurisdictional choice is anticipated to lead to greater homogeneity in the investigated characteristics.

Dowding and John argue that these studies are broadly “consistent with Tiebout, but...not truly corroborative” (1994:774). In particular, they point out the problem of accounting for statistical sorting. Tiebout theory predicts that smaller jurisdictions will be more homogeneous than larger jurisdictions. But any randomly selected subpopulation is statistically likely to show lower variance over a given characteristic (i.e., be more homogeneous) than the population from which it is selected. Therefore, a homogeneity investigation must distinguish Tiebout sorting (the intentional grouping of households with similar characteristics) from this statistical artifact. Following Dowding and John, research design has moved away from the use of cross-MSA regressions, and instead tests for statistical significance of observed municipal homogeneity within single MSAs (Heikkila 1996, Bickers, Engstrom 2006).

I argue that homogeneity tests of the Tiebout model face an even more severe challenge due to the spatial dependence of

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sociodemographic data. The statistical sorting problem applies to independent samples. But if households locate near other households with similar characteristics, a subset selected within a contiguous geographic area will not be an independent sample, and will be even more homogeneous than a subset selected at random from across the MSA. This could lead to misattribution of the socioeconomic characteristics being sorted and/or the geography being sorted over. For example, households might sort by religion without regard to political boundaries, yet because of spatial dependence religious homogeneity would be found at the level of the political jurisdiction. Households might sort based on public services provided by one kind of government, such as school district, but homogeneity would also be found at the level of the municipality. While this is obvious for the case where school districts and municipalities are coextensive, it also applies when municipal and school district boundaries are not coextensive (provided municipalities are not too much larger than school districts). In short, existing approaches will tend to find sorting at whatever geographic unit is selected for study, with no necessary relationship to the Tiebout mechanism.

Nonetheless, I attempt to resurrect homogeneity investigations of Tiebout relying on aggregate data, primarily because the availability of

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aggregate data allows research to proceed at low cost, with ease of replication, and with ease of comparison across time and space. While micro-level studies may demonstrate the link between tax-service packages and household behavior, survey data is not always preferable to aggregate data when they are in conflict. For example, in studying aversion to majority Black neighborhoods, Harris (2001) avoids asking survey respondents their attitude toward racial integration in order to avoid “socially modified responses,” and instead uses neighborhood composition from the U.S. Census. Interestingly, I find this to be consistent with Tiebout’s original claim that household location in space reveals preference in a way that mere survey (i.e. voting) can obscure. I argue that homogeneity studies of the Tiebout hypothesis can be corroborative when the method excludes other explanations of observed sorting. Therefore, rather than use homogeneity within jurisdictions (as have previous investigations), I focus on heterogeneity across jurisdictional boundaries. This has some similarities with the border discontinuity design used in the capitalization literature. I argue that socioeconomic stratification across boundaries can be indicative of fiscal sorting *if the degree of stratification is greater than that between neighborhoods that do not straddle jurisdictional boundaries.*

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Thus, in Chapter 3 I present results of a study of jurisdictional homogeneity in New York State's Queens and Nassau counties, one county being part of a jurisdictionally unified central city, the other a jurisdictionally fragmented suburban county. I find strong empirical support for income stratification across suburban municipalities. Across suburban school districts I find ambiguous evidence regarding income stratification, but strong support for racial stratification. This result relies upon the fact that municipal and school district borders do not in general coincide with each other. In contrast, in New Jersey, school districts are by law coextensive with municipalities. In Chapter 4 I investigate heterogeneity across jurisdictional boundaries in a comparison of counties between New York State and New Jersey, focusing on the suburban counties of the New York-Northern New Jersey-Long Island CMSA. While it seems plausible to hypothesize that Northern New Jersey would exhibit stronger income and racial stratification as households jointly select a municipality and a school district of residence, the investigation does not support the hypothesis.

### ***1.3 Equity in a Tiebout World***

The empirical investigation of this dissertation will support the claim that households do sort into Tiebout-consistent landscapes. While supporters of metropolitan decentralization will take this as good news,

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John, et al., point out that the policy implications are ambiguous. Their conclusion is worth quoting at length:

Supporters of Tiebout, aware of its empirical corroboration, would thus recommend fragmented government to encourage Tiebout effects. Those who are more concerned with welfare or egalitarian objectives, believing in the efficacy of redistributive taxes, may take an opposed policy stance. To the extent that fragmented government leads households towards jurisdictions with the lowest tax burden, and this drives local governments to impose lower taxes in order to attract households, the result is cheaper and fewer services. This does not entail Pareto-efficiency, merely different levels and types of services, which confuses the ability of citizens to compare local governments and makes the idea of increasing choice problematic. Our results suggest the consequence would be fewer services since lower taxes rather than better services seem to motivate more movers. In the absence of full needs and resources central grant equalization, fiscal migration would lead to large inequalities between jurisdictions and impose heavy tax burdens on citizens who live in poorer areas. Thus, whilst our findings have important policy implications, *the lessons to be drawn will be normatively driven by prior political commitments*. Contrary to what most supporters and opponents of Tiebout seem to believe, the truth of the Tiebout model does not, on its own, offer lessons for the organization of local government. (John, Dowding & Biggs 1995:396-7, emphasis mine)

Their view is a necessary corrective, though it would be strange to suggest—and perhaps I read in too much to think they suggest—that one’s political commitments are not influenced by empirical analysis. But clearly they are right about the importance of the normative dimension. To this end, I devote a chapter to equity in a Tiebout world. This chapter assumes a particular outcome of the empirical

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investigation, specifically that household sorting is at least partially driven by fiscal choice, enough so that the sorting landscape that emerges is consistent with actual household preferences. Further, at this stage of the investigation, the efficiency claim that is central to the Tiebout model is not interrogated. Assuming, then, that Tiebout sorting is occurring and is efficient, I investigate the equity or justice of the sorting outcome in a geographical context. Tiebout (1956) addresses choice among small municipalities, a landscape typical of jurisdictionally fragmented American suburbs. But Tiebout choice can also be exercised over collections of socioeconomically similar localities, such as the choice between city and suburb. White flight or flight-from-blight can be seen as a special case of Tiebout choice (Mieszkowski, Mills 1993), and persistent inequality between cities and their suburbs make what might be referred to as the intrametropolitan scale important for an investigation of spatial equity. More recently it has been argued that “Tiebout-like exclusion” also can be found *wholly within* a single jurisdiction, such as the the unified jurisdiction of a central city (Lynch, Rasmussen 2004). The Tiebout model was also extended to encompass subnational migration (i.e., fiscal choice among states) by Tullock (1971). This so-called Tiebout-Tullock model has been investigated by Cebula (2009 and references cited therein).

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While households may very well take state-level taxes and services into account in the location decision, interstate moves involve changes in employment and social networks that go well beyond the spirit of the Tiebout model as originally proposed. While interesting, this represents a distinct set of research questions which I do not engage in this dissertation.

The substantive focus of the Tiebout model is the balance of taxes and services in local jurisdictions. I will argue, however, that this fiscal milieu is difficult in practice to separate from other aspects of the social and physical environment. Surveys such as the American Housing Survey and John, et al. (1995), indicate that people choose neighborhoods/jurisdictions for a variety of competing reasons. Given a household decision-making process which takes into account not only the Tiebout-type fiscal calculus but also various aspects of the natural, built, and social environment, the question with regard to equity is whether and how this household decision-process creates or reinforces inequality, and how these various dimensions of household choice create or reinforce inequality along other dimensions. In the chapter on equity in a Tiebout landscape, I will further develop the relationship among the various dimensions of the local environment that motivate household choice. It is to the possible frameworks for evaluating equity

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that I now turn.

Distributive justice was foregrounded by John Rawls' pathbreaking *A Theory of Justice* (1971), a work whose influence cannot be overstated. *A Theory of Justice* revitalized an Anglo-American philosophy which for much of the 20th century had concerned itself primarily with conceptual analysis of meaning and language, and had abdicated its historical role in ethical and political inquiry. Rawls concerned himself with the long-standing question within Western political philosophy of the tension between liberty and equality, while challenging a degraded form of utilitarian thought which had worked its way into policy analysis via economics (Nussbaum 2001).

While a fuller exposition of Rawls' theory will be presented later, perhaps the most widely cited element of his theory is what he calls the *difference principle*. This principle states that "[s]ocial and economic inequalities are to be arranged so that they are ... to the greatest benefit of the least advantaged" (Rawls 1971: 266). While arguing from a generally Kantian position emphasizing individual liberty, Rawls' difference principle allows for a significant degree of redistribution, which he believes to be compatible with either socialism or a welfarist market-economy.

Rawls' theory has been criticized on libertarian grounds (Nozick

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1974) and Marxian grounds (Miller 1975). It has been criticized for paying insufficient attention to identity-based political movements, and to the place of “difference” in culture and political decision-making (Young 1990). The geographer Gordon L. Clark has criticized the theory for the lack of social context in the original position (Clark 1986) and for its inherent individualism (1983, where he nonetheless attempts to develop a national policy for regional development that is consistent with the spirit of Rawls’ theory). Some of these challenges, such as the libertarian and Marxian, are radical, by which I mean that if they are successful, Rawls theory is left defeated. Other challenges have been answered by Rawls in later work. For example, Clark’s challenge to the theory’s lack of social context may be partially met by Rawls adjusting the theory to account for “reasonable pluralism” in *Political Liberalism* (Rawls 1993). And some approaches, such as incorporating the politics of difference, may be seen as complementary to Rawls’ (near exclusive) emphasis on distribution (Schlosberg 2007). My focus will be on spatial complications to the theory in the urban context.

The first attempt toward a spatially contextualized theory of justice based on Rawls’ theory was David Harvey’s *Social Justice and the City* (1973: Ch. 3). While the influence of *A Theory of Justice* extended far beyond philosophy, *Social Justice and the City* was perhaps as

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influential within the narrower confines of the related disciplines of geography, urban planning, and regional science. In it, we see Harvey moving beyond the classical location theory in which he was trained toward a wider engagement with the concerns of poverty, inequality, class, and political power. Harvey argues that in various ways, urban form is organized to redistribute income in anti-egalitarian ways. In moving beyond a bare concern with the spatiality of service provision that characterizes Davies' concept of territorial justice, Harvey makes use of Rawls' theory to propose an updated set of principles for a "territorial social justice" that is sensitive to the spatialized nature of production. Harvey proposes a spatialized difference principle: "The mechanisms (institutional, organizational, political and economic) should be such that the prospects of the least advantaged territory are as great as they possibly can be" (Harvey 1973: 116-117).

However, in considering central city/suburban inequality, Harvey is pessimistic about achieving territorial social justice under the capitalist mode of production. Consider the problem of central city disinvestment. Under capitalism it is rational for capital to flow to the territory with the highest rate of return. The return on investment of inner city housing is lower than it would need to be to attract capital from alternative investment in suburban housing. But liberal solutions

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to this problem which might focus on subsidizing (Harvey says “bribing”) financial institutions to invest in inner city housing will have the effect of raising what suburban developers are willing to bid for access to capital. Overall and in all territories the return to capital will increase, while the spatial outcome desired may very well be subverted. “Thus there appears to be a built-in tendency for the capitalist market system to counteract any attempt to divert the flow of funds away from the most profitable territories” (Harvey 1973: 113). These considerations and others lead Harvey to conclude that “the market mechanism is automatically antagonistic to any principle of social justice” (Harvey 1973: 116). While Rawls sees his analysis as consistent with either liberalism or socialism, Harvey believes that from Rawls’ original position “it is possible to arrive ... at a Marx or a Milton Friedman, but in no way can we arrive at the liberal or [market] socialist solutions” (Harvey 1973: 109).

Harvey’s earlier chapters on “Liberal Formulations” therefore give way to the later chapters on “Socialist Formulations”. Although Harvey claims that “the material content of Part I is not rejected but is incorporated and given new meaning by the evolving framework of Part 2” (Harvey 1973: 10), later writers have commented that what Harvey called a “general characterization” of territorial social justice

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was essentially dropped by him and the rest of the discipline: “[T]he subsequent development of human geography revealed little progress in this direction .... So, when Harvey (1996) returned to the subject at book length twenty-five years on [in *Justice, Nature and the Geography of Difference*], his central question of ‘the just production of just geographical differences’ was virtually the same as before” (Soja 2010, Smith 2000a: 137, see also Pirie 1983).

The idea of a specifically *spatial* justice has a checkered history. Pirie argues that Harvey’s territorial social justice and subsequent discussion of justice in geography “calls for no other justice judgements than those which can be made in terms of some concept of social justice” (Pirie 1983: 470). David M. Smith has perhaps done the most to establish connections between geography and ethics, and with liberal borrowing from political philosophy and other disciplines he situates his investigation of “the place of good fortune” in the tradition of Western philosophical interest in moral luck, and the idea that people should not be penalized (or rewarded) for arbitrary differences (2000a, Smith 1994, 2000b, 2000c). Most recently, urban geographer Ed Soja reviews the history of the spatial justice concept and its grounded application in Los Angeles in *Seeking Spatial Justice* (2010). Soja notes that until recently geographers have been reticent to even

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use the phrase *spatial justice*, and argues that geographers, concerned with a disciplinary history of environmental determinism, have been reticent to put forward an “assertive spatial perspective” which views space not as a mere container for social processes, but as dialectically influencing spatially situated social processes.

Spatial justice, as developed by Soja, is closely related to environmental justice. Environmental justice concerns how poor and minority communities are disproportionately impacted by such things as air pollution, toxic waste facilities, and other anthropogenic degradations of the environment. While environmental justice is sometimes defined so as to encompass the impacts of social environment (Greenberg, Schneider 1996 devotes a chapter to crime in Camden, NJ), in agreement with Soja I will treat environmental justice as a logical subset of spatial justice. The mechanisms through which certain inequities are perpetrated are similar, as disproportional impact is only possible if classes and/or races are spatially separated. For example, Hurley (1995) describes how, prior to the era of white flight, upper-class white executives, middle-class white managers, and black and ethnic white laborers in Gary, Indiana’s, dominant industry (steel) faced similar environmental conditions, even while living in quite distinct neighborhoods within Gary. But the socio-spatial process

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of suburbanization created a new landscape in which, for a time at least, middle- and upper-class whites removed themselves from the environmental degradation within the city limits. Pulido (2000) has argued that the suburbanization of middle-class whites underlies disproportionate exposure to environmental degradation in Los Angeles. I will argue that the same socio-spatial processes which lead to disproportionate exposure to industrial pollution or toxic waste in poor and minority communities also lead to disproportionate access to educational resources and other public services. Specifically, an historical legacy of housing discrimination has created a self-perpetuating system in which neighborhoods with poor schools and unhealthy environs repel middle-class households while at the same time severely constraining the life chances of the current residents.

In support of the idea of environmental justice as a component of a broader, spatial justice, note that the legal pursuit of environmental equity and educational equity share a similar jurisprudential history. Both the environmental justice movement and the educational equity movement have had to deal with the difficulty of proving *discriminatory intent*. Both have pursued theoretically easier-to-prove *disparate impact* claims, allowed by the implementing regulations of federal civil rights law (Title VI and occasionally Title VIII Fair Housing

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Act). Both have generally fought against state and local governments and regulatory agencies—in the educational equity cases because the governments are the producers of education, while in environmental justice cases because the governments are being accused of granting permits or enacting policies that benefit private producers, e.g. a company seeking a permit for a waste facility. Both environmental and educational equity claims have had to deal with a jurisprudential shift making it increasingly difficult to pursue civil rights claims, and in particular with the elimination of a private right to sue over alleged Title VI violations (*Alexander v. Sandoval*, 532 U.S. 275 (2001)).

Soja further compares the relative privileging of time over space, of history over geography, and argues that social processes must be understood from a perspective that is simultaneously historical and geographical. Similarly, I will argue that Rawls' theory, which addresses distribution across time (generations of persons), must also address distribution across space: both of natural resource endowments, as discussed by Smith and by some political philosophers (Smith 2000c, Pogge 2002), as well as of the concentrations of economic activity (agglomerations) that define cities themselves. I therefore propose a modification of Rawls' principles of justice, examine the relationship between Rawls' theory and federalism, and

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argue for the compatibility of a suitably constrained Tiebout model with a spatialized Rawlsian justice.

### **1.4 Constructing a Just Tiebout Landscape**

Empirical and normative investigation must support each other. The Tiebout model is a “pure theory” which, like the neoclassical market model it is derived from, relies upon an implicit empirical claim about human behavior and an implicit normative claim about the value of Pareto efficiency. If empirically we fail to find that households make Tiebout-consistent location decisions, the efficiency claims of the model are vitiated. Similarly, if we conclude that Pareto efficiency is normatively subordinate to equity claims, the empirical findings cannot *justify* the Tiebout model—they can only serve as evidence in our policy-making. And, just as a study of the sociology of crime would be used to try to reduce rather than to justify crime, the finding of fiscal sorting by households might be used as evidence in crafting a policy to *interfere with* fiscal choice, if that is what our normative convictions demand.

The final question then is what kinds of goods should be distributed via the Tiebout mechanism? Consider educational finance, which has been important to the Tiebout literature because it comprises the largest part of American local government expenditure. Numerous

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studies document the impact of school test scores on housing prices, indicating that households value and are willing to pay for better school performance (Black 1999, Bayer, Ferreira & McMillan 2007, Bogart, Cromwell 1997, Barrow 2002). Tiebout choice may be promoted as a mechanism for school choice—a commonly suggested strategy for improving schools (Hoxby 2000). Against this stand studies indicating that parents have little knowledge of actual school performance (Buckley, Schneider 2006), and that parents place greater emphasis on peer group (especially race) than on school performance in their actual residential choices (Rothstein 2004, Hamilton, Guin 2005).

This is a complex literature which I will not engage experimentally. Rather, I will argue that the Tiebout model can at best provide a *post hoc* justification for a system which was not actually designed as a system of school choice. Of major concern is the relationship between small, independent school districts and segregation. Metropolitan fragmentation increases racial segregation (Woo 2004, Dawkins 2005), which has been shown to have deleterious effects on academic performance among minority students (Mickelson 2003). My empirical finding of greater racial sorting across school districts than across other types of local governments, and the mutually reinforcing nature

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of school segregation and housing segregation (Orfield 1996, Orfield 1997), strongly suggest that relying on the housing market to implement school choice would engender even greater segregation. Yet while the harms in terms of increased segregation are clear, empirical support for the alleged productivity of smaller school districts has been ambiguous (contrast Hoxby 2000, Rothstein 2004). Finally, based on my justice analysis, I argue that education is a primary good of such importance to well-being and to democracy that tax base inequalities make a pure system of local finance unjust. If local control is valued, the actual funding must be supplemented, perhaps even supplanted, with intergovernmental transfers or a system of central financing. One might ask, if school choice can improve school productivity and student outcomes via market competition, whether it should be implemented directly rather than hitched to the housing market. After all, Tiebout's original conclusion that allocation of public goods via local governments "need not take a back seat to [the efficiency of] the private sector" (Tiebout 1956: 424) is a far cry from arguing that public goods *ought to be allocated via local governments* or *ought to be allocated based on residential location* when other alternatives exist.

In concluding, I defend a circumscribed view of localism that is

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motivated more by the political benefits of citizen participation than the efficiency effects of the Tiebout model. A certain class of public services is ideally, perhaps even necessarily, allocated via the Tiebout mechanism. Tiebout's original paper discussed a fixed public resource—the example given was the fixed length of a beach. Access to a beach *must* be rationed, while access to education need not be. Given the efficiency characteristics of the Tiebout model, residential choice remains a reasonable way to distribute access to fixed resources, and in analyzing income sorting in Nassau County (Chapter 3) I will suggest that households are making decisions based on a crucial suburban amenity, *viz.* low housing density. Other spatially fixed amenities which might be allocated via the Tiebout mechanism include natural amenities and quasi-permanent capital infrastructure such as roads and sewerage. But these efficiency characteristics cannot suffice to recommend the distribution of other public services, such as education, via residential location. That decision must be made on another basis, and if local provision is retained, compensatory funding is necessary to assure just outcomes.

What is most interesting is how, while the Tiebout model has all but been used as an apologia for exclusionary zoning and school segregation, there is so little diversity in residential living. While the

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household may choose between urban multi-family apartment buildings, inner-suburban attached housing, and outer-suburban detached single-family homes, there are many fewer places to go for households interested in ecovillages, clustered or car-free suburban housing, limited equity cooperative housing, or mixed-age housing that incorporates desired care services such as childcare and eldercare. A reconstituted Tiebout model should focus on what can effectively and ethically be distributed via housing choice—natural amenities and parks, infrastructure, density, and design and planning—and on encouraging for housing the experimentation that markets are praised for providing.

## **2 Justice in Space, Spatial Justice, and the Structure of Metropolitan Governance**

### ***2.1 Introduction***

An important criticism of urban fragmentation, and the Tiebout model which justifies it, is that it is implicated in the middle-class abandonment of central cities that has left these cities as containers of concentrated poverty. In 1999, the median household income of all central places in the United States was \$40,000 and the percent of the population living in poverty was 16%, while the median household income in the suburbs (the urbanized area not in central places) was \$51,000 and the percent living in poverty was 8%. For New York City, median household income was \$38,000 and the percent of the population living in poverty was 21%, while the median income in the metropolitan area's suburbs was \$66,000 and the percent living in poverty was only 6%. (Figures from Census 2000 "Table GCT-P14. Income and Poverty in 1999". Median income rounded to nearest thousand, percent in poverty rounded to nearest whole number.) There is some disagreement about whether this poor-city/rich-suburbs landscape has been produced by a process of "natural evolution"

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driven by decreasing transportation costs and the demand for new housing, particularly single-family detached housing, or whether it is a “white flight” response to changing urban racial composition or deteriorating public services (Mieszkowski, Mills 1993).

A significant body of literature investigates whether white flight is motivated primarily by race (particularly white avoidance of blacks) or by central city environmental and fiscal characteristics. While early work tended to come down on one side or the other, later work was more nuanced, teasing out the effects while admitting that both were operative (Krysan 2002). Often the phrase “flight from blight” is used (instead of white flight) when focusing on this aspect of central city amenities and fiscal health: as higher-income, white households move to the suburbs, the deteriorating tax base forces the central city to cut back on public services like police and education, leading to a vicious circle of flight and deteriorating services. This kind of fiscally motivated suburbanization is itself a form of Tiebout choice (Mieszkowski, Mills 1993). Even though a great deal of inequality exists *within* suburban areas and *within* central cities, the legal separation between cities and suburbs and the persistence of city-suburb inequality make this divide especially important in any examination of metropolitan inequality. (It is this internal suburban inequality which will be crucial to the

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empirical analyses of Chapters 3 and 4.)

I begin with a discussion of John Rawls' influential theory of "justice as fairness" (Rawls 1971), followed by a discussion of how urban space complicates this theory, and Harvey's attempt to create principles of territorial social justice (Harvey 1973). I then argue for a restatement of Rawls' two principles of justice which takes into account the impact of space on distribution. Finally, I return to the Tiebout model and the choice of residential location to argue for a basic structure that achieves spatial justice while preserving household choice.

### **2.2 *Distributive Justice***

The most significant modern statement of a theory of justice is the work of political philosopher John Rawls (1971). Rawls' method is to determine what principles would be endorsed by rational, self-interested parties who are negotiating the "basic structure" of their society from behind a "veil of ignorance". The basic structure refers not only to the governance structure—the constitution and laws of a nation-state—but also to the economic structure and social institutions, such as family structure. Behind the veil of ignorance, the negotiating parties do not know whether they will have any special talents, will be male or female, rich or poor, or what religion or ethnic group they might belong to. Not knowing this information, Rawls argues that the

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people in the original position will want to make sure that the worst-off roles are as well-off as they can possibly be. This leads him to adopt two principles of justice.

[First Principle:] Each person is to have an equal right to the most extensive total system of equal basic liberties compatible with a similar system of liberty for all.

[Second Principle:] Social and economic inequalities are to be arranged so that they are both: (a) to the greatest benefit of the least advantaged, consistent with the just savings principle, and (b) attached to offices and positions open to all under conditions of fair equality of opportunity (Rawls 1971: 266).

These principles are ranked, so that the first principle trumps the second principle. Thus, “the basic liberties can be restricted only for the sake of liberty,” not for the sake of ameliorating social and economic inequalities. Furthermore, within the second principle, (b) “fair equality of opportunity” takes precedence over (a) the “difference principle”. These principles are those Rawls believes rational self-interested actors will settle on behind the veil of ignorance; they are to guide the adoption of institutions, as well as specific policies, and they are to benefit classes of people, rather than specific individuals. The first principle will guide the design of political institutions (a political constitution), while the second principle will guide the design of social and economic institutions (Wenar 2008).

The adoption and application of the principles can be seen as

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working in stages, with the veil of ignorance “thinning” in later stages. The two principles are adopted in the first stage behind a “thick” veil of ignorance. In the second stage, “representatives” create the political constitution subject to the first principle and with knowledge of general facts about the society, including level of economic development, natural resources and environmental conditions, political culture, etc., but still with no knowledge of their own class or individual endowments. At the third, “legislative” stage, the actors must choose specific social and economic policies. These choices are guided by the second principle (i.e., the principle that incorporates both the difference principle and fair equality of opportunity) in light of all economic and social facts. It is only in the fourth stage, that of the actual administration of law, that full knowledge of all facts, including one’s own personal identity and standing, is allowed (Rawls 1971: §31).

Both principles of justice take precedence over efficiency. An institution which promotes efficiency would not be chosen in the original position if it violates either principle of justice. Rawls here takes efficiency in the economists’ sense of Pareto efficiency, which indicates a distribution where no one can be made better off without making someone else worse off. Rawls uses as an example the organization of labor. An economy may be feudal (that is, based on

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serfdom) or it may be premised upon free labor. To change from one to the other would involve taking rights away from one class and granting rights to another class. Therefore both institutions are efficient in the sense that neither can be altered without reducing the prospects of some person. But they are not equivalently just. Therefore, another principle is needed to choose between them.

Rawls is most concerned to justify his theory in contrast to utilitarianism, and in particular to justify the difference principle in contrast to the principle of average utility. If one were to adopt the principle of average utility, one would be willing to risk a reduction in one's utility in favor of the likelihood of a greater increase. That is, one accepts a decreased lower bound to one's possible income or status or well-being, however so measured, in exchange for a higher average. An extreme result of adopting this principle is that the institution of slavery would be allowed, if one could demonstrate that allowing slavery raised the average utility in the society. Those who have adopted the two principles would reject slavery because of the violation of both principles. The violation of the first principle of equal basic liberties is obvious, but moreover, Rawls argues that people in the original position would adopt the second principle over the principle of average utility, because they would reject any principle

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which traded off a risk of a worse lot (slavery) in favor of an average improvement. Rawls concedes that it is possible to modify the principle of average utility (in the first stage of deliberation) to guarantee that slavery is rejected (in the second stage of deliberation) by assuming a high degree of risk aversion on the part of those in the original position, but he argues that this result is more complicated to arrive at and would therefore not be preferred to the more parsimonious difference principle.

Importantly, the difference principle does allow some degree of inequality, perhaps even a large degree of inequality, if the proposed basic structure improves the lot of the least well-off class. What this means is that if a proposed basic structure would increase aggregate welfare at the expense of an increase in economic or social inequality, that basic structure could nonetheless be adopted if the lot of the worst-off were improved. For example, suppose that investing extra resources in the education of “the best and the brightest” leads to an overall improvement in the standard of living, say because of an increase in the rate of innovation. Such disproportionate investment will improve the lot of those toward whom the resources are directed, possibly increasing inequality. Should a policy such as establishing “gifted and talented” programs be adopted? According to the

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difference principle, the increased inequality in and of itself is not disqualifying. But the improved standard of living, if taken as an average, is immaterial. What matters is the impact on the worst off. If disproportionate investment in establishing gifted and talented programs comes at the expense of struggling students, leading to worse life prospects for these students, this policy would not be adopted. But if the benefits to society were so great that the least advantaged students realized an improved standard of living, then the policy would be allowable, even if there were an increase in inequality. The important conclusion is that social and economic structures are to be arranged so as to maximize the expectations of the least well-off class.

### **2.3 Spatial Complications**

Rawls does not address the spatial dimension of inequality and the issue of mobility. Rawls framework assumes that the question of distributive justice is one that is approached by a people with a shared political and ethical history, and is therefore relevant to the issue of inequality at a national scale rather than a global or subnational scale. Rawls initially sidesteps the issue of global distribution by assuming a closed society: people enter and exit the society only by birth or death. It has been proposed to extend the difference principle as a principle

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for rectifying global inequalities (Pogge 2002, Pogge 2005, Beitz 2005) —a move, incidentally, resisted by Rawls (Rawls 1999). Such an extension of the theory would create significant duties on the part of the wealthy industrialized countries of the world to aid the less developed countries. But whichever way the argument about global redistribution should come down, the issue of distributive justice at the subnational level is quite distinct.

Within geography, the focus on internal distribution precedes Rawls. The territorial justice framework developed by Bleddyn Davies is perhaps the earliest attempt to examine questions of inequality among administrative jurisdictions (1968). Territorial justice aims at providing services commensurate with need within each administrative unit. As such, it is primarily a tool for determining appropriate service-provision when the funding authority is centralized. It has therefore had great importance within British geography and related disciplines, since British local authorities receive their funding from the central government (Kay 2005). Without modification, this type of analysis has little relationship to the kind of independent local jurisdictions that are characteristic of American metropolitan areas, and that the Tiebout model envisages.

Spatial inequality in the urban system was examined in David

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Harvey's watershed *Social Justice and the City*. Harvey argues that urban form is organized to redistribute income in anti-egalitarian ways. For example, political processes will tend to reward the well-organized and well-financed, and usually will reward smaller groups at the expense of the majority. Poorer city dwellers will lose out due to job growth taking place primarily in the higher-cost-of-living and transportation inaccessible suburbs (i.e., the so-called spatial mismatch problem (Kain 1968, Kain 2004, Ihlanfeldt, Sjoquist 1998)). Differing social and cultural values make it difficult to measure preferences and needs among different populations, as well as making it technically impossible for Pareto optimal outcomes to emerge. The unavoidably location-specific nature of both natural and produced amenities make it possible for the wealthy as first movers in a bidding process to claim the best locations, while leaving the poor to the least desirable locations. Furthermore, if not enough housing is available for a given population, the poor may bid very high amounts for the lowest quality neighborhoods just to avoid losing the game of housing musical chairs (Harvey 1973).

Harvey goes on to consider the spatial problems of social justice. Most of his analysis is concerned with interregional equity. Interregional inequality is problematized by the production process in

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space. Due to agglomeration economies, output may increase if an industry is allowed to concentrate in a particular region rather than split across regions. But if national policy were to lock in the first mover advantage of a specific region, how and to what extent are other specific regions to be aided in economic development? Harvey agrees that efficiency is not to be ignored in the analysis, but too often the focus on efficiency amounts to a tacit endorsement of the *status quo*. Harvey, echoing Rawls, proposes two principles of territorial social justice (broadening from Davies' "territorial justice" (1968)):

- The distribution of income should be such that (a) the needs of the population within each territory are met, (b) resources are so allocated to maximize interterritorial multiplier effects, and (c) extra resources are allocated to help overcome special difficulties stemming from the physical and social environment.
- The mechanisms (institutional, organizational, political and economic) should be such that the prospects of the least advantaged territory are as great as they possibly can be. (Harvey 1973: 116-117)

This focus on interregional equity is pursued by Gordon L. Clark (1983). Rawls' prioritization of justice over efficiency is further defended by Clark's questioning of the very idea of a tradeoff between equity and efficiency. Clark specifically investigates the tradeoff between national efficiency and regional equity. If efficiency is defined

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as attaining maximum aggregate wealth for a given set of resources, technology, and income distribution, then targeting efficiency at a national level could mean ignoring interregional equity. But Clark questions why national wealth is to be valued at all. Against the claim that national wealth is valuable because of the benefits to regions or individuals, Clark counters that clearly not all regions or individuals benefit from an increase in national wealth. Thus, some concept of social justice is necessary to evaluate the outcomes for regions or individuals, and efficiency must be treated as a *means* to achieve the normative goals decided upon. Maximizing national or aggregate wealth can be justified by an appeal to utilitarianism, but this is exactly the view which Rawls seeks to supplant. Clark goes on to develop guidelines for a national urban policy sensitive to Rawls' difference principle, though he is also critical of the inherent individualism of Rawls' approach.

Returning to Harvey's principles of territorial social justice, the question is how these principles might apply to *urban* (rather than interregional) inequality. As discussed in the first chapter, it is consideration of the urban system which leads Harvey to conclude that "the market mechanism is automatically antagonistic to any principle of social justice" (Harvey 1973: 116). Harvey's "Liberal Formulations"

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give way to “Socialist Formulations”, and the socialist chapters of Part 2 of *Social Justice and the City* leave many of the specific questions of the liberal chapters behind. Incomplete analyses and tentative endorsements of Tiebout and Rawls from Part 1 are not reappraised, but the reader is left seeing them as inconsistent with Harvey’s later analysis. Are they still useful theories, to be rejuvenated with appropriate modifications for place, space, and scale? Can some version of them be adjusted to fit within a socialist analysis based on concepts of surplus value, alienation, or class-monopoly rent? Their ambiguous status is unfortunate, as the shift in Harvey’s analytical frame coincides with, and heavily influences, a broader shift within economic geography towards political economy approaches. The result is that the ethical and political questions raised in Harvey’s liberal chapters are left behind (while ethics and politics are engaged differently within the new frame of Marxist political economy), and not just by Harvey but by most geographers; while the empirical questions have continued to be pursued in ignorance of Harvey’s challenge to the “artificial separation of methodology from philosophy” (Harvey 1973: 11).

Harvey’s principles of territorial social justice (above) formed a starting point for further inquiry. “However, the subsequent

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development of human geography revealed little progress in this direction .... So, when Harvey (1996) returned to the subject at book length twenty-five years on [in *Justice, Nature and the Geography of Difference*], his central question of ‘the just production of just geographical differences’ was virtually the same as before” (Smith 2000a: 137). David M. Smith has attempted to develop this thread within geography, with liberal borrowing from political philosophy and other disciplines (2000a, Smith 1994, 2000b). He situates his investigation of “the place of good fortune” in the tradition of Western philosophical interest in moral luck, and the idea that people should not be penalized (or rewarded) for arbitrary differences.

Rawls argues that the distribution of social primary goods such as income, wealth, and political rights may not depend on arbitrary characteristics of individuals, such as race or age. He was criticized for not extending this to (arguably) equally arbitrary characteristics such as health and intelligence. Smith extends this argument from arbitrariness to the luck of being born and/or educated in one place or the other. Great differences in life chances attend to someone’s birth within one country or another, and even “within nation states, the quality of such services as health care and education may be so variable as to depend on what in Britain is referred to as a ‘post-code

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lottery’” (Smith 2000a: 141-142). Smith argues for the general principle of “the more equal the better,” softened by the caveat that “the objective of reducing inequality, of moving towards equality, need not require a commitment to the achievement of perfect equality, soon or ever. Perfect equality may be held out as an ideal ..., but in the real world of moderate scarcity, selfishness and actual inequality it is practically impossible, and not necessarily right” (Smith 1994: 118).

While Smith and others focus on health care and education as being important in virtue of the fact that access to these goods is a major component of equality of opportunity, we can go further in observing the important neighborhood effects associated with production of healthy and educated individuals. For education, a long literature supports the idea that educational outcomes are strongly influenced by peer group composition. While Rawls envisages monetary redistribution among individuals, and Harvey and Smith lead us toward the idea of monetary redistribution among regions, this proposed redistribution can be significantly undermined by neighborhood effects. Duncombe and Yinger (1997) estimate that large city school districts in New York State would have to spend twice as much per pupil to achieve equivalent outcomes. Betts and Roemer estimate that equalizing opportunity between black and white males would require

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spending nine times as much on the black students per capita (Betts, Roemer 2007). While racism doubtless plays a role in the different outcomes (Betts and Roemer use earning potential as the measure of outcome) of blacks and whites, racial differences in access to education manifest spatially. A large part of this difference may be due to the layering of neighborhood effects on top of racial segregation and class/income/education segregation.

### **2.4 *Spatialized Justice as Fairness***

Rawlsian liberalism has not engaged urban inequality, or spatial inequality generally, and would need to be modified in order to do so. I have already discussed Harvey's principles of territorial social justice, as well as the lack of subsequent development, by him or other geographers, following his conclusion that "programmes which seek to alter distribution without altering the capitalist market structure within which income and wealth are generated and distributed, are doomed to failure" (p. 110). But Harvey, already moving beyond liberal formulations, thought that the principles of territorial social justice could be used to guide a decentralized planning (i.e., nonmarket) process. It is with this in mind that I attempt to describe a basic structure that is consistent with territorial social justice, but, as with Rawls, I try to develop principles that are neutral with regard to

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capitalist or socialist economic organization.

There are several reasons for following this approach, not least of which is my disagreement with fundamental aspects of the Marxian program, including its millenarianism and its theory of surplus value. A full discussion is beyond the scope of this work. But a full discussion is also not necessary, as others have argued the compatibility of liberal or even specifically Rawlsian approaches to Marxian political economy. Katznelson argues that the Marxist critique of liberal rights was so thoroughgoing as to leave Marxist political economy with no tools for creating an arena for the representation of competing interests, in effect relinquishing such questions to liberal theory. “[L]iberal theory as it has developed [since Rawls] deserves our close attention because it currently constitutes the only serious site for deliberation about the principles and convictions that might help craft desirable political regimes...” (Katznelson 1997: 48). Further, there has been at least one serious attempt to extend Rawls’ theory in a Marxist direction, primarily through the addition of a principle of meeting basic needs, with priority over (modified versions of) Rawls’ two principles (Smith 1994 discusses at length, Peffer 1990). Thus, while my own convictions are more compatible with liberalism, I believe the result of my investigation will be valuable to both liberal and radical geographers.

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As already noted, Rawls proposes a four-stage sequence for arriving at justice. The spatial organization of urban systems interferes with achieving justice, primarily through the mutually reinforcing racial and socioeconomic segregation of both housing and education. An immediate question is at what stage of the four-stage sequence should spatial factors be taken into account? The answer is that we must *consider* spatial factors at each stage in order to develop a basic structure that is just, although we might conclude that space is not relevant in each of the four stages.

Harvey's two principles clearly echo Rawls' two principles, and we therefore might be tempted to treat them as the results of first-stage deliberation. But they mix ideas relevant to more than one stage in the sequence. Each part of Harvey's principles has an analogue in Rawls' theory. Principle 1(a) concerns territorial need, and is equivalent to Rawls' discussion of the "social minimum", a minimum income guaranteed to all persons based on need (Rawls 1971: 244). Principle 1(b) aims to maximize interterritorial multiplier effects, and is equivalent to the goal of maximizing welfare, which is not a principle of justice in Rawls' scheme (Rawls 1971: 266). Principle 1(c) allocates extra resources to "help overcome special difficulties stemming from the physical and social environment", and can be related to what

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Rawls calls “the principle of redress” (Rawls 1971: 86). Finally, principle 2 is a direct application of the difference principle to territories rather than social positions.

Of these, meeting territorial need and maximizing interterritorial multipliers are legislative (third) stage tasks. Further, welfare maximizing, as would be the point of maximizing interterritorial multipliers, must be subordinate to the demands of justice by reference to Rawls’ second priority rule (1971: 266). Principle 1(c) aims to redress environmental inequalities, and we can compare it to Rawls’ discussion of the redress of inequalities in natural advantages of persons. He argues that the principle of redress is a *prima facie* principle insufficient to serve as “the single aim of a social order”, and that the difference principle achieves some of the intent principle of redress. Again, consider education and the question of whether to concentrate educational spending on a particular group of students. According to the principle of redress, additional funding should be directed to the education of the least advantaged students. The intent of the principle would seem to be to improve the life chances of the least advantaged. The difference principle achieves this without insisting upon compensatory funding as the particular mechanism. It would allow (indeed require) us to direct greater funding toward the

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more talented students *if* (as was previously hypothesized) such a policy would improve the well-being of the less talented students (Rawls 1971: 86–87). The three components of principle 1 are not the equivalent of a first-stage principle of justice, and principle 2 appears to be nothing more than a restatement of the difference principle in an explicitly territorial manner. Hence Pirie’s conclusion that this and subsequent discussion of *spatial* justice “calls for no other justice judgements than those which can be made in terms of some concept of *social* justice [emphasis mine]” (Pirie 1983: 470). I will argue that in addition to considering how space affects the basic structure at the later constitutional, legislative, and administrative stages, a true spatial justice requires the modification of the first stage principles of justice, and in at least one specific way, namely in accounting for access to immobile resources.

At the first stage, behind the “thick” veil of ignorance, the parties nonetheless have knowledge of general facts about human society, including political and economic theory. They do not know particularities about their society, such as the level of civilization—a restriction which implies that, in spite of the similarities in terms of the emphasis on contract, this is not the same as a theory based upon the concept of a state of nature. The parties do not know which generation

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they belong to. Generation and level of civilization would seem to be linked, so knowing one implies knowing the other. But Rawls introduces the concept of generation in order to address justice between generations, particularly with regard the conservation of natural resources and the savings rate (Rawls 1971: §24). Rawls' discussion points to the obvious fact that the parties in the original position have a concept of time—perhaps already implicit within the idea that they know political and economic theory, but made clear by the examples of conservation and savings. I contend that space, like time, must be among the “general facts [which] affect the choice of the principles of justice”—in fact, time and space are supremely important. Space and time are the substrate for all social science, in fact all human knowledge and experience.

With this knowledge of space comes a particular fact and a particular class of theories which are sufficiently important as to affect the choice of principles. The fact is that natural resources are heterogeneously distributed. Here I include not only resources such as forests and fossil fuels, but also any variation in physical geography that might affect distribution, such as fertile soil or deep draft ports. In addition to this fact, various theories of location demonstrate that, even given a counterfactual homogeneous physical geography,

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concentrations of population and industry will emerge through the operation of market forces. These concentrations include concentric zones of agricultural use around the urban core (Thünen 1966 [1826]), concentric zones of other economic activities as established in the urban economics literature (Alonso 1964, Muth 1969, Mills, *Resources for the Future* 1972), systems of small and large cities as in the central place theory of Christaller and Lösch, and industrial agglomerations which create external economies of scale. All of these concentrations will have distributive impacts.

How might the fact of variation in natural resources and other aspects of physical geography modify the principles of justice and the basic structure? While Harvey discusses “special difficulties stemming from the physical ... environment,” special difficulties, like scarcity itself, are socially created. They are only those difficulties special to a particular region *in relation to other regions*. (This is of course merely an elaboration of Harvey’s meaning.) In terms of modifying the principles of justice, the idea of aiding regions that are specially disadvantaged can be better conceptualized as *equalizing* in relation to access to all natural resources and favorable or unfavorable characteristics of the physical environment. How the society chooses to do so is of course decided at a later stage of the sequence of

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creating the basic structure, and Rawls wants his principles to be compatible with both democratic socialism and democratic capitalism. A socialist state might go so far as to decree that natural resources and land be owned by the state (all land, or perhaps merely land which offers unique advantages, such as port access). Under capitalism, where there might be a preference for retaining private ownership of land and natural resources, the state must nonetheless have a process in place for ensuring equal access, equal opportunity of access, and/or compensation for exclusive use.

Elided in the quotation from Harvey in the last paragraph is a reference to the social, as well as the physical environment. Again, we observe that special difficulties of the social environment are (*a fortiori*) socially created, and that the issue again is equalizing between those regions and areas which are specially (dis)advantaged economically and socially. This connects neatly with the second way in which space must affect the choice of principles of justice, which is the uneven distribution of economic activity accounted for by theories of location. Although these theories are based on analysis of market forces, the spatial distributions that they predict must nonetheless be either adopted or rejected in a planned economy, and a planned economy might well organize production so as to mimic certain

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aspects of these arrangements, as we see with Harvey's principle that economic activity should be organized so as to take advantage of interregional multipliers. Under capitalism, capital may move to seek the highest return, but under either a planned economy or market socialism, capital must still be committed to specific locations, possibly for very long periods of time. Planners would want to make such decisions in a way that maximizes welfare, constrained by whatever principles they choose to guide them, which is consistent with Rawls' point that welfare and efficiency are still valued, but justice is given priority. The point may be driven home by noting the difference between Christaller's and Lösch's approach to central place theory. While both relied upon a theory of supply-and-demand-based market behavior, Lösch's version of central place theory was unabashedly normative.<sup>1</sup> The point of all this is that some degree of variation of economic activity, at the scale of the city, systems of cities, the nation, and the world, will emerge or be intentionally created under any mode of production, and the principles of justice need to take this into account. Leaving aside how a market socialism might decide on where to invest capital, it is clear that even under democratic capitalism the

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1 The colophon from the concluding chapter of Smith's *Geography and Social Justice* compares Lösch's remark that "The real duty...is not to explain our sorry reality, but to improve it" to a similar point made by the well-known moral philosopher Bernard Williams: "The point of morality is not to mirror the world, but to change it." (Smith 1994: 279)

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state must retain some authority over where capital is invested, and how so. This could include land use planning at the city and regional scale, inducements to bring capital to regions facing capital shortages (a move which Harvey believes to be self-defeating and which, as we have seen, leads him to the conclusion that capitalism is incompatible with social justice), and/or requiring compensation for the privilege of locating in areas with unique social and economic advantages.

With these discussions in mind, I propose the following modifications to Rawls' two principles (with my additions in italics):

First Principle: Each person is to have an equal right to the most extensive total system of equal basic liberties compatible with a similar system of liberty for all.

Second Principle: Social and economic inequalities are to be arranged so that they are both: (a) to the greatest benefit of the least advantaged, consistent with the just savings principle *and the principle of sharing the advantages and liabilities of locations and natural resources*, and (b) attached to offices and positions *and locations* open to all under conditions of fair equality of opportunity.

Rawls distinguishes capitalism from socialism in that capitalism allows private ownership of capital and natural resources, but the ownership models for capital and land need not be the same. Many readers will probably recognize a Georgist middle way that treats capital as a productive factor that should remain under private control and be duly rewarded, while asserting a collective interest in landed

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property (George 1879). The method of sharing the advantages and liabilities of locations and natural resources might vary under socialism and capitalism, but even under capitalism, justice would require that land and natural resources be subject to high levels of taxation with a strong presumption of state authority to (democratically and judiciously) exercise eminent domain and control land use planning.

## **3 Homogeneity Tests of Tiebout Sorting: A Case Study at the Interface of City and Suburb**

### ***3.1 Introduction***

One of the central problems in the provision of public goods is the lack of incentive for voters, who enjoy a common level of public service unrelated to their individual tax bill, to reveal their true demand. Tiebout (1956) proposes that for *local* public goods—i.e. those public goods whose benefits are confined to a small geographical area, such as playgrounds, elementary education, and fire protection—preferences will be revealed if households “vote with their feet” by moving to the jurisdiction that best matches their desired mix of taxes and services. This will lead to jurisdictions which are homogeneous with respect to public service demand. Furthermore, such homogeneous jurisdictions sidestep the inefficiency associated with demand diversity—that is, it eliminates the situation where some households are forced to pay for a higher level of service than they want, while other households that would be willing to pay for a higher level of service are prevented from doing so.

If public service demand correlates with observable household

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characteristics, jurisdictions will also be homogeneous with respect to these observable characteristics. Thus, a long literature attempts to corroborate the Tiebout model by looking for evidence of such homogeneity. But using jurisdictional homogeneity as a test of the Tiebout hypothesis is complicated by several factors. First, Tiebout sorting must be distinguished from what we might refer to as non-Tiebout sorting. A quick glance at the sociodemographic geography of any large city suggests that a large degree of sorting (by race or ethnicity, age, economic status, demand for non-public locational amenities, etc.) takes place *within* jurisdictions. If taxes and services are uniform throughout the city, such intrajurisdictional sorting cannot be accounted for by preferences in public services. Similar sociodemographic factors influence sorting in the suburbs, so an evaluation of Tiebout theory should not use such “baseline” sorting as evidence in favor of the theory.

Second, some of the apparent homogeneity of small jurisdictions is merely a statistical artifact. One of the implications of the Tiebout model is that an increase in the number of jurisdictions (for a given population) will lead to greater “consumer choice” among jurisdictions, and therefore to more homogeneous jurisdictions. Since Dowding and John (1994) it has been recognized that this increased homogeneity is

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at least partly a statistical artifact, since any randomly selected subsample is statistically likely to be more homogeneous than the population from which it is drawn.

Third, no research that I know of has addressed multiple scales of sorting, and the statistical problem posed by spatial dependence of population data. This can lead to a misattribution of the scale of sorting (e.g., Tiebout-induced sorting at the municipal level could be interpreted as sorting at the school district level, or vice versa) and of the cause of sorting (i.e., the sociodemographic dimensions along which people sort themselves).

Because of these issues, homogeneity has been found where it is has been looked for. Therefore, in this chapter I develop a method for finding sorting that is *a priori* agnostic about what political unit will exhibit sorting behavior. Homogeneity and sharp sociodemographic transitions can be read off of the landscape. Neighboring census tracts are paired across the study area and metrics of difference are calculated for the neighboring populations, including three alternative measures of income heterogeneity and, for categorical data such as race and presence of children, indices of dissimilarity. I hypothesize that if some of the observed sorting is due to the Tiebout mechanism, the sharpest differences should coincide with political and service

boundaries, and test this hypothesis using OLS regression.

### ***3.2 Sorting Implications of the Tiebout Hypothesis***

A typical investigation of the sorting implications of the Tiebout hypothesis is a cross-MSA study which tests the relationship between jurisdictional homogeneity and the number of local governments. The researchers begin by choosing the population characteristics of interest. Since higher-income jurisdictions spend more on public services (Inman 1979), household income is a frequently investigated characteristic. After selecting a population characteristic, the researchers develop a homogeneity measure (examples of which are discussed below) and regress the homogeneity measure on variables representing likely influences. These likely influences include the number of jurisdictions, as well as factors expected to interfere with the Tiebout mechanism such as state aid to local governments. If Tiebout sorting is taking place, greater jurisdictional choice is anticipated to lead to greater homogeneity in the investigated characteristics.

Several such studies compare a measure of homogeneity with jurisdictional choice. Pack and Pack (1977) characterize Pennsylvania towns as homogeneous or heterogeneous by applying a modified Leik Index to ranked income, occupation, household type, education, and

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age characteristics. They find that only 2% of towns are age homogeneous, while 42% of towns are homogeneous by household type, and 41% are homogeneous by occupation. They find 36% of towns homogeneous by education level, but only 11% of towns homogeneous by income level. Pack and Pack emphasize the low level of income homogeneity found in their study, and conclude that “either the desire for homogeneity is less important than is generally believed” or other factors are interfering with the sorting mechanism (1977: 199).

Eberts and Gronberg (1981) investigate income sorting at the school district level across 34 MSAs within seven states. They characterize homogeneity by the Theil entropy measure of income inequality, a measure which is decomposable into within-group and between-group inequality. Their dependent variable, representing heterogeneity, is within-jurisdiction inequality divided by total metropolitan inequality. A larger number of jurisdictions is expected to increase sorting, and therefore decrease the heterogeneity measure. Regression across MSAs confirms the expectation. They also find that heterogeneity decreases with demand for educational services (represented as the percentage of the population under age 18). Heterogeneity increases with average district population, equalizing

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aid from the state, and total MSA inequality. “One might expect that since an increase in total inequality causes a greater disparity within the population of relative tax burdens of families and their preferences of local public goods, there would be a greater incentive for families to stratify” (1981: 237). Their results generally confirm predictions of the Tiebout hypothesis.

Dowding and John (1994) discuss these and other investigations of the Tiebout hypothesis in a section on homogeneity and sorting implications. They claim that these studies are broadly “consistent with Tiebout, but...not truly corroborative” (1994: 774). In particular, Dowding and John point out the problem of accounting for statistical sorting. Since many smaller jurisdictions provide more choices for possible residents, a prediction of Tiebout theory is that smaller jurisdictions will be more homogeneous than larger jurisdictions. However, any randomly selected subpopulation is statistically likely to show lower variance than the population from which it is selected. Therefore, another problem in evaluating Tiebout theory is distinguishing Tiebout sorting from this statistical artifact. Dowding and John conclude:

Correlating the number of jurisdictions with degree of homogeneity does no more than confirm the null hypothesis —since statistically that is what we should expect. That sorting occurs beyond this is almost certainly true but the

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research shows mixed evidence that local tax and expenditure variables affect the process.... Few writers are aware of the logic of different sorting processes and so do not even attempt to distinguish between them. Future research needs to refine the measures in order to produce relevant tests of Tiebout (Dowding, John 1994: 775).

Following Dowding and John, researchers have applied new methods to control for the problem of statistical sorting. Interestingly, these studies move away from the use of cross-MSA regressions, and focus instead on whether observed municipal homogeneity within a single MSA is statistically significant. If the observed homogeneity is not statistically significant, there is no reason to “explain” the variance in homogeneity using cross-MSA methods. Two examples follow.

Heikkila (1996) uses tract-level data to investigate sorting in Los Angeles County. He uses factor analysis to reduce a large number of sociodemographic variables to 16 factors explaining 70% of the variance in the original dataset. He then uses an analysis of variance (ANOVA) to determine whether these factors are significantly different from each other at the municipal level, and finds that they are for 15 out of 16 of the retained factors.

Bickers and Engstrom (2006) use data from the Atlanta and Houston

*Table 3.1: Study Area Characteristics*

	<b>Queens County</b>	<b>Nassau County</b>
Population 2000	2.2 million	1.3 million
Density 2000 (persons / sq mi)	21000	4700
Municipalities	1 city (part of New York City)	2 cities; 64 villages
Unincorporated Areas	None	3 towns
School Districts	7 (elementary)	54 (unified or elementary)

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Metropolitan Statistical Areas to compare degrees of sorting on a composite diversity measure that encompasses age, education, income, housing structure, occupation, race, and ethnicity at the level of the census tract. They then use Monte Carlo iteration to bootstrap spatial information about residential choice in their study areas. Monte Carlo iteration is the repeated simulation of a probabilistic process in order to generate a sample population of outcomes. Real-world observations can then be compared to this population of possible outcomes in order to determine whether the observed outcome is likely or anomalous. For each municipality in the two MSAs, they evaluate the likelihood that the observed diversity is due to random chance. They reject the null hypothesis of random sorting ( $p < 0.05$ ) for only 4 out of 44 Houston municipalities and none of 42 Atlanta municipalities. They therefore conclude that for most municipalities, observed sorting is not due to a Tiebout-type process.

Although Dowding and John call attention to the problem of statistical sorting, homogeneity tests of the Tiebout hypothesis face a more severe challenge due to the spatial dependence of sociodemographic data. The statistical sorting problem that Dowding and John describe is that a randomly selected subset of households within an MSA is statistically likely to be more homogeneous than the

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MSA as a whole. But if households locate near other households with similar characteristics, a subset selected within a contiguous geographic area will not be an independent sample, and will be even more homogeneous than a subset selected at random from across the MSA. For example, households might sort by religion without regard to political boundaries, yet because of spatial dependence religious homogeneity would be found at the level of the political jurisdiction. Households might sort based on public services provided by one kind of government, such as school district, but homogeneity would also be found at the level of the municipality. While this is obvious for the case where school districts and municipalities are coextensive, due to spatial dependence homogeneity at the municipal level will be found even when municipal and school district boundaries are not coextensive (provided municipalities are not too much larger than school districts). In short, existing approaches will tend to find sorting at whatever geographic unit is selected for study, with no necessary relationship to the Tiebout mechanism.

### ***3.3 Methods and Data***

In order to investigate whether and at what level of government Tiebout sorting is taking place, I investigate the neighboring counties of Queens and Nassau in the New York–Northern New Jersey–Long

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Island MSA (See Table 3.1). Queens (2.2 million population in 2000) is a jurisdictionally unified county that is part of New York City. Queens (indeed, all of New York City) has one secondary school district, but several elementary school districts. Nassau has 54 school districts and 70 general purpose governments for a smaller population (1.3 million in 2000). The general purpose governments in Nassau include the county government, 3 towns (incorporated county subdivisions), 2 cities, and 64 villages. In New York State, all land is in either a city or a town, but not both.<sup>2</sup> Villages are incorporated areas within towns. Therefore, land in Nassau may be city; town but not village; or town and village. Villages can cross town borders (which 7 in the study area do) as well as county borders (which none in the study area do). Cities differ from towns in having greater autonomy and individual charters, while villages follow a standard form of government set by state law. Villages choose which services to provide on their own and which services to have the town provide. Cities and villages in Nassau are similar in that they are both geographically small incorporated municipalities. Cities and villages control their own zoning, while towns control zoning for those parts of the town which are outside of villages (NYS DOS 2008).

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<sup>2</sup> Some state land is in Indian Reservations, which are legally distinct and not part of either cities or towns. There are no Indian Reservations in Queens or Nassau County.

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While New York State law has its own unique typology of school districts, most of Nassau's 54 school districts are classified by the US Census Bureau as unified school districts, which means they encompass both elementary and secondary schools. School districts in most of New York State (including Nassau) have the power to levy property taxes. Their budgets are submitted to local voters. If rejected, the school district can submit a revised budget for a vote or can operate under a "default" budget which allows certain automatic spending increases from the previous year's budget. In Queens (NYC), the school district is financed by general funds. The study focuses on secondary school districts (and unified school districts, which are also secondary school districts). Elementary only borders are ignored, as the results of early analysis distinguishing elementary from secondary school districts were difficult to interpret. School districts in New York State can (and in the study area do) cross village, town, and county borders. One school district crosses the border of Nassau and Suffolk counties. No school districts cross the Queens-Nassau border (NYS DOS 2008).

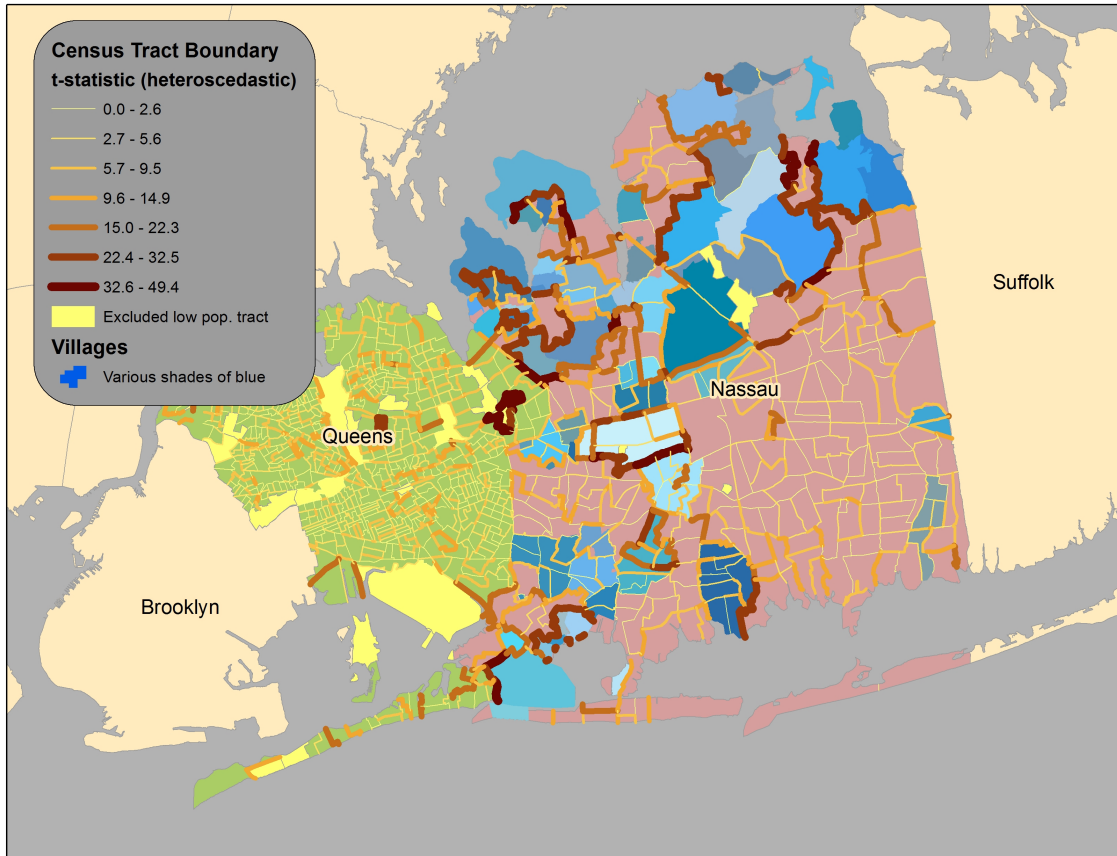
The study design is *a priori* agnostic about what types of local governments might show evidence of Tiebout-induced homogeneity. Instead of looking for evidence of homogeneity among households or

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census tracts grouped by jurisdiction, local heterogeneity is characterized throughout the study area, and I investigate whether observed local heterogeneity is correlated with jurisdictional boundaries. By characterizing heterogeneity across the study area, this approach is conceptually similar to the remote sensing problem of finding the boundaries between different classes of land cover, e.g. forest and grass (DeMers 2000). We are interested in heterogeneity over a few different dimensions: income, race, and presence of children (theoretically important for school district choice), all of which are expressed quantitatively as difference across boundaries of neighboring census tracts. The focus on differences across boundaries has also been used in several capitalization studies, including Black (1999), Bayer, et al. (2007), and Thorsnes and Reifel (2007). Black (1999) and Thorsnes and Reifel (2007) both make use of house-level sales data and Census aggregate demographic data. Bayer, et al. (2007) make use of restricted-access Census data. The present study uses publicly available Census data, and focuses entirely on economic and demographic sorting.

The population data comes from the 2000 Census. Census blocks are topologically ideal because the Census Bureau constructs blocks to correspond with natural and administrative borders. Therefore, blocks

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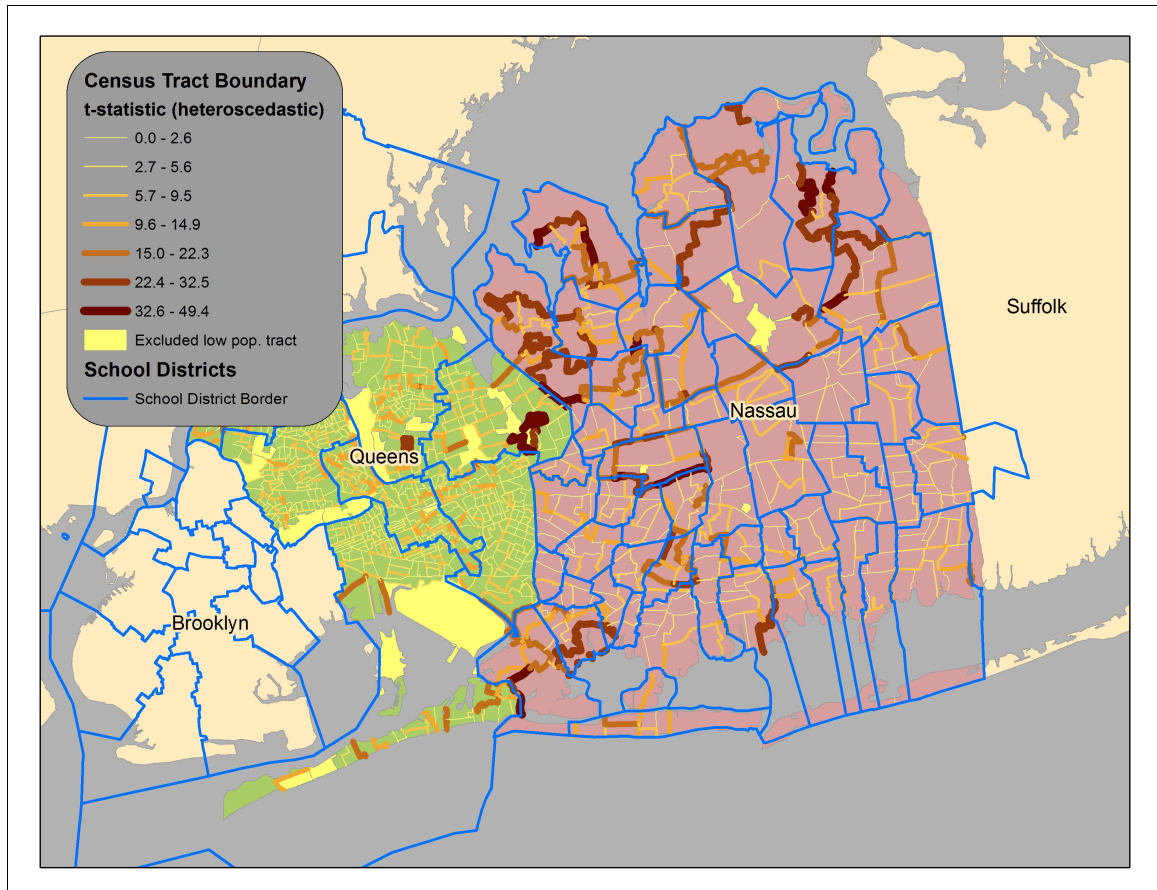
*Illustration 3.1: Heteroscedastic t-Statistic Compared with Village Borders*

will not be divided across towns, villages, or school districts.

Unfortunately, income data are only available at the larger geographies of blocks groups and tracts. Block groups and tracts conform well to villages and towns in the study area, but not to school districts. This study uses block group level data.

The geographic data that we use includes census tracts, block groups, and counties (ESRI 2004b, ESRI 2004a), school districts (NYS ORPS 2001), and civil boundaries for general purpose local

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*Illustration 3.2: Heteroscedastic t-Statistic Compared with School District Borders*

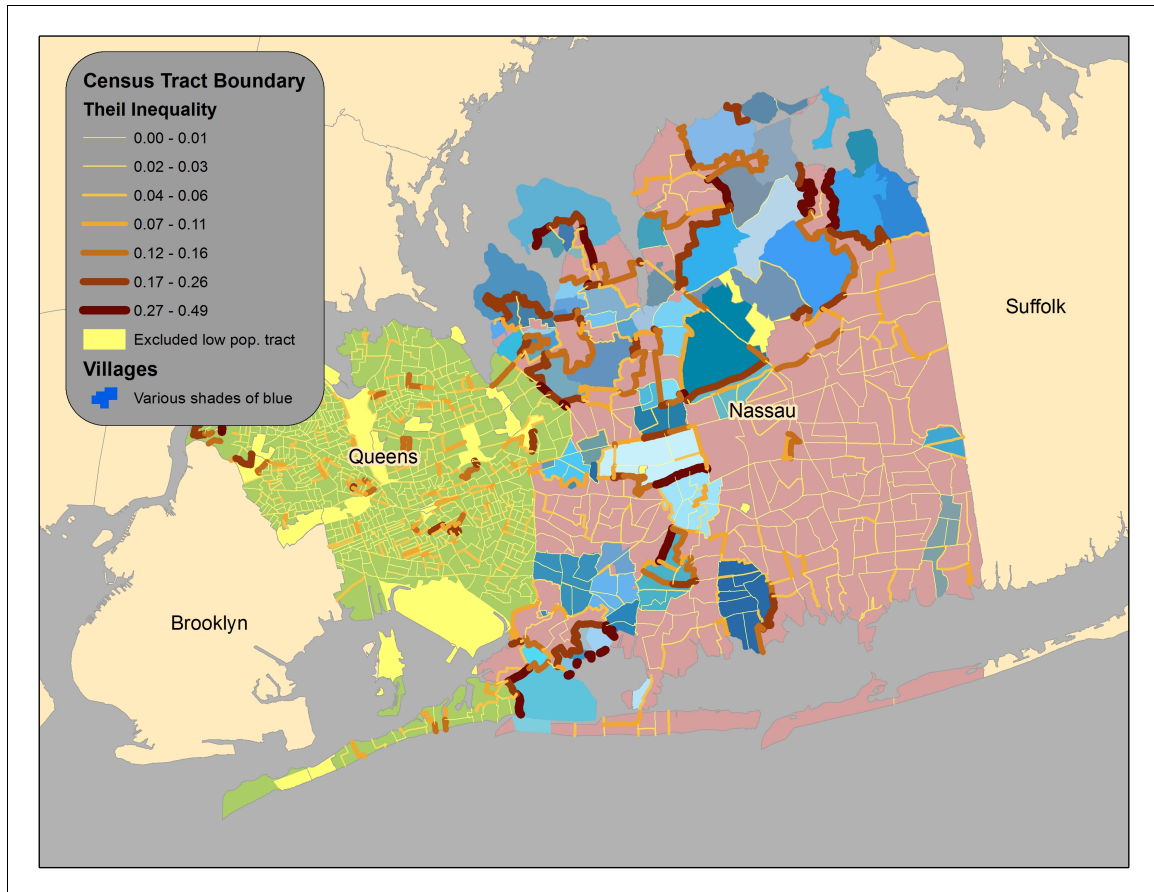
governments such as towns and villages (NYS CSCIC 2007). The unit of analysis is a block group boundary, which is the arc which separates two contiguous census tracts. ArcGIS 9.2 (ESRI 2007) was used to extract these arcs from the census tract polygons for visualization of the data. Each arc is associated with the block groups on either side, and heterogeneity metrics are calculated based on the populations of each block group pair. Each arc is categorized according to the local

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government borders it coincides with. If the neighboring census block groups are in different towns, the arc is classified as a town border. If the neighboring block groups are in different villages, or (since villages do not fill the landscape) one block group is in a village and one block group isn't, the arc is classified as a village border. These categories are entered as dummy variables in the regressions, with the "neutral" category being a block group boundary which does not coincide with any jurisdictional borders. For villages, towns, cities, and counties, the spatial matches between block group boundaries and jurisdictional borders are exact. Since school district boundaries do not match up with census block group boundaries, school district borders are classified based on a proportion of nonoverlapping population. Mutually exclusive populations are assigned a border value of 1, and completely overlapping populations (both block groups are in the same school district) are assigned a border value of 0.

Each OLS regression is set up with a dependent variable representing heterogeneity—that is, representing the strength of the difference between the populations of the neighboring block groups—and independent variables representing jurisdictional boundaries and other likely influences on heterogeneity. The boundaries of block groups with few or no households were excluded. Among these were

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*Illustration 3.3: Theil Inequality Compared with Village Borders*

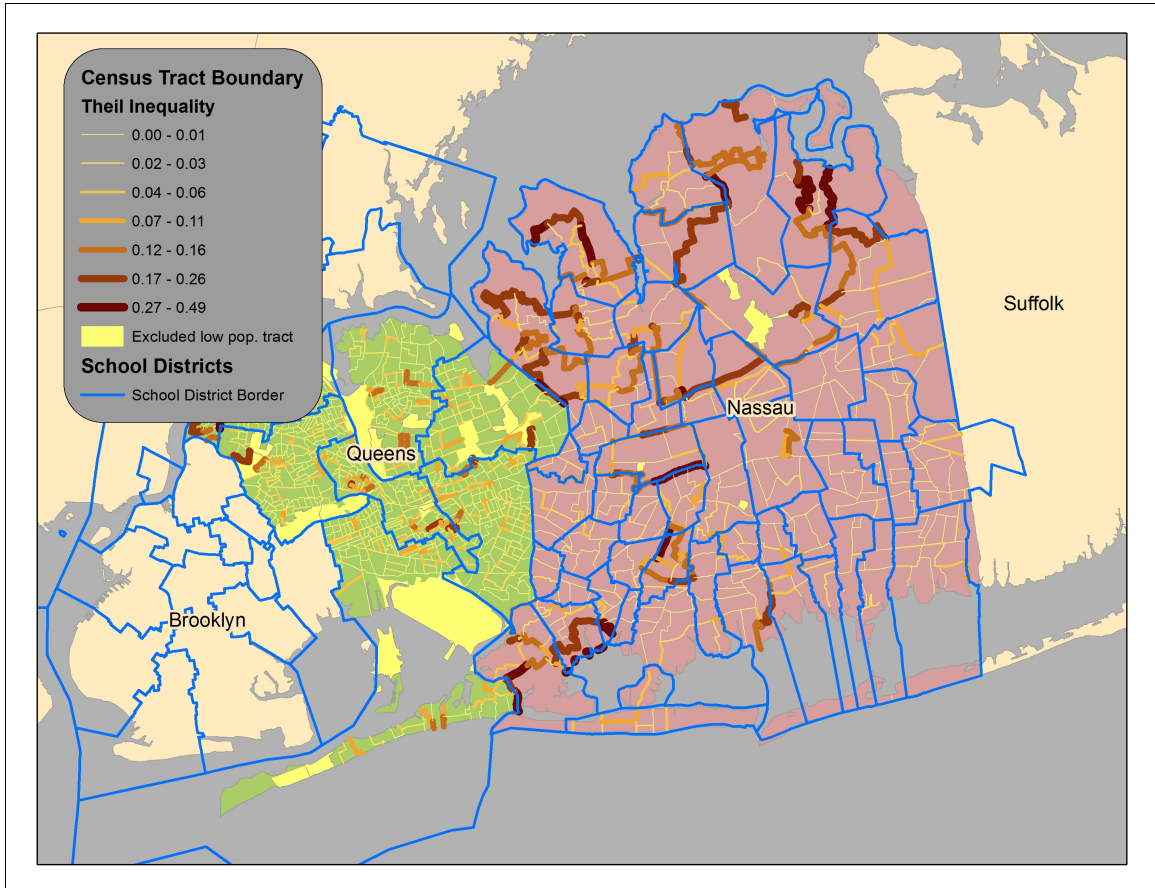
unpopulated (or nearly unpopulated) areas such as parks and open space, airports, and industrial areas, but also areas primarily or exclusively populated by group quarters residents, such as a psychiatric facility in Eastern Queens.

### **3.3.1 Dependent Variables**

The influence of jurisdictional boundaries is tested against sorting by income, by race/ethnicity, and by presence of school-aged children.

Income-based sorting has been most often studied in relation to the

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*Illustration 3.4: Theil Inequality Compared with School District Borders*

Tiebout hypothesis. A number of different measures of income heterogeneity are used in this investigation, including a  $t$ -statistic, a Theil Inequality measure as used by Eberts and Gronberg (1981), and a simple difference of median incomes. The  $t$ -statistic and Theil measure require data at the household level. Income is reported by the Census classified into \$5000 ranges for incomes below \$50,000, and in increasingly larger ranges above \$50,000 up to the “\$200,000 or more” class. Previous studies have estimated household-level income

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at the midpoint of each range (Eberts, Gronberg 1981, Ottensmann 1982). This study instead estimates household-level income so as to ensure that it sums to the block group's aggregate income reported in SF3 Table P54 - "Aggregate Household Income in 1999". Table P54 reports aggregate income for two classes of households: those earning above and those earning below \$200,000. Calculating average income for the "\$200,000 or more" class is straightforward, since we are given the aggregate and the number of households. Average income for households in each class below \$200,000 is calculated as follows. First a scaling factor,  $SF_k$ , specific to each income class is calculated as:

$$SF_k = 2 \times \frac{Y - \sum_k n_k LB_k}{\sum_k n_k Range_k}$$

where

$Y$  is the aggregate income for households in the tract with income below \$200,000;

$k$  is the index of the income class;

$n_k$  is the number of households in class  $k$ ;

$LB_k$  is the lower bound of class  $k$ ;

$Range_k$  is the range (upper bound - lower bound + 1) of class  $k$ .

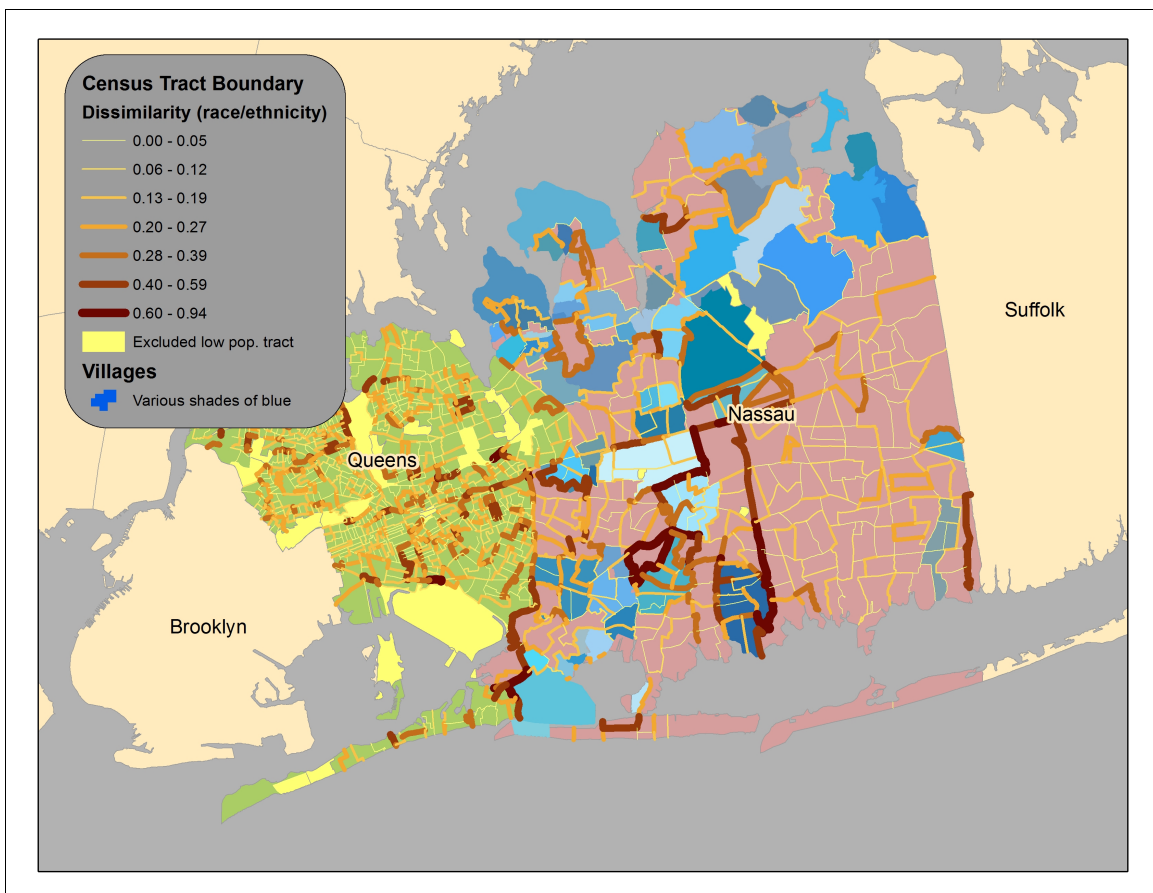
The average income,  $Y_k$ , for each class is calculated as:

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$$\bar{Y}_k = LB_k + \frac{SF_k}{2} \times Range_k$$

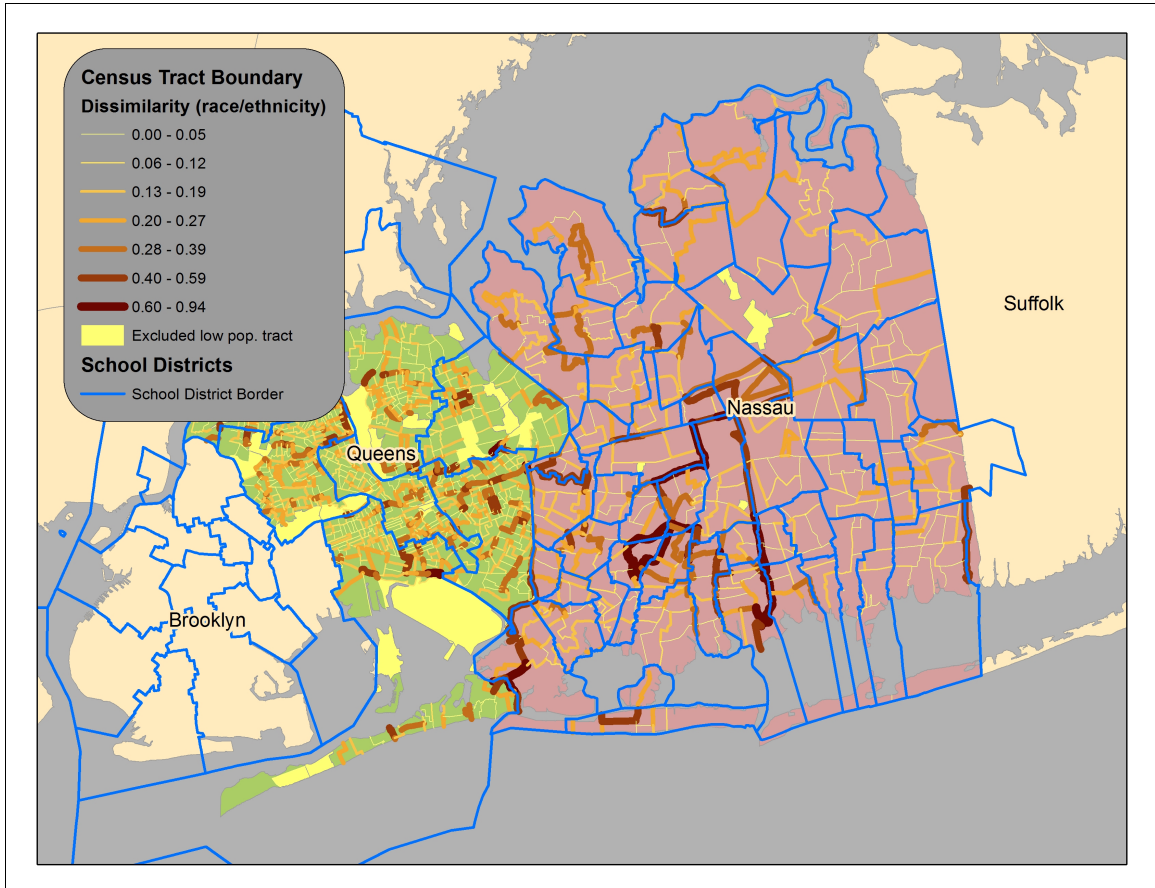
$SF$  varies between 0 and 2. If  $SF = 1$ , the average income falls at the midpoint of the range.

The household incomes in the neighboring block groups are then used to calculate two measures of difference: the  $t$ -statistic and the Theil inequality measure. The  $t$ -statistic is a variance-adjusted difference of means with a straightforward interpretation. Not only



*Illustration 3.5: Racial Index of Dissimilarity Compared with Village Borders*

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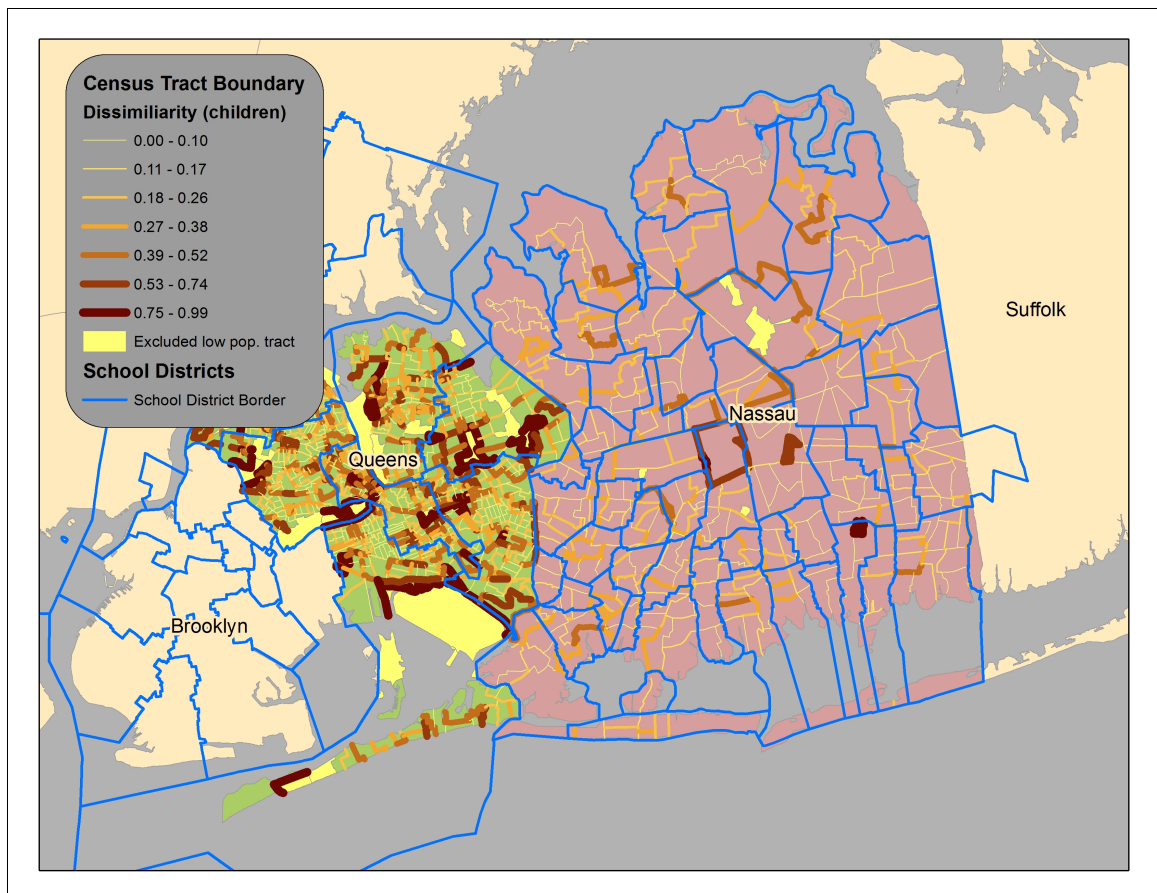


*Illustration 3.6: Racial Index of Dissimilarity Compared with School District Borders*

does a greater absolute difference in mean incomes affect  $t$  plausibly (making it increase), but Tiebout sorting implies that smaller jurisdictions should have more homogeneous populations within each jurisdiction. More homogeneous populations have a smaller income variance, which again yields an increased  $t$ -statistic. Note that this does not mean the statistical sorting problem has returned, because the  $t$ -statistic is not based on the income profile of the jurisdiction, only

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that of the block group. Illustrations 3.1 and 3.2 map the value of  $t$  over our study area. The figures are based on the same equations as the regressions, but using tracts instead of block groups as the geographic building block, in order to provide maps which are visually intelligible, i.e. not too densely clustered to make out the details. Visually, high values of  $t$  seem to coincide with village borders (villages are shaded blue) in Nassau County, but do not seem to coincide with school district borders.



*Illustration 3.7: Presence of Children Index of Dissimilarity Compared with School District Borders*

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An alternative measure of difference is the commonly used Theil inequality measure. This measure is decomposable into within-group and between-group inequality. The Theil measure is defined as:

$$\sum_{i=1}^N Y_i \log \frac{Y_i}{1/N} = \sum_{g=1}^G Y_g \log \frac{Y_g}{N_g/N} + \sum_{g=1}^G Y_g \sum_{i \in S_g} \frac{Y_i}{Y_g} \log \frac{Y_i/Y_g}{1/N_g}$$

where the left-hand term represents total inequality, the first right-hand term represents between-group inequality, the second right-hand term represents within-group inequality, and

$N$  is the number of households in both block groups;

$G$  is the number of block groups (since the study uses paired block groups,  $G=2$  always);

$Y_i$  is household  $i$ 's share of the total income of both block groups;

$Y_g$  is tract  $g$ 's share of the total income of both block groups;

$N_g$  is the number of households in block group  $g$ ;

$S_g$  is the set of households in block group  $g$ .

Following Eberts and Gronberg (1981), heterogeneity is expressed as the ratio of between-group inequality to the total inequality of the paired block groups. (In Eberts and Gronberg's *cross-MSA* analysis, they focus on *homogeneity*—they therefore use the ratio of *within*-group inequality to the total inequality of the *metropolitan area*. This chapter instead uses between-group inequality so that the inequality

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measure can be interpreted the same way as the alternative measures—in each case, a larger value means a greater difference between the populations of the neighboring block groups.) Illustrations 3.3 and 3.4 show results similar to the  $t$ -statistic: between-group inequality seems to coincide with village borders, but not with school districts.

Finally, both of these income heterogeneity measures are compared with the computationally easier difference of median incomes, based on the tract median income reported by the Census Bureau. If this measure produces similar results to the  $t$ -statistic and the Theil measure, it might be preferable to use because it would be easier to operationalize over a large geographic area. Maps of the difference of median incomes (not shown) look similar to the maps of  $t$  and Theil inequality shown in Illustrations 3.1 through 3.4.

In order to measure racial segregation as well as sorting by the presence of children in the household, we turn to the well-known index of dissimilarity,  $D$  (Kaplan, Holloway 1998).  $D$  is defined as:

$$D = \frac{1}{2} \sum_i \left| \frac{a_i}{A} - \frac{b_i}{B} \right|$$

where

$i$  is an index of subareas in the study region;

$a_i$  is the population of group A in subarea  $i$ ;

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$A$  is the population of group A in the study region;

$b_i$  is the population of group B in subarea  $i$ ;

$B$  is the population of group B in the study region.

$D$  can only measure segregation between two demographic groups.

Therefore it is usually calculated in studies of racial segregation as showing segregation of Whites (or non-Hispanic Whites) from Blacks, Hispanics, Asians, another specific racial or ethnic group, or from all minority groups combined. It is usually calculated for a geographic area with many small subareas—for example,  $D$  might be calculated for the MSA using census tracts as subareas. It can vary from 0, indicating that all subareas (tracts) have the same proportion of the minority population as the entire region (MSA), to 1, indicating that every subarea is exclusively populated by one of the two groups being investigated.

$D$  is subject to the modifiable areal unit problem (MAUP), in that small-area geographic units are empirically more homogeneous than larger units, so calculating  $D$  for an MSA using smaller subareas, such as census tracts, will yield a higher value than if larger subareas were used, such as counties (Wong 1997). Furthermore, this inflation of the index can mask spatial patterns that might mitigate segregation.

Assuming every subarea is exclusively populated by the majority group

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or the minority group, most observers would judge segregation to be lower if minority enclaves were scattered throughout the study region than if the minority subareas were concentrated in one part of the region. Modifications to  $D$  have been developed by Wong (1993) that account for spatial interaction between the populations of adjacent subareas. If majority group subareas are found next to minority group subareas,  $D$  can be considerably reduced. Wong has gone further in calculating  $D$  (or one of several variants that account for spatial interaction) separately for each census tract based on the population of its adjacent tracts, in order to show variation in segregation patterns across space (2002, 2005). The maps of locally varying heterogeneity included in this chapter bear some resemblance to Wong's maps of locally varying segregation. This study does not apply the spatial interaction adjustments, many of which are inapplicable to regions which, like the paired tracts and block groups here, have only two subareas. However, independent variables are used to control for expected spatial interaction between subareas.

$D$  is calculated based on standard Census racial and ethnic groupings, with Hispanics of all races broken out into their own group. Therefore, Whites will refer to non-Hispanic Whites, Blacks will refer to non-Hispanic Blacks, etc. Since  $D$  can only be applied to two groups, it

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*Table 3.2: Regression Results, Income-Based Sorting*

Independent Variables:		Dependent Variable:					
		t-Statistic (Heteroscedastic)		Theil Inequality (Ratio of Between-Group to Total)		Absolute Difference of Median Income	
		Model 1A	Model 1B	Model 2A	Model 2B	Model 3A	Model 3B
(Intercept)		2.688*** (0.100)	2.530*** (0.102)	0.012*** (0.002)	0.009*** (0.002)	6314.031*** (441.472)	5320.104*** (459.212)
Jurisdictional Borders	queens_nassau	-0.973 (0.591)		-0.029** (0.009)		-4325.098 (2602.762)	
	nassau_village	2.477*** (0.157)		0.053*** (0.002)		18180.410*** (692.552)	
	nassau_town	0.461 (0.405)		0.007 (0.006)		175.704 (1784.675)	
	nassau_city	3.487*** (0.726)		0.055*** (0.011)		5286.28 (3195.271)	
	sdsec	0.361 (0.186)	1.297*** (0.163)	0.006 (0.003)	0.023*** (0.003)	111.652 (819.553)	5636.933*** (738.811)
Spatial Interaction Measures	distance_km	1.732*** (0.225)	2.118*** (0.228)	0.031*** (0.003)	0.038*** (0.004)	10123.624*** (989.888)	12642.192*** (1028.730)
	distance_km2	-0.046 (0.070)	-0.069 (0.071)	-0.005*** (0.001)	-0.006*** (0.001)	-817.815** (307.522)	-984.820** (320.924)
Other Variables	suburban	-0.489*** (0.099)	-0.280** (0.097)	-0.002 (0.001)	0.003* (0.001)	2869.783*** (434.861)	4466.602*** (436.180)
	adj. R-squared	0.106	0.072	0.131	0.071	0.216	0.143
	F	114.475	149.475	144.705	145.498	263.511	318.434
	N	7620	7620	7615	7615	7620	7620

Numbers in parentheses are standard errors.

\* Significant at  $p < 0.1$

\*\* Significant at  $p < 0.05$

\*\*\* Significant at  $p < 0.01$

is calculated alternately for White-Black segregation, White-Hispanic segregation, and locally dominant segregation based on the top two race/ethnicity groups in each paired block group. Illustrations 3.5 and 3.6 compare the index of dissimilarity for the top two groups in each pair to village or school district borders. Visually, the relationship is ambiguous, with inconsistent matching of jurisdictional boundaries with a medium or high index of dissimilarity.

$D$  is also used as a measure of sorting among households with and

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without school-aged children,  $D_{children}$ . In this case, there are only two groups, and the meaning of  $D_{children}$  is consistent. Illustration 3.7 shows no visually obvious correlation between  $D_{children}$  and school district borders. A map of  $D_{children}$  against village borders (not shown) also shows no visually obvious correlation. Of interest, however, is the fact that households with school-aged children are much more sharply separated from childless households in the central city county of Queens than in the suburban county of Nassau.

### **3.3.2 Independent Variables**

Economic and demographic sorting is a feature of the American landscape. But can observed sorting be explained as resulting of households choosing particular packages of taxes and services? If Tiebout sorting is taking place, neighboring block groups separated by a jurisdictional border would be expected to be more heterogeneous than block groups in the same jurisdiction. The study design relies on the expectation that in a Tiebout world, there should be enough jurisdictional variation in service levels that the jurisdictional border itself can be used as an indication of service differences. Actual service differences are not measured.

As described earlier, most of the independent variables are dummy

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variables representing whether the block group boundary coincides with a jurisdictional border. The borders being investigated include the borders of school districts, towns (county subareas), suburban cities, suburban villages, and the Queens-Nassau border which separates city from suburb. Most of the school districts in the study area are unified school districts. Elementary school district borders are not included in

*Table 3.3: Regression Results, Sorting By Race and Presence of School-Aged Children*

Independent Variables:		Dependent Variable:			
		White/Black Index of Dissimilarity Model 4	White/Hispanic Index of Dissimilarity Model 5	Top Two Groups Index of Dissimilarity Model 6	Households with Children Index of Dissimilarity Model 7
(Intercept)		0.240*** (0.007)	0.189*** (0.005)	0.165*** (0.005)	0.219*** (0.009)
Jurisdictional Borders	queens_nassau	-0.115** (0.039)	0.018 (0.031)	0.064* (0.029)	-0.049 (0.032)
	nassau_village	0.059*** (0.010)	0.018* (0.008)	0.015 (0.008)	0.004 (0.014)
	nassau_town	0.055* (0.027)	0 (0.021)	-0.001 (0.020)	0.020 (0.028)
	nassau_city	-0.081 (0.047)	0.039 (0.038)	0.027 (0.035)	-0.047 (0.052)
	sdsec	0.055*** (0.012)	0.042*** (0.010)	0.069*** (0.009)	0.006 (0.011)
Spatial Interaction Measures	distance_km	0.079*** (0.015)	0.049*** (0.012)	0.056*** (0.011)	0.077*** (0.014)
	distance_km2	-0.023*** (0.005)	-0.016*** (0.004)	-0.021*** (0.003)	(0.009)*** (0.002)
Other Variables	suburban	-0.052*** (0.006)	0.030*** (0.005)	0.046*** (0.005)	-0.149*** 0.013
	adj. R-squared	0.017	0.026	0.059	0.062
	F	17.401	26.104	61.174	
	N	7620	7620	7620	2330

Numbers in parentheses are standard errors.

\* Significant at  $p < 0.1$

\*\* Significant at  $p < 0.05$

\*\*\* Significant at  $p < 0.01$

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the analysis.

Independent variables are selected that might plausibly influence heterogeneity across block group boundaries. Of primary importance is controlling for spatial interaction, the way that spatial characteristics of the local area influence the interaction between neighboring populations. The motivating assumption is that households will be more likely to move to a place if they have already socially interacted with the current residents, and therefore social interaction between two areas will lead to more similar populations; i.e., where spatial interaction between neighboring block groups is high, heterogeneity will be low. Wong (1993) discusses ways to correct  $D$  for spatial interaction between neighboring tracts, including the length of the shared border and a shape index equal to the average of the ratio of the perimeter to the area ( $P/A$ ) of the neighboring tracts. Since census tracts and block groups are often oddly shaped, it seems that the length of the shared border is an inconsistent metric of spatial interaction. Consider the difference in the metric between two octagons that share an edge versus two squares of equal area that share an edge. The octagons will generate a lower spatial interaction metric because of their shorter sides, but an ideal metric would be more nearly equal for the octagons and the squares (assuming that the

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space outside the octagons is not water or some other barrier to spatial interaction). The alternative spatial interaction metric, the shape index, is a measure of compactness: a circle has the lowest possible  $P/A$  ratio. A square has a lower  $P/A$  ratio than a rectangle. In this case the proposed metric again seems inconsistent. Two contiguous rectangles could offer much greater opportunity for spatial interaction than two squares *if* they connect along their long side. They would offer much lower opportunity for spatial interaction than the squares if they connect along their short side.

One of the commonest measures of spatial interaction is distance, and this is what is used for this study. Distance between the block group centroids (geometric centers of mass) is the measure used. Spatial interaction may not decline linearly with distance, so distance may be raised to a power. Distance squared yields a so-called gravity model. Often, both distance and distance squared will be included so that spatial interaction may be allowed to vary in intensity and sign as distance changes.  $F$ -tests indicate that models with both distance variables perform better than models with only one or the other.

Finally, a dummy variable is included to indicate whether the tract boundary is suburban (in Nassau County). Tiebout sorting relies on the possibility of choosing between a large number of competing

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jurisdictions (Tiebout 1956), a condition which is met in the suburbs, but not in large heterogeneous central cities. It seems important to control for suburban location so that, if it so happens that there is an overall higher level of tract-level sorting in the suburbs, this will not be misinterpreted as jurisdictional sorting in the regression.

### **3.4 Results**

OLS is used to regress the dependent variables, including three alternative measures of income heterogeneity and four measures of demographic sorting, on the independent variables described above. The income regressions appear in Table 3.2. Models 1A and 1B use the heteroscedastic *t*-statistic as the measure of income heterogeneity; models 2A and 2B use Theil inequality (the ratio of between-group to total inequality); and models 3A and 3B use the absolute difference of median incomes. The A models include all jurisdictional borders, while the B models include only school district borders.

In all six income models, one or both of the spatial interaction measures are statistically significant at. Centroid distance is relatively large and positive ( $p < 0.01$  in all six models) while centroid distance squared is relatively small and negative (though not significant in the *t*-statistic models), indicating that heterogeneity increases quickly with increasing distance when tract centroids are close to each other (i.e.,

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when tracts are small/compact/tightly joined), but increases more slowly when tract centroids are already far apart (i.e., when tracts are large/convoluted/tenuously joined). The suburban dummy is significant in the Models 1A&B and 3A&B and only weakly significant in Model 2B. Its sign is negative, indicating that after other effects are controlled for, neighboring census tracts in suburban areas are more similar in household income than neighboring tracts in the city. The magnitude of the effect, however, is generally weaker than the effect of the other significant variables.

The general purpose local government borders appear only in the A models. Queens/Nassau is only significant in model 2A. Town borders (nassau\_town) are not significant in any of the three models. Village borders (nassau\_village) are strongly significant ( $p < 0.01$ ) in all three A models, and shows the largest effect of all the independent variables. Model 3A indicates that paired block groups on opposite sides of a village border show a difference in median incomes that more than \$18,000 greater than the difference for block group pairs that do not straddle a village border. Nassau city borders are strongly significant in models 1A and 2A, and the coefficients in those models are similar in magnitude to the coefficients on village borders. In model 3A, which uses difference in median incomes for the income

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heterogeneity measure, city borders are not significant and the coefficient is one-third the magnitude of the coefficient on village borders.

Finally, the coefficient on the school district borders variable is not small and insignificant in all of the A models. Tiebout sorting by school district has often been investigated by past studies, with generally corroborating results. And the importance of school districts in where households choose to live is a widely accepted truism. The nonexistent support for sorting by school district these models provide is curious. I hypothesize that previous work has failed to distinguish the effect of school district sorting from sorting over other local government jurisdictions. The test of this hypothesis is shown in the B models, which exclude other local government borders from the regressions. In all three models, the magnitude of the coefficient on increases, and the coefficients are strongly significant ( $p < 0.01$ ). Thus, investigating school district sorting without accounting for choice over other local governments will lead to invalid conclusions. This is discussed further in the concluding section of this chapter.

Models 4 through 7 appear in Table 3.3. (Model 7 is based on tract-level data.) The first thing to note is that the adjusted R<sup>2</sup> for these

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models are extremely small. Whatever these models show, it is clear that they do not capture the vast majority of influences on household sorting by race and by presence of school-aged children.

As with the income regressions, the demographic dissimilarity models show strongly significant ( $p < 0.01$ ) coefficients on the spatial interaction measures and on suburban location. The coefficient on the suburban dummy in Model 7 is large and negative, indicating that city households are much more likely than suburban households to segregate based on the presence of school-aged children. Beyond that, Model 7 shows no influence of any jurisdictional borders on the family structure index of dissimilarity, including, surprisingly, school district borders.

Model 4, which investigates White/Black dissimilarity, does show significant coefficients for Queens/Nassau border ( $p < 0.05$ ) and Nassau village borders ( $p < 0.01$ ), and all three race-ethnicity dissimilarity measures have significant coefficients for school district borders ( $p < 0.01$ ). Racial sorting can of course be driven by many factors. Tiebout sorting by race requires racial differences in demand for public services. Other factors contributing to racial sorting include racial steering in the home renting/buying process (Turner et al. 2002), redlining (Jackson 1985), and the persistence of historical segregation.

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Furthermore, the race-ethnicity dissimilarity models do not control for income characteristics, leaving open the possibility that the model is just measuring income sorting another way. Mitigating against this interpretation, note that the coefficient on the school districts variable is roughly equal to the coefficient on village borders, whereas in the income regressions the coefficient was an order of magnitude smaller. In the Southern part of Nassau County, two pairs of census tracts show evidence of racial sorting: one pair straddles the divide between the Freeport and Merrick school districts, the other straddles the Uniondale and Garden City school districts. For each pair, the census tract in the first school district is approximately one-quarter White, with Blacks and Hispanics predominating, while its neighbor in the latter school district is over 90% White. This is the starkest example, but gives some credibility to the result.

Although the model leaves much out, it is clearly indicating that race plays a relatively greater role in sorting by school district than in sorting by general purpose local governments. This could be interpreted as meaning that households place more importance on having their children attend racially/ethnically homogeneous schools than on living in racially/ethnically homogeneous neighborhoods. This in turn raises a host of question which we cannot here address

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regarding how well movers are able to evaluate school quality (Buckley, Schneider 2006, Teske et al. 1993), their reliance on heuristics to evaluate school quality (Bickers, Stein 1998), and the extent to which race dominates other factors in school choice (Hamilton, Guin 2005).

The regressions overall provide additional evidence in favor of the Tiebout model, but also caution the researcher to be careful in drawing conclusions regarding which unit of government is actually influencing the household's decision about where to relocate. When jurisdictional borders are not coterminous, choosing along one dimension may mean subordinating choice along another dimension.

### **3.5 Conclusion**

Household sorting along a variety of economic and demographic dimensions is an inarguable feature of the American housing landscape. The Tiebout model suggests that some of this sorting is due to household choice regarding tax and service packages provided by local governments. This investigation of household heterogeneity in the neighboring central city/suburban counties of Queens and Nassau, New York, supports this hypothesis with evidence that sharper economic and demographic differences coincide with certain kinds of jurisdictional borders. The evidence is strongest for sorting by income

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across small, general purpose local governments. While many studies have found evidence of Tiebout sorting at the level of school districts, the current study produces more ambiguous results. There is no evidence of income sorting across school districts. On the other hand, there evidence of strong racial sorting across school districts, though overall racial/ethnic dissimilarity models explain little of the variation in racial heterogeneity across our study area.

The ambiguity of the evidence regarding sorting across school districts wants explaining, in particular the lack of a strong relationship between income and school district choice. The following section is fairly speculative, and additional work will be necessary to determine which of these explanations might have merit. Two broad classes of explanation are possible. Either sorting is taking place at the level of school-districts, but our method is not able to find it; or sorting at the school district level is not as important as generally assumed, and studies that have found evidence of it have been flawed.

In the first class of explanation, it is possible that sorting is taking place at the school district level but homogeneity is just a poor test of the Tiebout mechanism. This would be the case if unobserved public service demand does not correlate with observed economic and demographic characteristics. However, this explanation is not

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consistent with the success of the method in finding evidence of sorting at the municipal level. Alternatively, we might consider that Tiebout competition is taking place, but the result of Tiebout competition is that most or all suburban school districts provide the same level of service. This explanation works particularly well with the flight-from-blight theory of suburbanization. Higher-income households seeking good schools will set off a “race to the top” among suburban school districts, leaving the central city to lower-income households. A relative homogeneity of outcomes in suburban school districts would make fine-grained income sorting unnecessary. Investigating this further would require data on school performance, and remains a possible direction for future research.

Accepting the finding that income sorting by school district is weak or nonexistent, what explanations could account for it? Note that education is not a typical public good, in that it is not characterized by joint consumption (additional children require additional teachers and other resources to produce equivalent learning) and it is not nonexcludable (a child has to be enrolled to be allowed in the classroom). Furthermore, education can be and frequently is purchased privately. Not only will this interfere with the expected homogeneity, Nechyba goes so far as to suggest that higher-income

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households that intend to consume private education might purposefully locate in a low-tax, low-performance school district (2003a). This would work to dilute the expected Tiebout-induced homogeneity. Finally, in an important extension to the Tiebout model, Hamilton (1975) explains how Tiebout sorting would work in a system of property tax financing with zoning. In particular, zoning can be used to ensure a minimum level of housing consumption within the community, and therefore a minimum level of taxation. We note that school districts on Long Island do not have the requisite powers of zoning. They therefore cannot enact the exclusionary zoning necessary to create homogeneity. In neighboring New Jersey, school districts are by law coterminous with municipal governments. The landscape of coterminous municipal and school district borders is investigated in the next chapter.

Importantly, we note that the method used in this chapter finds sorting at the school district level *when other jurisdictional boundaries are left out of the regression*. To this author's knowledge, no previous papers have attempted to investigate the sorting implications of the Tiebout hypothesis over multiple jurisdictional geographies simultaneously, and therefore no previous papers that have found sorting by school district have controlled for sorting occurring at other

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geographies. More sophisticated (border-discontinuity design) capitalization studies have found evidence of Tiebout choice at the school district level, but they also find that the capitalization response is smaller than previous studies have estimated (Black 1999, Bayer, Ferreira & McMillan 2007).

The strongest evidence of sorting in this investigation is the finding of strong income sorting at the level of villages and suburban cities, small area municipal governments that control their own zoning and that choose which local services to provide, leaving other services to their encompassing towns. As already mentioned, Hamilton (1975) points out the importance of the zoning function to the workings of the Tiebout model. Villages in Nassau County *can* provide their own police force, garbage collection, road maintenance, etc., but many do not. They do all control their own zoning. The finding of strong income heterogeneity at the borders of villages suggests the possibility that this is due to fiscal zoning, that is, zoning designed to guarantee that new households pay the full marginal cost of the new level of services.

Fiscal zoning is often discussed in the context school taxes. But (a) this investigation finds no support for income sorting across school districts, while (b) Nassau school districts do not control zoning anyway. How much could fiscal zoning affect income sorting across

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villages when school taxes are charged by a different unit of government and other municipal services such as police and road maintenance are not consistently provided by the village government? I would like to suggest that households are consuming another kind of service, one not often talked about in discussions of the Tiebout model, but described in Tiebout's original paper. Tiebout proposes competition for a fixed resource: "The factor may be the limited land area of a suburban community, combined with a set of zoning laws against apartment buildings" (Tiebout 1956:419). This suggests that refocussing on the demand for housing density (specifically, low density) may be important to further understanding the workings of the Tiebout model.

This chapter demonstrates that new methods are necessary which are capable of characterizing sorting across multiple geographies. I suspect that when this or other such methods are applied to other study areas, local context will assert itself, and sorting by school district in addition to general purpose local governments will turn out to be important in some counties, states, or MSAs. Further, while research on the Tiebout model has focused on the provision of services like education and crime control, I think the zoning regime itself (with its density limits) has been underemphasized as a differentiated

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service households value when they vote with their feet.

## **4 Jurisdictional Homogeneity and Coterminous Local Government Borders: A Comparison of Counties in New Jersey and New York State**

### ***4.1 The Political Geography of Suburban Local Governments***

The previous chapter discussed sorting among competing local government geographies, drawing attention to differences in sorting among municipalities and school district. Income stratification was apparent at the village (municipal) level in Nassau County, while racial sorting was the greater influence at the school district level. These differences are observable because the method developed exploits the incongruent geographies of villages and school districts in New York State. This raises the question of how household sorting might differ if the political geography were different.

This chapter focuses on the tension between localism and segregation with regard to the political geography of metropolitan areas. The Tiebout model assumes perfect information on the part of residential households. In the real world households will of course not have perfect information, but anything that increases their knowledge of community taxes and services will facilitate Tiebout mobility and

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therefore bring local public service provision closer to the efficient outcome. Household knowledge will be impeded by a large number of incongruous political and administrative boundaries for different services, such as school districts, fire districts, water districts, etc. Coterminous political boundaries may therefore aid Tiebout mobility, but also facilitate citizen oversight and democratic participation in local governance (Schwartz 2001). But anything that increases Tiebout mobility may also increase income and racial segregation, suggesting that segregation may be higher in areas with coterminous political borders. This hypothesis is investigated for the New York metropolitan area, comparing New York State counties, where municipal and school district boundaries have no relationship to each other, and New Jersey, where school district boundaries are by law coterminous with municipal borders.

While local government formation is long-term endogenous, the relative stability of municipal and town structure in Nassau made it an ideal laboratory for an investigation of Tiebout sorting, as it removes a potentially confounding choice variable from consideration. Nassau County itself was formed out of the Eastern portion of Queens County in 1899, the year after the Western portion joined New York City. With regards to Nassau's municipal structure, a review of about two dozen

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of Nassau's 64 villages finds most incorporations occurring in the 1920s and virtually all occurring between 1900 and 1940. The timing of these incorporations in the earliest decades after New York City's consolidation suggest that these are defensive incorporations in the same manner that the timing of the incorporations of Bronxville, Scarsdale, and other villages in Westchester are argued to have been a response to expansion by New York City and White Plains (Jackson 1985: 152). One important feature of New York State's Village Law is that villages have the power to control zoning within their borders. However, in response to the proliferation of villages in Nassau, a provision of the Nassau County charter retains zoning power at the town level for any villages formed after January 1, 1963 (NYS DOS 2008: 73). In 1962, Atlantic Beach became the last village to incorporate before the charter change, and no villages have incorporated since then (NYS DOS 2008).

As for Nassau's school districts, a first pass at an answer is developed by Fischel (2009), who attempts to explain regional variation in school district formation in the United States. Fischel argues that today's suburban school districts are the result of historical forces, specifically the consolidation of one-room school districts (typically each one-room school was its own district) in the rural areas

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that surrounded American cities prior to twentieth century suburbanization. The number of one-room schools declined from over 200,000 in 1916 to “near zero” in 1972, while the number of school districts declined from approximately 120,000 to fewer than 20,000 (2009: 68). The consolidation process appears to be one-way: splitting existing school districts is politically difficult and rare. Further, this process was driven by *rural* consolidation; while the number of school districts in New York State declined by 43 percent between 1960 and 2000, the number of districts in Westchester and (importantly for our purposes) Nassau Counties was unchanged, as both had transitioned from rural to suburban counties earlier in the twentieth century. In the only two states for which he is able to find old school district maps near large cities, Fischel finds that school district boundaries show virtually no changes (other than a handful of consolidations) after 1926 in Ohio or after 1938 in Illinois (2009: 214-15). While the history should be investigated more deeply, it appears reasonable to tentatively conclude that Nassau’s school districts exhibit the same decades-long stability as its towns and villages.

Fischel surveys the overlap of populated area between municipalities and school districts for all large cities and a sample of smaller cities, and concludes that one-third of the urbanized population

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of the United States live in cities that are virtually coterminous with “their” school districts, and an additional one-third of the population live in cities that “substantially overlap” with “their” school districts. Fischel is primarily concerned to show that the received view of school districts largely *not* conforming to municipal boundaries is more apparent than real. Why do the incongruent geographies of states like New York and Illinois differ from this norm? To address this question, it is useful to look at the history of local government formation in neighboring New Jersey.

New Jersey is one of the states that, along with those of New England, has school districts that are virtually always coterminous with municipal boundaries (the only exception noted by Fischel being one where two contiguous elementary school districts share a high school). The law governing New Jersey’s school district boundaries was enacted in the context of 1890s “Borough Fever”, the rapid formation of small local governments in suburbanizing New Jersey. A detailed history, based on contemporary newspaper accounts, appeared in a newsletter of the Bergen County Historical Society (Wright c. 1994). Rural Bergen County had been increasingly settled by commuters, whose village-centered residences shouldered increasingly larger shares of the tax burden of the prevailing township form of government, while the rural

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inhabitants were leery of the threat of rising taxes due to the infrastructure needs of the village centers. The most significant points of contention were payment for paving (“macadamizing”) roads and building the new school buildings that the larger population required. Six decades before Tiebout’s watershed paper, the residents of parts of Bergen County argued that incorporation would allow them to retain “their” tax money, rather than paying for improvements elsewhere.

School district boundaries, which were not yet required to conform to township boundaries, had largely remained unchanged in the previous two decades in spite of a 35% increase in the school population, and residents of the new population centers objected to the long distances their children had to travel to attend the rural schools. In February 1893, a school district covering parts of both Palisades Township and Midland Township was divided, and in the process the village of Peetzburgh voted itself a territory including the Hackensack Water Works, a valuable ratable. In March 1894, the villages of Oradell and New Milford seceded from Midland Township, forming the borough of Delford, and grabbing back the Water Works. The incorporation was immediately challenged because the new borough crossed township lines. In May 1894, the New Jersey State Legislature passed a Supplement to the Borough Act giving its

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imprimatur to the new borders of Delford, but in the process creating a general enabling law that granted a seat on the County Board of Chosen Freeholders to new boroughs formed from territory ceded by two adjacent townships. In the same month, in order to address concerns over educational equity between rural and suburban areas, the legislature enacted the Township School Law, providing for consolidated school districts covering entire townships, but also requiring separate and coterminous school districts for cities, boroughs, and incorporated towns. Both laws would contribute to an explosion of borough formation. Over the following year the County Board of Chosen Freeholders would increase in members from 15 to 28 as villages intentionally formed boroughs crossing township lines, and wealthier suburban areas circumvented the intention of the Township School Law by forming their own boroughs. Borough proponents openly acknowledged the fiscal incentive and motivating force of the Township School Law. In 1896 the legislature took to itself the authority for all new incorporations, ending the era of easy incorporation (Wright c. 1994).

Wright's account and Fischel's account, along with what we know of the incorporation dates of Nassau villages, suggest a general history of the process of local government formation in the New York City

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suburbs. Rural county subdivisions—towns in New York State, townships in New Jersey—shouldered the bulk of local government responsibility in the mid-1800s. These subdivisions, however, were too large for the daily travel of schoolchildren, and school districts were formed covering geographically smaller areas than townships. In the late 1800s, these counties experienced a large influx of commuter population. Smaller local governments began to form—villages in New York State, boroughs in New Jersey—to satisfy the public service demands of the wealthier suburban areas. Defensive incorporation was also a factor, in Nassau due to the proximity of New York City, but even in Bergen County, “protected” from New York City by the state line, defensive incorporation seems to have been motivated entirely by local concerns. Initially these general purpose municipalities had no geographic correspondence with school districts. Only in New Jersey did specific concerns regarding equity in educational finance between the poorer rural areas and the wealthier suburban areas lead to legislation requiring school districts to be coterminous with townships and municipalities. Thus, while in both Nassau and Bergen there are many quite small municipal governments, in Nassau the villages are contained within or divided across larger school districts, while in Bergen, to this day, there remain many extremely small schools in

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extremely small school districts. Further, while the equalization intent of the Township School Law was subverted even at the time, its contribution to Borough Fever can be reasonably construed as influencing the modern landscape of educational inequality that the *Abbott* litigation addressed.

Finally, the largely unsuccessful Township School Law is a contingent historical event that creates for Bergen County a local government geography distinct from that of Nassau County, in spite of the otherwise similar geohistory of suburbanization. The last chapter demonstrated that income and racial sorting operate over different local government geographies in Nassau County. The current chapter exploits the differing histories of New Jersey and New York to compare the coterminous boundaries of New Jersey with the crazy quilt boundaries of New York State, beginning with a comparison of Bergen and Nassau.

### ***4.2 The Implications and Significance of Coterminous Boundaries***

Investigating the impact of coterminous borders is one question within a broader issue of how local government structure affects Tiebout outcomes. The more commonly engaged question is the issue of fragmentation vs. consolidation. Tiebout came down on the side of

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fragmentation, sidestepping the issue of arriving at political solutions to discordant preferences by proposing a system in which people formed political communities based on matching preferences. Tiebout therefore emphasized “exit” over “voice” (to put it in terms of the framework of Hirschman 1970), but the world in which we live has not abandoned voting (voice) as a mechanism for allocating local public services, and much urban economic research models the influence of voting (voice) as well as sorting (Ross, Yinger 1999). Indeed Fischel, a strong defender of a Tiebout-type localism, forcefully argues that homeowner *voters* (which he calls “homevoters”) are the driving force behind the general efficiency of small local governments (Fischel 2001). Arguably, small government units are easier for citizen-voters to monitor, and local officials in small units will be more accessible and more responsive to voters (Ostrom, Tiebout & Warren 1961). Yet a Long Island Index survey of attitudes toward local government found that, when compared with Long Island, residents in the more consolidated Northern Virginia counties of Fairfax and Loudon expressed more positive views of local government, greater confidence in access to public officials, higher satisfaction in local services (including separately specified education and local police), and were more likely to rate their property taxes as a good value compared to

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the services they receive (Center for Survey Research 2007).

While the Long Island Index report deals with fragmentation rather than the issue of coterminous boundaries, some of the theoretical issues are similar. Ostrom, et al. (1961) argue that citizens of “Gargantua” (a consolidated government) may be prevented from exerting effective control over local public officials by the bureaucratic complexity of large organizations. A similar argument can be made with respect to geographic complexity, such as the geographic complexity of overlapping general and special purpose local governments in Nassau County, possibly a contributing factor in the dissatisfaction with local government services documented by the Long Island Index report. It could also apply to the geographic complexity of administrative boundaries internal to larger units of government. For example, Schwartz calls attention to the jumble of incongruous administrative boundaries within New York City, including 32 elementary school districts, 75 police precincts, and 59 community districts. While conceding that each public service might have a different ideal size based on different economies of scale, she argues that citizen participation would improve if these boundaries were rationalized, perhaps uniting all service functions to the community district, even if they remain independently administered (Schwartz

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2001). Such rationalization of boundaries need not be linked, therefore, to either consolidation or devolution.

Clearly, coterminous boundaries are relevant to the Tiebout model. On the one hand, if coterminous boundaries force services with wildly different scale economies into like-sized units, they could undermine Tiebout efficiency. Conversely, by increasing household access to information, coterminous boundaries should promote efficiency, in either a voting (Fischel-type) interpretation of the model or a sorting interpretation of the model. The advantages for a pure sorting model are perhaps greater, as it might be hypothesized that the cost of information is higher to the nonresident mover choosing among several possible communities than to the situated resident. The investigation of the last chapter, which concluded that income is more important to choice among general purpose local governments while race is more important to choice among school districts, raises the question of how racial and income sorting will interact in the presence of coterminous local government borders. The next section investigates the hypothesis that racial and income sorting will reinforce each other, leading to greater racial and income stratification in states like New Jersey which mandate coterminous school district and municipal boundaries.

### **4.3 Empirical Investigation of Coterminous Borders**

The previous chapter tested one aspect of the Tiebout model by investigating socioeconomic sorting across differing local government in Queens and Nassau Counties, New York. This included general purpose local governments such counties, cities, towns (subcounty divisions), and villages (municipalities), as well as one particularly important special purpose local government, namely, school districts. Remember that city and town are mutually exclusive and exhaustive, i.e., all New York State land is part of a city or a town, but not both. Remember also that towns *may* contain villages, but some town area is not within any village. Villages control their own zoning, but they may choose whether to provide their own public services, such as road maintenance, trash collection, and local police, or whether to contract with the encompassing town to provide these services. The empirical investigation exploited the incongruity of these various local government boundaries to look for evidence of heterogeneity (or segregation) across these boundaries. The results indicated that income is a significant factor in sorting across municipal boundaries, but support for income sorting across school district boundaries was ambiguous: border heterogeneity was significant for only one of three alternative measures of income inequality, and the magnitude of the

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*Table 4.1: Bergen-Queens Income and Racial Sorting*

Independent Variables:		Dependent Variable:			
		t-Statistic (Heteroscedastic)	Theil Inequality (Ratio of Between- Group to Total)	Absolute Difference of Median Income	Top Two Groups Index of Dissimilarity
		Model 1	Model 2	Model 3	Model 4
(Intercept)		2.751*** (0.096)	0.015*** (0.001)	6451.096*** (378.852)	0.172*** (0.004)
Jurisdictional Borders	municipality	1.097*** (0.161)	0.022*** (0.002)	4078.435*** (637.219)	0.028*** (0.008)
Spatial Interaction Measures	distance_km	1.703*** (0.213)	0.022*** (0.003)	10183.546*** (841.504)	0.032** (0.010)
	distance_km2	-0.182** (0.063)	-0.004*** (0.001)	-1269.346*** (246.842)	-0.009** (0.003)
Other Variables	suburban	0.094 (0.108)	0.005** (0.002)	3479.066*** (425.130)	0.012* (0.005)
	adj. R-squared	0.056	0.061	0.131	0.011
	F	93.956	101.169	235.327	17.888
	N	6221	6221	6221	6221

Numbers in parentheses are standard errors.

\* Significant at  $p < 0.1$

\*\* Significant at  $p < 0.05$

\*\*\* Significant at  $p < 0.01$

effect was small compared with municipal border heterogeneity. Models of racial heterogeneity lacked explanatory power, but contrary to the income models, school districts rather than municipalities were the boundaries of significance. The plausible hypothesis that households would also sort by family structure, specifically that households with children would tend to separate from childless households, particularly with respect to school districts, was unsupported, and is not investigated in this chapter.

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In New Jersey, townships historically fulfilled the same function as New York State towns, as subcounty governments (minor civil divisions) that bore primary responsibility for service provision. Each county would be composed of several townships, which would provide infrastructure such as roads and streetlights. Boroughs, as small municipalities that tended to form around clusters of population and commerce, can be roughly equated to New York State villages. However, in New Jersey, when a borough forms, its territory actually *secedes* from the township it was formerly a part of. (There are other possible forms of government as well, but the township and borough forms are the most common.) No territory in New Jersey is

*Table 4.2: Bergen-Nassau Income-Based Sorting*

Independent Variables:		Dependent Variable:					
		t-Statistic (Heteroscedastic)		Theil Inequality (Ratio of Between-Group to Total)		Absolute Difference of Median Income	
		Model 5A	Model 5B	Model 6A	Model 6B	Model 7A	Model 7B
(Intercept)		2.268*** (0.154)	2.258*** (0.160)	0.012*** (0.003)	0.013*** (0.003)	9367.965*** (769.636)	10337.043*** (794.670)
Jurisdictional Borders	municipality	1.924*** (0.189)	1.933*** (0.193)	0.039*** (0.003)	0.037*** (0.003)	15343.786*** (944.216)	14513.988*** (958.384)
	sdsec	-0.536* (0.225)	-0.523* (0.231)	-0.008* (0.004)	-0.011** (0.004)	-1426.374 (1120.927)	-2693.393* (1149.993)
	nassau_town	1.702*** (0.369)	1.712*** (0.371)	0.028*** (0.006)	0.026*** (0.006)	3498.13 (1840.895)	2586.708 (1847.302)
Spatial Interaction Measures	distance_km	2.116*** (0.260)	2.114*** (0.260)	0.033*** (0.004)	0.034*** (0.004)	9219.700*** (1296.073)	9434.202*** (1294.365)
	distance_km2	-0.192* (0.081)	-0.192* (0.081)	-0.006*** (0.001)	-0.006*** (0.001)	208.795 (401.566)	167.713 (400.887)
	municipality x sdsec	0.402 (0.319)	0.371 (0.342)	0.005 (0.005)	0.011 (0.006)	-6740.768*** (1590.550)	-3813.276* (1702.433)
Other Variables	new_jersey		0.028 (0.114)		-0.005** (0.002)		-2708.892*** (569.023)
	adj. R-squared	0.11	0.11	0.104	0.105	0.145	0.148
	F	116.945	100.23	109.799	95.476	160.122	141.015
	N	5622	5622	5617	5617	5622	5622

Numbers in parentheses are standard errors.

\* Significant at  $p < 0.1$

\*\* Significant at  $p < 0.05$

\*\*\* Significant at  $p < 0.01$

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unincorporated, all territory is part of exactly one municipal government, and in spite of differences in form (e.g. “strong mayor” vs council-manager), there is no difference in the powers of different classes of municipality (Cerra 2007). Finally, as discussed earlier, because of the Township School Law, New Jersey school districts are coterminous with municipalities. It is this fact which motivates the investigation of the present chapter. The working hypothesis is that when school district and municipal borders are coterminous, racial and income sorting will reinforce each other, leading to higher degrees of racial segregation and income segregation in New Jersey than in New York.

In the first stage, the hypothesis is investigated comparing Bergen County, New Jersey, to Nassau County, New York. Bergen County is chosen as the best match among the candidate Northern New Jersey counties. Nassau County is a heavily urbanized suburban county, with a 2000 population of 1.3 million, and a population density of almost 4700 persons per square mile. At 880,000 persons, Bergen County is the most populous Northern New Jersey County, and has a similar population density (3800 persons per square mile). It is also demographically similar, with a population that is 72% White non-Hispanic, 5% Black, 10% Hispanic, and 11% Asian, compared to 74% /

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*Table 4.3: Bergen-Nassau Racial Sorting*

Independent Variables:		Dependent Variable:					
		White/Black Index of Dissimilarity		White/Hispanic Index of Dissimilarity		Top Two Groups Index of Dissimilarity	
		Model 7A	Model 7B	Model 8A	Model 8B	Model 9A	Model 9B
(Intercept)		0.202*** (0.010)	0.192*** (0.010)	0.218*** (0.007)	0.232*** (0.008)	0.219*** (0.007)	0.236*** (0.008)
Jurisdictional Borders	municipality	0.036** (0.012)	0.045*** (0.012)	0.021* (0.009)	0.009 (0.009)	0.014 (0.009)	-0.001 (0.009)
	sdsec	0.034* (0.014)	0.047** (0.014)	0.045*** (0.011)	0.027* (0.011)	0.070*** (0.011)	0.048*** (0.011)
	nassau_town	0.035 (0.023)	0.045 (0.023)	0.034 (0.018)	0.021 (0.018)	0.036* (0.018)	0.02 (0.018)
Spatial Interaction Measures	distance_km	0.081*** (0.016)	0.079*** (0.016)	0.030* (0.012)	0.033** (0.012)	0.018 (0.012)	0.022 (0.012)
	distance_km2	-0.021*** (0.005)	-0.021*** (0.005)	-0.010* (0.004)	-0.010** (0.004)	-0.011** (0.004)	-0.011** (0.004)
	municipality x sdsec	-0.008 (0.020)	-0.037 (0.021)	-0.041** (0.015)	0.001 (0.016)	-0.038* (0.015)	0.014 (0.016)
Other Variables	new_jersey		0.027*** (0.007)		-0.039*** (0.005)		-0.048*** (0.005)
	adj. R-squared	0.017	0.02	0.007	0.016	0.016	0.029
	F	17.554	17.152	7.987	14.154	16.003	25.051
	N	5622	5622	5622	5622	5622	5622

Numbers in parentheses are standard errors.

\* Significant at  $p < 0.1$

\*\* Significant at  $p < 0.05$

\*\*\* Significant at  $p < 0.01$

10% / 10% / 5% for Nassau County. Other candidate counties are more urban (denser) and too different demographically (Hudson County includes Jersey City and is 40% Hispanic, Essex County includes Newark and is 40% Black). Following the Nassau-Bergen comparison, all suburban New York State counties are compared with all New Jersey counties of the New York-Northern New Jersey-Long Island CMSA .

This investigation relies on data from the 2000 Census on household income and householder race by block group and by county. The method developed Chapter 3 is applied to the comparison of Bergen

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and Nassau Counties. Each OLS regression is set up with a dependent variable representing heterogeneity—that is, representing the strength of the difference between the populations of the neighboring block groups—and independent variables representing jurisdictional boundaries and other likely influences on heterogeneity. Household incomes in neighboring block groups are used to calculate two measures of difference: the *t*-statistic and the Theil inequality index.

*Table 4.4: Inequality, New Jersey vs. New York Suburban Counties*

Independent Variables:	Dependent Variable: Theil Inequality (Ratio of Between- Group to Total)		
	Model 10	White/Black Index of Dissimilarity Model 11	White/Hispanic Index of Dissimilarity Model 12
(Intercept)	0.608*** (0.050)	0.410*** (0.051)	0.058** (0.016)
new_jersey	0.007 (0.062)	0.048 (0.062)	0.01 (0.020)
F	0.012	0.59	0.246
p	0.914	0.452	0.626

Numbers in parentheses are standard errors.

\* Significant at  $p < 0.1$

\*\* Significant at  $p < 0.05$

\*\*\* Significant at  $p < 0.01$

The *t*-statistic is a variance-adjusted difference of means with a straightforward interpretation. Not only does a greater absolute difference in mean incomes affect *t* plausibly (making it increase), but more homogeneous populations have a smaller income variance,

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which again yields an increased  $t$ -statistic. An alternative measure of difference is the commonly used Theil inequality index. This measure is decomposable into within-group and between-group inequality.

Following a previous investigation of Tiebout sorting by Eberts and Gronberg (1981), heterogeneity is expressed as the ratio of between-group inequality to the total inequality of the paired block groups.

Finally, both of these income heterogeneity measures are compared with the computationally easier difference of median incomes, based on the block group median income reported by the Census Bureau.

In order to measure racial and ethnic segregation,  $D$ , the well-known index of dissimilarity, is used (Kaplan, Holloway 1998). The categories used are Hispanics of any race, and racial groups excluding Hispanics (i.e., White means White non-Hispanic, Black means Black non-Hispanic, etc.).  $D$  can only measure segregation between two demographic groups. For this study,  $D$  is calculated for White/Black segregation, White/Hispanic segregation, and segregation between the two most populous racial/ethnic groups in each block group pair.

Most of the independent variables are dummy variables representing whether the block group boundary coincides with a jurisdictional border. The borders being investigated include the borders of school districts, towns (county subareas in Nassau County),

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and suburban municipalities (which includes cities and villages in Nassau, boroughs and townships in Bergen). Most of the school districts in the study area are unified school districts. Elementary school district borders are not included in the analysis.

Independent variables are selected that might plausibly influence heterogeneity across block group boundaries. Of primary importance is controlling for spatial interaction, the way that spatial characteristics of the local area influence the interaction between neighboring populations. Distance between the block group centroids (geometric centers of mass) is the measure used. Spatial interaction may not decline linearly with distance, so distance may be raised to a power. Distance squared yields a so-called gravity model. Often, both distance and distance squared will be included so that spatial interaction may be allowed to vary in intensity and sign as distance changes. *F*-tests indicate that models with both distance variables perform better than models with only one or the other.

OLS regression is first applied to Bergen County to confirm socioeconomic sorting across municipal/school district borders. A problem with previous research is that jurisdictional sorting has not controlled for sorting absent political fragmentation. Queens County is included in the regression, as it was in comparison with Nassau, so that

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the regression presents jurisdictional heterogeneity against a baseline that combines urban and suburban populations. The three measures of income inequality and the measure of racial/ethnic segregation are calculated at census block group boundaries, and regressed on a dummy variable indicating a municipal border, controlling for expected spatial interaction and suburban location. In this regression, there is only one local government dummy variable, since New Jersey municipalities are coterminous with school districts and, as previously explained, are nonoverlapping and have the same powers whether their legal form is borough, township, or city. The results, presented in Table 4.1, show that the combined municipal/school district boundary variable is significant in both income and racial heterogeneity regressions, indicating that both aspects of sorting are operative across borders of New Jersey local governments. The magnitude of the effect is, however, smaller than in the Nassau-Queens investigation, and the explanatory power (adjusted  $R^2$ ) of each model is lower than the analogous model for Nassau-Queens (compare with Tables 3.2 and 3.3).

Next, the method is applied to a regression of boundary heterogeneity in Nassau and Bergen Counties. In this model, Nassau villages and cities are treated as equivalent to Bergen boroughs and

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townships. Nassau towns enter the regression independently, with no New Jersey equivalent. Secondary school districts are another explanatory variable, but remember that in Bergen, secondary school borders *always* coincide with municipal borders. The hypothesis of mutually reinforcing sorting is investigated by adding an interaction term for the municipal and school district borders. For most block group boundaries, the value of the interaction term is 1 if the boundary coincides with both a municipal border and a secondary school district border, 0 if either or both of the municipal variable or the school district variable are 0. In an additional series of models, a dummy variable indicates New Jersey boundaries, to control for whether Bergen or Nassau have pervasively higher heterogeneity.

The results, reported in Table 4.2, are not favorable to the hypothesis. The interaction term, municipality x sdsec, is not significant in the models relying on the *t*-statistic and the Theil Inequality Index as the measures of income heterogeneity. In the model that uses difference in median income, the interaction term is significant but of the wrong sign, indicating *lower* income heterogeneity across boundaries which are both municipal and school district borders. The dummy variable representing location in New Jersey is not significant in the model which uses the *t*-statistic, and

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while significant in the other two income models it indicates *lower* general income heterogeneity in Bergen than in Nassau. The difference in median income variable is right-skewed, and large residuals are found around known high-income enclaves on the North shore of Nassau County and along the Palisades in Bergen county. Residuals are uncorrelated with the state dummy variable, so in spite of generally larger spatial inequality in Nassau, the model is not consistently underpredicting border heterogeneity there in comparison with Bergen.

The investigation of racial sorting, reported in Table 4.3, is similarly unfavorable, moreso because the models have very little explanatory power (which was true of the Queens-Nassau models reported in Table 3.3). The interaction term is not significant for the White/Black index of dissimilarity, and for White/Hispanic dissimilarity and the index of dissimilarity among the top two racial/ethnic groups, the sign indicates *lower* dissimilarity where borders coincide. The New Jersey dummy variable does indicate pervasively higher White/Black dissimilarity in Bergen, though interpreting this result is complicated by the opposite (though insignificant) sign for combined municipal/school district borders. Indices of dissimilarity for White/Hispanic and top two groups are pervasively lower in Bergen. Residuals were examined for the

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study area. There was no obvious spatial patterning, and in particular no correlation with the New Jersey dummy variable. In spite of a small but significantly different pattern of racial/ethnic segregation (White/Black dissimilarity is approximately 0.02 higher in New Jersey, while White/Hispanic and top two groups dissimilarity are approximately 0.04 lower), there is no discernible impact in the residuals of the border heterogeneity models.

While the conjunction of municipal and school district boundaries does not seem to increase to increase heterogeneity at the local scale, the possibility remains that wider scale segregation will be facilitated by this political geography. Since municipal and school district borders are everywhere coterminous in New Jersey, but not in New York, Theil Inequality Indices and indices of dissimilarity are computed for 21 suburban counties in the New York-Northern New Jersey Metropolitan Area (that is, all counties except the five boroughs of New York City), and ANOVA is performed on the counties grouped by state. The F-statistics, reported in Table 4.4, indicate that there is no significant difference in either income or racial sorting across counties in the two states.

### **4.4 Discussion and Conclusion**

The hypothesis of this investigation of the impact of coterminous

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local governments on income, racial, and ethnic sorting is decisively rejected. The comparison of Bergen and Queens seems to be influenced by Nassau's extremely high levels of income sorting. Bergen's income sorting is much lower to begin with (compare the coefficients in Table 4.1 and 3.2). Since Bergen municipal and school district borders are all coterminous, while a large majority of Nassau's borders are not, coterminous borders as a class will appear to be less heterogeneous than single-scale borders. Thus, for one measure of income sorting (absolute difference in median income), the sign of the coefficient is negative. But for the other two measures, the coefficient is not even statistically significant.

If the result is dominated by Nassau's high degree of spatial inequality, a more favorable result might be obtained for a larger class of counties. But a simple comparison of county-level inequality and segregation between New York and New Jersey counties also yielded no statistically significant results. A version of the regression (not reported) looking at all counties from all metropolitan areas in New York and New Jersey was tried, and also failed to reject the null. The impact of coterminous boundaries remains interesting and important. Going forward, what is needed is a clearer theoretical understanding of the expected effects of coterminous borders, testable hypotheses, and

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the application of the current method and new methods to more states over a wider geographical area.

What lessons can be drawn from these negative results? In the next chapter, I will discuss the benefits of the rationalization of jurisdictional and administrative boundaries. One of the central criticisms of the Tiebout model is that it is believed to create or exacerbate economic and racial segregation. My working hypothesis was that income and racial segregation would be mutually reinforcing, and therefore larger, in areas with coterminous local governments. While the pure theory of the Tiebout model might view this outcome as just another manifestation of consumer preference, those who are already suspicious of the Tiebout model, or those who value its efficiency effects but recognize its contribution to racial segregation, might see coterminous borders as making a bad system worse. The negative results of the present investigation suggest that this concern is misplaced. Therefore *if* we have good reasons to promote the drawing of coterminous local government borders (and what those reasons might be will be discussed in the conclusion), the present investigation rejects one potential criticism of such a policy.

## **5 Concluding Remarks**

### ***5.1 Summary of the Empirical Investigation***

As stated in the introduction, the Tiebout model generates claims regarding empirical validity, efficiency, and policy. The primary empirical claim to have been investigated is whether households (adequately) take local government services into account in deciding where to live. If certain assumptions are satisfied, such as perfect knowledge and costless mobility, the resulting outcome is claimed to be efficient. If efficient, meeting the assumptions of the model is taken to be a reasonable policy goal. Missing in most discussions of Tiebout is an explicit ethical dimension. I have therefore discussed principles of spatial justice, focusing on how specifically local public services affect the distribution of resources in a society, and how the principles of justice and the federal structure of public service provision must influence each other. In the current, concluding chapter, I seek to tie these threads together in a discussion of the values in and the value of a Tiebout-inspired, justice-constrained localism. To begin with, let me summarize my empirical findings.

The Tiebout model implies that households will sort into jurisdictions

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based on preferences for local public services. While Tiebout assumed for purposes of exposition that income was unrelated to residential location, we do no great violence to the model by assuming that the household exercises choice over a labor market, which is basically how the United States Census Bureau defines a metropolitan statistical area. Actual household preferences are unobservable, but if preferences are correlated with observable characteristics such as income or race/ethnicity, populations should be socioeconomically more homogeneous within local government units than within the encompassing metropolitan area. Previous investigations of this implication are suspect because they have failed to account for a statistical artifact and for spatial dependence in the data. The statistical artifact is that smaller populations will be more homogeneous than larger populations. A finding of increased homogeneity for smaller municipalities is therefore not evidence of a causal relationship, and not evidence of Tiebout sorting. Furthermore, because of spatial dependence in socioeconomic data, randomly delineated areas will exhibit *some* homogeneity, and smaller areas will usually exhibit *more* homogeneity. Consider median income: In Chapter 3, Moran's I confirmed significant clustering ( $p < 0.01$ ) of census tracts by median household income in Queens and Nassau

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Counties, New York. If nearer census tracts have more similar household incomes, then smaller jurisdictions, i.e. those composed of nearer census tracts, will be more internally homogeneous than larger jurisdictions, i.e. those composed of more spatially distant (though usually still contiguous) census tracts. Thus an often-used approach to empirically corroborating an important assumption of the Tiebout model is biased toward its conclusion.

In Chapter 3, a new method is proposed, inspired by capitalization studies examining home prices across jurisdictional borders, that correlates socioeconomic discontinuities with jurisdictional borders. This method is able to weigh the relative importance of different kinds of jurisdictional borders. Heterogeneity is quantified between all pairs of contiguous census block groups in Queens and Nassau Counties, New York. Income heterogeneity is calculated using three alternative measures: the heteroscedastic  $t$ -statistic (a variance-corrected difference of means), the between-group Theil inequality index, and the absolute difference of median incomes. Racial/ethnic heterogeneity and heterogeneity of family structure (presence of children) is calculated using  $D$ , the well-known index of dissimilarity.  $D$  is calculated for White-Black dissimilarity, White-Hispanic dissimilarity, and dissimilarity between the top two racial/ethnic groups in each

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block group pair. For family structure,  $D$  is calculated using households with and without children as the two groups. Each of these heterogeneity measures is used as the dependent variable in regressions with explanatory variables representing jurisdictional borders, controlling for suburban location and spatial interaction. Block group pairs are coded 1 if they fall in different general purpose local governments, 0 if they don't. While block groups align precisely with general purpose local government boundaries, they do not align with school district boundaries. The variable indicating a school district boundary is therefore coded based on the percentage of school district population exclusive to each block group. This also reduces to 0 or 1 in the case of a single school district encompassing both block groups (0) or a school district border which exactly matches the block group boundary (1), but it may vary between 0 and 1 if a block group's population partially falls into the same school district as its neighboring block group, and partially does not. Queens County, a jurisdictionally unified borough of New York City, is included in the regression so that border heterogeneity will be tested against a baseline which includes households *not* choosing among different jurisdictions.

The regressions indicate that households sort among municipalities by income, but sort among school districts by race and ethnicity. The

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absolute value of the difference in median annual income is more than \$18,000 higher ( $p < 0.01$ ) in block group pairs which straddle village (municipal) borders than for the average block group pair. An important contribution of this study is the finding that income heterogeneity between school districts is largely an artifact of the failure to account for the sorting effects of multiple levels of government. School district border heterogeneity appears statistically significant ( $p < 0.01$ ) in regressions which omit the borders of general purpose local governments (villages, towns, and cities), but this effect completely disappears when the full complement of explanatory variables is introduced. This behavior applies to all three alternative measures of income inequality. Racial/ethnic heterogeneity is higher across school district boundaries for three different race/ethnicity pairs. Dissimilarity between the top two groups in each block group pair is 0.069 higher (on a 0 to 1 scale,  $p < 0.01$ ) for a block group pair which is divided by a school district boundary. Village (municipal) boundaries are only significant for White-Black dissimilarity, increasing  $D$  by 0.059 over a block group pair not divided by a village boundary. However, the explanatory power of the race/ethnicity models are weak. Family structure (presence of children) is found to not be influenced by municipal or school district borders.

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I attribute the finding of income sorting at the municipal level to control over zoning, which gives municipal governments considerable power to employ exclusionary zoning to control the price of access to a community. Nassau school districts do not have power over zoning, which means they cannot employ exclusionary zoning to control entry. Further, as education is also privately available, there is less incentive for income-based sorting over school districts (Nechyba 2003b). The finding of racial sorting is consistent with established research indicating that race is a significant driver in household choice of schools (Hamilton, Guin 2005). While much of the previous literature suggests that households are choosing school districts based on quality, these results suggest a more complicated story. First, racial sorting seems to be operative without school districts having control over zoning. Second, income sorting may be desired as its own end, regardless of access to particular schools. Third, zoning itself, or perhaps the direct effects of zoning such as lower residential density or the qualitative aspects of planning, may be a service which households value, rather than the indirect effect of zoning on the socioeconomic makeup of the jurisdiction.

The findings of Chapter 3 are possible because of the lack of correspondence among municipal and school district boundaries in

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New York State. In neighboring New Jersey, municipal and school district boundaries are by law required to be coterminous. A natural experiment suggests itself in investigating the impact of coterminous boundaries on household sorting. The Tiebout model assumes perfect information on the part of mobile households. While this assumption will not be met in practice, it stands to reason that coterminous borders will increase the accessibility of information. I hypothesized that racial and income sorting would be mutually reinforcing, leading to greater spatial segregation along both dimensions in New Jersey than in New York. The empirical investigation of Chapter 4 did not support the hypothesis. Income and racial sorting were not higher along the combined municipal/school district borders of Bergen County, New Jersey, than along the primarily unidimensional borders of Nassau; and overall inequality/segregation in the New Jersey counties than in the New York counties of the New York-Northern New Jersey-Long Island Metropolitan Statistical Area. However, it is important to stress that the regressions do confirm income and racial sorting across jurisdictional borders within Bergen County, though the effect is not as pronounced as in Nassau County. Since municipal and school district boundaries have been stable for decades in both Nassau and Bergen, I conclude that the population patterns have emerged through

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deliberate choice among local government jurisdictions, supporting an important assumption of the Tiebout model.

### **5.2 Spatialized Justice in the Fragmented Urban System**

Household sorting can be viewed as undesirable in its own right—that is, as a form of exclusion—or as indicative of households making choices regarding public services. The fragmented American metropolis can therefore be viewed as affording more choices and therefore higher household utility, or as contributing to racial segregation and spatial inequality. The central argument in favor of facilitating Tiebout choice is the claim that the resulting distribution is efficient. This claim engenders a certain complacency with regards to socioeconomic segregation, and can be interpreted, as Harvey suggests much of location theory can be, as a mere *ad hoc* justification for the *status quo*. Yet what is the value of this efficiency? Remember that an efficient outcome, in the economist's sense, merely means a situation in which no one can be made better off without someone being made worse off. As discussed in Chapter 2, Rawls prioritizes equity over efficiency. Using the example of serfdom, he argues that even though some people (feudal landholders) will be hurt in the transition to free labor, this is no argument against transitioning to a more

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equitable distribution (the abolition of serfdom). The Pareto efficiency concept is therefore inherently conservative, as it is probably very difficult to change *anything* in a way which does not hurt *someone*.

The Pareto efficiency concept is therefore of exceedingly limited use in actual policy evaluation (Hausman, McPherson 2006). Even if the outcome is efficient, we may look at the obvious inequalities written in the concrete, glass, asphalt, and steel of the urban landscape and agree with Smith (1994) that the worst-off cannot reasonably be considered to be as well-off as they can be. The basic structure of a society, according to Rawls, includes its governance structure, taxation, concept of family, etc. To account for a basic structure that allows (or discourages) the manifestation of inequality in a specifically urban form, we must also include the following as elements of the basic structure: land planning regime (locally controlled in the United States), metropolitan political structure (divided between city and suburb, and fragmented within suburbs), typical local revenue sources (primarily property taxes with significant intergovernmental transfers), and typical local government functions (which in the United States includes education). The result is a basic structure with a high degree of local control of those government functions which most heavily influence the well-being of the nation's citizens.

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Does this mean that Rawls would reject this basic structure? Rawls argues for redistribution at the level of a national polity. In this, he would be backed up by public finance economists who have typically argued that redistribution at the local level is too easily avoided by the emigration of the wealthy or overburdened by the immigration of the poor. In its focus on local public goods, the Tiebout model is primarily focused on the allocation branch of government—that is, allocating resources towards goods which would be underprovided by the market. If Tiebout sorting leads to efficiency in public goods provision, redistribution could take place at the national level, in terms of cash or in-kind transfers, or through intergovernmental grants which provide additional resources to the worst-off areas. In the American context, this would primarily involve providing grants to central cities which would be financed by suburban residents, though some redistribution among suburbs would be necessary as well.

A problem with this somewhat simple solution based on traditional public finance theory is that even after the monetary redistribution has taken place, because of the problem of neighborhood effects, the poor households or the poor regions (central cities) will still not be better off than they would be under strict equality. That is, the difference principle will not have been satisfied. The amount of redistribution

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necessary to satisfy the difference principle may be so large—recall Betts and Roemer’s estimate of nine times the per capita educational expenditure to offset the burden of being Black in the United States (Betts, Roemer 2007)—as to seriously distort allocative efficiency, compromise the individual incentive to work, and distort the residential location decision (particularly if the tax burden or benefits were based to some degree on geography). It seems that the basic structure must involve not only a redistributive tax system, but some way of promoting socioeconomic integration or otherwise preventing wide disparities in the quality of local public services. What might a planner capture the efficiencies of the Tiebout model while conforming to the demands of the difference principle?

Tiebout suggests three policies to facilitate the operation of the model: information, persistence, and fragmentation. Since the model requires full knowledge of taxes and services among the various local governments, the government should publicize such information. In the case of services, publicizing of service quality is a movement that is gathering steam, partially through political effort, as with the grading of schools in New York City, and partially through the increased access to information made available by the internet. This policy can also be commended for its contribution to democratic

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control and oversight, not just in the process of household relocation. It seems relatively uncontroversial. An additional recommendation is the persistence of local government spending patterns. Most consumer durables do not change after purchase (except for expected wear and tear), but a house becomes, in a sense, a *different product* if the local government changes its allocation decision, introducing (or eliminating) a specific tax or a specific service. So Tiebout suggests that local governments be required to maintain existing tax and service packages. This idea has not been pursued in the literature and seems undemocratic and just plain bizarre. Just because we hope to capture the efficiencies of competitive markets does not mean that we should try to force public goods to be something they can never be.

Tiebout's main suggestion is to facilitate choice by providing a large number of communities from which to choose. Thus, he supports a fragmented intraurban political landscape. Because of the obvious inequalities between cities and suburbs, as well as because of the desire for regional planning, a contrary literature recommends metropolitan consolidation (Rusk 2003). There are certainly differences among communities that households might legitimately choose, such as the desire for natural amenities such as beaches and open space. The Tiebout model is motivated by the idea that households ought not

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to pay for the preferences of their neighbors, and even Harvey (1973) tepidly endorses sorting by consumer preferences. Rawls does as well, though without considering the spatiality of service delivery. He proposes that after government has provided public goods needed by all, and fulfilled the redistribution goals required by the difference principle, another branch of government (the “exchange branch”) should use benefit taxation—taxation that falls on the party that enjoys the service—to provide for goods not uniformly demanded by the population (Rawls 1971: 249-250). Although Rawls’ spaceless theory suggests that this function could be provided by a national assembly, the Tiebout model suggests instead that this function be provided by a system of competing local governments. Therefore, it seems that Rawls could endorse a separation of city and suburb if each area provides a unique set of public goods.

But the goods differently available must not conflict with the demands of justice. While Rawls sees this as a two-stage process, where first we provide the public goods demanded by justice, and then we provide the public goods demanded by differing segments of the population, it could instead be conceived as a two-scale process. As a first pass, consider central provision of those goods demanded by justice, and local provision of those goods whose availability does not

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impact a just distribution. We would still need to evaluate educational provision in light of the difference principle. Would central provision benefit the worst-off? The experience of California suggests that it might not. When California, like other states, faced education funding equalization following the *Serrano* decision, California voters responded by passing Proposition 13 in 1978, placing limits on local property taxes. California's local school systems became increasingly dependent upon state transfers (primarily funded through state-level income taxes). But the primary result over subsequent decades was not to "equalize up", but to reduce the overall quality of California's public schools (Brunner, Sonstelie 2006).

Does the current system of local provision benefit the worst-off? Hoxby finds that greater Tiebout choice (a higher Herfindahl of school districts enrollment as a proportion of total metropolitan enrollment) leads to higher productivity, because of *both* higher student achievement *and* lower costs. These benefits extend to lower-income and Black and Hispanic students, although the effect is not as large as for higher-income and White students. Alternative interpretations include that the choice measure is dominated by choice of nondisadvantaged students, or that the choice has both benefits and harms for disadvantaged students, the negative effects partially

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offsetting the benefits (Hoxby 2000). This latter interpretation would be consistent with negative peer group effects and the harmful impact of racial segregation (Mickelson 2003). Rothstein challenges Hoxby's conclusion by focusing on the extent to which parental choice may be dominated by peer group choice, which is highly correlated with school performance (2004).

In sum, it seems unclear whether more centralized or decentralized provision would benefit disadvantaged students. But a system where education is primarily *funded and controlled* at the local level would be unlikely to satisfy the needs of the difference principle. A solution must include policies both to promote socioeconomic integration and to correct the "special difficulties stemming from the social environment" in the form of transferring additional resources to impoverished communities. While primarily concerned with the orthodox economists' approach to efficiency and welfare, Schwab and Oates (1991) propose that intergovernmental transfers would have the effect not only of compensating for the added costs of educating lower SES students, but would lead to increased integration because higher-income communities would be more willing to accept lower-income residents (students) because of the added funds such students bring with them. That is, a community could choose to enact exclusionary zoning, but

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they would pay the price in terms of their tax transfers to communities with lower average incomes. A community that enacted a policy of inclusionary zoning would reduce or eliminate their tax export. They would still have to pay local taxes, but those taxes would be directed locally, and supplemented by transfers from other localities. Though their approach entirely sidesteps the equity issue, it is entirely consistent with the spatialized Rawlsian approach developed here.

Finally, any discussions of the basic structure and of intergovernmental transfers must consider the source of tax revenue. Property taxes remain historically important specifically for financing local government in general as well as for education specifically. Income taxes are important at the national level. Rawls briefly discusses some alternatives, including a progressive consumption tax (Frank 2007 provides a recent statement). My own view is that Thomas Paine's (1796) and Henry George's (1879) argument about the relationship between land ownership and inequality is correct, and that George's proposed solution of a high tax on land rents, with central redistribution of the funds, is consistent with Schwab and Oates welfare analysis and would also satisfy the demands of the spatialized difference principle. With this background, specific policies for metropolitan structure and government funding are discussed in the

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next section. I will argue the advantages of local control with fiscal equalization.

### ***5.3 Policy Implications***

The most common policy question which emerges from the Tiebout literature is the issue of consolidation versus fragmentation. When Borough Fever was in swing in Bergen County, New York City was only a few years away from forming the largest American local government jurisdiction through consolidation. Consolidation during this period was driven by a belief that size mattered, and that economies of scale would lead to more efficient urban governance (Jackson 1985). In addition to economies of scale, regionalists have focused on the necessity for regional planning, e.g. for transportation systems, as well as on the impact on spatial inequality, particularly between lower-income central cities and higher-income suburbs (Orfield 1997). Against this, Tiebout saw his model as a defense of fragmentation, but he did realize the necessity to account for economies of scale (1956). The primary gains in a Tiebout landscape come from the sorting into relatively homogeneous jurisdictions of households with similar preferences, and this seems like a fair, perhaps even unavoidable manner for distributing access to locationally fixed amenities.

Throughout the literature in urban geography, planning, public

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finance, and ethics, two almost naturally important spatial scales appear over and over. Those scales are the metropolitan area and the neighborhood. The metropolitan area might be defined as a labor market or a production agglomeration. It is the area over which Tiebout choice might operate, in that a household may locate anywhere in the metropolitan area and get to employment in the region's core. Neighborhoods are small, relatively homogeneous areas. They might be defined in terms of face-to-face contact, or the daily mobility of the nonemployed, or the relationship to a central amenity such as a community center or park. But each neighborhood has a character, for good or ill, which people in other neighborhoods will be aware of. In a sense, regionalists might argue that the entire metropolitan area is the most natural political unit (although most contemporary regionalists, recognizing the political unfeasibility of such a goal, will offer less encompassing measures), while localists might argue that the neighborhood is the most natural political unit. Yet neither scale can be conceived without the other. Large central cities like New York are informally divided into neighborhoods and formally divided into administrative districts, while the residents of the suburbs of Long Island participate in the life of the region when they take advantage of employment, retail, cultural, and entertainment

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opportunities in neighboring suburbs or in New York City. What is needed, then, is perhaps not a wholesale reorganization of local government, but a mutual learning in which the city becomes more like the suburbs while the suburbs become more like the city.

Thus, Schwartz's (2001) call for the localization of power in New York City is just the flip side of Long Island Index's call for consolidation of government units within Long Island (Center for Survey Research 2007, Center for Governmental Research 2007). New York City residents already choose neighborhoods based on desired features (the New York City Housing and Vacancy Survey regularly asks householders their reason for leaving their previous neighborhood). The City does not have to split into a thousand small municipalities to take advantage of a Tiebout-type efficiency, or to increase citizen participation in oversight and governance. Conversely, Nassau County does not have to join itself to New York City to participate in regional planning or to take advantage of economies of scale. And both New York City and Nassau County could benefit from the congruence of administrative and jurisdictional boundaries. Here the negative results of Chapter 4 are useful, as this policy can be recommended with some evidence that conterminous borders will not *exacerbate* the segregation and spatial inequality that remains the biggest challenge

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to the Tiebout model.

There might be some efficiency losses if various public services have widely divergent optimum sizes, but the benefits in terms of citizen oversight and participation in governance might well be worth having some public services organized at other than their optimum size. Moreover, many “horizontally integrated” public services—services like fire protection and police protection which must be produced in “plants” dispersed throughout the landscape—appear to have essentially flat cost curves (no economies or diseconomies of scale) over a wide range of outputs (Hirsch 1968). Thus, there may in practice be *no* production cost tradeoff to requiring common jurisdictional boundaries for such services. But in arguing for the usefulness of a Tiebout-type localism, some restriction as to the lower size of a municipality (or central city administrative district) seems necessary. The small average size of municipalities in Long Island and New Jersey have repeatedly been suggested as a major factor in the high property tax burdens of these areas (Center for Governmental Research 2007). Yet a recent New Jersey state-level push toward consolidation of small municipalities has met resistance from local governments and their residents (Pérez-Peña 2010). New York’s new governor has similarly called for local consolidation as a cost-saving

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measure. It remains to be seen whether New York might have more success in this endeavor than New Jersey.

Resistance to the Tiebout model grows primarily out of concern for racial segregation and spatial inequality. To evaluate possible policies for dealing with this inequality, we must apply the justice perspective developed in Chapter 2 and in the last section. Recall that Rawls proposed an exchange branch of government (with its own legislature) that would use benefit taxation to provide services targeted to people who demand them. Given the nonexcludable nature of many public goods (but not, it should be noted, education), it is difficult to imagine what such services could be other than those whose benefits attenuate rapidly with distance, i.e., local public goods. I therefore proposed that a Tiebout-type localism could fulfill the function of the exchange branch. But in Rawls' theory, the demands of justice must be satisfied prior to any allocation by the exchange branch. Goods which are fundamental to distributive justice, such as education, should not be allocated via the exchange branch.

If local governments are to fulfill the role of the exchange branch, does this mean that education must be provided by a higher level of government? Since I have conceived of the exchange branch as being part of a *two-scale* system instead of the *two-stage* system proposed

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by Rawls, I am not proposing that local governments must be restricted to this exchange branch role. (In Rawls' two-stage system, the exchange branch legislature *must* be restricted to deliberating temporally after any distribution-impacting services have been provided for.) Local governments would continue to function, as they currently do, primarily as an allocation branch. But if they are also to provide public goods such as education which are heavily implicated in distributive justice, financing must be arranged so as to satisfy the demands of the spatialized difference principle: the financing system must be the one, out of all possible systems, which provides the greatest benefit to the least well off; and the locational advantages and disadvantages must be shared.

To satisfy the demands of the spatialized difference principle, we do not need consolidated metropolitan school districts (a proposal for which I am unaware of any proponents), but we do need to transfer resources from the wealthier to the poorer districts. This policy is consistent with Schwab and Oates' welfare economics analysis of the Tiebout model, which found increased *efficiency* (not just equity) in intergovernmental transfers, and also found that if additional funding were portable with disadvantaged students, this would provide an incentive for wealthier communities to accept some proportion of

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disadvantaged students so as to reduce their tax export (Schwab, Oates 1991). The policy is also consistent with modern American jurisprudence, which in many states has been receptive to fiscal equity challenges to the structure of educational finance. Fiscal equity campaigns have generally proceeded via lawsuit at the state level, as *San Antonio Independent School District v. Rodriguez* (1973) determined that school tax base inequality was not a federal issue (although *Milliken v. Brady II* (1977) explicitly *allowed* states to pursue their own tax base sharing plans). Legal successes in the courts have not always translated to policy implementation. Although Vermont's legislature passed Act 60, implementing a school district property tax sharing pool, for the school year immediately following *Amanda Brigham v. State of Vermont* (1997), in New Jersey (*Abbot v. Burke*) and New York (*Campaign for Fiscal Equity v. State*) court decisions have been met with footdragging by the legislatures and subsequent relitigation (New Jersey's *Abbot v. Burke* has seen 20 NJ Supreme Court decisions between 1985 and 2009).

The kind of tax base sharing enacted in Vermont inevitably brings us to discuss the most significant source of local public revenue, the property tax. The property tax is well-liked by public finance economists for several reasons, including its transparency; the

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immovability of the tax base (making it a better source of autonomous local revenue than income or sales taxes, which are more easily avoided); and the recapture of community-created property value (Youngman 2002). In spite of this, it is perhaps the most unpopular of taxes, its transparency being one of the features which causes it to draw so much ire. While property taxes are widely viewed as regressive, this view has not held currency in public finance economics for 35 years (Aaron 1975, Oates 1999). (Of interest, although I cannot address it here, is the fact that the left persists in the belief that property tax is regressive. Doubtless the lack of a committed opposition from the left has something to do with the success of property tax limitation measures proposed and financed by conservative organizations.)

In theory, the transfer of property taxes out of the local jurisdiction should be capitalized into lower housing prices. This would be beneficial in one of two ways. First, it would work directly to reduce the differential in housing prices in high tax base and low tax base jurisdictions, which itself would promote economic integration. Second, to the extent that housing prices remain high in the high tax base area, the residents would in essence be paying for their exclusivity. This would satisfy the requirements of the spatialized difference

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principle.

Rawlsian considerations point strongly toward the conclusion that educational funding should be structured so as to equalize not inputs but outcomes. This could involve intergovernmental grants, as I have discussed, or moving the entire funding system or even control to higher level of government. Considerable control of education by the states is already in effect, leading some to argue that local control of education is more myth than reality, and that state and U.S. Supreme Court decisions which justify local finance in terms a desired value of local control are suspect (Shelley 1994). Against this stands work by Hoxby, finding higher productivity (in terms of a measure of outcome success per dollar spent) among smaller districts, and Fischel's important argument that geographically defined school districts provide benefits in terms of social capital that lead to greater citizen involvement in local governance (Hoxby 2000, Fischel 2009). Considering that educational performance among OECD countries seems to be essentially uncorrelated with whether education is financed at a national, local, or (in some federal systems) state level (Fisher 1996: 503), it would probably be unwise to make too strong of a case for organizing education at any particular level. Since a wholesale transfer of educational finance to the state (or even federal)

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level is politically unlikely, a tax base sharing or equalization program is both politically expedient and preserves the argued benefits of local control.

This equalization with regard to need can be pursued in different ways. Vermont collects school property taxes at a uniform rate at the state level, then disburses the revenue to the school districts. Local school districts may increase their own taxes to add to this foundation funding, but must contribute part of the revenue they raise to a sharing pool that is distributed to other school districts. By comparison, New York State's response to the *Campaign for Fiscal Equity* decision is to provide additional funding to the New York City schools (\$359 million in the 2008-09 school year) out of general revenue, which means that it is mostly paid out of state income taxes and partially includes money collected from New York City residents. This may result in improvements in New York City education, but it is not exactly tax base sharing. Further undermining any equalizing intent of the law, a voting bloc of Long Island Republicans in the New York State legislature have made sure that the state aid funding formula includes a fixed proportion of state education aid for Long Island, including wealthy districts like Great Neck {(Kaplan 2011, New York State Education Department 2010).

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In a hostile political environment, policies to address metropolitan inequality could also be promoted via private organizations. Yaro (Yaro 2000) discusses the century-plus role of Regional Plan Association as a planning research and advocacy group. A variety of metropolitan-level issues, such as housing integration, school integration, a broader geographic tax base in school funding, a just distribution of metropolitan resources, and housing choice within the constraints of planning and justice could be promoted privately by a metropolitan-wide organization which had aspects of a regional land trust, a planning organization, a real estate investment trust (REIT), and a community development corporation (CDC). Regional land trusts were first described by Swann in 1972 in a document which also introduced the community land trust (CLT). While CLTs have primarily been used as an affordable housing solution, Swann envisioned the regional land trust leasing land to local agencies and CDCs, either directly or via CLTs, in order to promote local economic growth and to provide a community voice in land use decisions. I would suggest that the regional land trust manage some of its land for profit, leasing to local industry and higher-income residents. The profit would then be used to (a) acquire more property; (b) subsidize geographically widespread CLT affordable housing projects including advocating for affordable housing

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in currently exclusive communities; and (c) implement a form of tax base sharing by transferring funds from high-tax-base/low-need jurisdictions to low-tax-base/high-need jurisdictions within the metropolitan area. By managing some its property for profit, the regional land trust would be operating similarly to a REIT, but dividends would fund education in high-need school districts, affordable housing projects, and other needs in disadvantaged jurisdictions. The income stream would give the regional land trust a natural growth rate independent of philanthropic and government largesse.

### **5.4 Future Research**

I began the research for this dissertation with an idea that the Tiebout model can incongruously serve to support democratic localism, but also serve as an apologia for persistent spatial inequality. I was unsure where the investigation would take me. Two empirical studies produced results which were unexpected. First, based on the existing literature, I expected a clear finding of income sorting across school districts, but the magnitude of the effect was weak and the finding was not robust to alternate measures of inequality. Instead I found that income sorting is very important at the municipal level, while school district sorting is dominated by race (this latter finding consistent with

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the existing literature on school choice). This result in turn suggested that income and racial sorting might be mutually reinforcing in regions where municipal and school district borders are coterminous, but this hypothesis was decisively rejected.

These empirical findings cannot alone determine our attitude toward the Tiebout model. I therefore began with a discussion of spatial justice in the urban system. I argued that distributive justice must take locational advantages into account, and this includes the social and economic advantages of wealth and exclusivity. While a number of policies might contribute to a more just distribution of locational advantages, I focused on intergovernmental transfers. I found transfers to be consistent with a welfare economics analysis of the Tiebout model, as well as with the legal successes of fiscal equity lawsuits in several states. Since local government finance can be modified so as to achieve a more just distribution, it is not necessary to insist upon regional governance, though some consolidation of extremely small suburban municipalities might be sensible.

A number of questions remain. While the empirical method developed to investigate household fiscal sorting is promising, it needs work. In particular, the low explanatory power of the models must be investigated, or new methods need to be developed. The current

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method relies merely on the presence of a jurisdictional border for several explanatory variables. Perhaps a measure of service quality (e.g. school test score differentials) could be used instead. The current investigation used data from the 2000 Census. The release of 2010 data is imminent, so the method could be applied to newer data, and older data as well. A change over time approach could be used, where the dependent variable would be change in income heterogeneity.

Further applications of the method could include more administrative districts within New York City (or another central city). In particular, New York City high school attendance zones could be investigated, and their influence on residential sorting compared suburban school districts. (Alesina, Baqir & Hoxby 2004 find some evidence of ethnic sorting at the level of school attendance zones but no evidence of racial sorting.) New York City could also be investigated as a “school choice” city. In the largest school district in the country, secondary school students may request to attend any high school in the city, although they are only *guaranteed* a seat in their zoned school. Given the logic of the Tiebout model, such a system would dampen the motivational force of this aspect of the residential location decision. Taking into account how many students are actually able to take advantage of choice in this system, it would be interesting to

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investigate how overall residential sorting compares to other urban school systems.

In framing the justice discussion, I had to leave off some questions regarding processes of suburbanization, including assuming a fiscal sorting aspect to white flight. This bears further investigation, particularly as to the relationship between fragmentation and suburbanization. If a Tiebout landscape of small municipalities is more efficient and offers more consumer choice, suburbanization may have happened more quickly in landscapes which were already more fragmented or which had relatively permissive laws regarding municipal incorporation.

I began this dissertation discussing the lack of dialogue between the Tiebout literature and the residential location literature. My empirical chapters provide support for the view that Tiebout choice is a factor in household location. Additional work is needed to quantify the relative importance of this factor compared with other factors, such as proximity to employment and social networks.

Finally, writings on spatial justice or the just city have increased dramatically in recent years. What empirical analyses are undertaken should partially be determined by the pressing needs of those who may be shut out of access to good education and safe environments by

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the current balkanized urban landscape. The spatialized Rawlsian perspective must be applied to these and other urban issues, and critiqued with respect to its usefulness in engaging urban issues. As the population of the world becomes more and more urban, ideas for evaluating and achieving justice in urban environments will become tantamount to pursuing justice for the world.

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