THE PROXIMATE POLITY:
EXIT, VOICE, AND SPACE IN LOCAL DEVELOPMENT POLITICS

by

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The Proximate Polity: Exit, Voice, and Space in Local Development Politics
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People have the power to change where they live, where they work, where they vote, and where they spend their money. This geographic uncertainty has important implications for the policies cities pursue as it impacts the relative value of local goods provision. In this dissertation I examine how the potential movement of people within metropolitan areas influences developmental goods provision and production.

The proximate polity theory begins with the assumption that city officials aim to maximize the economic and political benefits of developmental policies while also minimizing the economic and political risks of policy failure. Accordingly, local leaders strike this balance by anticipating how their policy choices are likely to influence the movement of people in and out of the jurisdiction. In order to make this assessment, public officials must be keenly aware of who resides in nearby cities and also which policies nearby cities are engaging. Because policy consequences do not end at the jurisdiction’s edge, leaders must also pay attention to how their policies will influence the political relationships that exist between themselves and other cities.

Using spatial statistics and network analysis tools, I test the theory on a dataset of 15 metropolitan areas across the United States. I then focus in Colorado’s Front Range cities for a closer analysis that includes original survey data, time-space models of development policy over a 25 year period, and a dyadic analysis of intergovernmental developmental cooperation.
For Robin, my one and only.
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THE PROXIMATE POLITY THEORY

The American city is not isolated. Cities are part of a political and economic ecology that includes other local governments, state governments, the federal government, and many other overlapping economies and polities. This ecology is derived from the ability of people to choose where they live, where they vote, and where they spend their money and has important implications for the policies cities pursue as it impacts the relative value of their goods provision. This dissertation is about understanding how this political ecology—this potential for mobility—affects the developmental outputs of cities in American metropolitan areas.

In a seminal piece on the economics of public spending, Paul Samuelson (1954) argued that there is no market solution to determine the optimal level of public goods a government should be providing. Samuelson’s theory was that it is impossible to determine the true preferences of “consumer-voters” because each should misstate her preferences in hopes of getting more but paying less. Without knowing true preferences the government cannot know optimal provision levels. Charles Tiebout’s rejoinder to Samuelson’s “Pure Theory of Public Expenditures” was a “Pure Theory of Local Expenditures” (1956; emphasis
Tiebout’s hypothesis was that there is a market solution to the optimal provision problem at the local level and it lies in our ability to vote with our feet. People choose where they live and are consequently able to select the jurisdiction that provides them the package of taxes and expenditures that meets their needs and resources. More jurisdictions leads to increased variation in package composition, which means that packages should nicely reflect the optimal preferences of those in the jurisdiction. Tiebout’s market solution was the system of many jurisdictions that characterizes American government.

Much research—some of it discussed below—has focused on whether Tiebout is right about people and goods. This project focuses on how the potential for Tiebout-like processes influences the policies that cities choose. To do so, I develop the *proximate polity theory*. The proximate polity theory says that to understand which development policies a city is likely to pursue, we must also understand the geopolitical context that the city is situated in. Tobler’s 1st Law of Geography states, “everything is related to everything else, but near things are more related than distant things” (Tobler 1970: 236).¹ This is a concept that has been largely ignored in the research on local government outputs. However, its consideration together with other theoretical concepts helps to better explain the policy choices of American cities.

After a more complete description of the motivating research question, this chapter proceeds with a review of the many literatures on local goods provision, city economic development policy, and intergovernmental collective action, that inspired the research question and informed the development of the proximate polity theory. I then describe the theory in full, the analytical tools I use to test it, and preview the remainder of the dissertation.

¹ Note here the term “related” does not necessarily mean the “same.” For Tobler, “related” refers to connections more broadly stated: that near things influence one another in a way that distant things do not.
THE RESEARCH QUESTION

How does the potential movement of people within a metropolitan area influence city-level developmental goods provision? This is the research question that motivates the project. As many research questions do, this one suggests a cause and an undefined effect that will ultimately take the form of a hypothesis. The cause is the potential movement of people—a concept that will permeate the entire dissertation. This is the notion that people (and their capital) can move in and out of cities with relative ease. As we will see later, potential movement is closely connected with the concept of space. So long as city-level policy-makers believe that their policy outputs figure into the calculus that people and firms use to decide where to live, work, and vote, then it follows that city-level policy-makers consider the characteristics of the space around them when formulating policy. I explore two different policy effects associated with the potential movement of consumer-votes: provision-amounts and provision-arrangements.²

Provision-amounts are simply how much of a good a city is providing to its residents. I measure amounts in dollars. This will be the effect considered in chapters 3 and 4.

Provision-arrangements are the relationships that cities use to implement policies. Though there are many different relationships that cities can utilize to provide goods and implement policies, I focus on one type of “alternative” arrangement that is relevant (if also a little puzzling) to local economic development policy: city-to-city (or intergovernmental) developmental agreements. For example, two cities may decide to work together to build a road or develop a new mall. While either city could build the road or develop the mall on its own

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² My use of the terms provision amount and provision arrangements is similar to Oakerson’s (1999) use of the terms provision and production. For Oakerson, provision is the policy and production is the arrangement. I use the term “provision amount” as the focus of the research is less on policy content and more on the amount of the policy (good) being provided to residents and firms. I use the term provision arrangement instead of production because I only focus on one type of alternative-production: intergovernmental cooperation. My hope is that these alternative phrasings are more intuitive.
own, some reduced cost or increased benefit is achieved by cooperating. These arrangements are explored in Chapter 5.

The research question is a fairly simple one but as I will explain below, its purpose is at odds with much of the prevailing thinking about local expenditures. In particular, Paul Peterson argued in his seminal work on local spending, *City Limits* (1981), that there is a developmental imperative such that all cities will not only prioritize economic development spending above all other categories of expenditures but also that development spending should be universally high—a developmental race-to-the-top. One needs only to consider the information presented in Figure 1-1 below to see that Peterson’s theory is not entirely borne out. The figure describes the median and inter-quartile range for per-capita highway spending in 15 metropolitan areas. (This is the same measure that Peterson used to measure developmental expenditures with in *City Limits* though he aggregated all local spending to the state-level in order to avoid the problems of functional responsibility differences across states). The metropolitan areas exhibit variant median levels of expenditures and wide ranges of spending within the metropolitan areas. The reader will become more familiar with the information provided in Figure 1-1 in the ensuing chapters. However, for now, it is sufficient to say that not all cities appear to be prioritizing economic development equally.

**THE TIEBOUT HYPOTHESIS AS THE POLITICS OF SPACE**

The explanations of sub-metropolitan variation in developmental goods provision that are pursued in this project are spatial, or geographic, in nature. Though motivated by a range of literatures ad research, Tiebout’s “Pure Theory” (1956) has a special place in the theoretical development of the proximate polity theory.
As I noted in the introduction, Tiebout’s pure theory offered a solution to an optimal provision problem described by Samuelson (1954). To get to this solution, Tiebout defined cities as motivated to achieve the optimal population size such that each jurisdiction’s preferred tax-expenditure bundle is provided at the lowest possible cost. When jurisdictions are below the optimal size, they bring more residents in; when jurisdictions are above the optimal size they force residents out (Tiebout concedes that this latter situation is harder to imagine). The optimal provision goal is realized because a city’s taxing authority demands honest preference revelation via human mobility—our ability to vote with our feet, to choose the jurisdiction that offers the goods we want provided we can
afford to live there. However, for “Tiebout sorting” to work, other considerations—such as employment—cannot be a deciding factor in where people choose to live (people live on “dividend income” in his theory). Each household has a set of preferences and a set amount of income and selects the jurisdiction that offers the closest match. The result is not merely efficient goods provisions but also a metropolitan-wide equilibrium where each and every government is efficiently providing its optimal bundle. Tiebout makes no suggestion that his assumptions are realistic (in fact, he acknowledges they are not); however, this is not the purpose of his hypothesis. Rather, the Tiebout hypothesis places the policy decisions of cities in the context of a space where people make decisions about how they want to live. So long as people are free to make these decisions, then the policy decisions and economic characteristics of other political jurisdictions are critical to understanding the policy choices of cities.

Though Tiebout does note that “There is no way in which a the consumer can avoid revealing his preferences in a spatial economy” (1956: 422), his theory has no serious spatial demands—his was a “pure” theory where people are not constrained by such factors as distance within the metropolitan area so what is going on in the town over is irrelevant. Tiebout’s theory was also not a political theory—he assumed public officials to be motivated by economic efficiency and not reelection or good public policy. Nevertheless, a spatial-political dynamic is a natural extension of the theory and the catalyst for this project. In a world that is more or less like our own, where people are mobile but also constrained by distance and where politicians have to make complex political decisions, what goes on in the town over matters. It is in this way that we can begin to think about the Tiebout hypothesis as the politics of space.

This project is an effort to evolve our understanding of the policy variation we see at the local level in America. There is no one answer to questions about local policy variation.
The politicians and professionals running the city, the rules that govern city operations, and the preferences of those that vote in the city are all variables that help to explain local policy decisions. What I offer in the ensuing chapters are tests of a new set of variables that describe the geographic context that cities are situated in. These spatial variables define the economic and policy conditions of neighboring cities and economic regions. What I find is that understanding what is going on around a city helps us to understand what is going on in a city.

**LITERATURE REVIEW: GOODS, MOBILITY, AND RISK**

**Types of Goods and Policy Types**

Goods provision is a foundational concept for this project. Paul Samuelson (1954) was the first to make a formal economic distinction between types of goods. Samuelson identified “private consumption goods” and “collective consumption goods.” Tiebout and subsequent scholars (such as Olson 1971) have generally referred to “collective consumption goods” as “public goods.” With public goods, “each individual’s consumptions of [the] good leads to no subtraction from any other individual’s consumption of that good” while private goods can be “parceled out among different individuals” (Samuelson 1954: 387).

*Excludability* and *rivalry* are the terms used to distinguish between public and private goods as well as two other categories of goods: club goods and common goods. Table 1-1 distinguishes between the four types of goods based on these conditions. *Private goods* are excludable and rivalrous meaning that people can be prevented from obtaining the good and its supply is limited (e.g. bread from a bakery). *Public goods* are non-excludable and non-rivalrous meaning that there are no serious restrictions to the receipt of the good and its supply is left undiminished by someone else’s receipt of the good (e.g. public transportation, roads, public education). *Club goods* are excludable like private goods but
non-rivalrous like public goods (e.g. cable television, structured tax systems, relocation incentives) (Buchanan 1965). Common goods (also known as common pool resources) are non-excludible like private goods but rivalrous like private goods (e.g. fisheries, forests) (Ostrom 1990).

<table>
<thead>
<tr>
<th>Types of Goods</th>
<th>Excludible</th>
<th>Non-Excludible</th>
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<tbody>
<tr>
<td>Rivalrous</td>
<td>Private Goods</td>
<td>Common Goods</td>
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<tr>
<td>Non-Rivalrous</td>
<td>Club Goods</td>
<td>Public Goods</td>
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Public goods provision generally characterizes the business of local governments. The building of public parks, the development of roads, and the provision of public education are all public goods provided by the government and as such people may not be excluded from consuming them. This is not to say that government is not also in the private goods business. An important job for most American governments (but for the purposes of this project, local governments in particular) is to promote the provision of private goods by businesses. Frequently, adjustments to the provision of public goods and club goods are aimed at indirectly enhancing the quantity and quality of the private goods offered in the jurisdictions.

In addition to making distinctions between types of goods, it also necessary to make distinctions amongst policy types as they pertain to goods provision. While there are many ways that policies can be broken down in the context of local goods provision, Peterson’s (1981) taxonomy has, justifiably, had staying power in the local politics literature. He divides spending into three categories: redistributive, allocational, and developmental.³

³ Peterson also has a fourth category, education, over which he admits to confusion over how it fits into the other three categories.
Redistributive policies are those that constitute a net-economic loss for the city (e.g. homeless shelters, public health efforts, welfare). While they may have normative value, it can be difficult for cities to financially justify redistributive spending. The allocation category includes the housekeeping policies implemented to ensure a well-functioning city (e.g. police, fire, sewers). The focus of this project, however, is developmental policy.

Developmental policies, according to Peterson, “enhance the local economy because their positive economic effects are greater than their cost to community residents” (Peterson 1981: 42). In the language of public and private goods, developmental goods are usually those public and club goods that lead to an increase in the provision non-governmental private goods; they are incentives for individuals to live and work in the city (e.g. tax incentives, new roads). Positive economic effects include attracting people and firms to the city, enhancing property values, and increased revenues for firms in the jurisdiction.

Examples of developmental goods, according to Peterson, include infrastructure, public transportation systems, location incentives, cultural attractions, and structured tax rates. Examples of the costs that he is referring to are taxes levied to carry out the policies, loss of land, and negative environmental externalities.

Many scholars have identified developmental policy as having a high position in the hierarchy of urban priorities. Consequently, understanding the conditions for their provision is important for our understanding of cities generally (Peterson 1981; Logan and Molotch 1988; Stone 1989; Pagano and Bowman 1997; Clarke and Gaile 1998; Florida 2002). Indeed, local development has been the subject of much theoretical and empirical investigation. Developmental policies can distinguish cities within regions and the nation at-large; but they can also drive cities into debt and are consequently associated with some amount of risk.
The Public Choice Literature and its Critics

The public choice literature is primarily concerned with understanding goods provision in the American city with an eye toward Tiebout’s (1956) solution to the optimal provision problem identified by Samuelson (1954). Perhaps the most overwhelming critique of Tiebout has nothing to do with his rigid assumptions. Rather, the critique is that the model contains nothing about how political dynamics within a city influence changes in goods provision. Tiebout’s theory says that residents will relocate to a jurisdiction with a more ideal bundle when their jurisdiction’s bundle is unsatisfactory. In a classic monograph in the social sciences, Albert O. Hirschman (1970) balances the choice between exit and voice as it applies it to a broad set of entities including firms, organizations, and political jurisdictions under conditions of their decline. Hirschman’s argument is that people’s loyalty (or the absence of an exit option) may lead them to attempt to avert the decline via voice over exit (see also Clark and Ferguson 1981). When it is clear that voice will not work or when voice becomes too costly, people choose to exit.

The problem, of course, is that voice and exit are endogenous actions because the credible threat of exit is a form of voice. Moreover, the entity in decline may actually prefer that people exit rather than voice their concerns. Others have integrated the concept of voice into models of local expenditures using the median voter model. Inman (1978) and Bergstrom et al. (1982) found that school district expenditures were accurately predicted by the median-voter’s preferences. Verba and Nie (1972) point out that voter turnout is lower in local elections than it is national elections but Oliver’s (1999) research attributes this to minimal conflict in homogenous populations due to a Tiebout-sorting process that produces responsive government.

Hamilton (1975) introduced the concept of zoning into the Tiebout model. He assumes that the property tax is the base-fee for local public goods provision. Because of
this, the minimum necessary tax-base can be maintained with strategic property zoning which ensures both the optimal amount of housing in the jurisdiction and optimal property values. A more recent take on Tiebout, Hirschman, and Hamilton is Fischel’s *Homevoter Hypothesis* (2001). Fischel’s argument is that much of city politics can be traced back to homeowners’ desire to maximize their property values. Homes are the principal asset of most homeowners and their high costs of exit leads them to be risk-averse. Homeowners consequently advocate for public goods (especially schools) and zoning requirements that they believe will maximize their principal asset’s value. His thesis accounts for why people who do not have children still support a robust education package as well as why people are so concerned about risky or unnecessary development nearby to their properties (the “not in my back yard” or “NIMBY” phenomenon). Homeownership, Fischel argues, “amplifies voice” (Fischel 2001: 74). While there is something both intuitive and appealing about Fischel’s theory, most of his support for the “homevoter hypothesis” is anecdotal.

This question of what drives local public goods provision can be looked at in a variety of ways. In Tiebout’s pure model, the sorting of people and the package are endogenous because those in the jurisdiction are uniform in their preferences. While uniform preferences may be efficient, it would be difficult to defend it as a realistic state of the world. Buchanan (1971) observes that the goods preferences of the city are generally greater than its resources will allow. This leads the city to pursue policies that increase resources by way of federal grants and expanding the tax-base: “The familiar practice of allegedly favored treatment accorded high-income residential property owners in assessments may be ‘explained’ as one part of an optimal strategy” (Buchanan 1971: 16). Buchanan identifies a sort of Leviathan model (in contrast to Tiebout’s optimal population model) where local governments are, above all else, driven to expand their size in order to efficiently maximize their tax-take (Oates 1985).
Buchanan’s work (along with Tiebout’s) is the foundation of Peterson’s seminal book on city politics in the American federal system: *City Limits* (1981). Peterson recognized that cities risk becoming the home of residents who do not sufficiently contribute to the tax-base if they do not engage in economically beneficial policies (sorting that the federal government need not concern itself with). He identifies local governments as highly constrained by economic, state, and federal institutional structures. City policy making authority is limited by state rules and limited financial resources—many of which come in the form of state and federal grants (see also Kantor 1995). *Local decisions are thus limited to the feasible and economically essential.*

It should come as no surprise then that the empirical component of Peterson’s work indicates that developmental policies constitute the bulk of local policy activity in the aggregate (Peterson’s unit of analysis is the aggregation of local governments to the state level). Peterson argues that developmental and redistributive policy decisions are consequently characterized by a certain non-politics. Local redistributive spending is limited because it constitutes a net-economic loss for the city and may attract unwanted residents. Developmental spending is almost unlimited because policy-makers expect to recover short-term costs with long-term gains.

Other research suggests that Peterson may be right. In a piece on the economic development efforts of Twin Cities metro area governments, Goetz and Kayser (1993) note that competition for firms leads to inefficiencies due to a race-to-the-top where local officials overpay for firms. However, Goetz and Kayser also discover negative consequences to the race-to-the-top mindset: cities are frequently too busy trying to attract new firms that they do not do enough to keep their current ones in the city. The result can be job-shifts rather than job-growth. Goetz and Kayser also observe that cities tend to compete most with cities in their own region of the metropolitan area. In the Twin Cities area this meant the
development of two competitive corridors focused around “competitive nodes”—cities that many other cities in the corridor saw as their primary competitor.

Peterson’s theory has implications for the Tiebout hypothesis because it means that people are sorting themselves into jurisdictions that are almost homogeneously motivated by economic development. An important consequence of this is that cities should always be competing with each other for the most desirable residents and firms. Tiebout sees uniformity of preferences within cities while Peterson sees uniformity of preferences among cities.

As I will explore later, a problem with Peterson’s theory is that it is not entirely borne out: there is substantial variation in developmental expenditures amongst cities within and across metropolitan areas (see Figure 1-1). While Peterson may have had the developmental imperative correct, it appears to be playing out differently in different metropolitan areas. The proximate polity theory will help explain this variation.

One response to the public choice literature has been the Social Stratification-Government Inequality (SSGI) thesis. Here the argument is that sorting occurs not based on public goods provision but rather on socio-economic and political grounds (Hill 1974; Neiman 1976; Lyons and Lowery 1989; Lyons et al. 1993; Bishop 2009). People make decisions about how they want to live, but those decisions are based on living near others like themselves (race, class, religion, etc.) and necessity. Supporters of this thesis have argued that this type of sorting has led to an uneven distribution of public goods. It is not that groups living in areas with minimal public goods provision do not want public goods; it is that these areas frequently lack the resources to sufficiently provide them.

Advocates of the SSGI thesis have also argued that people lack the information and interest to make decisions about where they are going to live based on public goods provisions (Lowery et al. 1995). The SSGI thesis is instructive in that it suggests the need
to be aware of varying levels of information amongst potential movers, different types of movement, and causes of local goods provision. Too often scholars in the Tiebout tradition have too often ignored the SSGI hypothesis; goods provision cannot reflect true preferences when the resources are not there to accommodate that provision.

Actual Tiebout-based sorting will not be a theoretical requirement of the proximate polity theory presented below. What will be required is that local policy-makers believe that people and firms are mobile and that this mobility constitutes a part of the policy-making calculus. To be sure, policy-makers are neither uninformed nor irrational so the decision to use mobility as an indicator ought to be grounded in both logic and evidence.

From the policy-maker’s perspective, full-information about government outputs on the part of individuals and firms need not be universally true in order for mobility to be of consequence. Teske, Schneider, Mintrom, and Best (1993) draw on economic theory to emphasize the importance of the marginal mover. So long as there is an active subset of households and firms actually comparing local packages, mobility will matter for policy-makers: competition will exist between jurisdictions for these marginal movers (see also Claxton, Fry, and Portis 1994). What is more, Teske et al. offer survey evidence that there is a “subset of informed consumers” who do “shop around” and that subset is disproportionately comprised of the consumer-voters that politicians most desire: high-income movers. Other surveys of households suggest that police protection, fire protection, personal security, and neighborhood are dominant factors in deciding whether to move and (Percy and Hawkins 1992; Percy et al. 1995; Bickers et al. 2006). Other work has utilized computer models that compare the actual spatial distribution of people in metropolitan areas to random distributions and found results inconsistent with the SSGI thesis (Bickers and Engstrom 2006).
Polycentric Systems and Institutional Collective Action

One of the most important outgrowths of Tiebout’s original thinking about goods provision was Ostrom, Warren, and Tiebout’s (1961) recognition that the complexity of metropolitan areas changes the goods provision dynamic. Ostrom and his coauthors develop the concept of “polycentricism” which can be loosely defined as a region (frequently a metropolitan area) with many independent centers of decision-making (governments) where pairs or groups of governments cooperate to produce and provide public goods. They observe that governments and neighborhoods pursue alternative modes of service delivery (arrangements) via privatization, formal cooperation, and organization into special jurisdictions. Under the right conditions, economies-of-scale and adjustable borders allow polycentric arrangements to be more efficient and responsive than an arrangement where all public goods production remains within the jurisdiction.\(^4\)

This polycentric efficiency argument has also served as an important intellectual counterpoint to the advocacy of metropolitan consolidation that was dominant in the 1960s and 1970s (Friesema 1966; Hawley and Zimmer 1970).\(^5\) Just as was the case in Tiebout’s original theory, the polycentricity argument is reliant on individuals who make calculations about where and how they want to live. The polycentric system can be a complicated and chaotic one and as such reflects a lot of what we observe about modern metropolitan areas. The system is both self-generating and self-policing (Ostrom 1972; Oakerson 1999). New governments and new relationships between governments develop over time and

\(^4\) Vincent Ostrom identifies three necessary conditions for efficient performance: “(1) the correspondence of different units of government to the scales of effects for diverse public goods; (2) the development of cooperative arrangements among governmental units to undertake joint activities of mutual benefit; and (3) the availability of other decision-making arrangements for processing and resolving conflicts amongst units of government” (Ostrom 1972: 53).

\(^5\) Ostrom (1973) has also argued that there is normative democratic value associated with administrative decentralization.
partnerships are most efficient and successful when the necessary rules are in place to prevent shirking.

One of the contributions of Ostrom, Warren, and Tiebout lies in their identification of the complexity and interaction of geographic space and efficiency. In the pure theory Tiebout identifies the existence of multiple jurisdictions as a solution to a preference identification problem. The polycentricity approach complicates the pure theory by recognizing that the barriers between local jurisdictions can be loosely defined.

A major component of the study of the polycentric metropolitan region is on institutional collective action (ICA) aimed at dealing with the political complexities and economic inefficiencies of local public goods provision. In addition to the work of Ostrom, Tiebout, and Warren (1961), the ICA research is grounded in Coase’s theory of the firm (Coase 1937), and Olson’s logic of collective action (Olson 1971). ICA is the cooperation of governments via formal and informal agreements to provide goods. Richard Feiock, a leading scholar of ICA (and the acronym’s author), notes:

“Interlocal cooperative agreements generate collective benefit by producing efficiencies and economies of scale in the provision and production of services and by internalizing spillover problems. They can also advance the individual interests of local government officials” (Feiock 2007: 49).

While the Petersonian logic is all about competition between cities, the ICA logic says that sometimes cooperation is actually preferable to competition.

Two questions drive the ICA literature. The first is: Why do we see collective action in some areas but not in others? The second: What holds the interlocal agreements together? On the first question, the consensus in the literature is that collective action tends to arise under two primary conditions: (1) When there is homogeneity of preferences across and within units; and (2) When economic conditions are such that the costs of cooperation outweigh the costs of going it alone (Parks and Oakerson 1989; Scholz and
Efficiencies are usually ones of scale: goods provision to large populations is frequently cheaper per-capita than goods provision to small populations. Cities with fewer resources have less to lose and more to gain by cooperating on any number of fronts including economic development. If the costs and risks are diversified (and thus minimized) cities may be able to engage policies they would not be able to otherwise. Other factors also greatly influence the cooperative opportunities. Post (2002a), for example, shows that geographic density is connected with interlocal expenditures—more governments means more potential partners.

The risks associated with cooperation generally lie in transaction costs. Four types of transaction costs are associated with ICA in particular. The first is the obtaining information about other jurisdictions. The second are the agency costs that come from designating an agent to work with the other jurisdictions or new governing entity. The third is negotiation and division costs over how gains from the good are to be split up. And fourth, are the monitoring and enforcement costs necessary to ensure that no participant in the agreement reneges. (Inman and Rubenfeld 2000; Feiock et al. 2008; Steinacker 2010)

The privatization of public goods provision is another component of the polycentricity theory that has received considerable attention. Among the most definitive works on the topic is Stein’s Urban Alternatives (1990) which offers empirical evidence that administrative decentralization and alternative modes of service delivery allow metropolitan governments to more efficiently provide goods and services and lessen the negative economic and political consequences of service provision (see also Boyne 1998; Brown et al. 2006; Brown and Potoski 2003; Clingermayer and Feiock 1997; Dilger et al. 1997). The idea of privatization is also closely connected with an evolving literature on
urban governance which examines the idea that the “boundaries between and within public and private sectors have become blurred” (Stoker 1998).

As the polycentricity and ICA literatures show, provision is closely connected with geographic arrangements. In Chapter 5, this concept will be developed further to indicate that the presence of provision options due to geographic arrangements helps to define the scope of policy options.

The Politics and Logic of Local Economic Development

For some time now social scientists (political scientists, economists, sociologists, and demographers) have used the core-model to understand metropolitan areas (Orfield 1997). This model—where metropolitan areas are understood as having a core-city that acts as the economic center of the metropolitan area and is surrounded by primarily residential jurisdictions (some incorporated, some not)—still has some utility. Core-cities are frequently the most densely populated and have the largest, most important central business districts in the metropolitan area. Core cities also continue to identify regions in the public consciousness (people say they are visiting family in Denver even if their family really lives in Westminster or Littleton). However, the relative role of the core-city has changed over the last 50 years. As Judd and Swanstrom note:

“The old form, which found a big city surrounded by rank on rank spreading suburbs is giving way to a new metropolitan form characterized by many nodes of activity... The suburbs have gradually been transformed from wholly dependent satellites of cities... to self-sufficient enclaves” (Judd and Swanstrom 2009: 262).

Indeed, it is evident to even the casual observers of metropolitan areas that many suburban towns are becoming cities in their own right. Consider an excerpt from an article that appeared in The Economist in 2008; it describes a drive through Valencia, California—a Los Angeles suburb:
“Even when seen from a car at 65 miles per hour, Valencia does not conform to the popular image of suburbia. Drivers heading north from Los Angeles along Interstate 5 see few houses, because most are hidden behind a golf course. Instead they pass factories, warehouses and offices. It is not a bad introduction to the place. With some 60,000 jobs and 20,000 houses, Valencia boasts a better ratio of employment to homes than the city of Los Angeles. And still its businesses grow. Between 2002 and 2009 its supply of offices will have increased by half.” (An age of transformation 2008)

Suburban cities have their own complex politics, their own goods provision, and their own economic development policies.

Scholars have identified many categories of economic development activity. Perhaps the most basic distinction is that of supply-side versus demand-side (Eisinger 1988; Reese 1992). Supply-side development activities include tax-incentives, debt-financing, and infrastructure investment while demand-side activities include the creation of business incubators, venture capital financing, and research investment. Others have developed more specific categories such as Feiock’s promotion, service coordination, business-nonfinancial assistance, and incentives (Feiock 1987). An important part of understanding which of these local economic development policy strategies cities are likely to pursue is in identifying the uncertainty that characterizes the process. As cities seek to attract firms there is an informational asymmetry: the firm knows what it will require to get it to move while the city can only make an informed guess (Rubin 1988; Bachelor 1994; Jones and Bachelor 1993; Goetz and Kayser 1993). To overcome these uncertainties and inefficiencies, cities generally develop decision rules and routines aimed at establishing expectations (Reese 1993; Wolkoff 1992).

Clarke and Gaile (1989; 1992; 1998) distinguish between conventional policies (public intervention to attract businesses) and entrepreneurial approaches (greater
governmental flexibility and risk). They identify this distinction in the wake of the Reagan-era declines in local assistance but it remains equally relevant today:

“As the rate of capital and labor mobility accelerates, and the global competition for investment tightens, local communities become more vulnerable to external decisions that can dramatically influence their economic well being. The complexity and rapidity of the economic changes threaten the stability of local revenue sources... This revenue imperative—the effort to increase the stability and lower the vulnerability of the local revenue base—prompts many local officials to seek new types of economic activity to provide more local jobs” (Clarke and Gaile 1989: 575)

Today, cities are grappling with a similar set of problems: diminishing revenues and increased demand for development initiatives. *Thus, an important part of understanding which development strategies cities are likely to pursue, if any, is identifying the uncertainty and informational asymmetries that characterizes the process.* In particular, people and firms know what it will require to get them to move while the city can only make an informed guess (Rubin 1988; Bachelor 1994; Jones and Bachelor 1993; Goetz and Kayser 1993; Teske et al. 1988; Steinacker 2002).

The work of Richard Florida might be seen as a sort of contemporary theoretical extension of Clarke and Gaile’s conventional v. entrepreneurial dichotomy. Florida identifies people engaging in “creative professions” (everything from scholars to artists to software engineers) as the growing class of individuals driving America’s economic engine. He calls this group the “creative class” (Florida 2002). He contrasts the creative class with the simultaneously growing service class (health care support professionals, technical support professionals, food services) that supports the lifestyles of the creative class for considerably lower wages. The creative class prefers a culture that is technology based, talented, and tolerant. Florida argues that successful local economic development is directly tied to attracting people not companies: attract the creative class and the
businesses will come. It is in this way that creative cities approach might be seen as a twist on the entrepreneurial city.

However, Florida’s prescription for achieving this culture is rather unsatisfying. His list of strategies includes using universities as engines of economic growth, cultivating a diverse community, building bike trails and parks, and being family friendly.6 Furthermore, many of the attributes he ascribes to the creative city may be endogenous to their presence. There is little evidence presented in his work that he has examined a representative set of cities—in the parlance of social science, he has made the faux pas of selecting on the dependent variable. He has identified common characteristics among prosperous cities without consideration of the presence of these same characteristics in non-prosperous cities.7

Unlike Peterson, the constraints of cities are not such a concern for Florida—if city leaders put their minds to it, they can do whatever they want. Regardless of the role of the creative class in the American economy, it is not clear that cities have the flexibility to engage the right policies or that these policies work. Unlike traditional economic development tools like tax subsidies, the people first strategy is cash intensive and difficult to leverage. What is more, Florida offers no empirics that show investment in public goods like the arts (as desirable as it may sound) actually attract people away from the currently creative cities and into developing creative cities. Just because cities with large creative classes are developed, it is not clear that that is why they developed. One thing is for sure, Florida has offered a Tiebout sorting hypothesis in which the population reflects the public-goods provided by the city. And even if the evidence supporting Florida’s creative class

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6 These suggestions are as vague in the book as they are on this page.
7 Another criticism of Florida has been about the validity of his measures of the presence of a creative class in a city. He uses broad occupational categories produced by the Census and does offer a serious discussion of the non-creative jobs that makeup his creative categories.
thesis is weak, it does not mean that many city governments of the last several decades have not been developing policies along the principles that he outlines. As I show later, many jurisdictions have identified creative goods provision as part of their development effort.

A natural alternative to the question of why do cities engage in developmental policy is: Why don’t cities engage in developmental policy? When this question is addressed it has primarily been in the form of explaining “anti-growth” or “growth-management” policies (DeLeon 1992). These policies are frequently traced back to anti-growth interest groups for whom “the costs of economic growth, such as environmental pollution, increased traffic congestion, physical changes to existing neighborhoods, and negative fiscal implications, outweigh its benefits” (Schneider and Teske 1993: 721). And Schneider and Teske (1992) find that “rapid growth can strain existing services, increase pressure on taxes, and mobilize local citizens who see the quality of life in the community changing” (743). These anti-development groups face challenges because their goals frequently require collective action rather than individual action, but they are not without their success. Lewis and Nieman (2002), for example, find that growth-management policies frequently emerge out of resident activism.

The anti-growth approach to the non-development question is problematic because there is no questioning of the development imperative. This seems to be because the development imperative has become so ingrained in the literature: Why would cities not be interested in growing? But even lay observers of city politics will see that many governments are not seriously engaging in economic development policy. In many cities the infrastructure is old and unrepaired, tax-incentives are not being offered, and graduations rates are low. This should not be the case in a country where economic development
activity characterizes the primary function of local government and anti-growth groups pale in number and resources to pro-growth interests.

While anti-growth voices are important for understanding local economic development policy there has been minimal consideration of how economic and political context can actually limit the engagement of growth policies. To understand economic development it is also necessary to understand non-economic development and to conceptualize it as more than a function of anti-growth interests. Among the most notable exception to this attachment to the developmental imperative is the work of Pagano and Bowman (1997) who argue that the “orbits” of cities—that is the city’s that city leaders view as competitors—influence when and how cities engage development. Perceptual orbits are informed by impressions (or “images”) that city leaders have of the other cities that they aspire to compete with. As I move forward, it will become clear that this notion of relative-evaluation that is put forward so thoughtfully by Pagano and Bowman (1997) is important to the development of the proximate polity theory.

Enter Risk

Though it has not been sufficiently considered, the idea of relative-evaluation informs the idea of risk as it pertains to economic development policy. Indeed, risk is situated in an awkward place in the politics of economic development literature. Many studies ignore risk altogether while other studies include risk but make different assumptions about what it means for policy-makers. Wolman’s (1988) “uncertainty model” of developmental decision-making is a good initial example. The model suggests that if political and economic costs are sufficiently high, policy-makers will not offer development subsidies—but Wolman also says that costs are rarely high enough to avert spending. Wolman gives the hypothetical example of a politician who believes that a set of tax
incentives has a 25% probability of attracting the desired economic activity into their jurisdiction and 75% probability of not working. However, the cost-benefit structure in Wolman’s model is such that it is still in the interest of local politicians to pursue the provision of developmental incentives. The payoff structure stems, in part, from Wolman’s belief that policy failure is only marginally visible to the average voter. Furthermore, he argues that policy-makers are obtaining information about economic growth from businesses themselves (see also Stone 1989), which leads them to overvalue the probability and value of developmental success.

Wolkoff’s (1992) model leads us to a similar prediction as Wolman’s model but gets us there via a different process. Wolkoff develops a basic game-theoretic model of the local economic development process. His game produces an equilibrium that borders on the irrational. The equilibrium is such that when cities offer subsidies to firms in order to promote economic development activity, they simultaneously increase demand for said subsidies producing a potentially endless cycle. While this demand cycle is undesirable, Wolkoff argues that it is preferable to the consequences of not offering subsidies at all.

Yet another take on the role of risk in economic development policy decision-making comes from Annette Steinacker. In an important 2002 piece, Steinacker offers a Nash Bargaining Game backed up by case-study research. The game depicts a negotiation between a city (represented by a political executive such as a mayor or city manager) and a firm over location incentives. The city wants to reduce the cost of the incentives such that it reaps more the developmental benefits and the firm naturally wants increase the incentives offered by the city. In Steinacker’s model, the city’s bargaining position is effected by both political risk and outside options. The city executive is likely to negotiate

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8 Wolman makes the potential economic and political benefits of successful development substantially higher than the potential economic and political costs of failed development (there is an over 400% difference in the payoffs that favor of doing the development).
more cautiously when the risk of being replaced—should she fail to negotiate an agreement with the firm—is higher. In cities where slow-growth is the dominant preference, politicians can actually be more risky because the consequences of failing to grab the firm are lower. Outside options for cities come in the form of expected growth given no deal is reached. Generally speaking, the greater the outside option (that is, the less the city is economically dependent on a reached-deal) the greater the incentive is for the city executive to bargain tough. Among the most important predictions of the game is that when cities have some sort of comparative advantage over other cities (location, talent, etc.) they can rely on incentives less and allow market forces to act on their own. In the “Theory” section below I will offer a somewhat different perspective on risk than Steinacker.

THE PROXIMATE POLITY THEORY

Peterson (1981), Teske et al. (1993), and others have argued that intense developmental competition amongst metropolitan jurisdictions is theoretically founded and an empirical reality. If such were truly the case we would almost certainly see narrower intra-metropolitan distributions of developmental policy-activity than those presented in Figure 1-1 above. Moreover, the inclusion of risk into the developmental policy calculus has been on the minds of scholars since the early 1980s but is rarely (if ever) considered (or found to be) as an obstacle of enough magnitude to reduce developmental competition or constrain developmental policy activity. The proximate polity theory helps to theoretically bridge the gap between variation in policy activity and developmental competition; it does so by bringing the concept of space to the forefront of the theoretical development (and later the empirical tests).

9 Steinacker (2002) tests her model using a case study of Miami-Dade County and Broward County in Florida.
Though the idea of space tacitly underlies much of the theoretically motivated research on local politics, it is rare to see it considered explicitly. The theoretical framework presented here does this and as such guides the development of more specific hypotheses tested in the following chapters. The theory itself does more than simply answer the underlying research question (*How does the potential movement of people within a metropolitan area influence city-level developmental goods provision?*). The theory also suggests a context for thinking about how cities in metropolitan areas prioritize their expenditures. The proximate polity theory can be summarized as follows:

*In an effort to keep their jobs and effectively govern, policy-makers in American metropolitan cities will pursue policies that have a low probability of economic or political failure. Policy-makers will use the policy choices and demographics of nearby cities to inform their own policy selections in order avoid policies that are likely to fail.*

The first part of the theory is that local officials are motivated by political and policy ends. They want to get reelected. In the case of government professionals, they want to keep their jobs. And both want to be able to effectively govern their city. All of these goals are jeopardized when policies fail. As such, I expect local policy makers to avoid unnecessary risk. The introduction of risk into the policy-calculus is not new; however, I will use the concept to somewhat different ends. Previous theoretical and empirical work (with notable exceptions such as Clarke and Gaile 1998 and Steinacker 2002) has either thought about local economic development policy as a sort of risk-free enterprise or failed to suggest that risks are high enough to thwart developmental policy endeavors. Indeed, the vary nature of economic development policy is, as Peterson writes, “to enhance the local economy because their positive economic effects are greater than their cost to community residents” (Peterson 1981: 42). Not only does the proximate polity theory take risk seriously but it also conceptualizes it differently than the extant research.
A better way to understand developmental goods is to revise Peterson’s definition as “developmental goods are those that enhance the local economy because their positive economic effects [should be] greater than their cost to community residents.” This change may seem trivial but in the context of the economic development literature it is not. There is always a risk of policy failure just as there is always a risk that politicians will lose their next election. Of course, policy failure and political consequences go hand-in-hand. Policy failure occurs not only when the city fails to economically develop (attract new quality firms and residents) but also when the negative externalities of the policy (traffic, pollution, even the suburban blight that has become associated with sprawl) dissatisfy a critical mass of existing residents. And voiced anti-growth sentiment is simply not that uncommon; Judd and Swanstrom note:


There are political consequences when local officials pursue development policies when their constituents do not want them.

The reader will note here that this conception of risk is substantively different than Steinacker’s (2002) conception of risk for her game-theoretic approach. Steinacker’s model assumed that the presence of political risk for policy-makers leads to a sort of desperation: attract the firm or bust. I make no assumption that attracting a new firm (subsidy or not) is always the dominant preference of the city. Furthermore, I do not assume that risk-averse behavior comes in the form soft negotiation or a willingness to give up more. To the contrary, I will argue that aggressive development policy (in the form of high developmental
goods provision rather than increased direct incentives to firms) is politically risky in and of itself. Survey research presented in Chapter 2 will support this argument.

The second component of the theory is that jurisdictional neighbors matter for our understanding of developmental goods provision. To be clear, this is not part of Tiebout’s theory nor is it a part of Peterson’s. While it may be seen as a sort of extension of their work, the process described by the proximate polity theory is different than that proposed by other scholars of local politics. The theory is one about what governments do and not what people do and as such, theoretical development need not be grounded in what citizens actually do. Rather, theoretical development must be grounded in what politicians expect citizens to do. The following four assumptions characterize these expectations as they inform the policy-makers decision calculus.

**Assumption 1: Mobility.** City politicians believe that people and firms are mobile and make a purposeful selection of the city they want to reside. While the decision of where to locate is not made entirely based on the city’s tax-expenditure package, the components of the tax-expenditure package are an important part of that decision.

**Assumption 2: Exit Options.** City politicians believe that when people and firms relocate they prefer close exit options to distant exit options. Close exit options are more appealing than distant exit options for two reasons. First, it is much easier to collect information about nearby cities than it is cities that are far away. Second, people and firms have social ties and patron networks that a distant move may jeopardize.

**Assumption 3: Preferences and Accountability.** City politicians believe that constituents want to minimize their taxes yet maximize the amount of public goods the city is providing. When policies fail to produce promised outcomes, elected politicians believe that constituents hold them accountable by supporting another candidate. Likewise, when policies fail to produce promised outcomes, government professional believe that elected politicians will hold them accountable by firing them or undercutting their authority.
Assumption 4: Economic Development. I assume that all cities prefer to have higher median-income levels than low-median-income levels and more high-paying jobs to fewer high-paying jobs.

Together, these assumptions indicate that city officials are answerable to their constituents but must simultaneously pursue policies that ensure the city’s economic importance within the region. The causes of local policy selection are influenced by the situation of the city in a larger geographical context that includes nearby and distant communities. In a mobile environment, cities expect that individuals and firms will locate themselves to maximize the benefits they receive from the jurisdiction. City politicians consequently evaluate the characteristics of other cities within the metropolitan areas (weighting near cities more than far cities) and use this information to help them make their economic development policy decisions.

The dissertation has a running null hypothesis and a running alternative hypothesis:

Null Hypothesis: Economic development decisions are caused by variables that are strictly internal to the jurisdiction and/or institutional constraints imposed by superior governments.

Alternative Hypothesis: Local officials will use the policy choices and socio-economic conditions in nearby jurisdictions to inform their own policy choices such that the political and economic risks of policy failure are minimized, all else being equal.

The null hypothesis merely states that conditions outside a jurisdiction’s borders do not contribute to policy inside the jurisdiction’s borders. The alternative hypothesis is a general statement of how the proximate polity theory connects what is happening outside those borders to what is happening inside those borders. These connections are explored in detail throughout the remainder of the dissertation. Among other spatial effects, I will show that cities have reason to engage policies that are similar to their neighbors, that cities estimate the probability of policy success by looking at their neighbors, and that
spatial conditions inform the production tools that cities use to carry out developmental policies.

Many of us observe some aspect of the theory every day as we commute between cities for work or play and see similarities and differences between them. It may be the quality of the roads and parks that you notice, the presence of a vibrant or lifeless downtown, differences in the upkeep of building facades, or access to cultural amenities like museums and theaters. Such differences are directly or indirectly related to the policies that cities choose. Most streets, parks, and trails are public goods provided and maintained directly by the city government. Cities construct walking malls and large sidewalks so that retail outlets and restaurants will find an area attractive enough to locate there. I will show that one of the reasons that both City X and its neighbor, City Y, are repaving roads and preserving green-space are not idiosyncratic to City X and City Y respectively. The internal politics of City X and City Y matter greatly, but policy choices are not made in isolation. Rather, they are made as part of a complex economic and political ecology. The proximate polity theory is designed to make sense of this ecology.

The proximate polity theory offers an important and needed contribution to the literature on local politics broadly and local economic development politics specifically. Two elements separate it from other theories of local policy making. First, the theory treats other governments as specific (and measurable) policy actors in the policy-making process. This means that the constituents in other jurisdictions are able influence the politics of their neighbors via whom they elect and how they vote on ballot initiatives. Second, it suggests that the demographic makeup of nearby cities serves as cue to local officials about how successful various development policies are likely to be. From a democratic perspective, both of these are strange, and perhaps even unnerving, possibilities as they
mean that local politicians are crafting policies based, in part, on an entirely different constituency than elected them.

**VOCABULARY**

It may already be apparent that a common language from which to effectively communicate the theories and tests in the dissertation is necessary before going into any more detail. Because the ensuing hypotheses and analysis involve looking at cities and their neighbors simultaneously, the terminology can get confusing. A reference to a “home jurisdiction” is a reference to a unit in the universe of cases: some city in some metropolitan area. Similarly, a reference to “internal spending” or “home spending” is a reference to the spending (or policies) of the home jurisdiction. References to “neighboring jurisdictions” are references to the weighted conglomeration of all of the home jurisdiction’s neighbors as defined by a spatial-weights-matrix (explained below). Rarely is there a reference to a single neighbor; rather, neighbors are best understood as “average neighbors.” This can get particularly confusing because in many of the analyses all jurisdictions are both “home jurisdictions” and “neighboring jurisdictions.” At all points, however, the unit of analysis is the home jurisdiction.

Spatial-weighting and the spatial-weights-matrix (SWM) are also terms the reader needs to be familiar with. Spatial-weighting procedures are used to geographically relate each of the cities within a metropolitan area. The procedure that is used is important on a theoretical level because it is the abstraction of geo-political and geo-economic processes. In spatial statistics, the weighting procedure for the external variables can take several forms depending on the concept being measured and the spatial process at work. For most of the ensuing analyses I use an inverse-distance-squared (IDS) spatial-weights-matrix. This type of SWM treats every city as a neighbor but weights near neighbors more than distant
neighbors so as to reflect the assumption that people and firms prefer to move shorter
distances than longer distances. Figure 1-3 visually represents the IDS-SWM weighting
scheme. To determine how a jurisdiction is going to be weighted, simply locate the distance
the jurisdiction is from home jurisdiction and find the corresponding weight along the line.
Figure 1-2 is a sample spatial-weights-matrix and a corresponding map for a small section
of Albany’s northern suburbs. The SWM is the translation of the weighting scheme for all
jurisdictions into a usable mathematical tool. In the sample, the spatially-lagged median-
income for Saratoga Springs is the standardized weighted average median-income of all
other cities on the map.

**PLAN OF THE DISSERTATION**

The remainder of the dissertation is comprised of various tests of the proximate
polity theory and its implications. In Chapter 2 I report some of the results of the Front
Range Economic Development Survey (FREDS)—a new survey of local officials in Colorado.
The results presented in Chapter 2 help to justify the assumptions of the proximate polity
theory. Chapter 3 is a large-scale multi-metropolitan area spatial-econometric test of
hypotheses derived from the theory. This analysis utilizes a dataset that contains all of the
cities that makeup 15 American metropolitan areas. The results reveal sub-metropolitan
areas clustering and policy-risk aversion that is consistent with the theory.

Chapter 4 is the first of two multivariate analyses of Colorado’s Front Range. Any
causal process necessarily involves time—a clear cause followed by a defined effect.
Accordingly, Chapter 4 introduces time into the theory using three types of time-space
models of development expenditures over 25 years. The results show not only that there
are inter-jurisdictional policy responses going on but also that cross-sectional results are

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10 The SWMs used in the actual analyses are much larger and related every jurisdiction within a
metropolitan area to one another.
not always perfectly compatible with time-based results. In Chapter 5 I explore additional FREDS results that reveal how network and spatial dynamics play out in city halls. Chapter 5 uses network-data collected via the FREDS to expand the proximate polity theory to an understanding of inter-jurisdictional economic development cooperation.

I conclude in Chapter 6 by considering both the successes and deficiencies of the proximate polity theory as well as how it might be expanded to consider the provision of non-developmental goods.

Figure 1-2. Sample Spatial Weights Matrix with Corresponding Map

<table>
<thead>
<tr>
<th></th>
<th>Corinth</th>
<th>Moreau</th>
<th>Wilton</th>
<th>Saratoga Springs</th>
<th>Milton</th>
<th>Greenfield</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corinth</td>
<td>0</td>
<td>1/d²</td>
<td>1/d²</td>
<td>1/d²</td>
<td>1/d²</td>
<td>1/d²</td>
</tr>
<tr>
<td>Moreau</td>
<td>1/d²</td>
<td>0</td>
<td>1/d²</td>
<td>1/d²</td>
<td>1/d²</td>
<td>1/d²</td>
</tr>
<tr>
<td>Wilton</td>
<td>1/d²</td>
<td>1/d²</td>
<td>0</td>
<td>1/d²</td>
<td>1/d²</td>
<td>1/d²</td>
</tr>
<tr>
<td>Saratoga Springs</td>
<td>1/d²</td>
<td>1/d²</td>
<td>1/d²</td>
<td>0</td>
<td>1/d²</td>
<td>1/d²</td>
</tr>
<tr>
<td>Milton</td>
<td>1/d²</td>
<td>1/d²</td>
<td>1/d²</td>
<td>1/d²</td>
<td>0</td>
<td>1/d²</td>
</tr>
<tr>
<td>Greenfield</td>
<td>1/d²</td>
<td>1/d²</td>
<td>1/d²</td>
<td>1/d²</td>
<td>1/d²</td>
<td>0</td>
</tr>
</tbody>
</table>

\[d = \text{distance}\]
ON THE IMPORTANCE OF STUDYING CITIES

Before continuing it is worth taking a moment to consider the importance of studying the politics of the American city. More than one hundred years before Samuelson and Tiebout were struggling to better understand the economics of public goods provision, Alexis de Tocqueville wrote:

“[The American city] unites two advantages that, everywhere they are found, keenly excite men's interest; that is to say: independence and power. It acts, it is true, in a circle that it cannot leave, but its movement within that is free. That independence alone would already give it a real importance if its population and its extent did not assure it.”11 (Tocqueville 1992 edition, 62)

At the risk of poorly interpreting Tocqueville, he appears to have identified three conditions that make American cities a unique context in which to study politics. First, cities are constrained by the federal structure situated above them (the circle: their state and the national government). Second, despite these constraints, cities are essential providers of

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11 Tocqueville is actually referring directly to the New England Township. I believe the generalization to the American city is a safe one.
fundamental governmental goods. And third, cities are democratic jurisdictions subject to the preferences of the people. Indeed, cities offer us the opportunity to study dynamics that are fundamental to our broader understanding of politics and economics.

Not long after Samuelson and Tiebout offered their theories, Robert Dahl, a seminal figure in political science, asked a question that was not about economic efficiency or optimal provision levels. Rather, in seeking to better understand the democratic polity, he asked something much simpler: *Who Governs?* (1961). Though both our scope and our answers differ considerably, we ought not forget that when Dahl sought an answer to his question he turned not to the Congress or the President or even the State House; where he turned to was the American city. Which is where I turn now.
CHAPTER 1 BIBLIOGRAPHY


———. 2009b. "Survey: Interlocal Cooperation and Interlocal Network for Economic Development (Lake County Version)."


———. 2002b. "Local Government Cooperation: The Relationship Between Metropolitan Area Government Geography and Service Provision " In Annual Meetings of the


The proximate polity theory is based on assumptions that describe the motivations of local policy-makers and their perceptions of the local policy-making environment. Local politicians are assumed to be motivated by reelection and risk-minimization. In an effort to keep their jobs, officials engage policies that have a high probability of producing their preferred outcomes and avoiding policies that have a low probability of producing their preferred outcomes. In this chapter I explore the assumptions that underlie the proximate polity theory using unique survey results.¹²

*The Four Assumptions*

(1) *Mobility*: Officials believe that people, firms, and capital are mobile

(2) *Exit Options*: Officials believe that people and firms prefer to move shorter distances than longer distances.

(3) *Accountability*: Officials believe that voters will hold them electorally or professionally accountable when policies fail to produce the promised outcomes.

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¹² It is worth noting at the outset that the survey remains in its early stages with plans to expand it to additional metropolitan areas and boost response rates with the Denver Metro survey.
Economic Development: Officials believe their constituents prefer economic development to economic decline or stagnation.

THE FREDS SURVEY

The Front Range Economic Development Survey (FREDS) was designed to gain a better understanding of the political and economic contexts in which cities engage (or do not engage) economic development policies. The survey was modeled after a Lake County, Florida survey administered by Feiock (2009) and analyzed by Feiock et al. (2010). It was emailed to all mayors, city managers, and county commissioners along Colorado’s Front Range (92 jurisdictions)—the same geographic area that will be analyzed in Chapter 4 and Chapter 5 (see Map 2-1). At least one response was received from 38 of the 92 jurisdictions. Roughly half the responses came from mayors with the other half coming from city managers or the occasional economic development director or city council member.

Table 2-1 presents some of the differences between the respondent and non-respondent jurisdictions. (A list of the respondent jurisdictions with descriptive statistics can be found in Appendix 2-1.) Population size is the primary difference between respondent and non-respondent jurisdictions. Respondent jurisdictions have, on average, more than twice the residents of non-respondent cities. This is not surprising given that larger cities tend to have more resources and more elected officials who spend significant time at city hall. Moreover, officials in small residential towns on the outskirts of the metropolitan areas may have discarded survey because they do not view their city as being in the business of economic development. In the other ways the respondent and non-

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13 A full copy of the survey is available from the author upon request.
14 The survey was modeled after Feiock’s survey with Feiock’s permission.
15 Denver was surveyed by sending a survey to all of the members of the city council and the city’s economic development directory. One member of the Denver City Council responded. No survey was sent to the mayor who was, at the time, running for governor of the state.
respondent jurisdictions are actually quite similar. Respondent jurisdictions have only moderately higher median incomes and shorter travel times to work but have nearly identical mean non-white populations. The shorter mean travel time to work for respondent jurisdictions reflects their being slightly closer in to the core cities of Denver, Colorado Springs, Boulder, Greeley, and Fort Collins.

Map 2-1. Colorado’s Front Range
Map 2-2. Close-Up of the Denver Metropolitan Area

Table 2-1. Differences Between Respondent and Non-Respondent Cities

<table>
<thead>
<tr>
<th></th>
<th>Mean 2009 Population</th>
<th>Mean Median Income</th>
<th>Mean % Non-White</th>
<th>Mean Travel Time to Work</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Respondent Jurisdictions</strong></td>
<td>108,557.8</td>
<td>$59,739.54</td>
<td>15.8%</td>
<td>23.9 mins</td>
</tr>
<tr>
<td><strong>Non-Respondent Jurisdictions</strong></td>
<td>48,789.7</td>
<td>$50,084.21</td>
<td>15.2%</td>
<td>27.8 mins</td>
</tr>
<tr>
<td><strong>Difference</strong></td>
<td>59,768.1</td>
<td>$9,655.33</td>
<td>0.5%</td>
<td>3.9 mins</td>
</tr>
</tbody>
</table>
RISK AND POLITICAL ACCOUNTABILITY

For the theoretical causal link between risk-minimization and policy choice to be logically consistent, it must also be the case that local officials actually perceive economic development policy as risky. To assess whether or not local officials view economic development policies as risky, I asked them about two types of risk for nine types of development policy. The first type of risk was "political risk" which was defined to respondents as being high when there is a "high probability of negatively effecting local elected officials (electorally or in their ability to govern) when the policy is either unpopular or does not yield the desired outcome." The second type of risk I asked about was "economic risk" which was defined to respondents as being high when there is a "high probability of not yielding the desired economic outcome given the project's cost." The nine types of development policies were: infrastructure improvements, new cultural attractions, new parks/recreation programs, bike path networks, development or expansion of public transportation, subsidies, revenue sharing, regulatory flexibility, and business/industrial parks. Officials were asked to define the policies as not risky, slightly risky, moderately risky, or very risky for both types of risk.

For an overall assessment of the political and economic risk associated with economic development policy, I took the average response across all of the categories.\(^\text{16}\) These results are presented in Figure 2-1. The most important thing to note in Figure 2-1 is that local economic development policies are not seen as being risk free--neither economically nor politically. On the 1 to 4 scale, the average political risk valuation was 2.66 and the average economic risk valuation was 2.48. In both cases, right about in the middle.

\(^{16}\) For jurisdictions with more than one respondent, the elected official rather than the professional official was used. Consequently, respondent jurisdictions are only represented once in the analyses in this chapter.
Figure 2-1. Mean Economic and Political Risk for Economic Development Policies

Of course, not all economic development policies are equally risky. I begin to break this down by taking a closer look at the evaluations of risk for the two developmental policy measurements used in Chapter 3: infrastructure spending and lifestyle spending. Figure 2-2 reveals that infrastructure is, on average, seen as substantially more politically risky than economically risky. This suggests that the short and long-term negative externalities associated with infrastructure improvements (traffic, pollution, eminent domain acquisitions, fiscal cost, etc.) may, under some conditions, be seen as outweighing the long-term economic benefits of infrastructure improvements. It might pay politically for local policy to avoid increases in infrastructure spending even if they view it as being in the long-term economic best interest of the city.
The distribution of risk assessments for infrastructure is a bit different than the distribution for more alternative developmental policies. Figures 2-3 and 2-4 show the response distributions for the questions about lifestyle development. Figure 2-3 shows the average response for policies that involve parks, recreation, and trails. Local policy-makers clearly do not view these kinds of policies as risky as infrastructure policies. Figure 2-4 shows the average response for policies that involve new cultural attractions such as museums, ball parks, and theaters. These lifestyle investments are much more costly and, as can be seen in Figure 2-4, are perceived as being much riskier than either infrastructure or parks and recreation investment. Lifestyle development policies fall on either end of the risk spectrum while infrastructure seems to sit comfortably in the middle.
In the analyses that come in the following chapters I am only able to measure economic development policy activity using categories developed by the Census of Governments. However, there are many economic development policy tools that lie outside the scope of the Census of Governments survey. These development policies are those which are targeted at specific businesses: subsidies to businesses, regulatory flexibility, zoning assistance, and the development of business parks or corridors. Though they go untested in the statistical models, the survey included questions about them.

Figure 2-5 shows that the modal economic risk assessment and political risk assessment is moderately risky or very risky for all three types if targeted economic development policy. This suggests that these types of policies are some of the most politically and economically risky that officials can utilize. They are economically risky because they frequently require short-term investments or revenue-decreases with the hope that the losses will be made-up via other collection sources (sales taxes, fees, etc.). They are
politically risky because the existing residents and business owners may perceive them as unfair. Firms that see new businesses getting better deals than they got may be inclined to attempt to leverage new deals for themselves, consider exiting, or may simply vote against the officials who were responsible for their implementation.

Figure 2-5. Risk Associated with Using Targeted Economic Development Tools

In all, the results of the economic and political risk questions suggest that analysts of local development policy ought to remember that officials are operating in complex environments and that their valuations of policies are important. The implementation of policy does not ultimately stem from a simple economic cost-benefit analysis but rather from a multi-dimensional cost-benefit analysis that accounts for how policy makers perceive the costs and benefits of policies.
MOBILITY, EXIT OPTIONS, AND COMPETITION

At the root of the public choice conception of local politics is the idea of mobility and, by extension, competition. To have mobility, households and firms must have exit options--alternative places to locate. There is no disputing that people and firms in the United States can be mobile. The question is: are they mobile? The proximate polity theory actually requires neither. Instead, it assumes that local officials believe that people and firms are mobile. Though the FREDs Survey did not ask officials about how mobile they believe people and firms are, two pieces of evidence support the assumption.

The first piece of evidence is that Americans are in fact mobile. Table 2-2 presents migration rates for the 1995 to 2000 period during which 45.9% of households moved. Of that 45.9%, 54.25% moved within the county, 21.13% moved in-state to a new county, and 18.30% moved from a different state. Household migration rates would be lower if people were not mobile. Though these data do not identify city-to-city movers, some information can be gleaned about city-to-city movers from the "Central City" category: 29.3% of households residing in central cities in 2000 (or 15.81% of the moving households) had moved from a different county within the state in the previous 5 years. This means that at minimum, 29.3% of American households did a within-state move to a different city.

The second piece of evidence lies in the fact that most local policy-makers view their jurisdiction as being situated in a competitive environment. As Figure 2-6 shows, over 80% of the FREDs respondent jurisdictions "agreed somewhat" or "agreed strongly" with the statement that their jurisdiction is situated in a competitive environment. Competition amongst subnational jurisdictions is premised on the mobility of people and capital. It would not stand to reason that policy-makers believe that people and capital are stationary while simultaneously believing that their jurisdiction is in competition with other jurisdictions.
Table 2-2: U.S. Migration Rates 1995-2000

<table>
<thead>
<tr>
<th>Residence in 2000</th>
<th>% Non-Movers</th>
<th>% Movers</th>
<th>Moved within County</th>
<th>Moved from a Different County within State</th>
<th>Moved from a Different State</th>
<th>Moved from Abroad</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>54.1%</td>
<td>45.9%</td>
<td>54.25%</td>
<td>21.13%</td>
<td>18.30%</td>
<td>6.32%</td>
</tr>
<tr>
<td>Metropolitan</td>
<td>53.1%</td>
<td>46.9%</td>
<td>55.22%</td>
<td>19.62%</td>
<td>18.12%</td>
<td>7.04%</td>
</tr>
<tr>
<td>Central City</td>
<td>49.4%</td>
<td>50.6%</td>
<td>57.91%</td>
<td>15.81%</td>
<td>17.59%</td>
<td>8.70%</td>
</tr>
<tr>
<td>Suburbs</td>
<td>55.3%</td>
<td>44.7%</td>
<td>53.24%</td>
<td>22.37%</td>
<td>18.57%</td>
<td>5.82%</td>
</tr>
<tr>
<td>Non-Metropolitan</td>
<td>58.5%</td>
<td>41.5%</td>
<td>50.60%</td>
<td>27.47%</td>
<td>19.04%</td>
<td>2.89%</td>
</tr>
</tbody>
</table>


Figure 2-6. Perceived Inter-Jurisdictional Competition
The survey results allow me to go several steps further than simply saying that cities are situated in competitive environments by examining the nature of that environment. Included amongst the questions on the FREDS Survey was a list of all of the other jurisdictions along the Front Range. Respondents were asked to identify jurisdictions as competitors, cooperators, both, or neither (see Appendix 2-2 for sample network battery). Here, I briefly explore the competitive relationships as they pertain to the exit options assumption (the cooperative relationships are the subject of Chapter 5).

Figure 2-7 is a network graph that identifies how jurisdictions along Colorado's Front Range perceive one another. Arrows point to nodes that are viewed as competitors by the source-node. Larger nodes have been identified by more jurisdictions as competitors (that is, they have a high in-degree). The dark nodes are the respondent jurisdictions: non-responder jurisdictions can be identified as competitors even though they have not identified competitors themselves. Note that most of the jurisdictions with high in-degrees are also respondent jurisdictions.

Network-graphs are good descriptive tools. The nodes in Figure 2-7 are arranged to reflect sub-networks. Though different sub-networks can be identified, three standout based on geography: (1) a Denver sub-network, (2) a Greeley sub-network, and (3) a Colorado Springs sub-network. Additionally, the northwestern suburbs of Denver (Boulder, Boulder County, Louisville, Westminster, Golden, and Broomfield) appear to constitute a distinct section of the Denver sub-network. This suggests that near jurisdictions are more likely to be seen as competitors than far jurisdictions.

To more thoroughly explore the exit options assumption (that near exit options are preferred to far exit options) using perceived competitors the network was transformed into a directed-dyad dataset. A complementary log-log model was used to predict the relationship between geographic distance and identification as a competitor: the results are
presented in Figure 2-8.\textsuperscript{17} The y-intercept of approximately 0.10 in Figure 2-8 can be interpreted as the overall probability that a jurisdiction is identified by some other jurisdiction as competitor. As the distance between a jurisdiction and some other jurisdiction along the Front Range increases, the probability that the jurisdiction will be identified as a competitor decreases. In other words, the closer a jurisdiction is, the more likely it is that it will be identified as competitor.

\textbf{Figure 2-7. Competitive Network Graph of the Front Range}

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{front_range_network.png}
\caption{Competitive Network Graph of the Front Range}
\end{figure}

Dark Nodes = Respondent Jurisdiction | Light Nodes = Non-Respondent Jurisdiction
Node size increases as in-degree increases

\textsuperscript{17} To appropriately carry out the dyadic analysis, all non-respondent jurisdictions were dropped. A full explanation of the complementary log-log model is provided in Chapter 5. At this point it is enough to say that it is similar to a logit model but more appropriate for rare-events data.
Figure 2-8. Predicted Relationship Between Distance and Competition

Predictions based on the results of a complementary log-log model with one regressor. Confidence intervals produced using 1,000 Monte Carlo simulations.

**DISCUSSION**

The FREDS data (with the help of Census data) offer support for the accountability, mobility, and exit-options. In contrast with some of the assumptions of previous research, it appears that local policy-makers (in Colorado, at least) view economic development activities ranging from infrastructural improvements to direct subsidies to firms as, at the very least, moderately politically and economically risky. While future survey research is needed to determine the reliability of these results, they should come as little surprise to close observers of metropolitan politics. Mayors and city managers are conflicted about (and frequently weary of) the financial costs involved with many developmental activities as well as the short-term negative externalities.
The results of the survey also help to clarify how officials perceive the competitiveness of their metropolitan area. Over 50% of respondents classified the metropolitan economic development environment as moderately or very competitive. But as the social network analysis showed, that perception is nuanced. In particular, cities are more likely to identify near jurisdictions as competitors than they are far jurisdictions. Officials were not asked if they are motivated by keeping their jobs or reelection but a substantial body of research suggests this is the case (Mayhew 1974, Fenno 1978) and it is not certain that respondents would admit to such a motivation anyways. The economic development assumption that officials believe that residents prefer economic growth to economic stagnation or decline will have to go untested for the short-term but it should be rather uncontroversial. As I proceed with more thorough tests of the proximate polity theory, however, the reader will see that that even if the preference for development is nearly uniform, policy action to achieve development is part of a much more complex environment.
## APPENDIX 2-1. FRENDS RESPONDENT JURISDICTIONS

Table 2-3. Descriptive Statistics of the Respondent Jurisdictions

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Arapahoe County</td>
<td>487,967</td>
<td>565,360</td>
<td>15.90%</td>
<td>26.4</td>
<td>$59,402</td>
<td>25.80%</td>
</tr>
<tr>
<td>Arvada</td>
<td>102,153</td>
<td>108,208</td>
<td>5.90%</td>
<td>28.8</td>
<td>$66,103</td>
<td>15.00%</td>
</tr>
<tr>
<td>Boulder</td>
<td>94,673</td>
<td>100,160</td>
<td>5.80%</td>
<td>18.8</td>
<td>$52,277</td>
<td>18.40%</td>
</tr>
<tr>
<td>Boulder County</td>
<td>291,288</td>
<td>303,482</td>
<td>4.20%</td>
<td>22.4</td>
<td>$65,960</td>
<td>16.80%</td>
</tr>
<tr>
<td>Cherry Hills Village</td>
<td>5,958</td>
<td>6,437</td>
<td>8.00%</td>
<td>21.6</td>
<td>$190,805</td>
<td>3.90%</td>
</tr>
<tr>
<td>Colorado Springs</td>
<td>360,890</td>
<td>399,827</td>
<td>10.80%</td>
<td>20.7</td>
<td>$97,480</td>
<td>15.20%</td>
</tr>
<tr>
<td>Commerce City</td>
<td>20,991</td>
<td>24,067</td>
<td>5.90%</td>
<td>25.8</td>
<td>$65,960</td>
<td>16.80%</td>
</tr>
<tr>
<td>Denver</td>
<td>554,636</td>
<td>610,345</td>
<td>10.00%</td>
<td>24.8</td>
<td>$45,002</td>
<td>29.00%</td>
</tr>
<tr>
<td>Douglas County</td>
<td>175,766</td>
<td>188,225</td>
<td>6.90%</td>
<td>26.7</td>
<td>$57,761</td>
<td>15.20%</td>
</tr>
<tr>
<td>Eaton</td>
<td>2,690</td>
<td>4,264</td>
<td>58.50%</td>
<td>21.6</td>
<td>$47,314</td>
<td>9.30%</td>
</tr>
<tr>
<td>Edgewater</td>
<td>5,445</td>
<td>6,159</td>
<td>-5.30%</td>
<td>24.4</td>
<td>$55,827</td>
<td>28.80%</td>
</tr>
<tr>
<td>El Paso County</td>
<td>516,929</td>
<td>604,542</td>
<td>16.90%</td>
<td>22</td>
<td>$57,761</td>
<td>21.50%</td>
</tr>
<tr>
<td>Erie</td>
<td>6,291</td>
<td>7,255</td>
<td>17.40%</td>
<td>25.7</td>
<td>$77,114</td>
<td>10.30%</td>
</tr>
<tr>
<td>Estes Park</td>
<td>5,413</td>
<td>6,543</td>
<td>20.90%</td>
<td>15.9</td>
<td>$43,262</td>
<td>4.90%</td>
</tr>
<tr>
<td>Evans</td>
<td>9,514</td>
<td>19,481</td>
<td>104.80%</td>
<td>20.4</td>
<td>$37,158</td>
<td>28.90%</td>
</tr>
<tr>
<td>Fort Collins</td>
<td>118,652</td>
<td>138,733</td>
<td>16.90%</td>
<td>19.7</td>
<td>$49,662</td>
<td>12.30%</td>
</tr>
<tr>
<td>Fountain</td>
<td>15,197</td>
<td>24,430</td>
<td>60.80%</td>
<td>26.3</td>
<td>$42,121</td>
<td>24.90%</td>
</tr>
<tr>
<td>Frederick</td>
<td>2,467</td>
<td>8,336</td>
<td>237.90%</td>
<td>31.8</td>
<td>$55,324</td>
<td>12.80%</td>
</tr>
<tr>
<td>Golden</td>
<td>17,159</td>
<td>17,458</td>
<td>1.70%</td>
<td>23.3</td>
<td>$49,115</td>
<td>9.30%</td>
</tr>
<tr>
<td>Greeley</td>
<td>76,930</td>
<td>92,625</td>
<td>20.40%</td>
<td>19.7</td>
<td>$40,741</td>
<td>16.10%</td>
</tr>
<tr>
<td>Greenwood Village</td>
<td>11,035</td>
<td>14,341</td>
<td>30.00%</td>
<td>21</td>
<td>$116,147</td>
<td>6.10%</td>
</tr>
<tr>
<td>Jefferson County</td>
<td>527,056</td>
<td>536,922</td>
<td>1.90%</td>
<td>26.2</td>
<td>$65,909</td>
<td>13.60%</td>
</tr>
<tr>
<td>Kersey</td>
<td>1,389</td>
<td>1,486</td>
<td>7.00%</td>
<td>24.3</td>
<td>$41,333</td>
<td>8.60%</td>
</tr>
<tr>
<td>Larkspur</td>
<td>234</td>
<td>343</td>
<td>46.60%</td>
<td>30</td>
<td>$43,750</td>
<td>2.10%</td>
</tr>
<tr>
<td>Lone Tree</td>
<td>4,873</td>
<td>9,549</td>
<td>96.00%</td>
<td>26</td>
<td>$96,308</td>
<td>53.30%</td>
</tr>
<tr>
<td>Longmont</td>
<td>71,093</td>
<td>88,425</td>
<td>24.40%</td>
<td>12.9</td>
<td>$58,514</td>
<td>18.80%</td>
</tr>
<tr>
<td>Louisville</td>
<td>18,397</td>
<td>19,656</td>
<td>6.80%</td>
<td>22.3</td>
<td>$69,945</td>
<td>6.20%</td>
</tr>
<tr>
<td>Loveland</td>
<td>50,068</td>
<td>66,124</td>
<td>32.10%</td>
<td>23.1</td>
<td>$54,867</td>
<td>12.30%</td>
</tr>
<tr>
<td>Lyons</td>
<td>1,585</td>
<td>2,098</td>
<td>32.40%</td>
<td>25.9</td>
<td>$50,764</td>
<td>7.50%</td>
</tr>
<tr>
<td>Monument</td>
<td>1,917</td>
<td>4,903</td>
<td>155.80%</td>
<td>24.7</td>
<td>$50,000</td>
<td>5.40%</td>
</tr>
<tr>
<td>Nederland</td>
<td>1,394</td>
<td>1,401</td>
<td>0.50%</td>
<td>34.6</td>
<td>$50,588</td>
<td>2.90%</td>
</tr>
<tr>
<td>Northglenn</td>
<td>31,575</td>
<td>34,739</td>
<td>10.00%</td>
<td>28.8</td>
<td>$63,007</td>
<td>15.10%</td>
</tr>
<tr>
<td>Parker</td>
<td>23,558</td>
<td>44,718</td>
<td>90.80%</td>
<td>25.7</td>
<td>$85,838</td>
<td>18.70%</td>
</tr>
<tr>
<td>Pueblo</td>
<td>102,121</td>
<td>104,877</td>
<td>2.70%</td>
<td>17.8</td>
<td>$34,184</td>
<td>18.30%</td>
</tr>
<tr>
<td>Sheridan</td>
<td>5,600</td>
<td>6,170</td>
<td>10.20%</td>
<td>26</td>
<td>$34,984</td>
<td>23.00%</td>
</tr>
<tr>
<td>Westminster</td>
<td>100,940</td>
<td>109,180</td>
<td>8.20%</td>
<td>25.5</td>
<td>$61,613</td>
<td>19.40%</td>
</tr>
</tbody>
</table>
## APPENDIX 2-2. NETWORK BATTERY

Figure 2-8. Sample Network Battery

### 3. Boulder County

<table>
<thead>
<tr>
<th></th>
<th>Developmental Agreement</th>
<th>Competitive &amp; Cooperative Relationships</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boulder County</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boulder City</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jamestown City</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lafayette City</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Longmont City</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Louisville City</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lyons City</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nederland City</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Superior City</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ward City</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
CHAPTER 2 BIBLIOGRAPHY


In January 2010, the Colorado Springs, Colorado City Council made the determination that the city would turn off every third street lamp, stop mowing the grass in public parks, and cut its firefighting force in an effort bridge a $28 million budget gap (Booth 2010). In times of decline, as in times of growth, it is important to recognize that cities are situated in complex economic and political environments and making decisions about budgetary priorities is anything but simple. In this chapter I set out to better understand local development spending in the form of infrastructure and lifestyle expenditures. The models I develop fall far short of identifying the true complexities of local budgetary processes. Nevertheless, by theoretically and empirically introducing space into the models I believe they move us toward a more nuanced and geographically contextual understanding of local development politics.

The reader will recall that the proximate polity theory involves modeling the unique ecology that city officials operate within where consumer-voters make choices about where
they want to live. Local officials use spatial context to assess the risk of policy failure. In this chapter I use spatial-lag models to show that the policy geographies and human geographies of metropolitan areas significantly affect local development policy choices.

**HYPOTHESES**

Tobler’s 1st Law of Geography states that “everything is related to everything else, but near things are more related than distant things” (Tobler 1970: 236). Tobler’s 1st Law adds an interesting and largely unexamined complexity to the process of explaining the policies that cities implement: if we are to understand local political decisions it is necessary to pay attention to their jurisdictional neighbors. This is a distinguishing component of the theory and analysis below.\(^{18}\)

Drawing off the assumptions outlined in Chapter 1 and the framework of the proximate polity theory, I hypothesize that local politicians are more likely to pursue high levels of developmental goods provision when the regional developmental policy environment is active and when the risk of policy failure is low. Under these conditions, policy outcomes are more predictable and electoral threats due to policy failure are minimized.

The risks associated with development policy have been minimized in the literature but it is important to account for them. When cities engage in development, existing residents are frequently faced with increased traffic, eminent domain acquisitions, environmental degradation, construction, and crowds. These are externalities that can be harmful to short-term property values and to the quality-of-life of those in the developing

---

\(^{18}\) As I note in Chapter 1, to accomplish this it is necessary to differentiate between internal variables and external variables. Internal variables are those that describe characteristics of a jurisdiction \(i\). External variables are those that describe a weighted aggregation of characteristics for all other jurisdictions \(j\). External variables are also referred to as spatially-lagged and neighboring variables.
jurisdiction (we are all familiar with the “not in my back yard” phenomenon).
Developmental policy engagement can also mean that the city is spending on development projects at the expense of other projects that may be urgent to existing residents but unimportant or unknown to potential residents and firms. For example, current residents will know if public safety, health care, and trash pickup need improvement and require budgeting attention while potential movers may not know about these problems. And if development is successful enough, existing renters may be forced out due to gentrification and increased rents. Finally, residents that move into the city because of the developmental policies may obtain the benefits without having to deal with some of these negative externalities. This is all to say that the preferences of existing residents for development and the preferences of potential residents for development may not always be the same.

**Spatial Clustering**

Though it may seem obvious to suggest that an active policy environment would lead to increased policy activity, it is important for both theoretical and model specification reasons. If neighboring policy choices influence internal policy choices, it means that cities are not making policy independently and that there are regional policy feedback loops that force city leaders to make policy adjustments—a violation of OLS assumptions and an interesting phenomenon in its own right. Take the expenditure geography depicted by Cities 1 through 7 in Figure 3-1a where internal goods provision is low and external goods provision is high. These seven cities are at risk of seeing desirable residents and firms exit to nearby jurisdictions that are providing more of the goods that they want. While taxes are likely lower in the low-provision jurisdictions, the dominant high-provision providers have likely created a high-provision expectation of what can be done with city resources.
Low-providers in this geography must then adjust their provision levels in order to avoid lagging behind other regional providers. The same is true of the expenditure geography depicted by Cities 8 though 14 in Figure 3-1b. These cities are high-providers in a low-provision environment and thus risk being seen as a high-tax outlier in a region where low-taxes and low-provision are the norm. *In short, there are consequences to being different.*

**Figure 3-1. Theoretical Provision Geographies**
(assumes uniform preferences across jurisdictions)

![Figure 3-1a](image1)

![Figure 3-1b](image2)

![Figure 3-1c](image3)

= High Provider

= Low Provider
Statistically, this concept of inter-jurisdictional comparison and policy adjustment is called positive spatial autocorrelation. In the case of local developmental expenditures, this is nearby jurisdictions having similar developmental expenditure levels regardless of whether those levels are low or high. Positive spatial autocorrelation is depicted in Figure 3-1c. Though Figure 3-1c contains clusters of both low and high spending, on average, jurisdictions provide at a similar level as their neighbors.

The two alternatives to positive spatial autocorrelation are negative spatial autocorrelation and a random distribution of spending about the metropolitan area. The former should be theoretically unsustainable in the political-economic environment in which cities exist: the short-term benefits of being different will give way to a long-term positive spatially auto-correlated equilibrium where cities are producing similar packages to avoid becoming a developmental outlier. The later—randomness—will be this chapter's null-hypothesis:

Null Hypothesis: Within metropolitan areas, developmental expenditure levels are randomly distributed about the metropolis.\(^{19}\)

The alternative hypothesis that describes the expected spatial relationship with respect to developmental goods provision can be stated as follows:

_Hypothesis 3-1:~^{20}~Cities will provide developmental goods in geographic clusters where clusters are characterized by similar levels of provision (positive spatial autocorrelation), all else being equal._

---

\(^{19}\) In the language of the dissertation’s running null hypothesis: Economic development expenditure decisions are caused by variables that are strictly internal to the jurisdiction.  
\(^{20}\) Hypotheses are number such that the first number indicates the chapter number and the second number indicates its place within the chapter. Hypothesis 3-1 is the first hypothesis presented in Chapter 3.
Risk Minimization

Policy only characterizes one aspect of the geography that city officials make choices in. Local officials also want to minimize the possibility that their policies will fail. They want to be confident that city resources will be put toward projects that yield the desired developmental benefits. When policies fail they can expect their internal constituency to hold them electorally accountable. Certainly, a lot of factors go into such an assessment but an important one might be the degree to which the city will be able to “piggy-back” off developed cities. The “exit options” assumption indicates that people and firms prefer to move shorter distances than longer distances. Consequently, the probability that developmental policies will yield actual development increases when neighboring jurisdictions are comprised of the types of consumer-voters that cities are aiming to attract.

When regional economic potential is concentrated in nearby jurisdictions, the risks of development decrease due to the pool of potential desirable residents being larger. I consider three non-clustering spatial relationships: neighboring population, neighboring median-income, and neighboring creative population.

Spatially-lagged population measures the city’s proximity to a metropolitan area’s population centers. When the variable takes a high value it indicates close relative proximity to the parts of the jurisdiction where the most people live. Being close to regional population centers has two consequences. First, it means that there are more nearby potential residential and commercial movers to attract. Second, it means that the city is closer to the metropolitan area’s more economically vibrant spaces.21 The risks of economic development are lower in these areas then in areas with low spatially-lagged populations.

21 An alternative to the population measures of the proximity to economic activity might be a distance from the core city measure. The population-based measures constitute better proxies of this concept because they are flexible with time. Core cities are determined by the Census Bureau and then remain constant for decades even as population dynamics change.
Taking advantage of this development potential, a city with a high spatially-lagged population will spend more on developmental goods than a city with a low spatially-lagged population. Population is measured as total population and metropolitan population-share. The former tests whether cities are responding to the amount of people without respect for their metropolitan context. The latter tests for whether cities are responding to their proximity to relative population share.

*Hypothesis 3-2: As spatially-lagged population increases, internal development spending will increase, all else being equal.*

Lagged population is a blunt but necessary instrument with which to measure developmental potential and policy risk. Measurements of nearby median-income and creative population operationalize slightly more specific aspects of the geographic context in which local governments make policy. Mayors, city council members, and other local officials are no different than other politicians who make assumptions about constituency preferences based on demographic characteristics (Fenno 1978). So while median-income, for example is not always an accurate representations of constituent preferences, it is likely what city officials use to make assessments about their metropolitan area. A city with a high median-income has a higher percentage of potential quality movers than a city with a low median-income. Individuals and families with high incomes are likely to spend more of their money in the community which helps cities to increase their overall revenues via property, sales, and use taxes and thus constitute desirable potential residents. Accordingly, cities that are geographically situated near high-income areas—even if the city itself is not high-income—have quality residents and firms to draw upon. My hypothesis is that cities assume that developmental goods appeal to these residents and they consequently cater to their preferences. Spatially-lagged median-income measures the
residential wealth of all of the other jurisdictions in the metropolitan area weighted for
proximity to the home-jurisdiction. As lagged median-income increases, the risk of policy
failure decreases. Accordingly, as spatially-lagged median-income increases so should local
development spending.

\textit{Hypothesis 3-3: As spatially-lagged median-income increases, internal developmental
spending will increase, all else being equal.}

The work of Florida (2002) on the “creative class” has achieved notice within both
the academic and policy communities. Florida identifies people engaging in “creative
professions” (everything from scholars to artists to software engineers) as the growing class
of individuals driving America’s economic engine. He contrasts the creative class with the
simultaneously growing service class (health care support professionals, technical support
professionals, food services, etc.) that support the lifestyles of the creative class for
considerably lower wages. The creative class prefers a culture that is technology based,
talented, tolerant, and environmentally friendly. If cities are seeing what Florida is seeing,
it should be the case that cities in areas that are particularly “creative” will try and
capitalize on this circumstance by engaging in greater developmental goods provision—
particularly the provision of goods that are desirable to the creative class.

\textit{Hypothesis 3-4: As the spatially-lagged creative population increases, internal
development spending will increase, all else being equal.}

\textbf{DATA AND MEASUREMENT}

The spatial analyses pursued below require complete data eliminating the analyst’s
ability to use a sample of cities from within a metropolitan area. This limitation in turn
limits the scope of available data\textsuperscript{22}. To test my hypotheses I have constructed a dataset that includes all of the cities that comprise 15 American metropolitan areas. To select the metropolitan areas, a pool of all metropolitan American cities in the 48 contiguous states was populated. After purposively selecting the Denver Metropolitan Area into the sample, cities were randomly drawn. Each time a city was drawn the rest of the cities in that metropolitan area also entered the sample. The final sample contains exactly 1,500 cities. Map 3-1 shows the geographic distribution of the metropolitan areas about the country and Appendix 3-1 provides a list of the 15 metropolitan areas and some of their characteristics\textsuperscript{23}.

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{map3-1.png}
\caption{The 15 Metropolitan Areas Used in the Analysis}
\end{figure}

\textsuperscript{22} Data from surveys of cities (like those done by ICMA and Social Capital Community Benchmark Survey) would offer valuable additions to the models presented below were the data available individually for all cities within the metropolitan area.

\textsuperscript{23} Because New York City is an outlier along several dimensions (i.e. a highly complex multi-tiered government structure, high expenditures, and high revenues), the New York Metropolitan area was left out of the pool.
To measure developmental goods provision, I turn to two concepts that are measurable using the 2002 Census of Governments, Finance: infrastructure spending and lifestyle spending. The infrastructure goods variable focuses on the construction and maintenance of roads, bridges, and highways. These goods are the foundation of economic development efforts as they are the groundwork on which both residential and commercial development takes place. Their provision is critical to attracting businesses and residents of all types. Lifestyle goods (measured through the COG-F’s recreation function) include everything from the construction and operation of parks, bike trails, ball fields, and public swimming pools to the construction and operation of convention centers, museums, and stadia. Lifestyle goods can make cities desirable places to live and relocate to. They are especially attractive to younger people, families, retailers, and restaurants that want to be located in cities that offer a wide array of entertainment options. Both dependent variables are examined in their per-capita and their total forms.

The limitations of the data are such that I am unable to measure government provided developmental club goods such as structured-tax rates, relocation incentives, and tax-increment financing. Though it is difficult to know with confidence, the expectation is that both of these dependent variables are highly correlated with the developmental policies that I cannot measure. For example, cities that are spending greatly on lifestyle goods are also likely to be the cities that are pursuing the businesses that benefit from

---

24 The Census of Governments is a survey conducted by the U.S. Census Bureau on years ending in 2 and 7. The survey is of all incorporated U.S. cities, towns, boroughs, counties, special districts, school districts, and states. My analysis is restricted to cities, towns, and boroughs. The Census Bureau generates imputed responses for jurisdictions that did not respond to the survey and follow-ups (about 10% in 2002) and for which the Census Bureau has previous data on which to base the imputation. (United States Census of Governments: Technical Documentation 2002)

25 The lifestyle variable is Function 44 is Census of Governments Classification Manual. (Government Finance and Employment Classification Manual 2002)

26 The lifestyle variable is Function 61 is Census of Governments Classification Manual. (Government Finance and Employment Classification Manual 2002)
these goods via structured tax-rates or other subsidies.

Population characteristics including total population, median-income, and creative population come from the 2000 Census-Summary File 3. Summary File 3 contains more variables than the other summary files because it is based on a sample (rather than the complete population) of the people in each city. Of the population variables, the creative population is by far the most difficult to measure. Florida has used general measures of occupational categories to proxy for creativity. The measurement route I take is to use three occupational categories from the Census: (1) Arts, design, entertainment, sports, and media occupations, (2) Professional occupations, and (3) Information occupations. Of course, these occupational measures are very blunt and do not perfectly distinguish between creative and non-creative people. For each jurisdiction, the estimated number of people in these occupations is totaled and made into a percent of the total working population.

Spatial Weighting

The spatial weighting scheme used in the following analyses is the same as the one outlined in Chapter 1. To review, spatial weighting procedures are used to geographically relate each of the cities within a metropolitan area. In this analysis I use a row-standardized inverse-distance-squared spatial-weights-matrix (IDS-SWM). This type of spatial weights matrix treats every city as a neighbor but weights near neighbors more than distant neighbors.\(^\text{27}\) The matrix is modified so that only cities within their respective metropolitan area are counted as neighbors. To provide an example, the spatially-lagged median-income for Denver, Colorado is the average median-income of all other cities in the

\[^{27}\text{The inverse-distance-squared weighting is achieved by post-multiplying the variable } v \text{ in the form of a vector } V \text{ with } n \text{ rows by an } n \times n \text{ spatial weights matrix } W. \text{ The matrix } W \text{ is composed of elements } e. \text{ To find } e, \text{ the inverse of the distance squared } (d^2) \text{ between } i \text{ and some other jurisdiction } j \text{ is taken. Then the elements are row-standardized so that } e \text{ is equal to inverse-distance-squared over the sum of all elements in the row.}\]
Denver Metropolitan area weighted such the median-incomes of close cities are valued more than the median-incomes of far cities. A high spatially-lagged median-income would indicate a higher wealth concentration around Denver then a low spatially-lagged median-income.

**DESCRIPTIVE ANALYSIS**

I begin the analysis by taking a closer look at the dependent variables. One of the prerequisites for the theory is that there is variation in developmental goods provision—that not all cities are engaging in economic development at the same level and that this variation in explainable. Figure 3-2 presents descriptive statistics and a histogram for each of the dependent variables in their per-capitized and total forms. (Note that for the multivariate analysis, the dependent variables are logged to base e.) Because both distributions are left-skewed, percentiles and inter-quartile ranges are offered in lieu of standard deviations. The histograms are visual evidence of what the medians and the inter-quartiles ranges (IQRs) indicate: that the median city has a moderate level of spending ($89.02 and $23.95 per capita for infrastructure and lifestyle respectively) but that the distance between the 25th and 75th percentiles is also considerable ($95.95 and $50.33 per capita for infrastructure and lifestyle respectively) and spending is not simply concentrated around the median. For infrastructure, 25 percent of the cities in the sample are spending less than $51.94 per capita and 25 percent are spending more than $147.25 per capita. For lifestyle, 25 percent of the cities in the sample are spending less than $6.06 per capita and 25 percent are spending more than $56.28 per capita. This strongly indicates that, in the aggregate, there is variation in developmental goods expenditures across American cities.
Figure 3-2. Developmental Expenditures: Descriptive Statistics

<table>
<thead>
<tr>
<th></th>
<th>Total Infrastructure Expenditures</th>
<th>Total Lifestyle Expenditures</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>N</strong></td>
<td>1,500</td>
<td>1,500</td>
</tr>
<tr>
<td><strong>Mean</strong></td>
<td>$2,004</td>
<td>$1,480</td>
</tr>
<tr>
<td><strong>Median</strong></td>
<td>$425</td>
<td>$77</td>
</tr>
<tr>
<td><strong>IQR</strong></td>
<td>$1,250</td>
<td>$439</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Per-Capita Infrastructure Expenditures</th>
<th>Per-Capita Lifestyle Expenditures</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>N</strong></td>
<td>1,500</td>
<td>1,500</td>
</tr>
<tr>
<td><strong>Mean</strong></td>
<td>$123</td>
<td>$50</td>
</tr>
<tr>
<td><strong>Median</strong></td>
<td>$89</td>
<td>$25</td>
</tr>
<tr>
<td><strong>IQR</strong></td>
<td>$95</td>
<td>$50</td>
</tr>
</tbody>
</table>

Some extreme/oulier observations have been excluded from all graphs for presentation purposes. Top x-axis is always the scale for the natural formulation of the variable, bottom x-axis is always the scale for the logged formulation of the variable. IQR is the Inter-Quartile Range: The distance between the 25th percentile and the 75th percentile.
Figure 3. IQR Dot Plot for Infrastructure Spending

Figure 4. IQR Dot Plot for Lifestyle Spending

It is also important to be certain that this variation is not simply occurring at the metropolitan level—that the variation is not only a function of state institutions. To examine this, I have produced metropolitan-level IQR dot plots that indicate the level of spending at the 25th, 50th (median), and 75th percentiles (the range of which is the IQR). These dot plots are presented in Figure 3-3 and Figure 3-4. (Appendix 3-2 includes maps of total and per-capita spending levels for both types of economic development for three metropolitan areas: Minneapolis-St.Paul, Raleigh-Durham, and Seattle.) There appears to be variation in median spending both across and within metropolitan areas. While there is sufficient overlap in the IQRs and substantial intra-metropolitan area variation to indicate that the aggregate variation is due to more than metropolitan-level variables, I proceed with caution by also including state-level fixed effects in the multivariate models. One preliminary inference that can be made from looking at these distributions is that not all American cities choose to pursue development (at least as formulated here) with equal
intensity. This is particularly true of lifestyle expenditures—an unsurprising result given that parks, museums, and stadia may be regarded as secondary to more primary infrastructure goods.

**Global Moran's I Tests**

For a preliminary assessment of the spatial nature of local development expenditures I turn to Global Moran’s I tests. The Global Moran’s I statistic is a basic test of spatial autocorrelation. It is the linear association between a set of values and the spatially weighted average of those values (Moran 1948; Cliff and Ord 1971, 1981; Anselin 1996; Anselin and Bera 1998). In this case, the statistic indicates the type and magnitude of spatial autocorrelation in economic development spending across all the cities in the sample. Monte Carlo simulations are used to test the significance of the statistic.

Table 3-5 presents Moran’s I statistics for each of the two types of economic development spending. For each category, I present four statistics: (1) Per-Capita Natural, (2) Per-Capita Logged, (3) Total Natural, and (4) Total Logged.28 (Note that these statistics do not control for any of the other factors that may influence spending.) All of the statistics are positive and statistically significant indicating that there is positive spatial autocorrelation—preliminary confirmation of Hypothesis 3-1. These statistics mean that developmental expenditure levels tend to be clustered such that high spenders are near high spenders and low spenders are near low spenders. Interestingly, both the per-capitized and the total formulations of the variable are significant. This suggests that two forms of clustering may be going on simultaneously. In the first form, similarities seem to account for population and in the second form, similarities seem not to account for population. On the one hand, cities are comparing themselves with their neighbors and

28 Global Moran’s I tests were carried out in R (R: A Language and Environment for Statistical Computing 2009) using the “spdep” package (Bivand 2009).
making an internal policy assessment in the context of their own limitations (spending on development can only cost so much per tax-payer). On the other hand, when cities are competing with one another, they may not always have the luxury of considering the limitations that their scale causes. If a neighbor is developing quickly, it may simply mean that the city has to dedicate more resources per tax-payer than its neighbor.

Table 3.1. Global Moran’s I Tests\(^A\)

<table>
<thead>
<tr>
<th></th>
<th>Lifestyle Expenditures</th>
<th>Infrastructure Expenditures</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Natural</td>
<td>Logged</td>
</tr>
<tr>
<td><strong>Per-Capita</strong></td>
<td>0.10**</td>
<td>0.23**</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>0.04**</td>
<td>0.13**</td>
</tr>
</tbody>
</table>

Significance assessed based on 1,000 Monte Carlo simulations; + p<0.10, * p<0.05, ** p<0.01

\(^A\) An inverse-distance-squared spatial weights matrix was used.

**SPATIAL-LAG AND SPATIAL-MIXED MODELS**

To jointly test the hypotheses, I estimate spatial-lag and spatial-mixed models. In any situation where there is spatial dependence in the dependent variable, the independence and omitted variables assumptions of OLS are violated. To overcome this problem, both spatial-lag and spatial-mixed models include a spatially lagged dependent variable as a regressor \((\rho_h, \rho)\) on the right-hand side of the equation. Rho functions similarly to the temporally-lagged dependent variable in a distributed-lag time-series model by filtering the dependent variable of its dependence and producing a parameter that estimates the dependence effect. Unlike the time-series case, however, \(\rho_h\) is correlated with the error term requiring the estimation to take place in a maximum likelihood framework that avoids inflated standard errors (Anselin 1988; Anselin and Bera 1998). In
order to test Hypotheses 3-2 through 3-4, I utilize spatial-mixed models, which, in addition to \( \rho \), estimate the spatial-lags of all of the independent variables.

Because it is difficult to control for the functional responsibility and cost-of-living differences that exist across states, the models also include metropolitan-level fixed-effects.\(^{29}\) The fixed-effects also guard against \( \rho \) simply estimating inter-metropolitan area variation. For example, Figure 3-4 indicates that, on average, Denver Metro cities spend a lot of lifestyle expenditures while, on average, Lincoln Metro cities spend very little on lifestyle. Without the fixed-effects, I run the risk of the models reporting this metro-to-metro correlation rather than the sub-metropolitan area spatial autocorrelation. The one setback of including these state-level fixed-effects is that they prevent the inclusion of metropolitan-level variables (e.g. metropolitan population, metropolitan fragmentation, etc.). The models also control for fiscal capacity in the form of per-capita revenue and inter-governmental revenue so that expenditures are not a function of earmarked revenue from the state and federal governments.

Though the models are estimated in a maximum likelihood framework with a Jacobian, the spatial-lag model and the spatial-mixed models are represented more simply in equations 3-1 and 3-2 respectively. In the equations \( W \) is the spatial-weights-matrix that geographically relates jurisdictions to one another and \( a \) is the fixed-effects term.

\[
y = b_0 + b_1 y_1 + b_2 x_2 + a_2 + e \quad \text{Equation 3-1}
\]

\[
y = b_0 + b_1 y_1 + b_2 x_2 + b_3 x_3 + a_4 + e \quad \text{Equation 3-2}
\]

\(^{29}\) All but two of the metropolitan areas lie entirely in single states. The Philadelphia metro area includes jurisdictions that lie in New Jersey, Maryland, and Delaware in addition to Pennsylvania. The Minneapolis-St. Paul metro area includes jurisdictions in Wisconsin in addition to Minnesota. When state fixed-effects are substituted for metropolitan-level fixed-effects the results remain substantively the same.
RESULTS

Tables 3-2 and 3-3 present the regression results for the total and per-capita models respectively. For estimation purposes, all of the independent variables are standardized to mean=0 and standard deviation=1. For each dependent variable, I estimate 3 models. The Rho-Only Models contain no covariates other than rho and the metropolitan-level fixed-effects (a). The Rho-Only Model is, in effect, a Global Moran's I Test that controls for state-level effects. The Spatial-Lag Models include internal independent variables and the spatially-lagged dependent variable (Rho). The Spatial Mixed-Models include both the spatially-lagged dependent variable and each independent variable is in its normal and spatially-lagged form. Because the models estimate feedback loops amongst jurisdictions, interpreting coefficients directly can be difficult. The results, however, can be assessed for their direction and significance.

The first thing to note about the two sets of models is that the total-spending models perform much better than the per-capita spending models. The AIC decreases in the total expenditures model as the covariates go from including only rho to internal variables plus rho to the full mixed-model. This indicates increased model performance for total expenditures and can be compared with the per-capita models where there is an AIC decrease between the Rho-Only models and the spatial-lag models but not from the spatial-lag models to the mixed-models.

*Hypothesis 3-1* is tested using the rho parameter. In the per-capita models, rho is insignificant in all of the infrastructure equations and two of the lifestyle equations—-it is significant in the rho-only lifestyle model. This can be contrasted with the total spending models where rho is positive and statistically significant across-the-board. This offers conditional support for Hypothesis 3-1. After controlling for other variables, sub-metropolitan spatial clustering on infrastructure and lifestyle expenditures remains for
total expenditures but not for per-capita expenditures. Though total and per-capita outputs are correlated, they are only correlated at 0.42 for infrastructure spending and 0.56 for lifestyle expenditures. *These tests of Hypothesis 3-1 indicate that cities are responding to the total development outputs of their neighbors rather than their scaled outputs.*

Controlling for other factors, when neighboring total expenditures go up, so do internal total expenditures. After controlling for a range of internal (including population) and external factors that can influence developmental expenditure decisions, total infrastructure and total lifestyle outputs are spatially clustered *within* metropolitan areas. Per-capita changes are, perhaps, too subtle for other cities to notice and may be a reflection of an expanded population more than direct developmental initiatives.

Above all, the results strongly indicate that spatial distribution of expenditures is significantly different than what we would see were expenditures distributed randomly about the metropolitan areas (the *Null Hypothesis*). The positive direction of these statistics indicates that cities are providing goods in clusters of similar amounts. The question, of course, is why? Cities are not merely producing similar policy outputs because of chance geographical proximity. Rather, I have hypothesized that the positive spatial autocorrelation is a function of the need for cities to satisfy the similar preferences of mobile consumer-voters and avoid producing policies that are substantially different from their neighbors.

The tests of hypotheses 3-2, 3-3, and 3-4 can be found in the spatial mixed-models that estimate spatially-lagged independent variables in addition to the spatially-lagged dependent variable *rho*. I restrict my analysis to the total-spending models because they perform so much better than the per-capita models. In short, the results indicate strong support for *Hypothesis 3-2* and *Hypothesis 3-4*. The reader will recall that *Hypothesis 3-2* conjectured that the physical proximity of the city relative to the metropolitan area's
concentration would influence developmental expenditures. This hypothesis is borne out for total population but not for population share. In other words, being centrally located in the Philadelphia, PA metropolitan area is different than being centrally located in the Lincoln, NE or Boise, ID metropolitan areas. Figure 3-5 compares the maximum spatial lags for total population and population share across metropolitan areas. As depicted, a centrally located city in the Lincoln area may have a large relative pool to draw upon for development but the population of that pool may actually be quite small. Compare Lincoln with the Houston and Philadelphia metropolitan areas that have many more people and are geographically large. In these metro areas there are considerably more people to draw upon but they may not be right next-door. Cities appear to care more about neighboring population than they do population share.

Figure 3-5. Metropolitan Area Maximum Spatially-Lagged Population v. Maximum Spatially-Lagged Population Share
Interestingly, Hypothesis 3-3 (spatially-lagged median-income) is not supported in the models while Hypothesis 3-4 (spatially-lagged creative population) is robustly supported; though it should be noted that when spatially-lagged creative population is dropped from the model, the spatially-lagged median-income variable becomes significant. When desirable neighbors live (though not necessarily work) in close proximity to the policy-making jurisdiction, the policy-making jurisdiction engages in more developmental activity. This is consistent with the proximate polity theory that having "quality" neighbors to draw upon reduces the risk of policy failure leading policy-makers to be more comfortable spending city dollars on developmental goods. They need not fear that such goods will go to economic or political waste.

The significance of spatially-lagged creative population and the insignificance of lagged median-income requires additional research. The results suggest that when jurisdictions make developmental policy choices they pay attention to the specific occupational characteristics of the desired population over more general indicators such as income. While the two variables are fairly highly correlated at 0.62, they are not so highly correlated as to suggest they measure the same concept. It should, however, go acknowledged that the measure of creative population may alternatively be measuring something more along the lines of "professional occupations" rather than specifically "creative populations."

DISCUSSION

There is considerable variation in developmental goods expenditures across and within metropolitan areas. This variation is partially explained in the statistical models presented here but, as with any model, results should be taken as coming from an
abstraction of reality. In particular, cross-sectional analyses offer but a snapshot in time where a large N is substituted for a temporal structure where dynamic changes can be identified (time will be considered in the next chapter). But while the analyses conducted in this chapter are but narrow tests of a broad theory, some very strong trends appear in the results that cannot be ignored. These trends add to, but do not replace, the extant research on local development politics.

The first, and most important, of these trends is that American local governments produce policies in clusters. I have theorized that this is caused by (a) cities needing to attract similar groups of residents and thus needing to produce similar policies; and (b) sub-metropolitan provisional norms. The costs of a city offering a substantially different set of policies than many of its neighbors will make that city either an unattractive high-tax outlier or an unattractive low-provision outlier. Of course, there are going to be exceptions to this trend (big providers in low provision areas and low providers in high provision area)—exceptions that I suspect are due to powerful anti-growth or pro-growth internal interests within the jurisdiction. The general policy calculus, however, appears to be driven by more than characteristics internal to the jurisdiction. Cities care about the economic characteristics of neighboring jurisdictions because as the number of potential nearby quality mover increases, the risks of developmental policy failure decrease. Engaging in a set of policies that is designed to increase internal property values and quality of life but ends up doing the opposite is a recipe for political failure.

Fischel (2001) makes a Tiebout-sorting argument that homeowners tend to be risk-averse because their home is their principal asset. Homeowners consequently advocate for policies that they believe will maximize their principal asset’s value but, more importantly,

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30 Within the model, outliers may also be due to measurement error from non-responses or incorrect responses to the COG-F.
Table 3.2. Spatial Autoregressive Models of Logged Total Economic Development Spending with Fixed Effects

<table>
<thead>
<tr>
<th>Internal Variables</th>
<th>Rho-Only Models</th>
<th>Lag Models</th>
<th>Mixed Models</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Infrastructure</td>
<td>Lifestyle</td>
<td>Infrastructure</td>
</tr>
<tr>
<td>Intergovernmental Revenue</td>
<td>--</td>
<td>0.21** (0.07)</td>
<td>--</td>
</tr>
<tr>
<td>Per-Capita Tax Revenue</td>
<td>--</td>
<td>0.14** (0.05) 0.26** (0.06)</td>
<td>0.14** (0.05) 0.26** (0.06)</td>
</tr>
<tr>
<td>Population</td>
<td>--</td>
<td>0.23** (0.06) 0.35** (0.07)</td>
<td>0.21** (0.06) 0.34** (0.07)</td>
</tr>
<tr>
<td>Median Income</td>
<td>--</td>
<td>-0.11+ (0.06) -0.40** (0.08)</td>
<td>-0.11 (0.07) -0.39** (0.08)</td>
</tr>
<tr>
<td>Metropolitan Population Share</td>
<td>--</td>
<td>0.37** (0.07) 0.56** (0.07)</td>
<td>0.37** (0.07) 0.55** (0.07)</td>
</tr>
<tr>
<td>Percent Creative Occupations</td>
<td>--</td>
<td>4.74** (0.66) 8.02** (0.79)</td>
<td>2.32** (0.79) 5.58** (0.95)</td>
</tr>
<tr>
<td></td>
<td>Spatially-Lagged Variables</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intergovernmental Revenue</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Per-Capita Tax Revenue</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Population</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Median Income</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Metropolitan Population Share</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Percent Creative Occupations</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td></td>
<td>Rho (Spatially-Lagged DV)</td>
<td>0.46** (0.04) 0.42** (0.04)</td>
<td>0.34** (0.04) 0.30** (0.04)</td>
</tr>
<tr>
<td></td>
<td>Intercept</td>
<td>2.18** (0.44) 1.26** (0.51)</td>
<td>2.31** (0.41) 1.03* (0.46)</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>1,500</td>
<td>1,500</td>
</tr>
<tr>
<td></td>
<td>Log Likelihood</td>
<td>-3150.85</td>
<td>-3445.74</td>
</tr>
<tr>
<td></td>
<td>AIC</td>
<td>6335.70</td>
<td>6925.50</td>
</tr>
<tr>
<td></td>
<td>LM Test for Residual Autocorrelation</td>
<td>0.41+</td>
<td>3.66**</td>
</tr>
</tbody>
</table>

+ p<0.10, * p<0.05, **p<0.01

Metropolitan-level fixed-effects have been suppressed in all models.
All non-fixed independent variables have been standardized to have mean=0 and standard deviation=1
Spatial Weights Matrix = Inverse-Distance-Squared (with no cross-metropolitan area neighbors)
Table 3-3. Spatial Autoregressive Models of Logged Per-Capita Economic Development Spending with Fixed Effects

<table>
<thead>
<tr>
<th></th>
<th>Rho-Only Models</th>
<th>Lag Models</th>
<th>Mixed Models</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Infrastructure</td>
<td>Lifestyle</td>
<td>Infrastructure</td>
</tr>
<tr>
<td><strong>Internal Variables</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intergovernmental Revenue</td>
<td>--</td>
<td>--</td>
<td>0.01* (0.00)</td>
</tr>
<tr>
<td>Per-Capita Tax Revenue</td>
<td>--</td>
<td>--</td>
<td>0.02** (0.00)</td>
</tr>
<tr>
<td>Population</td>
<td>--</td>
<td>--</td>
<td>0.00 (0.00)</td>
</tr>
<tr>
<td>Median Income</td>
<td>--</td>
<td>--</td>
<td>0.00 (0.00)</td>
</tr>
<tr>
<td>Metropolitan Population Share</td>
<td>--</td>
<td>--</td>
<td>0.00 (0.00)</td>
</tr>
<tr>
<td>Percent Creative Occupations</td>
<td>--</td>
<td>--</td>
<td>0.08** (0.03)</td>
</tr>
<tr>
<td><strong>Spatially-Lagged Variables</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intergovernmental Revenue</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Per-Capita Tax Revenue</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Population</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Median Income</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Metropolitan Population Share</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Percent Creative Occupations</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td><strong>Rho (Spatially-Lagged DV)</strong></td>
<td>0.03 (0.05)</td>
<td>0.11* (0.05)</td>
<td>0.03 (0.05)</td>
</tr>
<tr>
<td><strong>Intercept</strong></td>
<td>0.10** (0.02)</td>
<td>0.03+ (0.01)</td>
<td>0.10** (0.02)</td>
</tr>
<tr>
<td><strong>N</strong></td>
<td>1,500</td>
<td>1,500</td>
<td>1,500</td>
</tr>
<tr>
<td><strong>Log Likelihood</strong></td>
<td>1469.92</td>
<td>1929.54</td>
<td>1518.83</td>
</tr>
<tr>
<td><strong>AIC</strong></td>
<td>-2905.80</td>
<td>-3825.10</td>
<td>-2991.70</td>
</tr>
<tr>
<td><strong>LM Test for Residual Autocorrelation</strong></td>
<td>0.13</td>
<td>7.51*</td>
<td>0.73</td>
</tr>
</tbody>
</table>

+ p<0.10, * p<0.05, **p<0.01

Metropolitan-level fixed-effects have been supressed in all models.
All non-fixed independent variables have been standardized to have mean=0 and standard deviation=1
Spatial Weights Matrix = Inverse-Distance-Squared (with no cross-metropolitan area neighbors)
will not jeopardize its value. At first glance, it may seem that everyone wants new roads, bike trails, and minor league baseball stadiums as well as the condos, stores, and restaurants that may come with them; but such preferences are likely not universal. Residents and politicians may use neighboring characteristics to determine which policies they ought to support.

These findings also have some implications for Florida’s work on the creative class (Florida 2002, 2008). Florida’s argument has been that cities can flourish if they produce goods that lead to a technology-based, talented, and tolerant city. While this paper does not investigate policy effectiveness, it does offer evidence about the context in which policies are pursued. In finding that cities tend to pay attention to both their own residents and neighboring residents when engaging policies, it is reasonable to infer that cities will be reluctant to implement policies that lure the creative class (or anybody else) into the jurisdiction if the creative class is not already living nearby.

While the models presented here do not test the individual motivations behind the decisions that local officials make (this is assessed via the survey research presented in Chapter 2), it is possible to make some inferences about these motivations based on the contexts in which policies are being pursued. The evidence presented above preliminarily suggests that city officials are balancing the preferences of internal constituents with the assumed preferences of external constituents. Even if the pursuit of developmental policies is not overwhelmingly popular amongst those in the jurisdiction, economic growth may be viewed as good for their reelection prospects. From a democratic perspective, this is a strange and perhaps even unnerving possibility as it means that local politicians are catering policies as much to potential constituents as they do to current constituents. Regardless of whether or not people are actually sorting themselves as Tiebout (1956) theorized, it appears that local political actors pursue policies as if they do.
Understanding that cities within metropolitan areas are sensitive to the economic and political geographies that they are a part of is an important lesson for policy-makers at higher levels of governments (regional or metropolitan associations, county governments, state governments, or the federal government). The expectation that local politicians—subject to complex reelection calculations—will always pursue policies that increase the probability of local development is problematic. Local policy decisions are made within complex economic ecologies that influence the relative political and economic value of developmental goods provision.
# APPENDIX 3-1. THE 15 METROPOLITAN AREAS

Table 3-4. Descriptive Statistics for the 15 Metropolitan Areas

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Albany-Schenectady, NY</td>
<td>112</td>
<td>1,118,095</td>
<td>1,023,360</td>
<td>91.53%</td>
<td>9,137</td>
<td>14.49 (63.22)</td>
<td>63.22 (24.57)</td>
</tr>
<tr>
<td>Birmingham-Hoover, AL</td>
<td>96</td>
<td>1,129,721</td>
<td>719,014</td>
<td>63.65%</td>
<td>7,490</td>
<td>16.79 (72.77)</td>
<td>72.77 (57.44)</td>
</tr>
<tr>
<td>Boise City-Nampa, ID</td>
<td>22</td>
<td>464,840</td>
<td>346,216</td>
<td>74.48%</td>
<td>15,737</td>
<td>27.06 (55.47)</td>
<td>55.47 (34.54)</td>
</tr>
<tr>
<td>Denver-Aurora-Boulder, CO</td>
<td>37</td>
<td>2,629,980</td>
<td>1,808,835</td>
<td>68.78%</td>
<td>48,887</td>
<td>145.31 (154.70)</td>
<td>154.70 (203.98)</td>
</tr>
<tr>
<td>Des Moines-Newton, IA</td>
<td>74</td>
<td>550,659</td>
<td>445,396</td>
<td>80.88%</td>
<td>6,019</td>
<td>22.67 (76.94)</td>
<td>76.94 (48.14)</td>
</tr>
<tr>
<td>Hartford-West Hartford, CT</td>
<td>62</td>
<td>1,257,709</td>
<td>1,227,564</td>
<td>97.60%</td>
<td>19,799</td>
<td>28.54 (70.02)</td>
<td>70.02 (36.88)</td>
</tr>
<tr>
<td>Houston-Huntsville, TX</td>
<td>129</td>
<td>4,815,122</td>
<td>3,126,070</td>
<td>64.92%</td>
<td>24,233</td>
<td>7.08 (93.37)</td>
<td>93.37 (37.92)</td>
</tr>
<tr>
<td>Lincoln, NE</td>
<td>23</td>
<td>266,787</td>
<td>243,071</td>
<td>91.11%</td>
<td>10,568</td>
<td>7.87 (106.33)</td>
<td>106.33 (56.27)</td>
</tr>
<tr>
<td>Little Rock, AR</td>
<td>73</td>
<td>785,024</td>
<td>537,955</td>
<td>68.53%</td>
<td>7,369</td>
<td>3.75 (40.22)</td>
<td>40.22 (30.57)</td>
</tr>
<tr>
<td>Milwaukee-Racine, WI</td>
<td>85</td>
<td>1,689,572</td>
<td>1,621,131</td>
<td>95.95%</td>
<td>19,072</td>
<td>19.55 (141.06)</td>
<td>141.06 (38.87)</td>
</tr>
<tr>
<td>Minneapolis-St. Paul, MN-WI</td>
<td>254</td>
<td>3,271,888</td>
<td>2,955,289</td>
<td>90.32%</td>
<td>11,635</td>
<td>48.39 (158.64)</td>
<td>158.64 (79.05)</td>
</tr>
<tr>
<td>Philadelphia-Camden, PA-NJ</td>
<td>327</td>
<td>6,207,223</td>
<td>5,229,068</td>
<td>84.24%</td>
<td>15,991</td>
<td>13.22 (49.83)</td>
<td>49.83 (28.14)</td>
</tr>
<tr>
<td>Raleigh-Durham-Cary, NC</td>
<td>40</td>
<td>1,314,589</td>
<td>797,139</td>
<td>60.64%</td>
<td>19,928</td>
<td>50.08 (68.04)</td>
<td>68.04 (93.43)</td>
</tr>
<tr>
<td>Salt Lake City-Ogden, UT</td>
<td>73</td>
<td>1,469,474</td>
<td>1,181,488</td>
<td>80.40%</td>
<td>16,185</td>
<td>42.15 (93.24)</td>
<td>93.24 (65.44)</td>
</tr>
<tr>
<td>Seattle-Tacoma-Olympia, WA</td>
<td>93</td>
<td>3,604,165</td>
<td>2,280,398</td>
<td>63.27%</td>
<td>24,520</td>
<td>46.20 (181.03)</td>
<td>181.03 (92.95)</td>
</tr>
</tbody>
</table>
APPENDIX 3-2. EXPENDITURE MAPS

Minneapolis-St. Paul Metropolitan Area 2002
Economic Development Expenditures

Map 3-2. Logged Total Infrastructure Expenditures

Map 3-3. Logged Per-Capita Infrastructure Expenditures

Map 3-4. Logged Total Lifestyle Expenditures

Map 3-5. Logged Per-Capita Lifestyle Expenditures
Raleigh-Durham Metropolitan Area
2002 Economic Development Expenditures

Map 3-6. Logged Total Infrastructure Expenditures
Map 3-7. Logged Per-Capita Infrastructure Expenditures

Map 3-8. Logged Total Lifestyle Expenditures
Map 3-9. Logged Per-Capita Lifestyle Expenditures
Seattle-Tacoma Metropolitan Area
2002 Economic Development Expenditures

Map 3-10. Logged Total Infrastructure Expenditures

Map 3-11. Logged Per-Capita Infrastructure Expenditures

Map 3-12. Logged Total Lifestyle Expenditures

Map 3-13. Logged Per-Capita Lifestyle Expenditures
CHAPTER 3 BIBLIOGRAPHY


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**Government Finance and Employment Classification Manual.** United States Census Bureau, Census of Governments Division 2002 [cited.]


I have hypothesized that local economic development spending in the United States occurs in sub-metropolitan spatial clusters. In the previous chapter, I used spatial-lag and spatial-mixed regression models on a cross-sectional “snapshot” of 15 metropolitan areas. The results were consistent with the causal theory: within metropolitan areas, nearby jurisdictions tend to spend similar amounts on developmental goods. However, any causal theory necessarily includes time—a clear cause followed by a clear effect—which is absent from most cross-sectional analyses. This chapter aims to better understand and better test the temporal component of the clustering process.

To accomplish this I take advantage of data collected annually on city finances by the State of Colorado Division of Local Government.31 While the data are collected under fewer (and slightly different) categories than the Census of Governments, the data are nearly complete across all Colorado jurisdictions allowing for the development of time-space

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31 I would like to thank the State of Colorado and, more specifically, Don Marrion at the Colorado Department of Local Affairs Division of Local Government for generously providing me with the necessary data to conduct the analyses in this chapter.
models of local economic development spending. By focusing in on Colorado—specifically Colorado’s Front Range—I eliminate the inter-metropolitan and inter-state variation present in the Chapter 3 models. Including that variation in the Chapter 3 models was important for showing the generalizability of the proximate polity theory but also introduced modeling complications associated with functional responsibility: the responsibilities and limitations of local government are not identical across states. In restricting the following analysis to Colorado, inferential leverage is gained (at the expense of generalizability) by introducing time and keeping functional responsibility constant across all jurisdictions in the analysis.

**HYPOTHESES**

To take the proximate policy theory and test it in a temporal context, I have developed time-based spatial hypotheses. The theory, already discussed at length in the previous chapters, is aimed at rejecting the following null hypothesis:

*Null Hypothesis: Economic development expenditure decisions are caused by variables that are strictly internal to the jurisdiction.*

The introduction of time into the testing of the theory requires a reformulation of the alternate clustering hypothesis laid out in Chapter 3:

*Hypothesis 4-1: As per-capita neighboring economic development spending increases in t-1, per-capita home economic development spending will increase in time t, all else being equal.*

Most local budgeting is done annually so policy choices at time t are likely not direct
responses to neighboring policy choices also at time $t$. Rather, policy choices at time $t$ are more likely responses to neighboring policy choices at time $t-1$ or, more abstractly, $t-x$.

As in the previous chapter, the measures of economic development expenditures are spatially-lagged to describe the geographic developmental context that local jurisdictions operate in. Also as in the previous chapter, I examine measures of developmental goods provision using infrastructure and lifestyle expenditures. Unlike the previous chapter, the dependent variable is always per-capita spending and tests of the effect of total v. per-capita lags are done on the right-hand side of the equation. The importance of considering total neighboring spending in addition to per-capita neighboring spending was made clear in Chapter 3 where the evidence strongly indicate that cities adjust their spending based on the overall policy output of their neighbors.

**Hypothesis 4-2**: As total neighboring economic development spending increases in $t-1$, per-capita home economic development spending will increase in time $t$, all else being equal.

With the cross-sectional spatial analyses, an SWM was used to geographically relate the jurisdictions to one another for a single time-period: 2002. For this time-space analysis, a similar SWM is applied separately to each of the 23 years in the dataset. Consider the variable $y$ (in the form of a vector) for jurisdiction $j$ in the year $t$ ($y_{jt}$). $W$ is an inverse-distance-squared spatial-weights-matrix that is post-multiplied by the variable $y_{jt}$ producing $yW_{jt}$: the spatial lag of $y_{jt}$. Because $y_j$ changes annually so does $yW_j$; $yW_{jt-1}$ is the spatially-lagged expenditures $yW$ of jurisdiction $j$ at time $t-1$. Put differently, $yW_{jt-1}$ measures the spatial developmental policy context for a city in the previous year allowing me to assess how the previous year’s spatial environment influences current expenditures.
THE DATA IN DETAIL

The Colorado Division of Local Governments annually obtains revenue and expenditure information from each city, county, and special district in the state. The data are compiled into the “City and County Municipal Financial Compendium” (CCMFC 2011). The data collection effort also includes the examination of budget documents in order to “help further break down aggregated audit figures” (CCMFC 2011). The unique completeness of these data over extended period of time is what allowed me to conduct the statistical tests presented in this chapter.

Though the Division of Local Governments collects data on all Colorado cities, I restrict my analysis to cities along Colorado’s Front Range. The Front Range is the portion of the state just east of the Rocky Mountains and west of Colorado’s plains (see Map 2-1 above). It includes four metropolitan statistical areas that combine to makeup 81 percent of Colorado’s 2000 population: Denver-Boulder-Greeley (2,581,506 people), Colorado Springs (516,929 people), Pueblo (141,472 people), and Fort Collins-Loveland (251,494 people).\(^\text{32}\) Cities in the Rocky Mountain are excluded for two reasons. First, many cities and towns in the mountains are, as the crow flies, quite close. However, the road travel distances between them can be quite lengthy making it difficult to operationalize distance. Second, the Rocky Mountains are home to many resort towns (Vail, Aspen, Breckenridge, etc.) that are in too many respects different than the non-resort cities throughout the state. Restricting the analysis to the Front Range eliminates these problems.

Two of the categories in the CCMFC are of particular note for this project and constitute the dependent variables: “capital outlay expenditures” and “culture and recreation expenditures.” The capital expenditures category includes:

\(^{32}\) All populations are according to the 2000 United States Census.
“Expenditures for the acquisition of capital goods, including land, buildings, equipment, and any improvements thereto [including construction costs associated with] roads, highways and streets, provision of solid waste handling, weed control and storm sewers.” (CCMFC 2011).

This is the expenditures category that is closest to the “infrastructure” category used in Chapter 3 and its breadth may even make it a slightly more valid measure of economic development than the measure used in Chapter 3. The CCMFC measure includes a larger set of infrastructure-related categories—something that functional-responsibility differences prevented in the multi-metro analysis.

The second CCMFC measure of economic development used in this chapter is culture and recreation expenditures. This culture and recreation category includes:

“Expenditures related to leisure time activities. These include participant recreation, spectator recreation, parks, fairs, and libraries” (CCMFC 2011).

Unlike the capital expenditures category, the CCMFC “recreation” category is a bit more restrictive than its Census of Governments counterpart as it does not include spending associated with “zoos, arenas, auditoriums, and stadiums” (Kennedy 1998; Montgomery, Jennings, and Kulahci 2008). These expenditures are either included in the capital outlays category or in a third CCMFC category that is insufficiently complete to include in the analysis.

The primary deficiency of using these data is that many of the demographic and economic covariates that are available in the Decennial Census and other Census publications are not collected annually (income, occupation, etc.). Annually collected data are usually measured at the county or metropolitan levels making them unsuitable for this analysis. Accordingly, the following analysis has to be restricted to three covariates: neighboring spending, population, and fiscal capacity.
Figure 4-1 is a time series graph depicting average per-capita spending amounts across all panels from 1981 to 2004 for the two economic development categories described above. The graph also includes a third category—ED—that is the sum of the two measures to reflect the total developmental goods output for the jurisdiction. Table 4-1 describes the data in more detail for 1981, 1993, and 2004. Figure 4-2 is a set of time series graphs depicting the same spending categories from twelve selected cities in the dataset.

Over the 24-year time period spending in the two independent categories increases (meaning the ED category also increases over the same period). Per-capita capital outlay spending increases from an average of $70 per-capita in 1981 to $221 per-capita in 2004. The increase in the culture and recreation category goes from $18 per-capita to $106 per-capita over the same time period. The data for the selected cities (Figure 4-2) demonstrate that while average spending increases over time, not all cities exhibit the same patterns. For example, the ED time-series for Denver, Golden, and Castle Rock are spikier and reach significantly higher apexes than those for Aurora, Colorado Springs, and Pueblo.

<table>
<thead>
<tr>
<th></th>
<th>1981</th>
<th>1993</th>
<th>2004</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Per-Capita Capital Outlays</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Mean</strong></td>
<td>$70.08</td>
<td>$99.48</td>
<td>$221.30</td>
</tr>
<tr>
<td><strong>SD</strong></td>
<td>$170.60</td>
<td>$112.85</td>
<td>$206.70</td>
</tr>
<tr>
<td><strong>Minimum</strong></td>
<td>$0.00</td>
<td>$0.00</td>
<td>$0.00</td>
</tr>
<tr>
<td><strong>Maximum</strong></td>
<td>$1,420.15</td>
<td>$478.52</td>
<td>$997.44</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>1981</th>
<th>1993</th>
<th>2004</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Per-Capita Recreation Expenditures</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Mean</strong></td>
<td>$18.25</td>
<td>$53.24</td>
<td>$106.20</td>
</tr>
<tr>
<td><strong>SD</strong></td>
<td>$20.53</td>
<td>$53.20</td>
<td>$90.73</td>
</tr>
<tr>
<td><strong>Minimum</strong></td>
<td>$0.00</td>
<td>$0.00</td>
<td>$0.00</td>
</tr>
<tr>
<td><strong>Maximum</strong></td>
<td>$77.36</td>
<td>$286.03</td>
<td>$372.70</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>1981</th>
<th>1993</th>
<th>2004</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Per-Capita ED (Capital + Recreation)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Mean</strong></td>
<td>$88.33</td>
<td>$152.73</td>
<td>$327.50</td>
</tr>
<tr>
<td><strong>SD</strong></td>
<td>$172.07</td>
<td>$139.06</td>
<td>$259.82</td>
</tr>
<tr>
<td><strong>Minimum</strong></td>
<td>$0.00</td>
<td>$0.00</td>
<td>$0.00</td>
</tr>
<tr>
<td><strong>Maximum</strong></td>
<td>$1,420.15</td>
<td>$551.72</td>
<td>$1,370.14</td>
</tr>
</tbody>
</table>

33 While the CCMFC begins in 1974, the data analysis in this chapter begins in 1981. This is because the spatial component of the data necessitates complete data across all cities—something that is not present for the 1974 to 1980 period.
Figure 4-1. Mean Economic Development Spending by Category for Colorado’s Front Range

Figure 4-2. Actual v. Predicted Per-Capita ED Expenditures for 12 Selected Colorado Cities
FOUR APPROACHES TO EXAMINING EXPENDITURES OVER TIME AND SPACE

Though the econometrics literature on time-series analysis has been developing for decades, the literature on spatial econometrics remains in a relative infancy. The intellectual evolution of time-space models in the social sciences has been limited by both technical know-how and practical constraints. Technically, time-space data are difficult to setup, model, and interpret. Practically, time-space analysis requires comprehensive datasets that includes information that describes temporal and spatial characteristics of the data. That said, time-space models offer strong inferential leverage for causal inference making.

The problems of correlated errors in time-series analysis have been well documented (Kennedy 1998; Enders 2003). A correlated error structure is also a problem in spatial analysis as objects that are close to one another are likely to be more similar than objects that are far from one another (Tobler 1970; Anselin 1988). This problem of correlated errors can be dealt with various correction processes. In time-series analysis this is frequently the use of a distributed lag model, an error-correction model, or an ARIMA model. In spatial analysis the problem is usually dealt with using a spatial lag model (the spatial counterpart to the distributed lag model) or a spatial error model.

With spatial analysis another problem presents itself. This is the problem of spatial non-independence—a violation of the independently and identically distributed (iid) assumption of general probability theory (Tobler 1970; Anselin 1988). By definition, spatial modeling is the modeling of non-independent processes where “Area 1” is influencing “Area 2” and “Area 2” is influence “Area 1”—a feedback loop that can be nearly impossible to understand yet alone quantify. To be sure, this is a problem in many non-spatial analyses (e.g. a survey of residents in a single neighborhood) though it frequently goes unacknowledged or un-modeled. While a generalization of the corrections we have for
serial autocorrelation can be applied to spatial autocorrelation, the feedback loops present an additional endogeneity problem that is difficult to fully resolve: whereas $y_t$ can never be causing $y_{t-1}$, $y_{j1}$ and $y_{j2}$ can cause each other. It is important to note here, however, that because my hypothesis aim at identifying the presences of a spatial process, a true “correction” for the spatial process is not necessary. Rather, the presence of a spatial process after correcting for time indicates support for the hypotheses. With this in mind, I proceed by looking at the serial and spatial developmental expenditure decisions of Colorado jurisdictions in four different ways:

1. Examining the serial and spatial error structures.
2. Estimating serially-lagged time-space models with a corrected error term.

No one of these approaches is flawless. None of them deal perfectly with either the temporal or spatial error-structures. However, support for the hypotheses across approaches should lend validity to the results.

**Examining the Serial Error Structure**

Most time-series are subject to serial (or temporal) autocorrelation: events in time $t$ are related to events in time $t-1$. Local expenditures data should be no exception. In this section I explore the temporal nature of economic development spending in Colorado. While time-series analysis allows for the analyst to more clearly assess cause and effect, it also presents modeling difficulties: serial autocorrelation can lead to inefficiency and estimation bias (Kennedy 1998). Before the spatial-effect can be tested—that is, before the hypotheses can be tested—it is important to first conduct an analysis of the serial structure.
Figures 4-1 and 4-2 above, give strong clues of positive serial autocorrelation in economic development spending as spending appears, on average, to be increasing over time. This is to be expected. When cities go to budget they almost certainly look to their previous year's allotment to make their funding decision; budgeting decisions are not idiosyncratic to the budgeting-year. To make a more empirical assessment of the serial error structure I produce serial correlograms for each of three measures of economic development expenditures (Figures 4-3, 4-4, and 4-5). The correlograms measure the relationship between $X_t$ and $X_{t-x}$ for lags $t-1$ through $t-10$. To produce these statistics, I pool together the data for all the panels and estimate pair-wise correlation coefficients. The test results indicate just what was anticipated: strong positive serial autocorrelation. Moreover, the diminishing magnitude of the coefficients as the lag increases is consistent with an AR(1), or first-order, serial-process.

Prior to running a time-series model it is also important to examine the stationarity of the temporal process. Most time-series models assume that data are stationary; that is, the data converge on equilibrium after some kind of disturbance such that there is a constant mean, constant variance, and constant auto-covariance (Stata Statistical Software: Release 11 2009). Time-series data with a unit-root are non-stationary and thus require appropriate corrections. I perform Levin-Liu-Chu panel unit-root tests in Stata on each of the three dependent variables (2004). The null hypothesis of these tests is that the time-series does not contain a unit root so statistically insignificant results indicate a stationary time-series. The results, presented in Table 4-2, indicate that the per-capita recreation expenditures variable is the only one of the three that is non-stationary necessitating a correction.
Examining the Spatial Error Structure

In many analyses, spatial autocorrelation is treated as nuisance: something to treat to ensure unbiased estimates of the non-spatial terms. My hypotheses suggest that we ought to think about spatial autocorrelation as a substantively interesting process in its own right. In the previous chapter, I found the presence of positive spatial autocorrelation for the 2002 period across 15 metropolitan areas. In this section, I pursue an
understanding of the spatial nature of local economic development spending in Colorado alone. The process I use is loosely based on the one provided Lopez and Chasco (2004).

Assessing the temporal spatial-process is more complicated than assessing the contemporaneous spatial process as was done in the previous chapter. Typically, when spatial autocorrelation is estimated it is done so by examining the spatial distribution of the variable for one moment in time without consideration with any other moments in time. The typical test for this, as has been discussed, is the Moran’s I test that is functionally equivalent to the regression coefficient of the spatially-lagged variable on its non-spatially-lagged form (see Equation 4-1a). To assess the temporal spatial-process, I estimate a similar equation as the one used for a Moran’s I but make two changes. First, I pool the data for all of the jurisdictions over all of the time-periods together. Second, I estimate the effect of $yW_{jt-x}$ on $y_j$ for $t-1$ through $t-10$. The modification takes the form given in Equation 4-1b.

\[
y_j = b_0 + yW_j b + e_i \quad \text{[Equation 4-1a]}
\]

\[
y_{jt} = b_0 + b_1y_{jt-1} + b_2yW_{jt-x} + e_{it} \quad \text{[Equation 4-1b]}
\]

The estimates for each of the three dependent variables are presented in Figure 4-6. These preliminary time-space estimates offer information about the overall effect of space at time $t-x$ on jurisdiction $j$ in year $t$. In other words, it is the past-effect of space on current policy action controlling for no other factors. The results fit nicely with the proximate polity theory as the spatial effect is positive and significant for just about all of the lags. Only the capital outlays measure is insignificant at any estimated time lag and even then it does not come until the $t-9$ and $t-10$. 
**Spatial Distributed Lag Models**

So far the evidence shows strong serial autocorrelation and conditional spatial autocorrelation in the 1981 to 2004 dataset. The models developed here are designed to correct for the serial AR(1) process identified above but do not correct for the non-stationarity present in the recreation variable. I estimate a serially-lagged model with a first-order autoregressive error term and spatially-lagged independent variables. To start, I first fit a null regression with panel (jurisdictional) fixed-effects and a correction for a first-order autoregressive disturbance term but leave out the serially-lagged dependent variable and include no spatial terms (see Equation 4-2).34

$$y_{jt} = b_0 + a_i + e_{it}$$  \[Equation 4-2\]

where  
$$e_{it} = \rho e_{i,t-1} + z_{it}$$

In Equation 4-2, $e$ is the autoregressive disturbance term such that $\rho$ estimates the magnitude of the serial autocorrelation where $|\rho| < 1$ and 0 indicates no serial

---

34 This is done using Stata’s xregar command (Stata Corp. 2009).
autocorrelation; $a_i$ is the panel (jurisdictional) fixed-effects; $z_{it}$ is assumed to have zero mean and zero variance and is subject to a transformation that leads to spherical errors (1991). For more on this process, including the proofs, see Baltagi and Li (1999) and Baltagi and Wu (1999). I present the estimates of $\rho$ for the null model in Table 4-3. In all three null models $\rho$ is positive and substantially greater than zero suggesting that the corrected AR(1) error term is not doing enough to make the errors spherical. A second test of the error structure is presented in Figures 4-7, 4-8, and 4-9. These figures depict the residual autocorrelation in the null model by plotting $e_{it}$ against $e_{it-1}$. It is clear that additional corrections are necessary.

To further correct for the serial autocorrelation, I add a serially-lagged dependent variable to the right-hand side of the estimator. To distinguish between equations, the error term in the following equation is taken as $u$ rather than $e$.

$$y_{jt} = b_0 + b_1 y_{i,t-1} + a_i + u_{it}$$  \hspace{1cm} [Equation 4-3]

where $u_{it} = \rho^* u_{i,t-1} + z_{it}$

Here again, $a_i$ is the fixed effects term and the error term $u_{it}$ is estimated to correct for the auto-regression.

As can be seen in Table 4-3, the estimates of $\rho$ for the null models with a lagged term are substantially decreased. In fact, the estimates of $\rho$ turn negative indicating a slight overcorrection. In addition to plotting the null model residual autocorrelation ($e_{it}$ against $e_{it-1}$), figures 4-7, 4-8, and 4-9 also plot the residual autocorrelation for the lagged model ($u_{it}$ against $u_{it-1}$) with their respective best-fit lines.

Two pieces of evidence suggest that the estimator with the lagged dependent variable is improvement over the one without. First the absolute value of $\rho$ is substantially

---

35 For the recreation model, the serial autocorrelation was strong enough that it was necessary to estimate with two lagged dependent variables ($y_{i,t-1}$ and $y_{i,t-2}$) in the model.
lower as estimated by Equation 4-3 than by Equation 4-2. Second, the equation with the lagged dependent variable shows substantially reduced serial-autocorrelation in the error term as presented in the figures. I proceed by fitting the full models using the distributed lag model with a error correction—what I refer to as the SDL models.

Table 4-3. Comparison of \( \rho \) Across Null and Lagged Models

<table>
<thead>
<tr>
<th></th>
<th>Capital Outlays</th>
<th>Recreation</th>
<th>ED</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \rho ): no lagged DV</td>
<td>0.47</td>
<td>0.87</td>
<td>0.52</td>
</tr>
<tr>
<td>( \rho ): with lagged DV</td>
<td>-0.09</td>
<td>-0.16</td>
<td>-0.13</td>
</tr>
<tr>
<td>N</td>
<td>1641</td>
<td>1641</td>
<td>1641</td>
</tr>
<tr>
<td>Groups (Mean N per Group)</td>
<td>75 (21.9)</td>
<td>75 (21.9)</td>
<td>75 (21.9)</td>
</tr>
</tbody>
</table>

Figure 4-7. Per-Capita Capital Expenditures: Uncorrected v. Corrected Residuals

Figure 4-8. Per-Capita Recreation Expenditures: Uncorrected v. Corrected Residuals
I fit four SDL models for each of the dependent variables. The Base Model contains only the serially-lagged dependent variable, serially-lagged population, and serially-lagged debt-to-revenue ratio (no spatial components). All independent variables, including the spatial ones, are serially-lagged for endogeneity reasons so that the effect is $x_{jt-1}$ on $y_{jt}$.

Model 1 introduces the spatially-lagged dependent variable: per-capita economic development expenditures. Model 2 drops the spatially-lagged dependent variable and substitutes spatially-lagged total economic development expenditures. Finally, Model 3 contains both spatially-lagged per-capita expenditures and spatially-lagged total expenditures. In Equations 4-4a through 4-4d $E$ is per-capita economic development expenditures; $T$ is total economic development expenditures; $P$ is population; $D$ is the debt to revenue ratio; $W$ is an inverse-distance-squared spatial-weights-matrix; and where $a$, $e$,
and \( \rho \) specify the autocorrelation coefficient, the error term, and the autocorrelation estimate respectively. The parameter \( \lambda \) is the coefficient for the serially-lagged dependent variable and estimates the rate of decay.

**Base Model:** \( E_{jt} = b_0 + \lambda E_{jt-1} + b_1 P_{jt-1} + b_2 D_{jt-1} + a_i + e_{jt} \)   [Equation 4-4a]

**Model 1:** \( E_{jt} = b_0 + \lambda E_{jt-1} + b_1 EW_{jt-1} + b_2 P_{jt-1} + b_3 D_{jt-1} + a_i + e_{jt} \)   [Equation 4-4b]

**Model 2:** \( E_{jt} = b_0 + \lambda E_{jt-1} + b_1 TW_{jt-1} + b_2 P_{jt-1} + b_3 D_{jt-1} + a_i + e_{jt} \)   [Equation 4-4c]

**Model 3:** \( E_{jt} = b_0 + \lambda E_{jt-1} + b_1 EW_{jt-1} + b_2 TW_{jt-1} + b_3 P_{jt-1} + b_4 D_{jt-1} + a_i + e_{jt} \)   [Equation 4-4d]

where, for all models: \( e_{jt} = \rho^* e_{jt-1} + z_{jt} \)

To evaluate the results of these time-space models of local economic development spending in Colorado, I look to both the parameter estimates and the overall model fit. In short, the results are quite consistent with the proximate polity theory: the spatial lags are positive and significant and increase the overall fit of the model. The model estimates are presented in Tables 4-4, 4-5, and 4-6. In all models, \( \lambda \) is positive and significant. \( \lambda \) indicates the rate at which the effects of \( X_{jt} \) on \( Y \) persist over time: the higher \( \lambda \) is, the slower the decay process. In other words, the higher \( \lambda \) is, the further back in time we can go and still identify a connection between past internal and external expenditures on present expenditures.

For each of the three dependent variables the time-space lag of the dependent variable is also positive and significant. This is an indication that, all else being equal, the per-capita economic development spending of nearby jurisdictions in the previous year influences the spending of the “home” jurisdiction in the following year. In other words, jurisdictions appear to responding to one another. The positive and significant estimates of spatial lag means not only that as nearby spending increases, “home” spending also increases but also that as nearby spending decreases, “home” spending decreases.
Figures 4-10, 4-11, and 4-12 show the improvement that the spatial lags offer by comparing the “best model”—in all cases, Model 3—with actual spending and predictions based on the Base Model. Because the models estimate panel data, these figures show the mean actual and mean predicted expenditures by year. Figure 4-12 presents the prediction comparisons for ED spending for 12 selected jurisdictions. These graphs indicate that in the case of Capital Outlay and ED spending, the addition of spatial-effects to the model leads to more accurate predictions. Though the spatial-effects are significant in the recreation models, they don’t appear to add much to the fit because the Base Models do such a good job with the prediction on their own.

The effect of the time-space total spending lag (neighboring total spending) is significant in all of the models with the exception of Recreation Model 3—when it is put in the same model as the time-space lag of per-capita recreation expenditures. Overall, this suggests that jurisdictions are paying attention and creating policy based on both the scaled development output of nearby jurisdictions and the total output of nearby jurisdictions. This makes sense: if a nearby jurisdiction is, perhaps for some limited period of time, engaging in serious developmental goods spending (e.g. major downtown infrastructure improvements) nearby jurisdictions may feel obligated to respond with their own spending.

Though these models are instructive in that they identify significant spatial effects over time they come up short in three respects. First, the models fail to deal with the non-stationarity problem in the recreation models (estimation bias and potential spurious regression). Second, the models are not the most finely tuned toward the problems of cointegration. And third, they fail to differentiate between short-term (spikes and drop-offs) and long-term effects. In the next section I estimate a set of spatial error-correction models that help to overcome these problems.
Table 4-4. SDL Model of Colorado City Per-Capita Capital Expenditures
Estimated with Panel Fixed-Effects and an AR(1) Disturbance Term

<table>
<thead>
<tr>
<th></th>
<th>Base Model</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\lambda$ Per-Capita Capital Expenditures (TL1)</td>
<td>0.37** (0.02)</td>
<td>0.39** (0.02)</td>
<td>0.37** (0.02)</td>
<td>0.37** (0.02)</td>
</tr>
<tr>
<td>Per-Capita Capital Expenditures (SL, TL1)</td>
<td>--</td>
<td>0.11** (0.03)</td>
<td>--</td>
<td>0.08* (0.04)</td>
</tr>
<tr>
<td>Total Capital Expenditures (SL, TL1)</td>
<td>--</td>
<td>--</td>
<td>0.01** (0.01)</td>
<td>0.01* (0.01)</td>
</tr>
<tr>
<td>Population (TL1)</td>
<td>2.80** (0.66)</td>
<td>2.37** (0.67)</td>
<td>1.84** (0.70)</td>
<td>1.78* (0.70)</td>
</tr>
<tr>
<td>Debt to Revenue (TL1)</td>
<td>35.80 (25.73)</td>
<td>35.08 (25.61)</td>
<td>30.98 (25.45)</td>
<td>31.57 (25.43)</td>
</tr>
<tr>
<td>Constant</td>
<td>11.04 (19.63)</td>
<td>8.10 (19.59)</td>
<td>18.33 (19.68)</td>
<td>14.22 (19.74)</td>
</tr>
</tbody>
</table>

N = 1641
Groups (Mean N per Group) = 75 (21.9)
$\rho$ (autoregressive) = -0.06
Sigma U = 225.36
Sigma E = 206.04
$\rho$ (fraction of variance) = 0.54
$R^2$: Within = 0.16
$R^2$: Between = 0.06
$R^2$: Overall = 0.07
F = 97.12**

Sigma U = 196.75
Sigma E = 205.35
$\rho$ (fraction of variance) = 0.48
$R^2$: Within = 0.16
$R^2$: Between = 0.07
$R^2$: Overall = 0.08
F = 77.39**

Sigma U = 161.68
Sigma E = 205.24
$\rho$ (fraction of variance) = 0.38
$R^2$: Within = 0.17
$R^2$: Between = 0.12
$R^2$: Overall = 0.13
F = 84.59**

Sigma U = 157.94
Sigma E = 204.98
$\rho$ (fraction of variance) = 0.37
$R^2$: Within = 0.18
$R^2$: Between = 0.12
$R^2$: Overall = 0.13
F = 68.43**

+ p<0.10, * p<0.05, **p<0.01
TL1 = First-Order Time Lag | SL = Spatial-Lag (Inverse-Distance-Squared SWM)
Total Capital Expenditures in thousands of dollars | Population in thousands of people

Figure 4-10. Per-Capita Capital Expenditures: Mean Model
SDL Predictions v. Mean Actual Spending
Table 4-5. SDL Model of Colorado City Per-Capita Recreation Expenditures
Estimated with Panel Fixed-Effects and an AR(1) Disturbance Term

<table>
<thead>
<tr>
<th></th>
<th>Base Model</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\lambda$ Per-Capita Recreation Expenditures (TL1)</td>
<td>0.63** (0.03)</td>
<td>0.55** (0.03)</td>
<td>0.55** (0.03)</td>
<td>0.53** (0.03)</td>
</tr>
<tr>
<td>$\lambda_2$ Per-Capita Recreation Expenditures (TL2)</td>
<td>0.27** (0.03)</td>
<td>0.23** (0.03)</td>
<td>0.25** (0.03)</td>
<td>0.23** (0.03)</td>
</tr>
<tr>
<td>Per-Capita Recreation Expenditures (SL, TL1)</td>
<td>--</td>
<td>0.28** (0.03)</td>
<td>--</td>
<td>0.23** (0.05)</td>
</tr>
<tr>
<td>Total Recreation Expenditures (SL, TL1)</td>
<td>--</td>
<td>--</td>
<td>0.01** (0.00)</td>
<td>0.01 (0.00)</td>
</tr>
<tr>
<td>Population (TL1)</td>
<td>0.15* (0.07)</td>
<td>-0.01 (0.08)</td>
<td>0.01 (0.08)</td>
<td>-0.02 (0.08)</td>
</tr>
<tr>
<td>Debt to Revenue (TL1)</td>
<td>-1.75 (2.55)</td>
<td>-2.48 (2.53)</td>
<td>-1.92** (2.55)</td>
<td>-2.40 (2.54)</td>
</tr>
<tr>
<td>Constant</td>
<td>6.45** (2.04)</td>
<td>3.71 (2.01)</td>
<td>5.76** (2.00)</td>
<td>4.04 (2.02)</td>
</tr>
<tr>
<td>N</td>
<td>1641</td>
<td>1641</td>
<td>1641</td>
<td>1641</td>
</tr>
<tr>
<td>Groups (Mean N per Group)</td>
<td>75 (21.9)</td>
<td>75 (21.9)</td>
<td>75 (21.9)</td>
<td>75 (21.9)</td>
</tr>
<tr>
<td>$\rho$ (autoregressive)</td>
<td>0.08</td>
<td>0.12</td>
<td>0.13</td>
<td>0.12</td>
</tr>
<tr>
<td>Sigma U</td>
<td>13.00</td>
<td>15.60</td>
<td>14.86</td>
<td>16.09</td>
</tr>
<tr>
<td>Sigma E</td>
<td>20.15</td>
<td>19.74</td>
<td>19.87</td>
<td>19.74</td>
</tr>
<tr>
<td>$\rho$ (fraction of variance)</td>
<td>0.29</td>
<td>0.38</td>
<td>0.36</td>
<td>0.40</td>
</tr>
<tr>
<td>$R^2$: Within</td>
<td>0.70</td>
<td>0.70</td>
<td>0.68</td>
<td>0.69</td>
</tr>
<tr>
<td>$R^2$: Between</td>
<td>0.95</td>
<td>0.98</td>
<td>0.97</td>
<td>0.97</td>
</tr>
<tr>
<td>$R^2$: Overall</td>
<td>0.88</td>
<td>0.90</td>
<td>0.88</td>
<td>0.88</td>
</tr>
<tr>
<td>$F$</td>
<td>867.97**</td>
<td>673.89**</td>
<td>645.98**</td>
<td>550.67**</td>
</tr>
</tbody>
</table>

+ p<0.10, * p<0.05, **p<0.01
TL1 = First-Order Time Lag | SL = Spatial-Lag (Inverse-Distance-Squared SWM)
Total Capital Expenditures in thousands of dollars | Population in thousands of people

Figure 4.11. Per-Capita Recreation Expenditures: Mean SDL Model Predictions v. Mean Actual Spending
Table 4-6. SDL Model of Colorado City Per-Capita ED Expenditures
   Estimated with Panel Fixed-Effects and an AR(1) Disturbance Term

<table>
<thead>
<tr>
<th></th>
<th>Base Model</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>λ Per-Capita ED Expenditures (TL1)</td>
<td>0.37** (0.02)</td>
<td>0.36** (0.02)</td>
<td>0.38** (0.02)</td>
<td>0.36** (0.02)</td>
</tr>
<tr>
<td>Per-Capita ED Expenditures (SL, TL1)</td>
<td>--</td>
<td>0.17** (0.03)</td>
<td>--</td>
<td>0.10** (0.04)</td>
</tr>
<tr>
<td>Total ED Expenditures (SL, TL1)</td>
<td>--</td>
<td>--</td>
<td>0.01** (0.01)</td>
<td>0.01** (0.01)</td>
</tr>
<tr>
<td>Population (TL1)</td>
<td>3.73** (0.72)</td>
<td>2.94** (0.73)</td>
<td>2.02** (0.75)</td>
<td>1.93* (0.75)</td>
</tr>
<tr>
<td>Debt to Revenue (TL1)</td>
<td>38.70 (26.90)</td>
<td>37.06 (26.63)</td>
<td>31.67 (26.35)</td>
<td>32.17 (26.30)</td>
</tr>
<tr>
<td>Constant</td>
<td>18.80 (20.12)</td>
<td>13.37 (10.02)</td>
<td>26.60 (20.00)</td>
<td>21.26 (20.06)</td>
</tr>
<tr>
<td>N</td>
<td>1641</td>
<td>1641</td>
<td>1641</td>
<td>1641</td>
</tr>
<tr>
<td>Groups (Mean N per Group)</td>
<td>75 (21.9)</td>
<td>75 (21.9)</td>
<td>75 (21.9)</td>
<td>75 (21.9)</td>
</tr>
<tr>
<td>ρ (autoregressive)</td>
<td>-0.11</td>
<td>-0.10</td>
<td>-0.08</td>
<td>-0.08</td>
</tr>
<tr>
<td>Sigma U</td>
<td>288.28</td>
<td>235.63</td>
<td>177.18</td>
<td>172.41</td>
</tr>
<tr>
<td>Sigma E</td>
<td>211.77</td>
<td>210.19</td>
<td>209.56</td>
<td>209.12</td>
</tr>
<tr>
<td>ρ (fraction of variance)</td>
<td>0.65</td>
<td>0.57</td>
<td>0.42</td>
<td>0.40</td>
</tr>
<tr>
<td>R²: Within</td>
<td>0.16</td>
<td>0.19</td>
<td>0.21</td>
<td>0.21</td>
</tr>
<tr>
<td>R²: Between</td>
<td>0.09</td>
<td>0.12</td>
<td>0.20</td>
<td>0.20</td>
</tr>
<tr>
<td>R²: Overall</td>
<td>0.08</td>
<td>0.12</td>
<td>0.19</td>
<td>0.20</td>
</tr>
<tr>
<td>F</td>
<td>105.15**</td>
<td>90.44**</td>
<td>103.10**</td>
<td>84.18**</td>
</tr>
</tbody>
</table>

+ p<0.10, * p<0.05, **p<0.01
TL1 = First-Order Time Lag | SL = Spatial-Lag (Inverse-Distance-Squared SWM)
Total Capital Expenditures in thousands of dollars | Population in thousands of people

Figure 4-12. Per-Capita Capital Expenditures: Mean SDL Model Predictions v. Mean Actual Spending
Spatial Error-Correction Models

The spatial error-correction (SEC) models that I estimate are a modification on the standard error-correction model. I estimate the error-correction models for two reasons. First, error-correction models are suited for time-series data that are non-stationary—a problem identified with the recreation time-series. Second, ECM are appropriate any time $Y$ and $X$ are in equilibrium (co-integrated) even if the series are stationary (Westerlund 2007). Such is the case in the Colorado data: $E_{jt}$ and $EW_{jt-1}$ show signs of cointegration. Table 4-7 presents the results of Westerlund tests that indicate statistically significant cointegration with the dependent variables and their spatially-lagged counterpart (Kennedy 1998).
Table 4-7. Westerlund Tests for Cointegration in Panel Data

<table>
<thead>
<tr>
<th>AIC Mean Lag Length</th>
<th>Capital Outlays</th>
<th>Recreation</th>
<th>ED</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>4.45</td>
<td>4.63</td>
<td>5.56</td>
</tr>
<tr>
<td>$G_t$</td>
<td>-3.56**</td>
<td>-2.90**</td>
<td>-3.02**</td>
</tr>
</tbody>
</table>

Tests estimated using Stata’s “xtwest” command

Error-correction models use differencing and serial-lags to strip models of serial autocorrelation and artificially impose stationarity. Figure 4-14 presents the first-differences of the per-capita ED spending for the 12 selected cities. As is evident in the graphs, some cities have stable spending over time (e.g. Aurora and Colorado Springs) while other cities’ spending appears to fluctuate annually (e.g. Castle Rock, Longmont, and Golden). The SEC models will help identify the extent to which the stability and fluctuation are a consequence of neighboring policy choices.

Figure 4-14. First Difference of ED Expenditures for 12 Colorado Cities
The standard error-correction model with one covariate can be taken as follows (Gujarati 1995: 621):

$$\Delta y_t = b_0 + y_{t-1} + b_1 \Delta x_t + b_2 x_{t-1} + e_t$$  \hspace{1cm} [Equation 4-5]

The model that I estimate includes a spatial component and, because it is estimated on panel data, also includes fixed-effects. The modification takes the following form:

$$\Delta y_{jt} = b_0 + y_{jt-1} + b_1 \Delta y_{W_{jt}} + b_2 y_{W_{jt-1}} + a_i + e_t$$ \hspace{1cm} [Equation 4-6]

In Equation 4-6 the subscript $j$ indicates the jurisdiction (the panel), $t$ indicates the time period, $a$ is the fixed-effects parameter, and $W$ is an inverse-distance-squared spatial-weights-matrix such that $y_{W_{jt}}$ is the spatially-lagged version of $y$ at time $t$. Returning to the variable identifiers used above, I estimate the models based on the following equation.

$$\Delta E_{jt} = b_0 + E_{jt-1} + b_1 \Delta EW_{jt} + b_2 EW_{jt-1} + b_3 \Delta P_{jt} + b_4 P_{jt-1} + b_5 D_{jt} + b_6 D_{jt-1} + a_i + e_{ts}$$ \hspace{1cm} [Equation 4-7a]

$$\Delta E_{jt} = b_0 + E_{jt-1} + b_1 \Delta TW_{jt} + b_2 TW_{jt-1} + b_3 \Delta P_{jt} + b_4 P_{jt-1} + b_5 D_{jt} + b_6 D_{jt-1} + a_i + e_{ts}$$ \hspace{1cm} [Equation 4-7b]

Note that I estimate separate error-correction models for spatially-lagged per-capita spending (Hypothesis 4-1) and spatially-lagged total spending (Hypothesis 4-2) and do not combine them into a single model.

In error-correction models the lagged dependent variable can be interpreted as the rate of decay. Differenced independent variables can be interpreted as the short-term effect of $X$ on $Y$ while lagged independent variables can be interpreted as the long-term effect of $X$ on $Y$. The variables of interest in these models are $\Delta EW_{jt}$ ($\Delta TW_{jt}$) and $\Delta EW_{jt-1}$ ($\Delta EW_{jt-1}$) that
identify the short and long-term effects of spatially-lagged developmental spending respectively. The two sets of models show stronger support for $H_1$ than they do for $H_2$. While per-capita neighboring spending has both a short and long-term effects home spending, total neighboring spending appears to only have a long-term effect.

The results of spatial error-correction models are presented in Table 4-8 and Table 4-9. The coefficient for differenced per-capita spatially-lagged ED is 0.11 and significant at the $p<.01$ level. When the spatially-weighted average per-capita neighboring spending increases by $100 it results in an immediate “home” spending increase of about $11.00 per-capita: a shock in time $t-1$ results, on average, in an adjustment in time $t$. This short-term effect is depicted for capital outlay spending in Figure 4-15 where I hold all the covariates, with the exception of the differenced spatial-lag, at their mean and then predict spending based on changes in that difference. The graphical depiction of the results is actually quite striking. When neighboring per-capita spending decreases by $750 or more it leads to a short-term decrease in home spending. Similarly, when neighboring per-capita increases by an amount greater than $25, it leads to an increases in home spending. Between -$750 and $25, the model predictions cannot distinguish between a home increase and a home decrease. Perhaps most interestingly, the predictions indicate that, on average, cities are more reactive in the short-term to nearby increases than they are to nearby decreases. It takes a fairly dramatic neighboring decrease to get cities to move into equilibrium. On the other hand, minor increases by neighboring jurisdictions appear to lead cities to keep-up.

Going one step further, dividing the serially-lagged variable by the differenced variable and then subtracting the short-term effect from the quotient produces the long-term effect of spatially-lagged spending. Thus, the effect of spatially-lagged ED spending can be expected to increase by another $1.69 over future time periods. In other words, the spatial effect lingers.
These findings are important. They indicate that Colorado local governments respond to nearby developmental outlays both immediately and over the long-term. In the context of infrastructure, this could mean that jurisdictions immediately respond to nearby infrastructure development with infrastructure fixes (repaired roads, improved sidewalks, etc.) in the long-term and larger projects in the long term (new roads, new city buildings, etc.).

The short and long-term results are similar for the ED and the capital outlay expenditures. However, the short-term effect for the per-capita recreation expenditures variable is statistically insignificant but the probability that the null hypothesis cannot be rejected ($p=0.08$) is not so high that a short-term effect should be dismissed outright. The effect of neighboring recreation expenditures appears to be slow acting in a way that the capital outlay expenditures do not.
Table 4-8. Time-Space ECM with Spatially-Lagged Per-Capita Expenditures

<table>
<thead>
<tr>
<th></th>
<th>Capital Outlays (D1)</th>
<th>Recreation (D1)</th>
<th>ED (D1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DV (TL1)</td>
<td>-0.59** (0.02)</td>
<td>-0.20** (0.02)</td>
<td>-0.55** (0.02)</td>
</tr>
<tr>
<td>Spatial Lag PC (D1)</td>
<td>0.08** (0.04)</td>
<td>0.16+ (0.09)</td>
<td>0.11** (0.04)</td>
</tr>
<tr>
<td>Spatial Lag PC (T1)</td>
<td>0.15** (0.04)</td>
<td>0.26** (0.03)</td>
<td>0.20** (0.03)</td>
</tr>
<tr>
<td>Population (D1)</td>
<td>1.87 (2.60)</td>
<td>-0.35 (0.25)</td>
<td>1.81 (2.69)</td>
</tr>
<tr>
<td>Population (T1)</td>
<td>1.97** (0.59)</td>
<td>-0.02 (0.06)</td>
<td>2.19** (0.61)</td>
</tr>
<tr>
<td>Debt to Revenue (D1)</td>
<td>49.63 (27.07)</td>
<td>-0.31 (2.60)</td>
<td>51.54+ (27.64)</td>
</tr>
<tr>
<td>Debt to Revenue (T1)</td>
<td>55.74* (28.47)</td>
<td>-0.02 (2.73)</td>
<td>54.38+ (29.07)</td>
</tr>
<tr>
<td>Constant</td>
<td>2.05 -18.38</td>
<td>2.73 (1.78)</td>
<td>6.35 (18.79)</td>
</tr>
</tbody>
</table>

TL1 = First-Order Time Lag | SL = Spatial-Lag (Inverse-Distance-Squared SWM)
Total Capital Expenditures in thousands of dollars | Population in thousands of people

Table 4-9. Time-Space ECM with Spatially-Lagged Total Expenditures

<table>
<thead>
<tr>
<th></th>
<th>Capital Outlays (D1)</th>
<th>Recreation (D1)</th>
<th>ED (D1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DV (TL1)</td>
<td>-0.59** (0.02)</td>
<td>-0.18** (0.01)</td>
<td>-0.56** (0.02)</td>
</tr>
<tr>
<td>Spatial Lag Total (D1)</td>
<td>0.01 (0.01)</td>
<td>0.01 (0.01)</td>
<td>0.01 (0.01)</td>
</tr>
<tr>
<td>Spatial Lag Total (T1)</td>
<td>0.01** (0.00)</td>
<td>0.01** (0.00)</td>
<td>0.06** (0.00)</td>
</tr>
<tr>
<td>Population (D1)</td>
<td>1.82 (2.61)</td>
<td>-0.33** (0.25)</td>
<td>1.68 (2.66)</td>
</tr>
<tr>
<td>Population (T1)</td>
<td>1.56** (0.63)</td>
<td>0.01** (0.06)</td>
<td>1.58** (0.64)</td>
</tr>
<tr>
<td>Debt to Revenue (D1)</td>
<td>48.52+ (27.10)</td>
<td>0.08 (2.61)</td>
<td>50.26+ (27.64)</td>
</tr>
<tr>
<td>Debt to Revenue (T1)</td>
<td>53.08+ (53.09)</td>
<td>-1.29 (2.74)</td>
<td>51.71+ (29.08)</td>
</tr>
<tr>
<td>Constant</td>
<td>14.79 (18.47)</td>
<td>4.60 (1.80)</td>
<td>22.89 (18.79)</td>
</tr>
</tbody>
</table>

TL1 = First-Order Time Lag | SL = Spatial-Lag (Inverse-Distance-Squared SWM)
Total Capital Expenditures in thousands of dollars | Population in thousands of people
Spatial Granger-Causality Tests

The problem of endogeneity between jurisdictional spending decisions has been discussed at length. The statistically significant results presented above suggest the presence of a complex system of policy feedback-loops evolving over time. To further explore the causal direction of the local spending decisions over time I estimate spatial Granger models on the Colorado data. The logic behind Granger-Causality is fairly simple and Damodar Gujarati puts it nicely: “The future cannot predict the past, [so] if variable x ‘Granger-causes’ y then a change in x should precede changes in y” (1995). Thus, it can be said that x “Granger-causes” y if the expectation of y given the history of y and the history of x is significantly different than the expectation of y given past values of y (Gujarati 1995).

Granger tests help to identify three types of Granger-Causality: unidimensional, feedback, and independence. Unidimensional Granger-Causality is when \( x_{t-1} \) causes \( y_t \) or \( y_{t-1} \) causes \( x_t \) but not both. Feedback Granger-Causality occurs when both are causing each other: \( x_{t-1} \) causes \( y_t \) and \( y_{t-1} \) causes \( x_t \). Finally, Granger-Independence occurs when \( x \) and \( y \) are not causally related. (Gujarati 1995)

To conduct the tests, I estimate two equations for each dependent variable. Using the variable identifiers from above, the first equation estimated is \( E_{jt-1...t-3} \) (serially-lagged home spending) and \( EW_{jt-1...t-3} \) (serially-lagged neighboring spending) on \( E_{jt} \) (contemporaneous home spending). I then estimate the equation \( E_{jt-1...t-3} \) (serially-lagged home spending) and \( EW_{jt-1...t-3} \) (serially-lagged neighboring spending) on \( EW_{jt} \) (contemporaneous neighboring spending). F-tests are then conducted on each of the two sets of explanatory variables for each of the two equations.

---

37 As reference, \( E_{jt-1...t-3} \) indicates the inclusion of four variables: \( E_{jt}, E_{jt-1}, E_{jt-2}, \) and \( E_{jt-3} \).
38 All Granger models are also estimated with panel (jurisdictional) fixed-effects.
The results of the F-tests are presented in Table 4-10 and show statistically significant tests across-the-board. Both past values of $EW_{jt}$ and past values $E_{jt}$ are significant predictors of contemporaneous values of $E_{jt}$ for the three measures of developmental spending. Likewise, past values of $EW_{jt}$ and past values $E_{jt}$ are significant predictors of contemporaneous values of $EW_{jt}$. Significant F-tests for both sets of variables, like those observed here, are consistent with feedback Granger-Causality. In the language of Granger-Causality: past home spending Granger-causes contemporaneous neighboring spending and past neighboring spending Granger-causes contemporaneous home spending. This is suggestive of the sort of spatial feedback process that is at the foundation of the proximate polity theory.

<table>
<thead>
<tr>
<th>Table 4-10. Spatial Granger-Causality Tests</th>
</tr>
</thead>
<tbody>
<tr>
<td>Per-Capita Capital Expenditures</td>
</tr>
<tr>
<td><strong>Equation</strong></td>
</tr>
<tr>
<td><strong>F-Test</strong></td>
</tr>
<tr>
<td><strong>F-Test</strong></td>
</tr>
<tr>
<td><strong>Equation</strong></td>
</tr>
<tr>
<td><strong>F-Test</strong></td>
</tr>
<tr>
<td><strong>F-Test</strong></td>
</tr>
</tbody>
</table>

| Per-Capita Recreation Expenditures | |
|-----------------------------------------------|
| **Equation** | Spatially Lagged Recreation $\rightarrow$ Recreation |
| **F-Test** | Serially Lagged Recreation | F=624.14 | Pr > F = 0.00 |
| **F-Test** | Space-Time Lagged Recreation | F=13.90 | Pr > F = 0.00 |
| **Equation** | Recreation $\rightarrow$ Spatially Lagged Recreation |
| **F-Test** | Serially Lagged Recreation | F=5.23 | Pr > F = 0.00 |
| **F-Test** | Space-Time Lagged Recreation | F=5368.29 | Pr > F = 0.00 |

<table>
<thead>
<tr>
<th>ED Expenditures (Recreation + Capital)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Equation</strong></td>
</tr>
<tr>
<td><strong>F-Test</strong></td>
</tr>
<tr>
<td><strong>F-Test</strong></td>
</tr>
<tr>
<td><strong>Equation</strong></td>
</tr>
<tr>
<td><strong>F-Test</strong></td>
</tr>
<tr>
<td><strong>F-Test</strong></td>
</tr>
</tbody>
</table>
It is easy to trivialize these Granger findings. One could easily say: “well of course it is a dynamic process.” And indeed, the evidence presented to this point in the dissertation indicates that such a Granger process should be expected. The problem is that evidence of the inter-jurisdictional dynamic processes associated with local policy choices have gone largely—if not almost entirely—unconsidered. A finding of independence or unidimensional Granger-Causality would have indicated that policy feedback-loops are not at work. The finding of a feedback Granger process adds to the mounting evidence that these spatial process matter for local developmental policy choices.

BRINGING THE RESULTS TOGETHER

On average, economic development spending in Colorado has been increasing over the last 30 years. When one looks at any single Colorado jurisdiction’s spending policy choices at a time during those thirty years, it is thus likely that their neighbors are in the process of increasing spending as well. Teasing out the inter-jurisdictional effects in this naturally cointegrated environment is difficult. I used two descriptive and three inferential methods for examining these relationships over time. No single one of these approaches fully eliminates the statistical difficulties associated with testing $H_1$ and $H_2$, but together they offer a robust rejection of the null hypothesis. It would be very difficult to look at these results and argue that developmental policy choices in Colorado are being made independently of their spatial context.

For both $H_1$ and $H_2$, the results are more robust for the capital outlay and the ED dependent variables than for the recreation and culture dependent variable. That ED and capital outlay both find a robust support is expected given that, on average, 64% of the ED measure can be attributed to capital outlays. Though the hypotheses are less robustly
supported for the recreation and culture spending, they are still supported in both the SDL and SEC models.

In the case of Colorado, at least, local policy makers appear to approach recreation and culture spending with an eye toward the long-term. In the SEC models, the lagged spatial variables were significant even though the differenced spatial variables were not. This indicated that neighboring recreation and culture expenditure changes tended to boost home spending over the long term even if the change did not lead to an immediate policy adjustment. This is, of course, in keeping with the proximate polity theory that jurisdictions develop local spending equilibriums over time. What we know now is that those spending equilibriums are also evolving over time. Unlike the results presented in Chapter 3, these results also suggest that cities look toward their neighbors’ per-capita and total expenditures when making policy decisions (the reader will recall that in Chapter 3, the evidence for per-capita spatial autocorrelation was weak). The SDL models and SEC models indicate that the two variables contribute about equally to the explanation of variance.

In sum, these results offer robust evidence that local policy choices are made in a complex geopolitical environment that changes over time. Support for $H_1$, that home and neighboring spending are positively related over time, was found in estimates made in SDL and SEC models. The SDL models showed for all three measures of economic development spending that neighboring increases lead to home increases (and vice-versa). The SEC models served as both a robustness check and a refinement of the SDL models. With capital outlay and ED spending the spatial-lag had both a short and long-term effect. Spikes or drop-offs in neighboring spending tend to lead jurisdictions to adjust their own spending in the same direction in the short-term and then continue that spending over the long-term. Indeed, this is one of the advantages of looking at spatial dynamics through the
lens of an EC model. Economic development spending is not always occurring in a linear fashion; cities may develop a lot one year and less the next year. The SEC models show that the proximate polity theory holds up even under these conditions.
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In many respects the idea of cooperative local economic development is incongruous with much of what we know about American sub-state government and implausible in the Petersonian (1981) conception of cities. And yet, cooperative development is not unusual: cities frequently cooperate to build roads, develop commercial properties, and even manage land use. The choice to aggressively pursue development can be expensive, confusing, and risky for cities. As the analyses in Chapter 3 and Chapter 4 demonstrate, active development need not be a city’s default policy state. Development frequently requires a devotion of resources to a range of policy products that may fail to yield the desired result. Cooperation allows cities to mitigate some of these risks and potentially do more with less.

Development policy is frequently depicted as subsidies to attract specific businesses; however, the scope of development policy is really much wider. Developmental policies are simply those targeted at increasing the economic well being of the jurisdiction. Sometimes this means attracting new business with subsidies but other times it means attracting new business and new residents with public goods: improved infrastructure, transportation
options, parks, and cultural amenities. Development policies can be the revenue choices jurisdictions make (e.g. sales and use taxes) and even the growth-management policies that jurisdictions implement in order to limit the geographic area of the jurisdiction and increase community desirability and property values (Fischel 2001).

In this chapter I examine the conditions under which Colorado local governments pursue formal intergovernmental agreements (IGAs). Formal development agreements in Colorado include the joint-financing of infrastructure, transportation, and business projects as well as revenue sharing and land-use agreements. After looking at some of the extant literature on interlocal cooperation and reviewing some sample intergovernmental agreements, I apply the logic of the proximate polity theory and the institutional collective action (ICA) literature to developmental interlocal cooperation. The theory emphasizes the competitiveness of the space that jurisdictions are situated in and the political relationships amongst officials.

**LITERATURE REVIEW**

Any discussion of interlocal cooperation must begin—even if only briefly—with the ideas of Ostrom, Tiebout, and Warren (1962). Their insight was that the polycentric metropolis (the fragmented metropolis) might have advantages over the gargantuan metropolis (the unified metropolis). For them, polycentricism referred to more than just the cities and counties that comprised metropolitan areas. Polycentricism also referred to the slew of alternative jurisdictions that perform any variety of functions from public transportation to the financing of convention centers and baseball parks.

Though the gargantuan metropolis may benefit from economies-of-scale, a polycentric system, they argued, allows for the jurisdictions to be more politically
responsive to their residents (Ostrom, Tiebout, and Warren 1962; Ostrom 1972). Much of the research on the consequences of fragmentation has also found that it is associated with more efficient (in addition to more responsive) goods provision (Wagner and Weber 1975, Dilorenzo 1982, Schneider 1986). Oakerson (1999) argues that this efficiency is the result of fiscal equivalence: in small, specialized jurisdictions, residents understand where their tax dollars are going and are able to make collective corrections when they are not getting their money’s worth. However, Berry (2009) points out that special districts may spring up in spite of—rather than because of—the mutually shared interests of multiple cities. Confusing elections, voter apathy, and complex boundaries can lead special jurisdictions to over-represent those with a stake in the goods the district is providing and under-represent everyone else.

Part of the responsiveness and efficiency of fragmentation comes from the separation of goods provision from goods production. Provision is the jurisdiction’s collective decision to offer the good to residents while production is how the good is actually distributed. Governments need not always produce the goods that they are providing: they can contract out to private companies or other governments (Stein 1990), voucher (Witte 2001), or utilize various forms of cooperation. The offering of developmental goods via interlocal cooperation is merely a mutual production decision among multiple cities that have independently made the same provision decision.

Understanding the links between boundary divisions and policy outcomes in metropolitan areas informs our understanding of interlocal cooperation for developmental purposes. Because local development can have positive externalities, the benefits of solo development are not restricted to the jurisdiction itself. While one jurisdiction may receive a disproportionate share of the benefits, nearby and overlapping jurisdictions are likely to benefit too. If a city recruits a company to locate within the city’s boundaries, both the
recruiting city and nearby cities and counties may benefit from increased sales and property tax revenues when employees purchase homes and frequent businesses.

In their extensive work on institutional collective action, Feiock and his co-authors have identified three types of local integrated decision making: centralized authority, network embeddedness, and mutually binding contracts (R. C. Feiock 2004, 2009; R. C. Feiock et al. 2010). Centralized authority is the assumption of responsibility by higher level or third party (overlapping) governments such as the state or a special district. Third party governments take on these roles for a multitude of reasons including failure to act on the part of lower-level governments (Burns 1994).

Network embeddedness characterizes the “agreements among local units that are coordinated and enforced through a network of social, economic and political relationships rather than formal authority” (R. C. Feiock, I. W. Lee, Park, and K. Lee 2010: 10). Embeddedness has been identified as particularly important for understanding local regulation of common-pool resources such as rivers and fisheries (Lubell et al. 2002; Schneider et al. 2003). The formal incarnation of embeddedness is contracting in which “fragmented governments legally bind themselves to mutual action” (Feiock et al. 2010: 10). With contracting, cities formalize their relationships with one another in order to achieve and enforce a mutually held goal. The need to formalize a cooperative agreement is clearer in some instances than others. Two nearby cities may operate a single sewage system or emergency medical service because neither can afford to do so alone but both can afford to do so together by achieving economies-of-scale.

While intergovernmental agreements necessarily mean that jurisdictions are giving up some amount of their authority to act independently, the jurisdictions remain integral to the decision-making process for the agreed upon area or project (Gerber and Gibson 2006, 2008). While formal intergovernmental agreements frequently result in the creation of a
new authority or district, they differ from most special districts—a form of cooperation that has received considerably more attention. Special districts can and do form without the formal cooperation of the presumptive under-lapping existing jurisdictional governments—even if those under-lapping jurisdictions approve of the district (Berry 2009). Though special districts are a form of cooperation, they are also the creation of a new and separate government structure.

Kwon and Feiock (2010) describe a two-stage process for cooperation. In the first stage, cities decide whether they are interested in pursuing cooperation. This decision is based on demand side factors such as the city’s fiscal situation, government resources, and potential negotiating partners. Of note, is their theory that despite fragmentation increasing the number of potential cooperative partners, it leads to collective action problems that are particularly difficult to resolve and thus should reduce interest in cooperative action (see also Shrestha and Feiock, Forthcoming). In the second stage, cities actually institutionalize the cooperation. The ability to do so is influenced by agency, negotiation, and enforcement costs. Kwon and Feiock test this two-stage process with ICMA, Census, and Census of Governments data using a Heckman selection model. Their stage 1 results indicate that many variables predict the desire to cooperate. However, the equation for stage 2—actually institutionalizing the desired agreements—provides less insight; only two variables are significant: at-large council system and previous interlocal communication (measured with interlocal revenue).

As noted above, the logic underlying formal local development agreements is trickier that which underlies other agreements. Developmental cooperation must logically flow from a belief by the negotiating officials that all of the jurisdictions in the agreement are better off with the agreement than without it. However, under what more specific conditions is this developmental cooperation likely to occur?
One place to look for an answer is the literatures on bargaining and interlocal cooperation for non-developmental goods. In any situation where there is the potential for cooperation, players need to make a cost-benefit analysis. Inman and Rubenfield (1997) identify five Coasian transaction costs relevant to intergovernmental bargaining: (1) bargaining costs, (2) information costs, (3) agency costs, (4) division costs, and (5) enforcement costs (see also R. C. Feiock, Steinacker, and Park 2005, 2008; Steinacker 2010; Coase 1937). Feiock et al. (2009) argue that for interlocal agreements, bargaining and enforcement costs are fairly low; the bargaining cost is the time it takes for the agreement to be reached and enforcement costs are settled by contract. Information costs, agency costs, and division costs, however, remain serious obstacles toward agreements. Because many cities are low-resource entities with few full-time employees it can be difficult for cities to collect (or even know to collect) information about other cities they can work with. And even if cities do seek to gather information potential cooperators may be hiding information in order to preserve their leverage (Inman and Rubinfeld 1997; R. C. Feiock 2009; Katz 2000a).

Agency costs are, in a sense, the costs of local democracy. Some agreements require voter approval, elected officials face reelection, and professional officials are at risk of losing their jobs (Steinacker 2002). Consequently, local agents must be careful to accurately represent city interests when negotiating agreements if they are to maintain their position and/or ensure the agreement remains in place (Gerber and Gibson 2008; Kwon and R. C. Feiock 2010).

With all intergovernmental contracts, agreement must be reached to determine how to divvy up costs and benefits. Some extant research has found that it is easier to negotiate division when leaders have good reputations, repeated interactions, and similar incentives. For example, research by Gerber et al. (2006, 2008) has found that cities in California with
similar partisan makeups are more likely to cooperate (see also Dixit 1996; Frant 1996; Heckathorn and Maser 1987; R. C. Feiock 2009). Others have offered evidence that the successful negotiation of interlocal agreements increases the likelihood that local elected officials will seek higher office—the agreements extend candidate reach to new attentive publics (Bickers, R. M. Stein, and Post 2010; Steinacker 2002). It is possible that officials hoping to extend their reach devote more resources into successful negotiation.

A more contextual alternative to the bargaining literature is that developmental cooperation actually stems from the competitive system in which local governments are situated. But how can we understand metropolitan areas as simultaneously competitive and cooperative? In an under-cited piece, geographer Allen J. Scott (1993) argues that there are “intermediate institutional arrangements” that constitute neither true market activity nor true hierarchical economic activity (Coase’s firm). Intermediate institutional arrangements “combine varying degrees of centralized and decentralized decision making” to constitute what Scott calls “flexible production agglomerations” (Scott 1992: 224). These “flexible production agglomerations” stem from learned failures of a market-based (competitive) system. In other words, competition can lead to institutionalized cooperation.

Research on the competition to cooperation theory is still rather limited. In their survey of the Twin Cities, Goetz and Kayser (1993) found that substantially less than half of the surveyed cities viewed competition as being beneficial to economic development. Won Lee et al. (2011) investigate how local officials in Florida perceive economic competitiveness and its relationship with cooperation. They find that cities are willing to informally cooperate with their perceived competitors.

While the extant research has moved us closer to a comprehensive explanation of local cooperation, data limitations have prevented researchers from specifically considering and defining the network and dyadic nature of interlocal agreements. It takes more than
one government to cooperate and the likelihood of reaching institutionalized agreements is a function of all the governments involved in the potential agreement. Consequently, interlocal agreements in this chapter are explored by examining dyadic relationships.

INTERLOCAL DEVELOPMENTAL AGREEMENTS IN COLORADO

For this study, an intergovernmental developmental agreement is one where two or more jurisdictions negotiate and formalize an agreement aimed at mutually enhancing the economic standing of all the jurisdictions involved.

Interlocal agreements become a necessity if the production of the developmental policy unavoidably entails the involvement of multiple jurisdictions. This can be the case for the construction of roads that cross over multiple jurisdictions: either the jurisdictions cooperate or the road does not get built. The construction of the Northwest Parkway in Colorado offers such an example. The Northwest Parkway is one section of the unfinished Denver Metropolitan Area “beltway” that consists of multiple, separately and independently developed highways and toll roads. Prior to the construction of the Northwest Parkway, Denver’s northern and eastern suburbs had direct access to the beltway but the northwest suburbs lacked such access. The Northwest Parkway was financed and developed in 1999 via intergovernmental agreements between the cities of Broomfield and Lafayette and Weld County. In addition to offering residents of Broomfield and Lafayette easier access to Denver’s airport, Broomfield and Lafayette hoped the highway would make both cities more desirable locations for businesses to locate and, in the case of Broomfield, a better out-of-town conference location (Plunkett 2006).

The success that Broomfield, Lafayette, and Weld County had in getting the Northwest Parkway constructed can be contrasted with the failure of Denver’s western
suburbs to negotiate an agreement to develop the Jefferson Parkway and effectively complete the beltway loop. The construction of that road had (and still has) vigorous support from the newer suburban cities of Broomfield and Arvada but the older city of Golden has consistently refused to be party to the construction. Broomfield and Arvada have been explicit in stating that the Jefferson Parkway would serve as a development boon for the cities—particularly with the high-end commercial development and the residential development that would come with the road’s construction along the eastern edge of the Rocky Mountains (Jacang Maher 2009). Golden, a Denver suburb of about 20,000 people and a gateway city to Colorado’s mountain resorts, has indicated that they fear the new highway would cut too close to the city’s quaint downtown (and consequently lower property values) and effectively split the city in two (Jacang Maher 2009). Indeed, current Golden Mayor Jacob Smith campaigned on his opposition to signing an agreement to build the highway (Minkoff 2010a). To date, the Jefferson Parkway remains just an idea though plans are in the works to potentially develop the road without crossing over into Golden (Crummy 2009).

Another set of intergovernmental agreements common in Colorado are those that involve revenue sharing. With these agreements, cities will aim to actually dampen existing competitive behavior that is resulting in high costs but insufficient return. Examples of such agreements in Colorado are ones struck between Louisville and Superior and between Thornton and Westminster in 1997 and 2000 respectively. In both cases, specific geographic areas were defined and the cities agreed to joint-responsibility for planning and zoning the area, joint-authority over the annexation of land into the area, and for an equitable splitting of the revenues obtained from property, sales, and use taxes within the defined area. Moreover, in both cases, the cities saw the areas as ripe for potential commercial and multi-family residential development and indicate so in the IGA
contracts (Planning for Growth… 2004). The Thornton-Westminster area, in particular, was likely to be a center of population growth and many developers had expressed interest to the cities about developing the land that straddles both jurisdictions. Rather than “do battle” over who could provide the best incentives for development, the cities agreed that they would both be best served by sharing the revenues obtained in the defined geographic area (Westminster, Colorado Names Developer… 2004; Murphy 2005).

Just like infrastructure agreements, revenue sharing agreements are not always a sure thing. Cities in Boulder County and Broomfield City/County have been exploring the idea of multi-government revenue sharing for some time. Such an agreement has the potential to make city revenues less susceptible to economic fluctuations and reduce the intense competition between cities to attract businesses and collect the resulting use and sales tax revenues. However, the financial models produced by a consulting firm hired to research the potential agreement indicate that full participation is necessary for an agreement to have the desired consequence but that it is also likely to result in reduced revenue for at least one city. These economic predictions have made settling on an agreement somewhat elusive (Brown 2009; Minkoff 2010b).

While Boulder and Broomfield counties have thus far been unsuccessful at institutionalizing a scheme for revenue sharing, nine of the ten cities in Boulder County as well as the County itself have succeeded in institutionalizing growth-management agreements. These agreements, which were formed over the course of two decades, were consolidated into a single “Super-IGA” in 2003. The individual agreements, and later the Super-IGA, aim to reduce competitive behaviors that are perceived to be mutually costly by defining land as being either within a city’s potential growth zone or as a rural preservation area. The agreement stipulates that cities will not attempt to annex or develop outside their growth zone and the county has agreed not to urbanize the unincorporated area. The
consequence is a region where cities do not blend into one another (unless they explicitly choose to) thus increasing the sense of community and potentially raising (or stabilizing) property values in each jurisdiction.

Beyond their stated goals of making their communities developmentally more desirable and increasing revenues, it is difficult to clearly identify the internal economic and political dynamics that condition formalized cooperation, broadly stated. However, the examples are instructive in several ways. First, they clarify that developmental cooperation is not merely an intellectual exercise—some local governments are seeking cooperative ways to navigate the hyper-competitive environment that they exist in. Second, agreements appear to be happening, at least in part, based on the developmental preferences of the community. Revenue-sharing agreements in Colorado require voter approval and all agreements require at least council approval making them a decidedly political activity. And finally, these examples suggest that developmental competition and cooperation are intertwined.

EXTENDING THE PROXIMATE POLITY THEORY TO COOPERATION

All jurisdictions, and particularly those in metropolitan areas, are situated in ecologies of policy choices, preferences, and connections between elected and professional officials. Perhaps the most discussed component of this ecology is competition for wealthy residents and firms in order to maximize the city’s tax base and provide the necessary goods and services (Tiebout 1956; Buchanan 1971; Peterson 1981). Thus, economic and political survival for the jurisdiction in this competitive ecology has generally been thought of as coming at the expense of other jurisdictions: getting people and firms to move out of nearby jurisdictions and into another jurisdiction. It is in this way that cooperation is not
what we should expect from our cities when it comes to development policy. However, as
the evolving ICA literature has identified, there are efficiencies to be gained from
coopera tion—even in the competitive development context (Lee, Feiock, and Lee 2011).

Explanations of formal developmental cooperation might be placed in two categories.
The first category contains idiosyncratic and, consequently, unpredictable explanations. If
a company decides on its own that it wants to locate in a specific area, then it may be a
catalyst of cooperation. In such a situation the cause is probably not random but very
difficult to model. The second category contains conditional explanations of cooperation.
These explanations, which are explored in this paper, define the context that sub-state
jurisdictions exist in as being conditional to formalizing developmental cooperation.

Prior to offering the details of the theory, it is necessary to go one step further in
defining the theoretical context in which cooperation occurs. Most previous work on local
cooperation has focused on whether individual jurisdictions are cooperating without
consideration of the characteristics of the jurisdiction(s) that they are cooperating with.
This is, generally and understandably, a function of data limitations that have not allowed
researchers to analyze the dyadic nature of institutional collective action. However,
cooperative action is best understood as relational. To use one of the examples from above,
Thornton was unable to cooperate with Westminster without Westminster’s consent and
Westminster was not able to cooperate with Thornton without Thornton’s consent.
Variables associated with both jurisdictions were critical for the formalization of their
revenue-sharing agreement. Though the details of the unique dyadic and network data
used in this paper’s analysis are discussed in depth below, it is important to note here that
the hypotheses presented next were constructed in a dyadic context.
From Competition to Cooperation

As the competition to provide and produce competitive developmental goods increases so do the costs and risks of that provision and competition. To keep up with nearby jurisdictions, cities need to spend more, which generally means they need to collect more. A consequence is that implementing development policies in competitive conditions is simultaneously necessary and risky for local officials. Local politicians and professional officials may diversify the risks associated with increased competition by doing just the opposite: cooperating.

Interlocal agreements are an elite-level production activity and as such are probably not of interest to the average resident of a jurisdiction. However, policy outcomes are of interest to the average resident and a competitive development environment does two things that are likely to effect how local politicians make decisions. One: the competitive environment increases resident awareness of development policy generally and development policy outcomes more specifically. In a context where nearby cities are building new roads and new trails, new shopping centers are sprouting up, and property values are increasing, it is easier for residents to make assessments of their own jurisdiction’s successes and to be aware of and even knowledgeable about their exit options. Local officials are very likely to feel this pressure. Two: the competitive context increases the probability of policy failure. Policy failure is more likely in competitive environments because more jurisdictions are offering a desirable bundle of developmental goods and services. This means that people and firms have more quality exit options. Policy failure can wreak havoc on a jurisdiction’s budget, elected officials may lose their office, and government professionals can lose their jobs.

Cooperation offers cities and counties a way to dampen the policy competition that has made development both essential and risky. Cooperative development, even if it is only
a single contract over a single piece of land, ties the fates of local governments together. At
the point at which they see development as mutually achieved, rather than as something
that is individually achieved, new developmental norms can be established that are not as
costly and not as risky as competitive policy-making. By institutionalizing cooperation (or,
in the words of Scott (1992), forming “flexible production agglomerations”) with revenue
sharing, development, and growth-management agreements, local officials create
economies-of-scale that decrease the budgetary and political costs of development. If the
development policy fails, the economies-of-scale decrease each jurisdiction’s budgetary and
political impact: each government puts less cash or liability into the effort to begin with so
the damages to the local treasury, local campaign platform, and the local bureaucrat’s
career ambitions are reduced upon policy failure. Though the jurisdictional benefits are
also reduced, formalized developmental cooperation may offset this by increasing the
probability of policy success. Bringing together actors with different perspectives and new
creative ideas boosts the likelihood of policy success. Moreover, sub-metropolitan regions
may be better able to sell themselves to potential movers by cooperating. Such is the case
with growth-management policies: by reducing sprawl and increasing property values, each
jurisdiction is able to sell itself as a more desirable place to live and work.

_Hypothesis 5-1: As the overall level of competition for a dyad increases, the higher the
probability that the dyad will have a formalized interlocal developmental agreement,
all else being equal._

**Jurisdictional Similarity**

A common hypothesis in the collective action, ICA, and bargaining literatures is that
agreements are more likely to be reached amongst similar parties. In the context of
interlocal developmental agreements, similarity can take three forms of note: (1) Economy Type Similarity, (2) Policy Similarity, and (3) Political Similarity.

Local jurisdictions can be loosely classified as being residential or mixed residential-commercial (rarely do we see exclusively commercial jurisdictions). Even with a uniform goal of maximizing tax-revenues, residential and mixed-economy jurisdictions have different preferences about how to achieve that goal. Officials in residential jurisdictions are concerned foremost about attracting new, wealthier residents and increasing property values (Fischel 2001). Alternatively, officials in more mixed economies will be primarily interested in attracting new firms (in addition to increasing property values). Accordingly, residential jurisdictions are likely seeking to develop parks and manage residential land-use while more mixed economies are seeking to develop infrastructure and large-scale projects. It is thus less likely that residential economies will be working with mixed economies and more likely that they will be working with other residential economies. Likewise, mixed economies are more likely to cooperate with economies that are also mixed.

*Hypothesis 5-2*: As the difference between the economy type of the jurisdictions in the dyad decreases, the higher the probability that the dyad will have a formalized interlocal developmental agreement, all else being equal.

Independent of (and because of) the competitive ecological context (Hypothesis 5-1), jurisdictions may be developmentally active or developmentally inactive. Interlocal developmental agreements can be instituted by both policy-active jurisdictions and policy-inactive jurisdictions. It is likely that jurisdictions that are policy-active will *more frequently cooperate* with jurisdictions that are also policy-active and *less frequently cooperate* with those that are policy-inactive. Positive economic externalities are a consequence of developmental policy activity. These externalities can lead to free-riding if
the right precautions are not taken (Samuelson 1954; Olson 1965). While active jurisdictions may want inactive jurisdictions to cooperate and reduce their developmental burden, the incentive is for the inactive jurisdiction to continue to freeride. Two active jurisdictions, however, are independently committed to development but are also aware of its costs so they benefit the most from economies-of-scale. Along these lines, two policy-inactive jurisdictions are able to economize the startup costs of development by working together.

**Hypothesis 5-3:** As the difference between the non-intergovernmental development policies of the jurisdictions in the dyad decrease, the higher the probability that the dyad will have a formalized interlocal developmental agreement, all else being equal.

The third way in which jurisdictions differ is in their partisan politics. Partisan politics are frequently left of out the equation when studying local policy choices. In many cases the data are not available and in other cases, partisan considerations are simply not theoretically linked to the outcome being studied. In Colorado, like many other states, local elections are non-partisan. But while party affiliation does not appear on the ballot, many people are able to make an informed partisan assessment of local candidates. Local officials are reflections of their constituency and partisan politics can find its way into even the most apolitical of concerns.

The partisan composition of a jurisdiction means two things for local developmental cooperation. First, jurisdictions with similar partisan compositions may prefer similar development tools (for a national-level example, see Bickers and R. M. Stein 2000). One can imagine that two conservative jurisdictions might be interested in cooperating to bring a large box-store to the region while two liberal jurisdictions might cooperate to prevent the box-store from locating in the region. These are both developmental policies but they are
policies of different types. The second way that partisan composition might matter is that cooperation necessitates communication. Officials from jurisdictions that have similar partisan compositions may simply be more likely to initiate the communication necessary to reach agreement.

*Hypothesis 5-4: As the partisan differences between the jurisdictions in dyad decrease, the higher the probability that the dyad will have a formalized interlocal developmental agreement, all else being equal.*

**Network Centrality**

Over the last three decades, scholars in various disciplines have begun to identify the importance of networks for policy selection. Coordination and innovation are fundamental to cooperative policy-making and government-networks help to facilitate these attributes in a variety of contexts (Burt 1987; Schneider et al. 2003; Hafner-Burton and Montgomery 2006). Here, I turn to a hypothesis that places local officials within a governmental-network of other elected and unelected officials within their metropolitan area.

Among the best examples of the importance of networks for local governance is the research done by Schneider et al. (2003). They find that networks that span a diverse set of interests (government officials, non-profit leaders, and policy experts) facilitate the coordination of estuary governance. Their argument is that the networks enhance the necessary communication, trust, and shared investment necessary for cooperation. Moreover, Feiock et al. (2009) offer evidence that informal networks exist even in the competitive world of metropolitan development:

“Informal networks constitute a macro-level regional governance structure that comprises a set of actors in a social network. Local actors are able to
enter or exit relationships and seek out partners embedded in network relationships that reduce risk, improve information or ensure commitments.” (Fieock et al. 2009: 22)

These structures can help to facilitate the sort of multi-faceted governance and regionalism of consequence to local governments (Ostrom, C. M. Tiebout, and Warren 1961; Robert M. Stein 1990; Burns 1994; J. Pierre 1999; Katz 2000b; Andersen and Jon Pierre 2010). Taking a cue from the literatures on how social-networks influence individual social-political behavior and how networks influence metropolitan-level governance structures, I explore how sub-network structure influences the likelihood of formalized developmental cooperation.

Local elected and unelected officials communicate with one another. They do this as policy-makers and policy-practitioners and these relationships can permeate throughout their own government. Some cities have long-established relationships with other cities where information is proactively shared. Other cities are connected to the cities that proactively share information. This informal communication may be critical to the process of formalizing developmental cooperation as it can facilitate the movement of information about a metropolitan area.

A jurisdiction’s situation within the broader communicative network structure of the metropolitan area is likely to influence the creation of formalized agreements. The concept of network centrality refers to how connected an actor in a network is to other actors in the network (Bavelas 1950; L.C. Freeman 1979; Scott 2009). Being more central within the informal metropolitan network facilitates the learning necessary to formalize intergovernmental cooperation in several different ways. Though intergovernmental agreements are not a new concept, some officials may know more about them than others. Intergovernmental agreements are complicated. To some local elected officials they may
even be enigmatic—a policy production tool they have heard about but have never dealt with and would not know where to begin if they wanted to pursue one. Being part of a network of other jurisdiction increases the likelihood that the jurisdiction will be aware of cooperative policy tools as an option and that another government will approach with cooperative opportunities.

Network centrality also facilitates the learning necessary to overcoming the impending division costs. Division costs for the financing of a new road or residential development, for example, involve determining which government will pay for what and/or who will take on the necessary financial liabilities. Network ties can help local officials obtain information about what is equitable. Though intergovernmental contracts are public information, the details of the negotiations that lead to the contract are not. Ties to other governments may offer “inside information” about ways to successfully leverage a deal.

Finally, a government’s network centrality may mean that the jurisdiction has taken on a leadership role with respect to facilitating informal regional governance. It stands to reason that those jurisdictions that have taken the initiative to informally collaborate would also be more likely to formally collaborate. In other words, informal communication may transition into formal cooperation. The more central a jurisdiction is within the network, the more likely it is to find a developmental agreement that works for them.

From a dyadic perspective each end of the dyad is independently situated within a network. The probability of agreement is thus a function of the combined network centrality of the dyad. When that combination is very low (two isolated jurisdictions), an agreement is unlikely; however, as the combination increases so should the probability of an agreement. Two highly centralized jurisdictions have a greater probability of cooperating than two jurisdictions with middling centrality scores or one jurisdiction with high centrality and another jurisdiction with a middling level of centrality.
Hypothesis 5-5: As the overall informal network centrality of the jurisdictions in the dyad increase, the higher the probability that the dyad will have a formalized interlocal developmental agreement, all else being equal.

RESEARCH DESIGN

To test these hypotheses I have compiled a dataset containing information about local agreements and other government and population characteristics for the cities and counties that make up Colorado’s Front Range. The data are from six different sources:

1. The FREDS survey (described in detail in Chapter 2)
2. The 2002 and 2007 Censuses of Governments—Finance
3. The 2000 Census
4. The 2006-2008 American Community Survey
5. The 2000 Colorado Redistricting and Reapportionment data,
6. The 2000 Census TIGER geospatial files

The unit of analysis for the study is the jurisdiction-jurisdiction-dyad. Dyads were created that independently pair each of government with all other governments along the Front Range (so each jurisdiction was paired with 95 other governments). All jurisdiction pairs that were more than 50 miles apart were then dropped from the dataset under the assumption that formal agreements between jurisdictions farther away from each other than this are simply not feasible. Dyads are undirected so that pairs of governments only appear in the dataset once.

A complete list of the variables in the analysis, how they were measured, and the source of the data can be found in Table 5-1. Table 5-2 contains dyad-level descriptive statistics. Because the survey was conducted in 2010 and asked for cities to report any current relationships the issue of time needs to be addressed.\(^{39}\) While some of the reported relationships were undoubtedly developed and/or formalized prior to 2000, I make the

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\(^{39}\) Future surveys will be more specific in order to eliminate this problem.
assumption that most developmental agreements currently in effect occurred in the year 2000 or after. Accordingly, to increase measurement validity, I average data for two time periods during the 2000-2010 decade. For example, the Census of Governments measures for jurisdiction \( i \) are the average of \( i \)'s information in the 2002 and 2007 surveys.\(^{40} \) By averaging two time points during the decade, I guard against the problem of the dependent variable (the occurrence of an agreement) actually happening before the independent variable (i.e. economy-type similarity). It is not possible to do this for the network-centrality measure because all network data are from the 2010 survey conducted by me. The dataset should thus be looked at as an overall assessment of the 2000-2010 decade.

### Measuring Formal Developmental Relationships

The reader will recall that the FREDS included a network battery that asked respondents to report their jurisdiction’s relationships with other jurisdictions. In Chapter 2, I explored the competitive relationships that exist between jurisdictions. To construct the dependent variable (the presence of a formal developmental agreement in the dyad) and the network centrality measure, I use different information from the networks component of the survey.

The dependent variable for the analysis is, very simply, the presence of a formal economic development agreement for the dyad. Formal agreements were described to the respondent thusly:

“Formal joint initiatives with another government aimed at mutual economic growth. They include tax incremental financing, tax abatements, business parks, zoning adjustments, and infrastructure improvements among other activities.”

\(^{40} \)A complete Census of Governments is conducted by the Census Department in years ending with 2 and 7. In other years, the survey is a sample of governments and thus does not offer complete enough data for this analysis.
Any dyad for which one of the jurisdictions responded that there was a formal developmental agreement was coded 1 and all other dyads were coded 0. Figure 5-2 contains the visualization of these formal relationships. ⁴¹

**Measuring Network Centrality**

To measure each jurisdiction's network centrality, I constructed an undirected social-network of all the jurisdictions along the Front Range. The network was based on which jurisdictions each respondent indicated having a cooperative relationship with. Cooperative relationships were defined to respondents as follows:

“Cooperative relationships are characterized by information exchanges, formal or informal joint economic development efforts, and constructive relationships among government officials.”

Jurisdictions that responded that they had either a cooperative relationship with another jurisdiction were treated as being informally tied to one another. The visualization of the network of informal inter-jurisdictional relationships can be found in Figure 5-1. Each jurisdiction’s network centrality score is then generated from this cooperative social-network.

There are many types and measures of network centrality that are used by social-network analysts. I use a measure of betweenness centrality called flow betweenness. Betweenness centrality goes beyond simply measuring the number of other actors that the network node (the jurisdiction) is tied to; betweenness situates the node within the context

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⁴¹ Because the analysis requires near complete data, I make the assumption that both formal agreements and cooperative arrangements are mutual. In other words, if a respondent city indicated a formal tie with a non-respondent city, then the cities were treated as having a formal tie. Similarly, if a respondent-city indicated a cooperative relationship with a non-respondent city then both cities were treated as having a cooperative relationship. The missing data includes only connections between mutually non-respondent jurisdictions. The formal cooperation variable treats multi-government IGAs as collections of dyadic agreements.
of the whole network. Though some nodes may not be connected to many other nodes, they may lie between nodes that have multiple ties making them central to the overall network (L. C. Freeman, Borgatti, and White 1991; Scott 2009). Flow betweenness centrality is a modification on Freeman’s more commonly used betweenness measure that is based on independent pairs of nodes rather than the shortest geodesic distance between nodes. The measure “adds up how involved that actor is in all of the flows between all other pairs of actors” (Hanneman and Riddle 2005). Accordingly, flow centrality more accurately operationalizes informational connectivity in a metropolitan area where information does not always travel the shortest path between nodes (L. C. Freeman, Borgatti, and White 1991). As noted in Hypothesis 5-5, the dyadic structure of the analysis requires the summation of the flow centrality values for each member of the dyad.

It is important to note here that the analysis will not relate the presence of a reported cooperative relationship in the dyad with the presence of a formal relationship in the same dyad. Rather, the analysis will relate the total flow betweenness centrality for the dyad with the presence of a formal relationship in the same dyad. This is done for two reasons. First, most agreements necessitate a simultaneous informal relationship which would lead to multi-collinearity problems. Indeed, this bears out in the data: the formal and informal dyads are correlated are $r=0.67$ and the Jaccard statistic (a statistic used to correlate binary matrices) is $j=0.34$ (significant at the $p<.01$ level) indicating that the two matrices are quite similar. The second reason is that the cooperative relationship may have developed after the formal relationship was established. The concept being measured with flow centrality is different than the concept being measured with informal agreements. This conceptual difference bares out in the data: flow centrality is correlated with the presence of formal tie at only $r=0.22$. 

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Figure 5-1. Network Graph of Informal Relationships Between Front Range Government Officials
(Node Size Increases with Flow Centrality Score)
Figure 5-2. Network Graph of Formal Developmental Agreements Between Front Range Jurisdictions

Spatial Variables

Three of the variables in the analysis are spatially-lagged: distance between jurisdictions, the number of neighbors, and developmental competition. To generate these variables, the data were put into a geographic information system (GIS) and a matrix (similar to those used in the preceding chapters) containing the distances between each jurisdiction was created. The distance between the jurisdictions in the dyad was measured in miles. For the neighbors measure, any dyad in which the jurisdiction’s borders were 10 miles apart or less was coded as 1 (and all other dyads were coded 0). The economic
development competition variable was measured as spatially-lagged economic development spending (the sum of per-capita infrastructure, roads, parks, and recreation expenditures) as reported in the 2002 Census of Governments. As the developmental spending going on in nearby jurisdictions increases the more developmental competition the “home” jurisdiction faces.\footnote{\textsuperscript{42}}

Map 5-1. Developmental Competition Along the Front Range

\footnote{\textsuperscript{42} The reader will recall that spatially-lagged variables are distance-weighted measures of a concept. For a jurisdiction \textit{i}, the spatially-lagged development expenditure value is the mean of the weighted per-capita spending of all other jurisdiction \textit{j}. For this analysis, as in the previous analyses, I use an inverse-distance-squared spatial-weights-matrix. This type of spatial weights matrix treats every jurisdiction along the Front Range as a neighbor but weights near neighbors more than distant neighbors to reflect the assumption that people and firms prefer to move shorter distances than longer distances. For a more in-depth review spatial-lags, turn to the “Vocabulary” section of Chapter 1.}
Map 5-1 depicts developmental competition along the Front Range by grouping jurisdictions into terciles based on their spatially-lagged developmental spending. Cities shaded the darkest are geographically situated in the most competitive parts of the metropolitan area. Note that city’s shade does not indicate how competitive that city is, only how developmentally aggressive its neighbors are. As is to be expected, the Denver Metropolitan Area is the most competitive area along the Front Range. In particular, Denver, Aurora, and Castle Rock are situated in close proximity to other jurisdictions (and one another) that are high developmental spenders. Fort Collins, is a fairly aggressive city itself but it is situated in a relatively uncompetitive environment because Greeley and Loveland are low development spenders. Boulder, another high spender in and of itself is situated in a moderately competitive environment: highs spenders to the southeast and (because it is up against the mountains) fewer close neighbors than many of the other jurisdictions along the Front Range.

DYADIC MODEL

Of the 1,987 dyads in the dataset, only 86 (or 4%) have formal agreements making it a “rare event.” When the event is rare the standard logit and probit models for binary data tend to underestimate the probability of the event occurring (King and Zeng 2001). To deal with this problem I use a complementary log-log regression model for binary data. The complementary log-log model is similar to the more commonly used logit and probit models, but unlike these models, the complementary log-log model has an asymmetric distribution that makes it more appropriate for rare-events data. To view the differences between these probability curves, see Figure 5-3. The reader will note that the complementary log-log function approaches 1 (success) more quickly (at a lower value on the x-axis) than the logit function approaches 1. For more on the complementary log-log model and its use with rare
In addition to the variables mentioned above, I control for a variety of other potential causes including distance, whether the jurisdictions are in the same county, population differences, fragmentation, capacity differences, and overall developmental policy aggressiveness.

Figure 5-3. Complementary Log-Log Function v. Logit Function
Table 5.1. Concepts, Measures, and Data Sources

For clarification purposes, measures are expressed in terms of the dyad \( AB \): \( A \) – \( B \). Each node-measure is the mean of both years of the source data (when appropriate). For example:

The population for Node A \( (A_{\text{Pop}}) = (\text{Population } A_{2000} + \text{Population } A_{2008}) / 2 \)

The population for Node B \( (B_{\text{Pop}}) = (\text{Population } B_{2000} + \text{Population } B_{2008}) / 2 \)

Therefore, the overall population sum for dyad \( AB = A_{\text{Pop}} + B_{\text{Pop}} \)

Therefore, the population difference for dyad \( AB = | A_{\text{Pop}} - B_{\text{Pop}} | \)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Concept</th>
<th>Measure</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dependent</strong></td>
<td>Formal developmental agreement</td>
<td>Coded 1 for agreement, 0 otherwise</td>
<td>Data collected by the author</td>
</tr>
<tr>
<td><strong>Independent</strong></td>
<td>Distance between jurisdictions</td>
<td>Miles</td>
<td>2000 Tiger Census Shapefiles (Generated using a GIS)</td>
</tr>
<tr>
<td></td>
<td>Neighbors</td>
<td>Number of governments within 10 miles</td>
<td>2000 Tiger Census Shapefiles (Generated using a GIS)</td>
</tr>
<tr>
<td></td>
<td>Same county</td>
<td>Coded 1 for same county, 0 for different counties</td>
<td>2002 Census of Governments</td>
</tr>
<tr>
<td></td>
<td>Overall economy type</td>
<td>Percent of revenue from sales taxes: ( A + B )</td>
<td>2002 &amp; 2007 Census of Governments</td>
</tr>
<tr>
<td></td>
<td>Economy type difference</td>
<td>Percent of revenue from sales taxes: (</td>
<td>A - B</td>
</tr>
<tr>
<td></td>
<td>Overall government capacity</td>
<td>Per-capita revenue (hundreds of dollars): ( A + B )</td>
<td>2002 &amp; 2007 Census of Governments</td>
</tr>
<tr>
<td></td>
<td>Government capacity difference</td>
<td>Per-capita revenue (hundreds of dollars): (</td>
<td>A - B</td>
</tr>
<tr>
<td></td>
<td>Overall economic development policy aggressiveness</td>
<td>Combined per-capita roads, highway, parks, and recreation spending (hundreds of dollars): ( A + B )</td>
<td>2002 &amp; 2007 Census of Governments</td>
</tr>
<tr>
<td></td>
<td>Economic development policy aggressiveness difference</td>
<td>Combined per-capita roads, highway, parks, and recreation spending (hundreds of dollars): (</td>
<td>A - B</td>
</tr>
<tr>
<td></td>
<td>Cooperative network centrality</td>
<td>Flow betweenness</td>
<td>Data collected by the author (Generated using UCI Net)</td>
</tr>
<tr>
<td></td>
<td>Partisan differences</td>
<td>Percent of affiliated registration that is Republican</td>
<td>2000 Colorado Redistricting and Reapportionment Data</td>
</tr>
<tr>
<td></td>
<td>Overall developmental competition context</td>
<td>Spatially lagged combined per-capita roads, highway, parks, and recreation spending (hundreds of dollars): ( A + B )</td>
<td>2002 &amp; 2007 Census of Governments, 2000 Tiger Census Shapefiles, (Generated using a GIS)</td>
</tr>
<tr>
<td></td>
<td>Developmental competition difference</td>
<td>Spatially lagged combined per-capita roads, highway, parks, and recreation spending (hundreds of dollars): (</td>
<td>A - B</td>
</tr>
</tbody>
</table>
Table 5-2. Dyad-Level Descriptive Statistics

<table>
<thead>
<tr>
<th></th>
<th>Dyads without Formal Agreements</th>
<th>Dyads with Formal Agreements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distance Between Jurisdictions</td>
<td>28.06 (13.02) Min: 0.00 Max: 49.95</td>
<td>10.40 (9.85) Min: 2.00 Max: 41.03</td>
</tr>
<tr>
<td>Jurisdictions in Same County</td>
<td>0.20 (0.40) Min: 0.00 Max: 1.00</td>
<td>0.65 (0.48) Min: 0.00 Max: 1.00</td>
</tr>
<tr>
<td>Jurisdictions within 10 miles</td>
<td>12.86 (5.69) Min: 0.00 Max: 28.00</td>
<td>13.64 (4.97) Min: 2.00 Max: 28.00</td>
</tr>
<tr>
<td>Population Difference</td>
<td>947.52 (1495.43) Min: 0.02 Max: 5824.71</td>
<td>1581.37 (1768.85) Min: 1.20 Max: 5778.03</td>
</tr>
<tr>
<td>Overall Economy Type</td>
<td>97.96 (32.01) Min: 0.00 Max: 162.85</td>
<td>102.83 (32.24) Min: 16.07 Max: 155.59</td>
</tr>
<tr>
<td>Economy Type Difference</td>
<td>25.17 (18.83) Min: 0.00 Max: 82.08</td>
<td>25.91 (21.26) Min: 16.07 Max: 155.59</td>
</tr>
<tr>
<td>Median Income Difference</td>
<td>24.82 (26.29) Min: 0.00 Max: 161.76</td>
<td>14.09 (16.64) Min: 0.01 Max: 145.80</td>
</tr>
<tr>
<td>Overall Government Capacity</td>
<td>3.18 (1.56) Min: 0.84 Max: 10.64</td>
<td>3.18 (1.42) Min: 1.21 Max: 7.72</td>
</tr>
<tr>
<td>Government Capacity Difference</td>
<td>1.10 (1.10) Min: 0.00 Max: 5.90</td>
<td>3.18 (1.42) Min: 1.21 Max: 7.72</td>
</tr>
<tr>
<td>Overall ED Policy Aggressiveness</td>
<td>0.67 (0.40) Min: 0.07 Max: 2.69</td>
<td>0.69 (0.34) Min: 0.16 Max: 2.06</td>
</tr>
<tr>
<td>ED Policy Aggressiveness Difference</td>
<td>0.29 (0.28) Min: 0.00 Max: 1.62</td>
<td>0.24 (0.19) Min: 0.00 Max: 1.24</td>
</tr>
<tr>
<td>Cooperative Network Centrality</td>
<td>1.56 (2.79) Min: 0.00 Max: 23.54</td>
<td>5.85 (6.60) Min: 0.09 Max: 22.02</td>
</tr>
<tr>
<td>Overall ED Competition</td>
<td>0.70 (0.06) Min: 0.52 Max: 0.96</td>
<td>0.69 (0.06) Min: 0.56 Max: 0.84</td>
</tr>
<tr>
<td>ED Competition Difference</td>
<td>0.04 (0.03) Min: 0.00 Max: 0.25</td>
<td>0.04 (0.03) Min: 0.00 Max: 0.25</td>
</tr>
<tr>
<td>Partisan Difference</td>
<td>14.84 (11.16) Min: 0.00 Max: 62.97</td>
<td>14.84 (11.16) Min: 0.00 Max: 62.97</td>
</tr>
</tbody>
</table>
RESULTS

Table 5-3 presents the results of the complementary log-log model of formal developmental cooperation. As would be expected, the model is a statistically significant improvement over the null model. The results are consistent across other models including a regular logit model and King and Zeng’s (2001) rare events logit. They are also consistent across higher and lower dyad mile restrictions as well as alternative measures of network centrality.

Table 5-3. Complimentary Log-Log Dyadic Regression of Intergovernmental Developmental Agreements In Colorado

<table>
<thead>
<tr>
<th>Term</th>
<th>B</th>
<th>SE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distance Between Jurisdictions</td>
<td>-0.17**</td>
<td>(0.02)</td>
</tr>
<tr>
<td>Jurisdictions in Same County</td>
<td>0.58*</td>
<td>(0.29)</td>
</tr>
<tr>
<td>Jurisdictions within 10 miles</td>
<td>-0.07**</td>
<td>(0.03)</td>
</tr>
<tr>
<td>Population Difference</td>
<td>0.00</td>
<td>(0.00)</td>
</tr>
<tr>
<td>Overall Economy Type</td>
<td>0.01</td>
<td>(0.01)</td>
</tr>
<tr>
<td>Economy Type Difference (H2A)</td>
<td>-0.04**</td>
<td>(0.01)</td>
</tr>
<tr>
<td>Median Income Difference</td>
<td>-0.02+</td>
<td>(0.01)</td>
</tr>
<tr>
<td>Overall Government Capacity</td>
<td>0.34**</td>
<td>(0.12)</td>
</tr>
<tr>
<td>Government Capacity Difference</td>
<td>-0.28</td>
<td>(0.18)</td>
</tr>
<tr>
<td>Overall ED Policy Aggressiveness</td>
<td>0.24</td>
<td>(0.39)</td>
</tr>
<tr>
<td>ED Policy Aggressiveness Difference (H2B)</td>
<td>-1.55*</td>
<td>(0.67)</td>
</tr>
<tr>
<td>Cooperative Network Centrality (H3)</td>
<td>0.23**</td>
<td>(0.03)</td>
</tr>
<tr>
<td>Overall ED Competition (H1)</td>
<td>8.96**</td>
<td>(2.96)</td>
</tr>
<tr>
<td>ED Competition Difference</td>
<td>3.63</td>
<td>(5.58)</td>
</tr>
<tr>
<td>Partisan Difference (H2C)</td>
<td>-0.01</td>
<td>(0.02)</td>
</tr>
<tr>
<td>Constant</td>
<td>-6.95**</td>
<td>(2.10)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>N</th>
<th>1987</th>
</tr>
</thead>
<tbody>
<tr>
<td>AIC</td>
<td>414.06</td>
</tr>
<tr>
<td>BIC</td>
<td>503.57</td>
</tr>
<tr>
<td>Log Likelihood</td>
<td>-191.03186</td>
</tr>
<tr>
<td>LR $x^2$</td>
<td>326.25**</td>
</tr>
</tbody>
</table>

+$p < .1; *p < .05; **p < .01$

Dyads > 50 miles are not included in the analysis.
Hypothesis 5-1 was that local developmental cooperation (operationalized with spatially-lagged developmental spending) would spur on developmental cooperation—that the costs of competition lead jurisdictions to work together. This hypothesis is supported in the model with a coefficient of 8.06 significant at the $p<.01$ level. To get a better sense of the effect of this variable, I have plotted predicted probabilities and their 90% and 95% confidence intervals in Figure 5-4. The predictions are based on a distance between jurisdictions of 15 miles with all other variables are set to their mean. With so few agreements relative to the overall number of dyads, the likelihood of an agreement under mean conditions is fairly low. As the combined competition levels of the dyad increase so does the probability of an agreement. Though the magnitude of the change under these conditions is not huge, the effect should not be discounted. Under mean conditions and a 15-mile distance, the probability of an agreement is about 6 percent. I observe that in the least competitive dyads along the Front Range, that probability drops to about 1 percent and in the most competitive areas the probability increases to about 10 percent.

Hypotheses 5-2, 5-3, and 5-4 looked at three types of jurisdictional difference: economy type difference (5-2), policy difference (5-3), and partisan difference (5-4). Of the three hypotheses, economy type difference and policy difference are supported but partisan difference is not supported. In the case of economy type and policy type, the more different the two jurisdictions in the dyad are, the less likely they are to have a formal developmental agreement. The effect of economy type difference (as measured by the percent of revenue from sales taxes), under a similar set of conditions as were used in the competition graph (Figure 5-4), are presented in Figure 5-5. Jurisdictions that are more reliant on sales-taxes are more likely to cooperate with one another and jurisdictions less reliant on sales-taxes are more likely to cooperate with one other. Note that the overall economy-type variable is insignificant meaning that cooperation is not about what economy
type a jurisdiction has but a jurisdiction’s economy type relative to prospective partners. In other words, residential jurisdictions do cooperate on developmental concerns; they just tend to cooperate with other residential jurisdictions—I attribute this to similar policy goals.

Figure 5-4. Effect of Developmental Goods Competition on the Probability of a Formal Agreement

*Predictions based on a 15 mile distance between jurisdictions, all other values set to mean.*
Policy difference was measured using the difference between the non-intergovernmental developmental spending of the jurisdictions in the dyad. Jurisdictions that take the same approach to development are more likely to cooperate because they have similar policy priorities. Furthermore, developmentally aggressive jurisdictions are unlikely to find partners in unaggressive jurisdictions as the unaggressive jurisdiction can free-ride off of the economic externalities of the aggressive jurisdiction. The effect of this variable is plotted in Figure 5-6.

The final hypothesis, Hypothesis 5-5, was that network centrality increases the likelihood of an agreement by boosting information flow and facilitating initial cooperative action. This hypothesis is robustly supported. The higher the combined flow centrality of the jurisdictions in the dyad, the more likely the dyad is to have a formal cooperative agreement. As can be seen in Figure 5-7, highly isolated dyads, even if they are
geographically proximate, are highly unlikely to cooperate. However, proximate jurisdictions that are connected to the larger network of jurisdictions are almost certain to cooperate.

Figure 5-6 Effect of Developmental Policy Difference on the Prob. of a Formal Agreement

Figure 5-7. Effect of Network Centrality on the Probability of a Formal Agreement

*Predictions based on 15 mile distance between jurisdictions, all other values set to mean.
DISCUSSION

The analysis in this chapter makes several important contributions to our understanding of local development policy generally and intergovernmental development efforts more specifically. The statistically significant relationships uncovered in the model emphasize the importance of studying intergovernmental agreements with a dyadic approach. Without accounting for the characteristics of both the jurisdictions that could potentially be involved in the agreement, it is difficult to assess the probability of formalization with confidence. While many IGAs involve more than two jurisdictions, even these agreements necessitate that each jurisdiction involved individually bind itself to each of the others in the IGA.

Jurisdictions engage the development enterprise differently for many reasons; here I have explored aspects of their sub-metropolitan area geopolitical environment as potential causes. The proximate polity theory has broader implications than solely how much development a city does: it also helps us to understand how governments go about the development enterprise. Though this analysis does not offer a clear picture of what specifically happens to budgets or politicians after they institute intergovernmental agreements, the conditions under which those agreements are formalized are made clearer.

To gain empirical leverage on sub-state/sub-metropolitan developmental competition, I used a spatially-lagged measure of developmental goods provision and find that public officials who more seriously encounter the budgetary and political difficulties that intense competition presents are also more likely to seek out ways to economize via partnerships. The idea that increased competition leads to cooperation is sensible but also a bit at odds with the pre-ICA literature on the American city. Indeed, metropolitan areas are ripe with efforts to attract the wealthiest residents and the best firms but these efforts can be both economically and politically burdensome for jurisdictions. Cooperation offers a
way to reduce these costs, even if it means continuing to compete—often with the same
governments—on other fronts.

The importance of social-networks for understanding local governments has also
been explored. Even within the relatively small world of Colorado’s Front Range, local
officials can be positioned in different places within the network that structures
information flow about the area. To date, social-networks have been the subject of research
primarily in various psychology subfields; however, they also clearly play a role in the
complex geopolitical environments that characterize American sub-state governance. I
utilized a measure of each jurisdiction’s flow centrality within the Front Range network. I
find that pairs of jurisdictions that are more centrally positioned within the network are
more likely to have formalized developmental agreements. I theorize that this is because
network centrality allows official to be more aware of the cooperative tools available to
them for achieving developmental ends. Moreover, just as there are costs with competition,
there are also costs with cooperation: network centrality allows officials to collect the
information necessary to overcome the division and enforcement costs associated with
intergovernmental agreements.

Because this analysis is restricted to Colorado, it is difficult to know the
generalizability of the findings. Future research using dyadic, spatial, and network
approaches of other metropolitan areas will better inform the generalizability question. For
now though, it is important to note that a sophisticated understanding of local policy
provision and production clearly requires us to model multiple aspects of the complex
geopolitical intergovernmental environment that America’s local governments are
positioned within.
CHAPTER 5 BIBLIOGRAPHY

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MOVING FORWARD WITH THE PROXIMATE POLITY THEORY

Tiebout (1956), Buchanan (1971), and Peterson (1981) offer such wonderful starting points for thinking about local politics. Tiebout showed us how human mobility and policy choices are related. Buchanan showed us that the cities are constrained in such a way as to be heavily dependent on their revenue sources. And Peterson showed that city politics revolve around the developmental imperative in an essential way. But as seminal as each of these pieces was, they were also generalizations. And as generalizations, it is incumbent upon those who use their work as a guide to drill down into the nuances of metropolitan politics to better understand the causes behind the policies that govern the jurisdictions that we interact with every day. The addition of a spatial dynamic that includes relative risk-assessments to our understanding of economic development policy is but a single nuance (and a broad one at that) for a single policy type (among many) into a long and thoughtful tradition of research.
In Chapter 1 I presented a running null hypothesis and a running alternative hypothesis for the dissertation (reproduced below).

**Null Hypothesis:** Economic development decisions are caused by variables that are strictly internal to the jurisdiction and/or institutional constraints imposed by superior governments.

**Alternative Hypothesis:** Local officials will use the policy choices and socio-economic conditions in nearby jurisdictions to inform their own policy choices such that the political and economic risks of policy failure are minimized, all else being equal.

The results presented over the last four chapters constitute a robust rejection of the null hypothesis and strong support for the alternative hypothesis.

Survey results presented in Chapter 2 indicate that cities do perceive their environment as competitive. While we know that this competitive environment can lead to high levels of developmental spending, it does not have to. One of the reasons we do not uniformly observe high amounts of developmental goods provision appears to be that local policy makers take development policy on with some amount of caution. This caution is important as it means that mayors and city councils recognize that there are potential political and economic costs that go along with developmental goods provision.

The results presented in Chapter 3 and Chapter 4 show that there is sub-metropolitan area spatial clustering of development policy. This clustering is consistent with the proximate polity theory that jurisdictions take policy cues from their neighbors. On average, politicians believe that residents will not stand for either significantly outspending or significantly under-spending their neighbors—in other words, there are political costs to being different. As the time-space analysis in Chapter 4 showed, this leads to inter-jurisdictional policy feedback loops.
The Chapter 3 models also demonstrated that cities look at more than just the policy choices of neighboring jurisdictions—they also look to the characteristics of the populations itself. All else being equal, as the percent of desirable residents in neighboring communities increases so does the amount that cities spend on developmental goods. This effect fits with what we may be observing in struggling metropolitan areas across the country. Having the necessary fiscal resources to provide developmental goods is important, but fiscal resources and political-will need not be correlated. Without desirable people and firms in other jurisdictions to draw upon, officials are unlikely to take the political risk of engaging expensive development policies.

The findings in Chapter 3 and Chapter 4 have implications for regionalism: the subject that I wade into in in the final empirical chapter. Chapter 5 offered an extension of the proximate polity theory to policy production: alternative service provision via cooperative interlocal agreements. The robust results in this chapter confirmed two important hypotheses for understanding when cities cooperatively develop. First, competition leads to cooperation. The cities that are situated in the highest spending areas are also the ones most likely to cooperate on developmental projects. This may be because cooperation reduces the risks of competitive spending by spreading the risk across multiple jurisdictions. However, I cannot rule out that high-spending jurisdictions are also the ones with the most information and the best tools for reducing the transaction costs associated with formal cooperation.

The second hypothesis confirmed in Chapter 5 revealed that it is necessary to think about space in more ways than just geographical placement (the primary focus of the dissertation). “Cognitive space” needs also to be considered to understand local policy choices. By this I mean that local officials operate in informational networks that are not confined by geographic boundaries. These networks were mapped and characteristics of
each jurisdictions specific location within the network were used to predict the probability of developmental cooperation. The more centrally a city was located within the informational network, the more likely they were to have a formal interlocal agreement.

The literature on regionalism (both new and old) has long suggested that municipal fragmentation can lead to fiscal enclaves, provision inequalities, and economic inefficiencies (Barnes and Ledebur 1998; Siegel 1999; Jones 2000). This research does nothing to support or refute that notion. However, the results do suggest that regional action is more likely to occur amongst cities in the high-spending regions of metropolitan areas. *This means that cities in developmentally inactive areas are not cooperating even if their preference is to be more developmentally active.* In other words, something is standing in the way of that cooperation for the communities that could benefit the most from it.

**ROOM FOR IMPROVEMENT**

The proximate policy theory is an economic, geographic, and political theory. The theory is economic in that it argues that jurisdictions will converge on sub-metropolitan regional provisional equilibria where spending levels are roughly similar (clustering). The theory is geographic in that it situates jurisdictions in a physical space and submits that the characteristics of that space and the space itself are important components of the policy-making process. The theory is political in that local officials make policy choices based on minimizing the political and economic risks of policy failure: election challenges, ballot initiatives, difficulty governing, etc. It is as a political theory the tests fall somewhat short. While the results are by all means consistent with the political components of the theory, the model results do not constitute direct proof.

The political component of the theory is difficult to address for a variety of reasons not least of which is that that spatial statistics require complete data and the data on local
elections is sparse even when it is at its most complete. Perhaps the most important underlying question not addressed is this: Does over-spending in a low-spending geography (or under-spending in a high-spending geography) lead to mayors getting voted out of office and/or increased council turnover? The proximate polity theory says that politicians that engage policies that are extreme relative to their neighbors, will expect to face some political repercussions (evidence of this expectation is presented in Chapter 2). Though the theory does not demand those repercussions are actually realized, their realization would serve as a robustness check on the theory. Indeed, the proximate polity theory remains in its infancy—its theoretical mission requires clarification and its mechanisms necessitate further definition. Over the coming years the theory and the tests will need refining and, perhaps more importantly, expanding.

WHERE TO?

Deficiencies aside, the theory and the empirics offer an important contribution to the literature on local policy making. From a theoretical perspective, it is necessary to integrate the ideas of risk and space into our conceptions of local policy choices. We cannot examine city policy making in isolation—without consideration of the choices that nearby cities make, any effort to do so will remain incomplete. The theory helps to explain why local development outputs are not uniformly high, as some of the theoretical literature has predicted. Empirically, the evidence of spatial clustering and attention to neighboring demographic characteristics clarifies what the variation in policy looks like within metropolitan areas and strongly suggests that development choices are politically constrained by sub-metropolitan regional norms.
In Chapter 1 I offered that the proximately polity theory should do more than tell us when developmental expenditures are high and when they are low. I wrote that it should serve as “a context for thinking about how cities in metropolitan areas prioritize their expenditures.” By this I meant that the political ecology of the metropolitan area is not just about development policy so the proximate polity theory should not be limited by policy type. The ecology of the metropolitan area is about local goods provision and policy-making of all sorts. Economic development policy served as a nice initial test of theory. Not only did it present an opportunity to discuss political risk in a new context, but it also presented an opportunity to deal with a much discussed and relevant topic amongst scholars of city politics: the developmental imperative.

The next step in the research is a slight reconfiguration of both the theory and the tests. Though the basics of the theory will stay the same—neighboring jurisdictions matter for policy selection—expectations will be expanded to include goods and service provision outside of those we characterize as developmental. Just as cities do not make policy choices in a geographic isolation, they do not make them in budgetary isolation: it is difficult to understand Policy A without also considering policies B through Z. In future research I will look at multiple categories of goods in addition to the overall goods provision package.43

There is also opportunity to expand on the concept of space itself. In light of the results presented in Chapter 2 and Chapter 5, the concept of space can be broadened from just physical distance to also include network space. Indeed, distance is not the only way that cities define their competition. Just as the policy choices and characteristics of physical neighbors matter, so may the choices of cities that are specifically identified as competitors (regardless of how far away they are).

43 Though my effort to measure policy “packages” is in its early stages, tools like cluster analysis and factor analysis show promise for defining jurisdictions as being in one of several to-be-defined package categories.
Another way in which the proximate polity project is evolving relates to data and empirical testing. Data collection efforts are already underway to collect information on all of the incorporated municipalities from Philadelphia to Boston (the Northeastern Corridor). This approach has the advantage of removing the artificially imposed spatial barriers that define metropolitan areas. People and capital are mobile within and across metropolitan areas. The approach will be to explore not only the sub-metropolitan area spatial and network dynamics but also the inter-metropolitan area spatial, network, and institutional dynamics. Jurisdictions between New York and Boston, for example, might have spatial or institutional leverage that allows them to compete in a way that is different than jurisdictions situated more closely to a single metropolitan core. Metropolitan areas along the Northeastern Corridor are also more tightly configured than many other areas of the country (the California coast is also quite tightly configured). Tight configuration with lots of contiguous borders will make some components of the spatial analysis easier and less resource-intensive.

CONCLUDING THOUGHTS

In their effort to develop a political economy that reconciles the incongruous political and economic boundaries that characterize American federalism, Barnes and Ledebur wrote: “The nation is not the real economy; nor are state or local political jurisdictions. Metropolitan-centered economic regions are the functional economies” (1991: 127). While metropolitan areas rarely act as single, cohesive units, Barnes and Ledebur realized that the complex aggregation of policy outcomes derived from their many government components is critical to broader economic success.

The policy role of the metropolitan area in national economic development will be
(and by many accounts has been) an important part of efforts to guide the American economy out of recession and beyond fiscal crisis. However, understanding what it means for metropolitan areas to be the “functional” political economies of significance requires the consideration of the political and economic interdependence that characterizes these regional systems. In addition to affecting where people live, work, spend their money, and vote, local policy choices will also influence which policies other cities pursue. When cities and towns devote resources to building new roads and new parks, new hospitals and new museums, attracting new companies and retaining old ones, they are doing so as part of a metropolitan system, a metropolitan ecology, where decisions are highly interdependent even if they are not always cooperative. If we are going to trust our metropolitan areas to be the catalysts of a revived economy, we must first understand how the cities that comprise them coexist. This dissertation was a step, if only a small one, toward understanding this system of coexistence—this metropolitan ecology.
CHAPTER 6 BIBLIOGRAPHY


