SOCIOECONOMIC DETERMINANTS OF LOCAL GOVERNMENT PARKS AND RECREATION SPENDING

By

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ABSTRACT

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Local governments provide several valuable services to their constituents. Parks and recreation services are often considered an amenity compared to other essential services such as education, public safety, public infrastructure, and sanitation; however, parks and recreation offer a wide variety of activities at indoor and outdoor facilities for constituents to enjoy. Based on the characteristics of local communities, I evaluate the socioeconomic determinants of local government parks and recreation spending. Applying the conceptual framework of the Median Voter Theorem, where majority rule voting selects the outcome preferred by the median voter, I examine a range of economic, demographic and institutional factors that influence how local communities determine appropriate spending for local parks. To my knowledge there are no empirical studies that evaluate the provision of this service based on community socioeconomic determinants. Using county level data from 1972-2012 across the United States, I find that increasing income and population results in increased parks and recreation spending; increases in the poverty rate and the female household rate, and the declining percentage of the Caucasian population, results in decreased parks and recreation spending. I also evaluate how these factors influence the composition of local government parks and recreation service funding: user fee charge revenue, operating expenditures, and capital outlay expenditures.

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CHAPTER 1: INTRODUCTION

Local governments provide many public services to constituents including public utilities, sanitation, hospitals, roads, transportation, public safety, education, and parks and recreation. Parks and recreation services are often considered an amenity service in comparison to public utilities or public safety, and provide many indoor and outdoor facilities for the constituents of a community to enjoy, are linked to positive health and well-being, and have increased in popularity. Expenditures for parks and recreation has increased by 238% from 1972-2012 and have remained relatively constant at about 2% of total local government expenditures on average for all jurisdictions throughout the period.

Based on the Median Voter Model (Bowen, 1943; Black, 1948) where the community decides the allocation and provision of public services based on majority rule, generating a political equilibrium where the outcome is most preferred by the median voter, this thesis attempts to evaluate the demand and allocation of resources towards parks and recreation spending of local governments based on changing socioeconomic factors within and across communities. Surprisingly, socioeconomic studies for the demand of local government services in general are lacking in the economic and public finance literature even though local governments are the closest form of government to an individual and therefore the community characteristics are likely to inform preference and demand more than at the state or national level. Therefore, I evaluate the role changing socioeconomic forces play in determining parks and recreation spending. Though I focus on parks and recreation, the framework I use could be applied to explain socioeconomic determinants on other local government services such as public safety.

For the empirical analysis, I use a large panel data set that includes revenue and expenditure data for local parks and recreation services available from the Annual Survey of Local Government Finances from 1972-2012 as the dependent variables, and economic and demographic variables from the Decennial Census of Population and Housing along with constructed variables that characterize changing institutions. Due to the nature of community specific socioeconomic trends and spending patterns, along with the 40-year period of study (in five-year intervals) from 3,105 counties in the United States, I use a robust fixed effects model on first differenced variables to remove the county level fixed effects while also removing the trend effects within a community. By using county level data in a fixed effects within transformation model, the analysis sheds light on how changing socioeconomic forces within a community affect spending on local parks and recreation based on the average effect of all communities included in the study. Further, while most studies treat places that are experiencing population growth or decline as if they were the same, I evaluate the degree to which the impacts of economic and demographic forces differ across growing (73%) and declining (27%) counties, focusing on the effect a declining population has on parks and recreation spending.

As a prelude to the full analysis, I find that income is an important driver of local parks and recreation spending; higher income individuals within a community have higher demand compared to the median income individuals within the community as well. Female headed households and poverty decrease parks and recreation spending, along with the percent of the population that is Caucasian. Age does not seem to systematically impact spending, though there is some evidence that a growing elderly population is more inclined to reduce capital outlays, holding all other factors constant. A growing population leads to a rapid increase in parks and recreation spending, but spending tends to fall relatively slowly in response to population

decline, which leads to increased spending in per capita terms in shrinking places. As discussed in more detail later, the adoption of tax and expenditure limitations, school finance reforms, and right to work laws tends to decrease expenditures, as expected. Finally, there are clear differences in the socioeconomic drivers of parks and recreation spending between growing and declining jurisdictions.

By identifying factors that influence parks and recreation spending, this research can help local officials use the socioeconomic trends in their communities to understand parks and recreation demand and thus inform spending decisions. The following section offers a literature review that includes the theoretical framework used to guide my analysis as well as the limited number of socioeconomic empirical studies on demand for local government services; Chapter 3 provides a discussion of local parks and recreation demand and several accompanying hypotheses; Chapter 4 presents the summary statistics for the dependent and independent variables, and a discussion of the trends in park spending and the socioeconomic variables; Chapter 5 provides a discussion of the empirical approach, including the methods of analysis; Chapter 6 provides the empirical results and discussion; and Chapter 7 concludes.

CHAPTER 2: LITERATURE REVIEW

The literature review is divided in to two sections: the first section discusses the motivation and conceptual framework - based on the Median Voter Theorem - to evaluate the provision of public services; the second section summarizes a broad range of empirical studies on the socioeconomic determinants for public services.

2.1 Motivation and Conceptual Framework

Local government units are responsible for providing many public services to the people within their jurisdictions, such as public utilities, sanitation, hospitals, roads, transportation, law enforcement and fire services, to name a few. Parks and recreation are one such public service local governments provide to communities. In varying degrees, these are considered public goods in that they contain elements of non-excludability and non-rivalry (Cowen, 2008).[1] In exchange for services, citizens pay taxes or fees to fund the operational and capital expenses associated with the service. As local governments are the closest functioning governing body to taxpayers, citizen preferences are thought to be reasonably well-represented.

In this context, economists frame the demand for local government services within the Median Voter Theorem. Bowen (1943) first introduced this idea by interpreting the effect of voting on the allocation of economic resources: it can be viewed as the constituent voting for an official that they believe will allocate revenue towards the services they most desire. Black (1948) also discusses this through group decision making where the voting of the collective set of constituents results in the outcome of the allocation of revenue to services within the jurisdiction. The general framework of the Median Voter Theorem is as follows: the community decides on the allocation and provision of public services based on majority rule, generating a

[1] Technically, a park could be overcrowded and therefore reduce the availability to others, but these types of services are considered public goods. Individuals can also be excluded if a parks has a fee for entry.

political equilibrium wherein the outcome is most preferred by the median voter. From this framework, this thesis evaluates the demand for parks and recreation spending at the local level based on changing socioeconomic factors within and across communities. Further, parks and recreation services are often considered amenities as opposed to essential services such as public utilities or public safety, and therefore socioeconomic factors are likely to influence the preference for demand.

In my analysis, I consider three categories of parks and recreation revenue and expenditures: 1) user charge revenues, 2) operating expenditures and 3) capital outlay expenditures. User charge revenues are collected from constituents for access, such as a fee for a public swimming pool or a baseball team renting out a ball diamond. Operating and capital outlay expenditures are funded by a combination of user fees and local taxes, primarily property taxes; Fisher (2007) notes that property taxes are the primary source of revenue for local governments, making up about three quarters of total taxes collected by local governments with much of the remainder generated from sales and income taxes. Note that local park services are typically funded through a combination of user fees and tax revenue. Moulder (2002) notes that 99% of local public golf courses and 93% of swimming pools charge user fees; these specific types of local parks and recreation facilities are good candidates for user fees as they are costly to build and maintain (high capital and operational costs), thus the portion of the population that use these facilities offset these costs by paying user fees and more fairly distribute payment responsibility.

Parks and recreation services contain elements of a public good in varying degrees; however, to the degree to which a local government can exclude potential users, fees can be charged to help pay for the locally provided service. Thus, a combination of general tax revenues

and charges are used to fund the provision of parks and recreation services. The mix of charges and fees depends on both the nature of the service and the values of the community. The Samuelson condition states a theory for an efficient provision of public goods where the total marginal benefit to each person consuming one unit of a public good is equal to the marginal cost of providing one unit of a public good (Samuelson, 1954). Fisher (2007) provides economic theory for the three types of revenue and expenditures as discussed above based on marginal benefits and marginal costs: user charges allow a local government to apply costs to a subset of the population that will use the facility, therefore making the consumer consider the costs of their decision and matching the subsets marginal benefit to marginal cost; operating expenditures should represent the total marginal benefit from the direct use of the facility; and capital outlays should represent the marginal benefit from the existence of the facility, whether the beneficiaries be users, or nonusers that could gain a spillover of economic activity or benefit from altruism by turning undeveloped land in to an open green space that people and animals can enjoy, for example. The socioeconomic variables I consider are intended to capture community characteristics and preferences.

2.2 Socioeconomic Empirical Studies on Local Government Services

To my knowledge, there have not been studies that focus on the socioeconomic determinants of parks and recreation spending – along with many other services – that general purpose local governments such as counties, municipalities, and townships provide. However, a study aptly titled "The First National Study of Neighborhood Parks" by Cohen et al. (2016) provides an evaluation of the socioeconomic demand and park use. This section also provides an overview of socioeconomic determinants on local government spending for school districts, a special purpose local government that provides only K-12 education, unlike general purpose

governments that provide a broad range of services such as parks and recreation or police; I discuss the research on K-12 education spending because socioeconomic studies on spending for specific local government services are limited and they are based on the general conceptual framework discussed above. I then discuss the limited research on local government asymmetry between jurisdictions that are declining and growing in population.

Cohen et al. (2016) sampled 174 neighborhood parks in 25 major cities and observed park use, physical activity and park conditions over the summer of 2014; they also interviewed parks administrators to assess policies and practices of the local parks and recreation divisions. They found that the neighborhood parks in the sample averaged 20 users per hour for a total of 1,533 hours of weekly use. They found that seniors represented only 4% of park use even though persons over the age of 65 represent approximately 20% of the general population. Further, park usage was less in low income neighborhoods compared to high income neighborhoods, hypothesizing the lack of use for low-income parks was due to fewer supervised activities and outreach marketing rather than asymmetric park health and facility types. This study established national benchmarks for local park use for the first time and the authors believe the benchmarks can guide future park investments and encourage park use.

Much of the other work on the demand for local government services has addressed education, and I briefly discuss this work because it provides context on local government spending based on the Median Voter Theorem. Harris, Evans and Schwab (2001) found that an increasing proportion of elderly persons have slight negative effects on local education spending, possibly because the elderly population does not have children in the local school system and therefore do not have demand for the service. Similarly, Epple, Romano and Sieg (2012) found that older households tend to vote for lower education expenditures although they possess a

larger tax base per student. Figlio and Fletcher (2011) also found that an increase in the number of elderly persons results in a decrease in education spending. Corcoran and Evans (2010) found that rising income inequality increased school spending from 12 to 22 percent. Lastly, Imazeki and Reschovsky (2003) evaluated rural places, which are often declining in population, finding that high poverty rates and a higher burden of special needs education leads to higher costs in many rural areas even though the cost structures were similar between rural and non-rural areas. Based on this limited research on the role socioeconomic characteristics play in determining local government spending, in the case of education, age seems to influence the provision of local services; the same should hold true for parks and recreation services although I explore number of socioeconomic factors in addition to age.

Lastly, there are two studies that consider asymmetry in the local spending response to population change. Berry, Grogger and West (2012) points out that because declining population at the state or national level is often nonexistent, there is an advantage to studying declining local governments and their public good provision trends; they found that local governments almost always expand even when the county population is declining. Even after accounting for income growth and other socioeconomic factors, the unexplained growth of declining areas is less explained compared to growing areas. They state this is concerning because as the public sector expands, it places rising per capita tax obligations on citizens and could increase out-migration and reduces potential in-migrants. Skidmore (2018) evaluated education finance and the local government responses in declining versus growing counties based on similar economic, demographic and institutional variables that I use. As Berry (2012) found for the entire local public sector, Skidmore (2018) demonstrated that education spending also tends to increase in declining areas. Skidmore found through his analysis that there are asymmetric differences to

population change and the change in school age children between the two population groups. These two studies document population asymmetries, ponder why it is that the local spending tends not to decrease in the face of population decline, and provide insight in to the needs of remaining residents.

CHAPTER 3: DETERMINANTS OF LOCAL PARKS AND RECREATION DEMAND

This chapter provides background information on local government parks and recreation services provided to communities, and presents hypotheses on the demand for parks and recreation spending based on the socioeconomic and institutional independent variables that are discussed in the next chapter.

3.1 Parks and Recreation Overview

The United States Census Bureau (2012) defines parks and recreation as "the provision and support of recreational and cultural-scientific facilities and activities including golf courses, play fields, playgrounds, public beaches, swimming pools, tennis courts, parks, auditoriums, stadiums, auto camps, recreation piers, marinas, botanical gardens, museums, and zoos. Also includes building and operation of convention centers and exhibition halls." Clearly local parks and recreation departments provide vastly more services than what some would think of neighborhood playgrounds, for example. Cranz (2000) stated that the Progressive movement of the 1900s included a demand for parks that provided recreational opportunities for adults and children in locations close to the neighborhood and this idea was expanded to include other activities such as the swimming pools and indoor facilities described above.

The National Recreation and Park Association states that parks provide conservation by protecting open space and engaging communities in conservation practices, health and wellness by providing a space for people to get outdoors and exercise, and promotes social equity by ensuring all constituents have access to the space for their enjoyment and needs (The National Recreation and Parks Association, 2018). Walls (2009) evaluated the local park systems for major cities throughout the United States. Note that it is difficult to describe these services due to a lack of information at the local level for smaller communities: "a comprehensive dataset on

local park acreage, facilities and characteristics does not exist" (Walls, 2009, p.2). However, Wall analyzes park acreage for major cities, shows trends in spending on parks and describes a few results from a survey of local park directors using the Trust for Public Land's Center for City Park Excellence (CCPE). I will summarize here briefly to provide more context for local parks and recreation services.

For the 75 cities in the CCPE sample, acreage varied between 330 acres in Santa Ana, California to over 500,000 in Anchorage, Alaska. Most of the cities had between 5 and 10 acres per 1,000 residents, showing that parks and recreation sizes for different municipalities vary widely. Based on the average number of different types of park facilities in these cities, 22% were the standard children park playgrounds, almost 20% were tennis courts, and 18% were sports recreation fields (baseball, soccer, etc.) with the remaining facilities being recreation centers, swimming pools, golf courses, dog parks and skate parks. The proportion of total park acreage for natural areas - such as walking trails and open space - compared to total park space in a community averaged 33% for the sampled cities.

The 2008 survey of park directors for these cities found that park departments often only collected consumer use information at park facilities that charge fees for entrance; therefore, total park usage at facilities with no entrance fees are not readily available. As discussed in Chapter 2, this makes it difficult for park directors to balance the marginal benefit to the marginal cost for some parks. Pergrams and Zaradic (2008) also came to a similar conclusion as the park directors: there seems to be a declining youth participation in outdoor based activities. From the survey, having adequate funding for operations and maintenance was concerning to local park directors, with many stating that deferred maintenance and costs of replacing aging infrastructure is an issue. Parks and recreation services seem less essential to a constituent (an amenity service)

compared to other services such as police or fire, and directors were therefore concerned about budgetary shortfalls during a recession or local government budget issues.

Local parks have recently come to rely more on the nonprofit community to invest in local park infrastructure. Banzhaf, Oates and Sanchirico (2007) found that since the late 1980s, local ballot initiatives have become popular to raise money for parks and open space; between 1988 and 2006, 76% of the ballot referenda to fund open space and conservation areas at the state and local government levels passed. While this is an amenity service provided by local governments, it seems that people enjoy the services and are willing to fund it through their time and/or an increase taxes or use charges.[2] Further, parks and recreation can serve as drivers of economic development through attracting businesses or providing social well-being.

3.2 Hypotheses

Based on the conceptual framework of the Median Voter Theorem, I hypothesize how a variety of economic, demographic and institutional factors could affect parks and recreation spending.

First, Fisher (2007) presents the work of Inman (1979) who estimated the income elasticities of certain state and local government services. Thinking about these services as being normal goods where increases in income tend to cause demand for services to increase while holding prices of these services constant, Inman (1979) found that parks and recreation services

[2] For example, the City of East Lansing, MI is currently looking for funding to fix and approve the existing Bailey Park; this park can be considered a common open space neighborhood playground park. Currently it is a fenced in area with a small playground, but the city would like to make the park more desirable as it is located in the heart of downtown East Lansing next to many residents and businesses. The city plans on funding it by applying for a $222,000 grant from the Department of Natural Resources' Trust Fund after they raise the required 25% local match which will be funded by $35,000 from the HUD Community Development Block Grant funds, $25,000 from the Capital Area Housing Partnership, and $14,000 from volunteers and citizens associated with the Bailey Community Association. They are also looking for funding by sponsorships for park fixtures like park benches and water fountains. Appendix Figure A3 provides an example of the plans for the park to provide context (Bailey Park, City of East Lansing).

were the only selected service that was income elastic with a reported elasticity range from 0.9 to 1.3, while the other elasticities for total local government – education, police and fire, and public works – varied between 0.4 and 0.8 confirming that most services are normal goods. Fisher (2007) points to parks and recreation as a superior good – where demand increases more than proportionally to an increase in income. This makes intuitive sense because Kohler (1982) found that restaurant meals and vacations were also income elastic; people enjoy parks and other amenity goods during leisure time. My first hypothesis is that median household income and household income of the top ten percentile will have large elasticities in the range previously discussed, with a higher elasticity for the top ten percentile income group, based on tax revenue and preferences. I expect capital outlay expenditure elasticities to be higher than operational expenditures for these groups as they look to invest in more parks and recreation opportunities or improve park facilities to meet their desires.

Second, Bird (1972) hypothesized a "ratchet effect" where government spending increases apace with the private economy during expansion periods, but declines slower than private income during economic decline. As population change directly impacts the economic activity of an area and thus would both change demand and funding for local government services, I expect that parks and recreation has a high positive elasticity on spending in growing places and a slightly negative effect in declining places based on the ratchet effect.

Third, based on Cohen et al. (2016) on the observed park usage of the elderly, I expect that as the percentage of the population over the age of 65 increases, park expenditures will decrease. Further, because low income areas utilized parks and recreation services less than higher income areas, I expect the poverty rate and the female household rate to have a negative effect on parks spending, especially on capital outlays, due to limited financial resources.

Fourth, as discussed in more detail later, the adoption of right to work legislation, tax and expenditure limits, and school finance reform are expected to have a negative effect on parks and recreation spending.

For the percent of the population with a bachelor's degree, the mobile home rate, the percent of the population under 18, and the percent of the population that is Caucasian, I do not have *a priori* expectations; however, the general trends and characteristics of these groups could shed light on the demand of parks and recreation services. For instance, the mobile home rate could put downward pressure on parks and recreation spending as these mobile home parks often have their own open space areas similar to apartment complexes. The percent of the population under 18 could also have a negative effect because students engage in school activities and sports whilst using a school's facilities and playgrounds; school spending on playgrounds and sports fields are not considered to be local government parks and recreation services. Also, I expect the socioeconomic variables to be less important in declining jurisdictions compared to growing jurisdictions due to the unexplained growth previously discussed in Berry (2012).

CHAPTER 4: DATA AND SUMMARY STATISTICS

The county level panel data set includes information for 3,105 counties in the United States from 1972 to 2012 in five-year intervals, resulting in an unbalanced nine panel data set with 27,961 observations.[3] The data set consists of parks and recreation functional expenditures and revenues as the dependent variables and a set of socioeconomic and institutional variables as the independent variables.[4]

4.1 Dependent Variables

Data on parks and recreation functional expenditures and charge revenue come from the Census of Government Finances and the Annual Survey of Local Government Finances compiled by the U.S. Census Bureau; these data are available in five-year intervals and the analysis begins in 1972 and ends in 2012, so I will analyze parks and recreation spending over this 40-year period. The data set contains reported finances for every local government jurisdiction and is aggregated to the county level.[5] For instance, East Lansing, MI and Lansing, MI finance data are summed into the same observation in the data set, along with the other municipalities within Ingham County, MI; the same applies to townships and special districts.[6] Therefore, the dependent variables consist of the sum of all county, municipality, township, and special district parks and recreations expenditures/revenues within each county as one observation during each available year. The finance data have been adjusted for inflation and put

[3] It is an unbalanced panel because not all counties contain observations for all 9 panels due to a variety of factors; Alaska and Puerto Rico have been removed from the analysis.
[4] The expenditure data only apply to local government parks and recreation spending; state and national parks are not considered in the analysis.
[5] School districts are not considered in this analysis because the Census does not report parks and recreation for school districts; however, it is important to note that school districts often do provide public access to their grounds such as a track, tennis courts or playgrounds; this will vary by local jurisdiction rules. For example, in California, 90% of California School Districts provide access to schools for recreation and access to the grounds during non-school hours under the Civic Center Act.
[6] If a jurisdiction, such as a municipality, crosses a county line it is not clear how the data is reported at the aggregated county level; certain local governments likely have different accounting and reporting methods.

in to 2009 real dollars. As presented in Table 1, there are four parks and recreation finance data variables that I evaluate: total expenditures, total charge revenues, operating expenditures and capital outlay expenditures.

Table 1: Dependent Variable Definitions

Dependent Variables	Definition
P&R Total Expenditures	Total operating and capital outlay expenditures
P&R Charge Revenues	Total parks and recreation charge revenues collected from citizens
P&R Operations	Parks and recreation expenditures for staffing, park maintenance and upkeep
P&R Capital Outlays	Parks and recreation expenditures to acquire, maintain, repair or upgrade capital assets

Total expenditures can be viewed as the demand for funds to be allocated towards parks and recreation from the total revenue collected by each jurisdiction. Charge revenues are the money individuals pay to access a park that collects fees, such as renting out a baseball diamond or accessing a boat launch. Tables 2 and 3 present summary statistics for parks and recreation spending for each of the year intervals in total dollars (in thousands) and in per capita dollars.

Table 2: Average Total Spending on Parks and Recreation

	1972	1977	1982	1987	1992	1997	2002	2007	2012	Change
P&R Total Expenditure	2,950	3,508	3,792	4,861	6,036	7,160	9,437	10,539	9,968	238%
	(19,881)	(20,356)	(21,820)	(28,858)	(33,058)	(39,691)	(52,007)	(54,338)	(50,987)	
P&R Charge Revenue	450	563	706	1,022	1,406	1,767	2,180	2,381	2,468	448%
	(3,266)	(3,792)	(4,471)	(6,612)	(7,756)	(10,273)	(14,459)	(15,193)	(13,779)	
P&R Operating Expenditure	1,939	2,468	2,743	3,570	4,506	5,158	6,547	7,639	7,617	292%
	(13,828)	(14,834)	(15,815)	(21,108)	(25,323)	(28,305)	(35,341)	(39,734)	(38,537)	
P&R Capital Outlay Expenditure	977	975	979	1,239	1,462	1,896	2,753	2,815	2,260	131%
	(6,879)	(5,644)	(6,214)	(8,441)	(8,172)	(12,458)	(18,340)	(16,364)	(14,220)	

Standard deviation in parentheses. Adjusted to 2009 dollars, in thousands.

Table 3: Average Total Per Capita Spending on Parks and Recreation

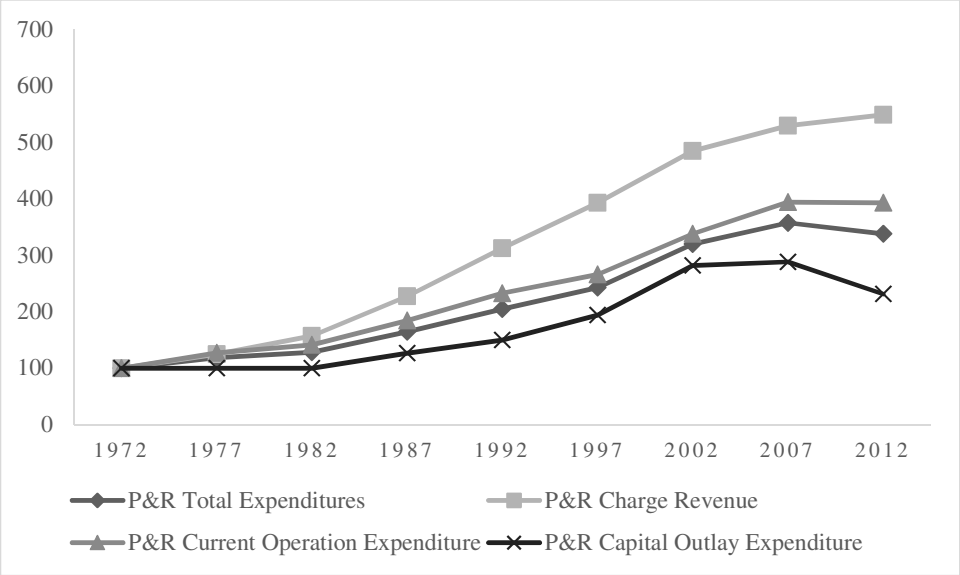
	1972	1977	1982	1987	1992	1997	2002	2007	2012	Change
P&R Total Expenditure	13.86	20.54	24.48	28.79	36.43	46.21	54.93	61.30	63.89	361%
	(21.66)	(24.13)	(33.35)	(37.15)	(49.26)	(76.02)	(75.77)	(78.00)	(90.42)	
P&R Charge Revenue	2.24	2.55	3.49	5.54	7.57	11.08	11.43	12.32	14.54	549%
	(6.21)	(7.07)	(8.25)	(14.79)	(17.92)	(35.86)	(25.09)	(23.28)	(28.45)	
P&R Operating Expenditure	9.95	14.74	17.77	22.84	28.33	36.59	41.46	46.67	49.97	402%
	(13.45)	(16.30)	(20.71)	(27.17)	(34.33)	(61.28)	(46.93)	(57.36)	(62.62)	
P&R Capital Outlay Expenditure	3.81	5.63	6.46	5.73	7.85	9.26	13.14	14.18	13.25	248%
	(11.96)	(11.95)	(20.98)	(15.11)	(26.65)	(23.81)	(39.07)	(32.21)	(39.96)	

Standard deviation in parentheses. Adjusted to 2009 dollars.

The 238% growth in total expenditures can be attributed more to an increase in operating expenditures (292% growth) compared to capital outlays (131% growth), implying that less capital asset investments are being directed towards parks and recreation compared to general maintenance and upkeep of the existing parks within the jurisdictions. Charge revenues have increased more than the other categories meaning more often in recent times, local governments are relying on charge revenues as supplemental income to their parks and recreation departments and individuals are willing to access certain types of public parks by paying an entry fee. For comparison, in 1972 total park expenditures outweighed charge revenues by a factor of 6.55, while in 2012 that number dropped to 4.03. Also, charge revenues in 1972 were less than capital outlays; however, by 2012 charge revenues were higher than capital outlays on average. This further implies a shift towards upkeep and fees rather than capital investments. For each category, the percentage change for per capita spending from 1972 to 2012 has increased faster than the total dollars spent within a jurisdiction. The general trend of operating expenditures and charge revenues increasing faster than capital outlays is still present.

Figure 1 presents total expenditures and charge revenue as an index with the base year of 1972 equal to 100. As discussed, charge revenue and operating expenditures show the largest increases, but there is a clear increase from 1982 to 2007 and then a decline following the financial crisis of 2008 where tax revenue for local governments decreased as income of constituents decreased during the general economic recession (Lutz et al. 2011). There is likely a similar trend for many functional expenditures during the years following the housing crisis in 2008 as local jurisdictions experienced a contraction of revenues.

Figure 1: Trends in Local Government Parks and Recreation Spending

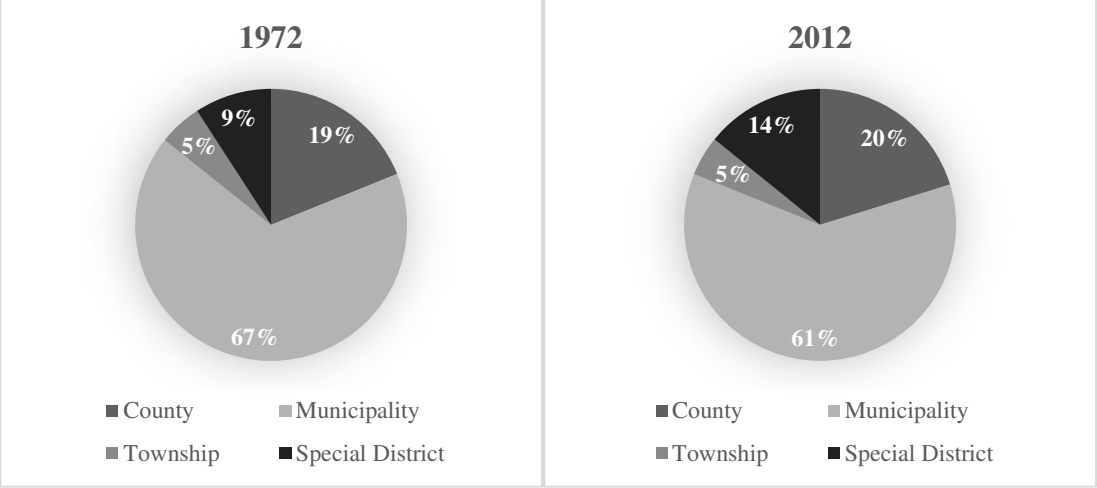


In comparison, total expenditures for all functional government services increased by 229%, education increased by 191%, public safety – including police and fire – increased by 436%, and utilities and waste increased by 325%. Given these values, parks and recreation expenditures increased more than total expenditures and many other functional expenditures other than services such as public safety and utilities/waste that voters often see as primary

expenditures within their jurisdictions. In total, parks and recreation has remained relatively constant at around 2% of total expenditures throughout the period.[7]

While the data I present is aggregated to the county level as described above, these data can also be broken down into different types of jurisdictions. Figure 2 presents this information. Special districts have increased throughout the 40-year period by 5% of total spending and municipal spending has decreased the most at 6%, while county spending decreased by 1%. This implies a local government shift for parks and recreation funding where municipalities are creating special districts to tax and fund parks and recreations projects; financing infrastructure through special districts is not new and plays an important role in local government finance (Porter et al. 1992, Foster 1996, Stephens et al. 1998, Mullin 2007).

Figure 2: Parks and Recreation Expenditures by Jurisdiction – 1972 versus 2012

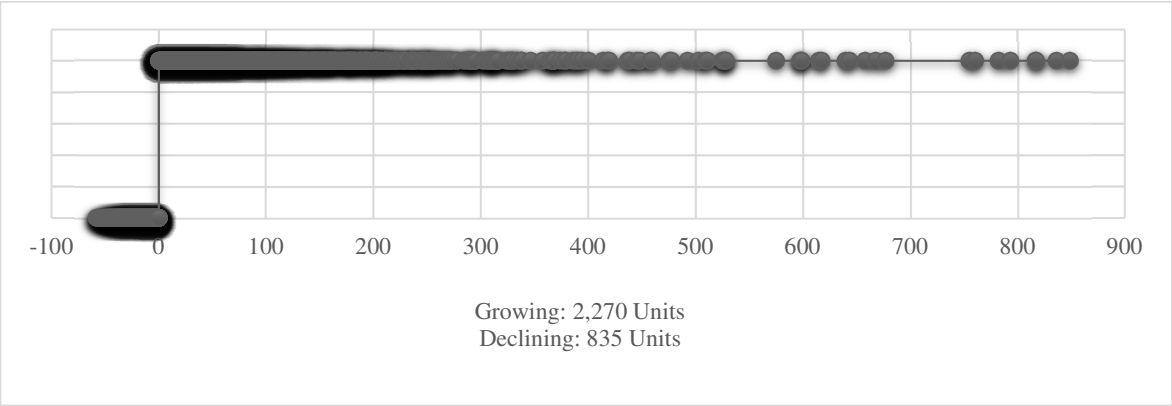


Further, given the differences between parks and recreation spending and per capita parks and recreation spending, I created subsamples based on population change over the period to determine whether the empirical results contained in Chapter 6 will shed light on different socioeconomic impacts on spending between: (1) growing counties defined as counties that have

[7] Appendix Figure A1 is a map that illustrates the geographical differences of total parks and recreation spending.

experienced a positive percent change in population over the 40 year period, and (2) declining counties that have experienced a negative percent change in population over the period.[8] Figure 3 presents the distribution of growing versus declining counties based on population.

Figure 3: Distribution of Percent Change in Population for Counties (1972-2012)



Out of the 3,105 counties included in the analysis 73.1% experienced population growth whereas 26.9% experienced a population decline. Growing population counties had a mean of 74.81% growth with a standard deviation of 112.45%, and a minimum and maximum of 0.05% and 2328%, respectively.[9] Declining population counties had a mean of -17.83% with a standard deviation of 12.95%, and an (inverse) minimum and maximum of -0.04% and -58.1%, respectively.[10] As seen from Figure 3 and the summary statistics, growing counties have a wide distribution of growth, but normally center around just below doubling their populations;

[8] While population and the other independent variables will be discussed in the next subsection, including the necessary interpolation and extrapolation, it is important to note that the population data used to generate growing or declining counties come from the U.S. Decennial Census (based on the percentage change from 1970 to 2010) and accessed from the Minnesota Population Center.

[9] For growing counties – minimum was Poweshiek, IA; the next minimum was 0.22% in Webster, Kentucky followed by several counties in 0.2-0.3% range. The maximum was Douglas, CO; the next maximum was Flagler, FL at 1565% followed by numerous counties with 700-800% growth. Therefore, there are some outliers in the data, but generally this method captures the mean of growth.

[10] For declining counties – the minimum was Turner GA; several counties had population decline under -10%. The maximum was Sheridan, ND and several counties (including many in ND) experienced a similar decline in population. Compared to growing counties, declining counties have less outliers.

declining counties normally lose 1/6th of their population and are more centered when it comes to the distribution of the decline in population.

Parks and recreation expenditures and per capita expenditures for each group are presented below. In comparison to all counties regardless of population change presented previously, declining counties experience considerable decreases in parks and recreation expenditure growth, but expenditures are still increasing as population declines throughout the period, with the caveat of a decrease in 2007 and 2012 likely due to the financial crisis as discussed. However, charge revenue growth decreased significantly less than operating expenditures and capital outlays in comparison, leading to an inference that as declining jurisdictions lose population and hence revenue, local jurisdictions alter their tax and revenue structure placing more burden on the consumer by way of charges for access to parks as they allocate more funds for public safety and other services. Secondly, declining counties experience a higher growth in per capita parks and recreation spending compared to all counties. For instance, total park expenditures increased by 82% for declining counties, but per capita total expenditures increased by 465% leading to the possibility that as population and revenue decline, the burden is shifted to current residents as local jurisdictions struggle to keep other non-amenity services operating while revenue contracts.

Table 4: Average Total Spending on Parks and Recreation for Declining Counties

	1972	1977	1982	1987	1992	1997	2002	2007	2012	Change
P&R Total Expenditure	2,803	3,163	2,825	3,467	3,893	4,720	5,853	5,661	5,101	82%
	(23,193)	(24,452)	(21,650)	(31,579)	(35,794)	(45,551)	(60,781)	(57,407)	(48,870)	
P&R Charge Revenues	424	513	500	724	907	1,183	1,491	1,626	1,529	261%
	(3,381)	(4,722)	(4,313)	(7,195)	(8,262)	(13,065)	(20,372)	(22,500)	(18,316)	
P&R Operating Expenditure	2,025	2,283	2,255	2,745	3,087	3,535	4,147	4,413	4,005	98%
	(17,311)	(17,456)	(17,406)	(23,803)	(28,943)	(34,048)	(42,624)	(42,979)	(38,519)	
P&R Capital Outlay Expenditure	774	769	518	680	773	1,132	1,626	1,197	1,039	34%
	(6,464)	(6,209)	(3,598)	(7,187)	(6,915)	(11,381)	(18,819)	(14,518)	(10,223)	

Standard deviation in parentheses. Adjusted to 2009 dollars, in thousands.

Table 5: Average Total Per Capita Spending on Parks and Recreation for Declining Counties

	1972	1977	1982	1987	1992	1997	2002	2007	2012	Change
P&R Total Expenditure	12.03	19.89	24.53	27.35	33.87	55.15	54.38	58.31	68.03	465%
	(21.42)	(24.29)	(38.33)	(36.13)	(48.33)	(116.84)	(88.26)	(75.84)	(95.86)	
P&R Charge Revenue	2.03	2.31	2.67	4.59	6.59	14.09	10.70	11.94	15.31	654%
	(8.39)	(9.12)	(9.51)	(20.31)	(23.41)	(60.79)	(26.81)	(28.66)	(36.52)	
P&R Operating Expenditure	9.00	14.58	17.53	23.37	27.21	46.27	42.31	46.42	55.04	516%
	(14.34)	(17.03)	(23.26)	(30.38)	(32.06)	(98.81)	(49.83)	(60.18)	(76.18)	
P&R Capital Outlay Expenditure	3.00	5.17	6.91	3.88	6.55	8.71	11.85	11.51	12.58	319%
	(11.19)	(11.90)	(27.44)	(10.92)	(32.52)	(26.15)	(47.92)	(32.84)	(38.70)	

Standard deviation in parentheses. Adjusted to 2009 dollars.

In comparison to declining jurisdictions, jurisdictions that have experienced population growth tend to have similar percent increases across all parks and recreation spending variables whether presented in total terms or in per capita terms. The same decreases from 2007 to 2012 were experienced. This leads to the conclusion that parks and recreation spending for growing jurisdictions increase proportionally to the increase in population.

Table 6: Average Total Spending on Parks and Recreation for Growing Counties

	1972	1977	1982	1987	1992	1997	2002	2007	2012	Change
P&R Total Expenditure	3,003	3,635	4,147	5,374	6,824	8,056	10,755	12,332	11,758	292%
	(18,521)	(18,630)	(21,876)	(27,781)	(31,966)	(37,278)	(48,333)	(53,066)	(51,639)	
P&R Charge Revenue	460	581	782	1,132	1,589	1,982	2,433	2,659	2,813	511%
	(3,223)	(3,387)	(4,526)	(6,383)	(7,555)	(9,026)	(11,546)	(11,380)	(11,661)	
P&R Operating Expenditure	1,907	2,536	2,923	3,873	5,027	5,755	7,429	8,825	8,945	369%
	(12,306)	(13,749)	(15,188)	(20,024)	(23,841)	(25,859)	(32,220)	(38,415)	(38,467)	
P&R Capital Outlay Expenditure	1,052	1,051	1,148	1,445	1,715	2,176	3,167	3,409	2,709	157%
	(7,026)	(5,421)	(6,924)	(8,850)	(8,576)	(12,822)	(18,147)	(16,956)	(15,410)	

Standard deviation in parentheses. Adjusted to 2009 dollars, in thousands.

Table 7: Average Total Per Capita Spending on Parks and Recreation for Growing Counties

	1972	1977	1982	1987	1992	1997	2002	2007	2012	Change
P&R Total Expenditure	14.53	20.78	24.47	29.32	37.37	42.92	55.13	62.40	62.36	329%
	(21.72)	(24.08)	(31.33)	(37.51)	(49.57)	(53.39)	(70.65)	(78.77)	(88.31)	
P&R Charge Revenue	2.32	2.63	3.79	5.89	7.93	9.98	11.69	12.46	14.26	515%
	(5.19)	(6.15)	(7.71)	(12.13)	(15.41)	(19.94)	(24.43)	(20.96)	(24.83)	
P&R Operating Expenditure	10.31	14.80	17.85	22.65	28.74	33.03	41.15	46.77	48.10	366%
	(13.09)	(16.03)	(19.69)	(25.90)	(35.12)	(38.77)	(45.83)	(56.30)	(56.72)	
P&R Capital Outlay Expenditure	4.10	5.80	6.29	6.41	8.33	9.46	13.62	15.16	13.50	230%
	(12.23)	(11.96)	(18.03)	(16.33)	(24.13)	(22.89)	(35.26)	(31.93)	(40.41)	

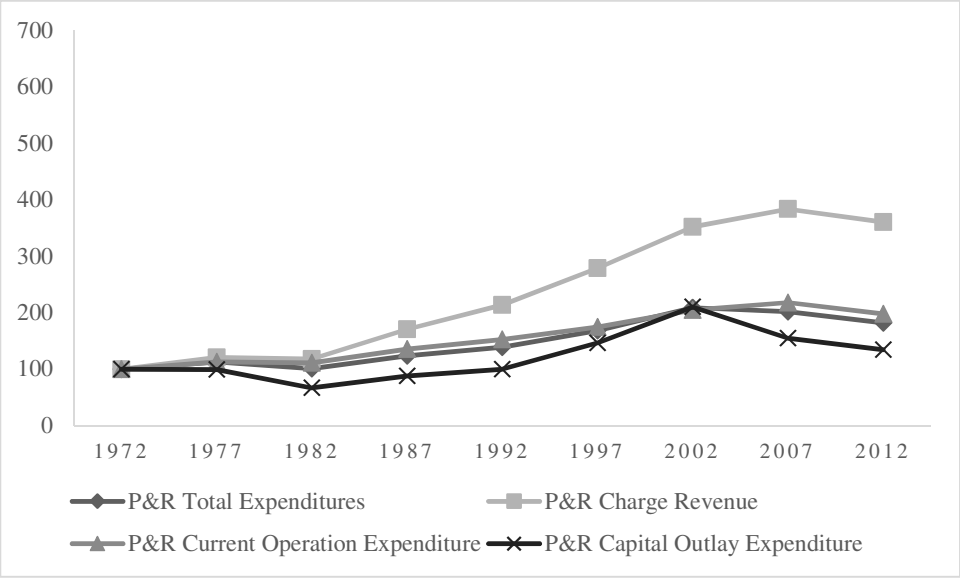
Standard deviation in parentheses. Adjusted to 2009 dollars.

Figure 4 shows the trend of parks and recreation for declining counties with the base of 1972 indexed at 100, while Figure 5 shows the same for growing counties. Generally, parks and recreation spending increased less in declining compared to growing counties as expected. For declining counties, operating expenditures trended closely with total expenditures while capital outlays tended to be below the growth of total expenditures. On the other hand, growing counties

experienced more operating expenditure growth compared to total revenue, but still experienced less growth in capital outlays. However, declining and growing jurisdictions experienced the largest growth in charge revenues; this growth exceeded total expenditures as previously discussed.[11]

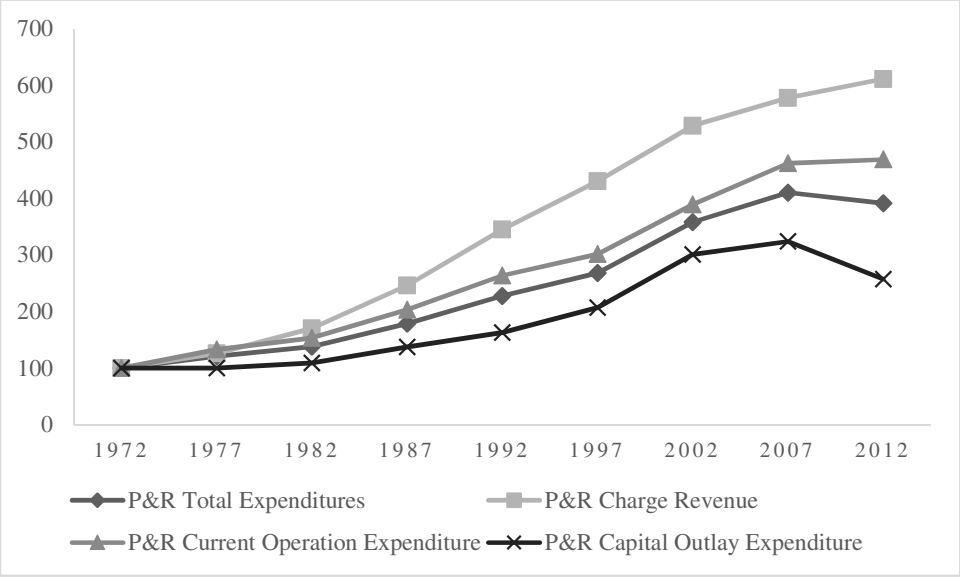
In Chapter 6, capital outlays will provide the most interesting results based on the socioeconomic determinants of the four parks and recreation expenditures and revenue. Note that while all four of these dependent variables exhibit an upward trend at the mean for all jurisdictions, total expenditures, operational expenditures and charge revenues tend to increase within county jurisdictions over the period, while capital outlays tend to fluctuate. This is due to the fact that capital outlays require an investment in infrastructure and often occur at different periods when a new park or further capital investment in an existing parks occurs, compared to the general maintenance of an existing park.

Figure 4: Trends in Parks and Recreation Spending for Declining Counties



[11] Appendix Figure A2 is a map that illustrates the geographical differences between growing and declining counties for total parks and recreation spending.

Figure 5: Trends in Parks and Recreation Spending for Growing Counties



4.2 Independent Variables

The independent variables can be divided in to four categories: (1) time dummy variables, (2) economic variables, (3) demographic variables and (4) institutional control variables. The variables were initially discussed in Chapter 3.3 during the hypotheses section and the reasons for including them in the analysis were presented. This section begins with a list of all the variables, broken down in to the above categories, and their respective definitions in Table 8. I will then discuss the data and methods, sources, and trends for each variable group.

Table 8: Independent Variable Definitions

Independent Variables	Definition
Time Dummies	Dummy variables for 1972, 1977, 1982, 1987, 1992, 1997, 2002, 2007 and 2012
Economic	
ln(Median Income)	Log of the income level that divides the income distribution into two equal groups for a county.
ln(Top Ten Income)	Log of the income level that defines the top ten percent income bracket for a county.
Poverty Rate	Percentage of households with income below the poverty line in a county.
Pct BA Degree	Percentage of the population that have earned a bachelor's degree in a county.
Mobile Home Rate	Percentage of households that occupy a mobile home in a county.
Demographic	
ln(Population)	Total number of persons inhabiting a county.
Female HH Rate	Percentage of households that are female-headed in a county.
Pct Over 65	Percentage of the population aged 65 years or older in a county.
Pct Under 18	Percentage of the population aged 18 years or younger in a county.
Pct White	Percentage of the population that are Caucasian in a county.
Institutional	
Right to Work	Dummy variable for right to work statutes within a state
Tax & Expenditure Limits	Count variable for the number of tax and expenditure limits within each jurisdiction.
School Finance Reform	Count variable for judicial or legislative acts that reform school funding rules.

The time dummy variables are equal to 1 for each respective five-year interval from 1972-2012. The reason for including these variables is to control for nationwide intertemporal variation and unobserved effects that are not explained by the economic, demographic and institutional variables.

The economic and demographic variables are sourced from the Decennial Census of Population and Housing and accessed through the Minnesota Population Center's database; the data set contains information from 1970-2010 in ten-year intervals. Because the local government finance data are released every five years and the data set contains information from 1972-2012 as discussed before, I linearly interpolated and extrapolated over the period to match the local government finance data. Also, these variables are representative of the county and are

not broken down to certain municipalities, townships, et cetera due to the nature of the census data collection method. A limitation of using county level data is that the analysis cannot be specific for a certain municipality, for instance, within the county. For example, the demographics of Ingham County, MI vary considerably throughout local communities (i.e. Lansing, MI versus East Lansing, MI) and these differences could result in different demands for parks and recreation spending. However, all parks and recreation spending is aggregated to the county level as described in the previous section; therefore, county level independent variables are the best option for modeling causal impacts at the aggregated county level. While not perfect, this approach offers useful insights in to the dynamics for parks and recreation spending. Table 9 below presents the summary statistics for the independent variables.

Table 9: Summary Statistics for Independent Variables

	1972	1977	1982	1987	1992	1997	2002	2007	2012	Change
Economic										
Median Income	32,589	34,961	37,508	40,317	43,798	48,285	49,402	45,450	43,078	32%
	(8,318)	(7,982)	(8,593)	(10,074)	(11,365)	(12,042)	(11,897)	(10,965)	(10,995)	
Top Ten Income	67,089	69,373	73,751	81,269	90,757	103,200	116,428	130,835	145,237	116%
	(12,581)	(11,459)	12,027)	(14,494)	(17,693)	(21,552)	(22,167)	(18,501)	(17,820)	
Poverty Rate	0.163	0.139	0.126	0.129	0.126	0.144	0.119	0.149	0.168	3%
	(0.089)	(0.071)	(0.062)	(0.065)	(0.066)	(0.060)	(0.057)	(0.059)	(0.062)	
Pct BA Degree	0.080	0.100	0.116	0.126	0.138	0.153	0.168	0.182	0.191	139%
	(0.040)	(0.047)	(0.054)	(0.059)	(0.065)	(0.071)	(0.077)	(0.083)	(0.084)	
Mobile Home Rate	0.057	0.071	0.085	0.102	0.114	0.119	0.122	0.126	0.133	133%
	(0.038)	(0.042)	(0.049)	(0.060)	(0.070)	(0.076)	(0.083)	(0.085)	(0.094)	
Demographic										
Population	66,738	70,492	74,160	77,695	81,917	87,166	92,094	96,468	99,107	48%
	(260,062)	(260,672)	(266,738)	(280,204)	(294,667)	(309,971)	(323,254)	(333,243)	(339,563)	
Female HH Rate	0.074	0.080	0.085	0.092	0.098	0.102	0.106	0.110	0.118	59%
	(0.026)	(0.029)	(0.032)	(0.036)	(0.038)	(0.039)	(0.040)	(0.041)	(0.045)	
Pct Over 65	0.113	0.119	0.126	0.135	0.140	0.139	0.141	0.146	0.149	32%
	(0.036)	(0.037)	(0.039)	(0.040)	(0.040)	(0.039)	(0.039)	(0.038)	(0.039)	
Pct Under 18	0.338	0.311	0.290	0.276	0.266	0.259	0.251	0.240	0.234	-31%
	(0.038)	(0.035)	(0.033)	(0.033)	(0.032)	(0.031)	(0.031)	(0.031)	(0.032)	
Pct White	0.896	0.890	0.884	0.880	0.872	0.858	0.848	0.841	0.836	-7%
	(0.151)	(0.148)	(0.148)	(0.149)	(0.151)	(0.155)	(0.158)	(0.159)	(0.161)	
Institutions										
Right to Work	0.535	0.555	0.555	0.570	0.570	0.570	0.596	0.596	0.623	16%
	(0.499)	(0.496)	(0.496)	(0.495)	(0.495)	(0.495)	(0.490)	(0.490)	(0.484)	
Tax & Exp. Limits	2.754	3.467	4.499	4.654	5.406	5.728	5.813	5.847	5.847	113%
	(2.032)	(1.960)	(2.431)	2.672)	(3.113)	(3.278)	(3.358)	(3.355)	(3.355)	
School Finance Reform	0.127	0.501	0.620	0.836	1.365	1.809	2.062	2.373	2.454	1832%
	(0.333)	(0.658)	(0.700)	(0.696)	(1.168)	(1.122)	(1.225)	(1.355)	(1.393)	

Standard deviation in parentheses. Adjusted to 2009 dollars.

Economic variables in the model include median income, top ten income percentile of households, poverty rate, percent of the population with a bachelor's degree or above, and the mobile home rate. Both median income and top ten percentile income are adjusted for inflation to 2009 dollars. All variables, other than top ten income percentile of households, the female household rate, and the mobile home rate, are taken directly from the census without manipulation other than the necessary interpolation. The top ten income variable was derived in the following manner: top ten income is defined as the top 10% (or 90th percentile) income level

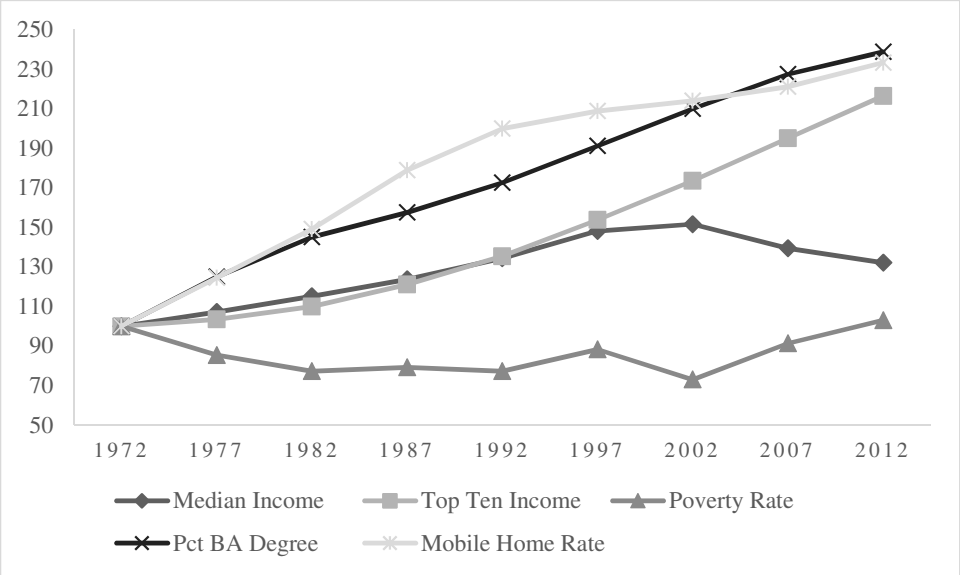
of U.S. households. The U.S. Census does not provide the full income distribution at the local level, so we restore an approximate income distribution using the reported number of households in each of the 10 income categories that are reported. The upper limits of the income distribution for each sampled period is estimated using the historical national-level household income trends. Assuming households are distributed uniformly within each income category, we generate a household distribution function across all income levels; using this function, we calculate the top ten percent income variable for the 90^{th} percentile in each county. The mobile home rate was created by dividing the number of mobile homes by the number of occupied and vacant homes in each county. Vacant homes are included because this variable captures the percent of mobile homes in a county rather than the percent of individuals living in a mobile home.

Median income rose modestly at 32% over the period and dropped between 2002 and 2012, likely due to the financial crisis of 2008 that also impacted parks and recreation spending during the same period. Top ten income grew 116% over the period and experienced no decreases between any time interval. The continual and larger increase of top ten income compared to median income is no surprise; Saez (2016) found that top incomes have grown faster than the middle or bottom incomes and these data support that claim. The poverty rate is adjusted for inflation based on the consumer price index, therefore the poverty threshold changes over the period of evaluation. Generally, the poverty rate decreased by approximately 27% between 1972 and 2002, but then increased in 2012 to above the 1972 level causing an increase of 3% over the entire period; in the late 1990s and early 2000s the poverty rate fluctuated. But generally, it has stayed between 17% and 11% throughout the period. The percent of adults with a bachelor's degree has increased the greatest out of all the independent variables at a value of

139% and the percentage of people living in mobile homes increased 133%; both experienced continued increases between each period.

Figure 6 presents the trends of the economic independent variables with the base index set to 100 in 1972. As previously discussed, percent with a bachelor's degree, the top ten income percentile and the mobile home rates have risen steadily in a somewhat linear fashion, while median income and the poverty rates have risen and fallen throughout the period.

Figure 6: Trends in Economic Independent Variables



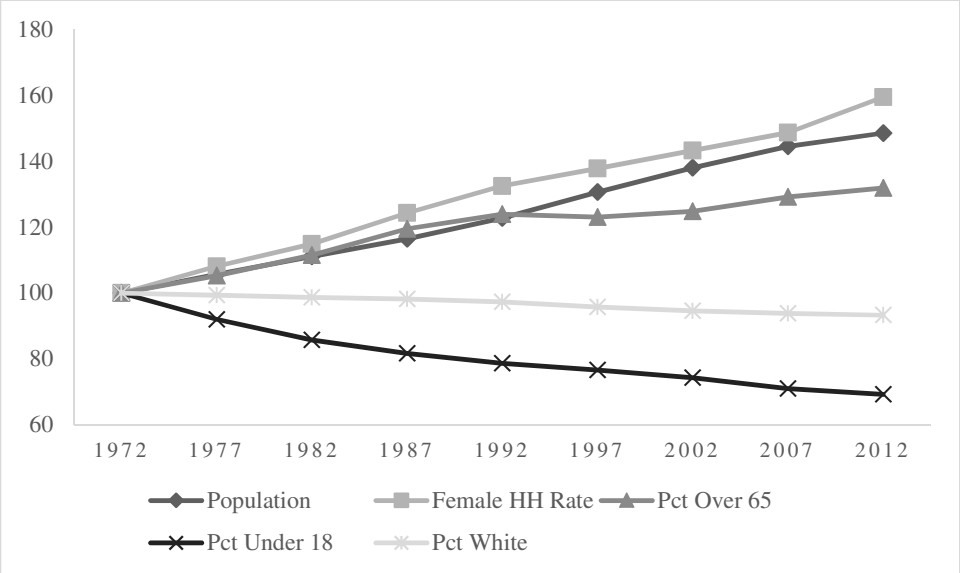
The demographic variables include population, female household rate, percent of adults over 65, percent of the population under the age of 18, and the percent of the population that is white/Caucasian. The census does not provide a female household rate; therefore, the variable was created by dividing the number of female headed families by the number of occupied homes in the county. Unlike mobile homes, the female household rate did not employ vacant homes to derive the rate as those homes do not have an inhabitant.

Population rose from 66,738 to 99,107, or a 48% increase at the mean county level. Generally, throughout the United States at the national level, population increased from 209.9

million to 314 million according to the census, a 49% increase. The female household rate has increased by 59% over the period and according to the 2012 Census, families headed by a single female adult have a 30.2% higher risk of poverty. The percent of people over the age of 65 has increased by 32%, while the percent of the population under the age of 18 saw a decrease of 31%; this shows that the population is aging, and birthrates are declining (Martin et al. 2018). Lastly, the percent of the population that is white decreased 7% throughout the period and can likely be attributed to the increase in Asian and Hispanic immigrants: percent change in population size by Asian race and Hispanic origin increased by 204% and 142% respectively accorded to Census information.

Figure 7 presents the trend in the demographic independent variables with the base index set to 100 for 1972. All these variables' trends seem to be linear and steadily increase over the period at similar rates throughout the time intervals; percent of the population under 18 years old and percent white have decreased, while population, the female household rate and the percent of the elderly population have increased.

Figure 7: Trends in Demographic Independent Variables



The last set of independent variables are institutional controls and include right to work legislation, tax and expenditure limits and school finance reform. These variables are not from the census, but rather are constructed manually. The importance of including this set of independent variables, while not the focus of the socioeconomic determinants of parks and recreation spending, is to control for state and local institutions that could affect spending on parks and recreation that are not accounted for by the year time dummies and socioeconomic determinants. Further, Brennan and Buchanan (1980) developed the Leviathan model of government where the government is assumed to act to work towards maximizing tax revenues, and thus depriving tax payers of control over the spending and services provided by their government; these three institutional variables address the issues with the Leviathan government thesis and are instituted by taxpayers and courts for that very reason.

Right to work legislation (RTW) is a state law that weaken the negotiating power of public sector unions and employees are not required to pay union dues in states that employ right to work statutes (Reed, 2003). The general reason for such a law is to reduce the ability of employees to increase bargaining power over employers. Also, this type of legislation may encourage efficiency and flexibility of government operations, thus reducing local spending. The variable was created using the following method: right to work statutes are defined to be a dummy variable: equal to 1 if a state has enacted a statute or constitutional amendment, and 0 if the state has not. The dummy variable applies to all types of local government units within a state. For example, Florida has had right to work legislation from 1943 to the present and therefore is equal to 1 over the entire period; Michigan instituted right to work legislation in 2012 and thus the variable is equal to 1 in 2012 and 0 in all previous years. The variable was sourced from the United States Department of Labor and includes state laws and constitutional

amendments. Nineteen states had RTW over the entire period, five states instituted laws during the period of study, and the remaining twenty-six states do not have right to work legislation.

Tax and expenditure limits are laws that restrict the growth of government revenues and/or spending by capping the dollar amount or limiting the growth rate based on a set of factors such as population or income, thus decreasing own-source expenditures. These limits vary considerably across the states and the jurisdictions in which they are applied. Therefore, I identify every change in the number of tax and expenditure limits for each state and the jurisdiction they apply to, however the variable does not capture different tax and expenditure characteristics and therefore can be viewed as the average effects of the limits on the growth of functional expenditures and revenues, including parks and recreation. The variable can be defined as a count variable that captures the number of statutory limitation changes that affect a local government unit over the period, and was constructed using Amiel, Deller and Stallman (2009), the Advisory Commission on Intergovernmental Relations (2005) and Wasisanen (2010). Tax and expenditure limits began to emerge during the tax revolt of the later 1970s and again during the economic recession of the early 1990s; over the period tax and expenditure limits increased 113% based on the construction method of the variable.

School finance reforms are legislative or judicial reforms that affect the distribution of school spending. Just like tax and expenditure limits, these reforms vary considerably across states, varying from distribution between rich and poor school districts to increasing education spending for all school districts in the state. The variable is defined as a count variable that captures the number of reforms within a given state without consideration of the specific reform requirements. Most of the growth has occurred since the early 1990s and over the entire period, the number of school finance reforms as measured by the construction of the variable has

increased 1832%. It should also be noted that Blankenau and Skidmore (2004) found that the imposition of tax and expenditure limits often occurs simultaneously with school finance reform legislation, thus increasing the state governments' role in funding education and reducing local government education spending control.

Table 10 and Table 11 below present the summary statistics for declining and growing jurisdictions, respectively. I will not go in to detail about the summary statistics, as they tend to be similar across both groups for all variables apart from population, as expected. However, the summary statistics show that median income and top ten percentile income is higher in growing counties, and a larger decrease in the percent of the population that is Caucasian is present for growing counties compared to declining counties.

Table 10: Summary Statistics for Independent Variables in Declining Counties

	1972	1977	1982	1987	1992	1997	2002	2007	2012	Change
Economic										
Median Income	30,740	33,098	35,152	36,751	39,366	43,506	44,638	41,258	39,230	28%
	(7,211)	(6,673)	(6,538)	(6,679)	(7,033)	(7,385)	(7,383)	(7,020)	(7,246)	
Top Ten Income	65,542	67,534	70,540	75,068	81,577	91,507	104,343	123,341	142,339	117%
	(11,783)	(9,747)	(9,479)	(10,388)	(12,008)	(14,122)	(14,616)	(14,364)	(18,197)	
Poverty Rate	0.167	0.148	0.138	0.142	0.139	0.125	0.127	0.153	0.168	0.6%
	(0.096)	(0.077)	(0.069)	(0.071)	(0.072)	(0.066)	(0.063)	(0.064)	(0.066)	
Pct BA Degree	0.071	0.089	0.103	0.112	0.122	0.135	0.149	0.162	0.171	141%
	(0.023)	(0.026)	(0.029)	(0.031)	(0.034)	(0.038)	(0.044)	(0.051)	(0.054)	
Mobile Home Rate	0.045	0.058	0.069	0.081	0.089	0.092	0.095	0.100	0.107	138%
	(0.029)	(0.033)	(0.039)	(0.048)	(0.056)	(0.062)	(0.070)	(0.071)	(0.079)	
Demographic										
Population	53,624	52,348	50,890	49,434	48,410	48,168	47,655	46,735	46,182	-14%
	(255,235)	(246,012)	(238,481)	(233,355)	(231,346)	(234,023)	(233,829)	(229,268)	(226,573)	
Female HH Rate	0.067	0.071	0.076	0.082	0.088	0.092	0.097	0.100	0.105	57%
	(0.031)	(0.035)	(0.039)	(0.045)	(0.049)	(0.050)	(0.051)	(0.052)	(0.056)	
Pct Over 65	0.131	0.141	0.151	0.163	0.170	0.171	0.172	0.174	0.176	34%
	(0.037)	(0.037)	(0.038)	(0.038)	(0.038)	(0.036)	(0.035)	(0.035)	(0.035)	
Pct Under 18	0.337	0.309	0.287	0.277	0.267	0.259	0.249	0.237	0.230	-32%
	(0.039)	(0.035)	(0.032)	(0.031)	(0.029)	(0.027)	(0.026)	(0.026)	(0.027)	
Pct White	0.915	0.908	0.902	0.898	0.891	0.880	0.871	0.866	0.862	-5.8%
	(0.164)	(0.164)	(0.166)	(0.168)	(0.171)	(0.174)	(0.177)	(0.178)	(0.179)	
Institutional										
Right to Work	0.584	0.605	0.605	0.613	0.613	0.613	0.640	0.640	0.657	13%
	(0.493)	(0.489)	(0.489)	(0.487)	(0.487)	(0.487)	(0.480)	(0.480)	(0.475)	
Tax & Exp. Limits	3.231	3.765	4.729	4.973	5.834	6.117	6.182	6.207	6.207	92%
	(1.695)	(1.648)	(1.876)	(2.013)	(2.715)	(2.903)	(2.916)	(2.916)	(2.916)	
School Finance Reform	0.171	0.400	0.537	0.699	1.327	1.704	1.932	2.269	2.363	1281%
	(0.377)	(0.513)	(0.641)	(0.664)	(1.096)	(1.057)	(1.178)	(1.313)	(1.368)	

Standard deviation in parentheses. Adjusted to 2009 dollars.

Table 11: Summary Statistics for Independent Variables in Growing Counties

	1972	1977	1982	1987	1992	1997	2002	2007	2012	Change
Economic										
Median Income	33,043	35,411	38,094	41,253	45,010	49,664	50,780	46,716	44,277	34%
	(8,450)	(7,896)	(8,240)	(9,656)	(10,964)	(11,773)	(11,890)	(11,369)	(11,503)	
Top Ten Income	67,668	70,055	74,935	83,554	94,138	107,669	120,874	133,589	146,303	116%
	(12,815)	(11,958)	(12,637)	(15,112)	(18,246)	(22,093)	(22,814)	(19,089)	(17,563)	
Poverty Rate	0.162	0.136	0.122	0.124	0.121	0.110	0.116	0.148	0.168	4%
	(0.087)	(0.068)	(0.059)	(0.063)	(0.063)	(0.057)	(0.054)	(0.057)	(0.060)	
Pct BA Degree	0.084	0.105	0.122	0.132	0.145	0.160	0.175	0.190	0.199	137%
	(0.045)	(0.053)	(0.060)	(0.066)	(0.073)	(0.079)	(0.085)	(0.092)	(0.092)	
Mobile Home Rate	0.063	0.078	0.094	0.113	0.126	0.132	0.136	0.139	0.147	133%
	(0.036)	(0.043)	(0.051)	(0.062)	(0.071)	(0.078)	(0.085)	(0.087)	(0.096)	
Demographic										
Population	71,376	76,990	82,527	87,945	94,110	101,396	108,296	114,617	118,409	66%
	(261,628)	(265,546)	(275,940)	(294,954)	(313,968)	(332,568)	(349,127)	(362,478)	(370,810)	
Female HH Rate	0.078	0.083	0.088	0.096	0.101	0.105	0.108	0.113	0.122	54%
	(0.025)	(0.026)	(0.028)	(0.031)	(0.032)	(0.033)	(0.034)	(0.035)	(0.039)	
Pct Over 65	0.107	0.112	0.118	0.125	0.129	0.129	0.131	0.137	0.140	31%
	(0.035)	(0.035)	(0.035)	(0.036)	(0.036)	(0.034)	(0.034)	(0.035)	(0.036)	
Pct Under 18	0.339	0.313	0.291	0.277	0.266	0.260	0.252	0.242	0.236	-30%
	(0.038)	(0.035)	(0.034)	(0.034)	(0.034)	(0.032)	(0.032)	(0.033)	(0.034)	
Pct White	0.889	0.884	0.878	0.874	0.866	0.852	0.841	0.833	0.828	-8%
	(0.146)	(0.142)	(0.141)	(0.142)	(0.143)	(0.146)	(0.148)	(0.149)	(0.151)	
Institutional										
Right to Work	0.517	0.538	0.538	0.555	0.555	0.554	0.580	0.580	0.611	18%
	(0.500)	(0.499)	(0.499)	(0.497)	(0.497)	(0.497)	(0.494)	(0.494)	(0.488)	
Tax & Exp. Limits	2.578	3,359	4.413	4.536	5.247	5.583	5.676	5.713	5.713	101%
	(2.117)	(2.053)	(2.601)	(2.869)	(3.233)	(3.395)	(3.498)	(3.495)	(3.495)	
School Finance Reform	0.064	0.453	0.584	0.847	1.363	1.776	2.024	2.318	2.408	3662%
	(0.245)	(0.627)	(0.666)	(0.670)	(1.178)	(1.152)	(1.230)	(1.428)	(1.470)	

Standard deviation in parentheses. Adjusted to 2009 dollars.

CHAPTER 5: EMPIRICAL APPROACH

The independent and dependent variables were discussed extensively in the previous chapter; this chapter evaluates the strengths and weaknesses of four statistical models for panel data that were considered. Given the nature of a large panel data set that spans nine time intervals over a 40-year period, possesses many jurisdictions, and includes growth trends in the dependent and independent variables, several statistical models were considered: (1) fixed effects, (2) ordinary least squares regression with county dummies and county-year interactions, and (3) first differenced variables with fixed effects.[12] These options will be presented using their general form before discussing the chosen model of first differenced variables with fixed effects where I specify the model using the variables discussed in Chapter 4.

Chapter 5.1 Statistical Model Options

The fixed effects model is the classic statistical model to use for panel data where the parameters are fixed; the model takes the following general form and displays the coefficient estimations within each unit (Wooldridge, 2013):

(1) $y_{it} = \beta X_{it} + \propto_i + \varepsilon_{it} \ \ for\ t = 1, \dots T\ and\ i = 1, \dots N$

where y_{it} is the dependent variable observed in unit i at time t, X_{it} is the time-variant $1xk$ matrix of independent variables where k equals the number of independent variables, β is the observed $kx1$ matrix of parameters, $\propto_i$ is the unobserved time-invariant individual effect, and ε_{it} is the error term. The fixed effects model allows $\propto_i$ to be correlated with the X_{it}. This model was considered, however, due to the trends discussed in Chapter 4, the results are subject to spurious

[12] While the random effects model is appropriate for some types of panel data it is not appropriate for this type of data as the assumption is that individual specific effects are correlated with the independent variables; I ran a Hausman specification test to confirm fixed effects was appropriate over the random effects model (Hausman, 1978).

correlation: the relationship between the dependent and independent variables could be influenced by trends rather than any causal relationship (Pearl, 2000).

The next option considered was an ordinary least squared regression with the inclusion of county dummy variables and county-year time trends; the equation takes the following form (Gujarati, 2009):

(2) $y_{it} = \beta_0 X_{it} + \beta_1 \varphi_i + \beta_2 \omega_i + \varepsilon_{it} \ \ for\ t = 1, \dots T\ and\ i = 1, \dots N$

where y_{it} is the dependent variable observed in unit i at time t; X_{it} is the time-variant $1xk$ matrix of independent variables where k equals the number of independent variables, β_0 is the observed $kx1$ matrix of parameters; φ_i is the unit dummy variable and β_1 is the unit specific parameter; ω_i is the unit time trend for unit i across T and β_2 is the unit specific time trend parameter; ε_{it} is the error term. While this option is more robust than the standard fixed effects model, due to the large size of the data set and the necessity to calculate an additional 3,105 coefficients for the number of units (counties in my case) for each φ_i and ω_i, it is not practical, but is possible; this would be an efficient option for a data set with less units (Wooldridge, 2010).

The third option considered is a fixed effects model on first differenced variables; the equation takes the following form (Wooldridge, 2010):

(3) $\Delta y_{it} = \beta \Delta X_{it} + \propto_i + \varepsilon_{it} \ \ for\ t = 1, \dots T\ and\ i = 1, \dots N$

where Δy_{it} is the first differenced dependent variable observed in unit i at time t; ΔX_{it} is the time-variant $1xk$ matrix of first differenced independent variables where k equals the number of independent variables, β is the observed $kx1$ matrix of parameters; $\propto_i$ is the unobserved time-invariant individual effect after reintroducing fixed effects, and ε_{it} is the error term. By first differencing the dependent and independent variables, the county level fixed effects are removed,

and applying the fixed effect model to the first differenced variables removes the trends of the independent and dependent regressors as discussed in Chapter 4. This method results in a more robust analysis compared to the standard fixed effects model by accounting for the county level effects and general trend effects. One limitation to this approach is losing a time period for analysis after first differencing but given the large number of time intervals, I chose this empirical approach due to more robust results. The next two sections present the chosen statistical model of fixed effects on first differenced variables and includes the dependent and independent variables used in the analysis.

5.2 Standard Regressions

The standard regressions encompass all jurisdictions at the county level without the consideration of asymmetric population change over the period. The regression analysis is characterized by the following equation:

$$(4)\ \ln(\Delta y_{it}) = t_t + \beta_1 \Delta Econ_{it} + \beta_2 \Delta Dem_{it} + \beta_3 \Delta Inst_{it} + \propto_i + \varepsilon_{it}$$

$$for\ t = 1972, 1977, \ldots 2012\ and\ i = 1, 2, \ldots 3{,}105$$

where $\ln(\Delta y_{it})$ is the natural logarithm of the first differenced parks and recreation dependent variables (total expenditures, charge revenues, operating expenditures, and capital outlays) in county i at time t; t_t is the time dummy variable at time t; $\Delta Econ_{it}$ is the vector of first differenced economic variables (natural logarithm of median income, natural logarithm of top ten percentile income, poverty rate, percent with a bachelor's degree, and the mobile home rate) in county i at time t and β_1 is the coefficient; ΔDem_{it} is the vector of first differenced demographic variables (natural logarithm of population, female household rate, percent of the population over 65, percent of the population under 18, and the percent of the population that is white/Caucasian) and β_2 is the coefficient; $\Delta Inst_{it}$ is the vector of first differenced institutional

variables (right to work, tax and expenditure limitations, and school finance reform) and β_3 is the coefficient; $\propto_i$ is the unobserved time-invariant individual effect after reintroducing fixed effects to the first differenced variables, and ε_{it} is the error term.

Note that the dependent variables, and the economic, demographic and institutional independent variables were all first differenced, but the time dummy variables were not first differenced. While it is possible to first difference a dummy variable, Wooldridge (2010) recommends to not first difference the time dummy variables because the cost of doing so results in the loss of the constant term in the regression.

Because this is a fixed effects model on first differenced variables, the coefficient estimates are based on within county changes over the period and 1972 data are lost after the first differencing. However, this method provides a coefficient that averages the within county changes in a community over the period on each independent variable. Further, while spurious correlation is better controlled using this method, I also account for heteroskedasticity and autocorrelation using clustered standard errors at the county level (Wooldridge, 2010). Clustered standard errors perform well when the number of clusters are large, making this appropriate given the number of counties in the United States (Bertrand et. Al., 2004; Kezdi, 2004).

5.3 Asymmetric Population Regressions

I will not discuss this asymmetric model and variables in as much detail because it follows directly from the overall estimates and would be redundant. Based on the asymmetric population description in Chapter 4.1 where I separated the counties into two groups for comparison: (1) growing counties defined as counties that have experienced an increase in population over the period, and (2) declining counties that have experienced a decrease in population over the period. The model takes the following form:

$$(5)\ \ln(\Delta y_{it}) = D(t_t + \beta_1 \Delta Econ_{it} + \beta_2 \Delta Dem_{it} + \beta_3 \Delta Inst_{it}) + G(t_t + \delta_1 \Delta Econ_{it} + \delta_2 \Delta Dem_{it} + \delta_3 \Delta Inst_{it}) + \propto_i + \varepsilon_{it}$$

$$for\ t = 1972, 1977, \ldots 2012\ and\ i = 1, 2, \ldots 3{,}105$$

where D is a dummy variable equal to 1 if the county population declined over the period, and is interacted with the time dummies, economic, demographic and institutional variables; G is a dummy variable equal to 1 if the county population grew over the period and is also interacted with the time dummies, economic, demographic and institutional variables; as before, $\propto_i$ is the unobserved time-invariant individual effect after reintroducing fixed effects to the first differenced variables, and ε_{it} is the error term.

Note that using D and G as interaction terms for their respective counties in the same regression equation allows for a comparison of coefficients across the two groups using the following equation (Gujarati, 2009):

$$(6)\ z = \frac{(\beta_D - \delta_G)}{\sqrt{(\sigma_D 2 + \sigma_G 2)}}$$

where β_D is the coefficient for any independent variable for declining counties and δ_G is the coefficient for any independent variable for growing counties; $\sigma_D$is the standard error for the same independent variable for declining counties and σ_G is the standard error for the same independent variable for growing counties. Because the coefficients for each specific independent variable comes from two groups, one can assume they are independent; z refers to the standard normal distribution at the 90% level.

Before turning to the results in the next section, I would like to discuss the interpretation of the coefficients. As stated, the dependent variables of parks and recreation spending are in log form, as are median income, top ten percentile income and population. These variables can be interpreted in the log-log form, and are therefore elasticities, where a 1% change in the

independent variables results in an expected change of the dependent variable by the coefficient, β, percent.[13] For example, let us assume that the coefficient on the log of population is 1.5 for the log of total parks and recreation spending regression; if population increases by 1%, we expect total parks and recreation spending to increase by 1.5%.

The remaining economic and demographic variables (poverty rate, percent with a bachelor's degree, mobile home rate, female household rate, percent over 65, percent under 18 and percent white) are all percentage rates and thus are technically interpreted in a log-level form.[14] Therefore, if we change the independent variable by one unit, we would expect the dependent variable to change by $100 * \beta$ percent; however, because the variables are entered into the data set as described in Table 9 where poverty rate is equal to 0.168, for example, these are also elasticities. Suppose that the coefficient for the poverty rate is -1.5 for the log of total parks and recreation spending; if the poverty rate increases by 1 unit (which in this case is a percent) we would expect total parks and recreation spending to decrease by 1.5%. It is not necessary to multiply the coefficient by 100 because the variables take a decimal form rather than the percent form. Continuing with the same example, if the data were entered differently where the values were in percent form, poverty rate would be equal to a value of 16.8. The decimal places in the example coefficient in the regression would move two places to the left and become -0.015, which multiplied by 100 as described in the log-level form gives the coefficient of -1.5. This is to say all the economic and demographic variables can be interpreted as elasticities whether the independent variable is logged or is in the decimal rate. The institutional

[13] Log-log Regression: $\ln(y) = \beta_0 + \beta_1 * \ln(x) + \varepsilon$ and thus $\%\Delta y = \beta_1 \%\Delta x$
[14] Log-level Regression: $\ln(y) = \beta_0 + \beta_1 * (x) + \varepsilon$ and thus $\%\Delta y = 100 * \beta_1 \%\Delta x$

variables (right to work, tax and expenditure limits and school finance reform) are evaluated at the log-level form and are not elasticities (i.e., the coefficients must be multiplied by 100).[15]

[15] Positive coefficient: $X \uparrow then\ Y \uparrow$ and $X \downarrow then\ Y \downarrow$; Negative coefficient: $X \uparrow then\ Y \downarrow$ and $X \downarrow then\ Y \uparrow$

CHAPTER 6: RESULTS AND DISCUSSION

The chapter is divided in to two sections: the standard regressions followed by the asymmetric population regressions. Results for both sections are presented by briefly discussing the regression results for each of the four parks and recreation dependent variables and comparing the results for the socioeconomic determinants across all significant independent variables. I will then compare how the drivers of parks and recreation spending differ once the counties are separated in to the population subgroups.

6.1 Standard Regressions

Table 12 presents the regression results for the four parks and recreation spending categories at the aggregated county level using the fixed effects model on first differenced variables, without consideration of asymmetric population change from 1972-2012, and with the described set of economic, demographic and institutional variables as regressors.[16] Note again that all the economic and demographic variables are reported as elasticities, while the time dummy variables and institutional variables are in log-level form.

[16] Note that the standard fixed effects regressions are included in Appendix Table A1. However, those results will not be discussed, and I leave it to the interested reader. The results for the standard fixed effects models possess a higher R-squared and several more significant independent variables; this is due to the trend effect of the dependent and independent variables as discussed in Chapter 5. Appendix Table A2 provides the fixed effect model on first differenced variables, divided by jurisdictions: county, municipalities, townships and special districts. I also will not discuss those results in this section but leave it to the interested reader; note that because we are using county level economic and demographic variables, the relationship between spending and the regressors are not exact for each type of community.

Table 12: Standard Parks and Recreation Regressions

	(1) P&R Total Expenditure	(2) P&R Charge Revenue	(3) P&R Operating Expenditure	(4) P&R Capital Outlay Expenditure
Dummy 1982	-0.402***	0.159***	-0.343***	-0.650***
	(0.0320)	(0.0451)	(0.0287)	(0.0770)
Dummy 1987	-0.386***	0.242***	-0.302***	-0.649***
	(0.0343)	(0.0540)	(0.0311)	(0.0871)
Dummy 1992	-0.341***	0.146***	-0.320***	-0.386***
	(0.0353)	(0.0533)	(0.0322)	(0.0906)
Dummy 1997	-0.360***	0.0787	-0.329***	-0.529***
	(0.0387)	(0.0588)	(0.0355)	(0.0963)
Dummy 2002	-0.338***	0.00815	-0.343***	-0.330***
	(0.0389)	(0.0598)	(0.0351)	(0.0979)
Dummy 2007	-0.405***	-0.0267	-0.427***	-0.430***
	(0.0424)	(0.0656)	(0.0388)	(0.106)
Dummy 2012	-0.517***	0.0669	-0.476***	-0.773***
	(0.0418)	(0.0639)	(0.0377)	(0.103)
ln(Median Income)	0.169*	-0.0599	0.101	0.311*
	(0.0994)	(0.102)	(0.0957)	(0.184)
ln(Top Ten Income)	0.211*	0.297*	0.0859	0.996***
	(0.108)	(0.178)	(0.101)	(0.295)
Poverty Rate	-0.396	-0.916	0.151	-2.713*
	(0.531)	(0.851)	(0.479)	(1.407)
Pct BA Degree	0.124	0.102	-0.0435	0.874
	(0.271)	(0.533)	(0.273)	(0.803)
Mobile Home Rate	-0.460	-1.016	-1.124**	-1.183
	(0.514)	(0.886)	(0.483)	(1.340)
ln(Population)	1.433***	1.735***	1.257***	1.553***
	(0.195)	(0.312)	(0.184)	(0.502)
Female HH Rate	-2.547*	1.600	-1.559	-11.62***
	(1.493)	(2.338)	(1.341)	(4.188)
Pct Over 65	0.366	0.638	0.0873	-5.256*
	(1.205)	(1.926)	(1.114)	(3.114)
Pct Under 18	1.152	-1.770	0.813	2.539
	(0.900)	(1.471)	(0.823)	(2.183)
Pct White	1.208***	0.663	0.898**	2.858***
	(0.420)	(0.714)	(0.388)	(1.085)
Right to Work	0.0930*	-0.199***	0.0265	-0.0303
	(0.0554)	(0.0739)	(0.0461)	(0.167)
Tax & Exp. Limits	-0.0102**	-0.00946	-0.0139***	0.00664
	(0.00499)	(0.00741)	(0.00450)	(0.0115)
School Finance Reform	-0.0303***	8.01e-05	-0.0218**	-0.0482*
	(0.0111)	(0.0164)	(0.0104)	(0.0278)
Constant	0.571***	0.0577	0.568***	0.625***
	(0.0429)	(0.0694)	(0.0395)	(0.107)
Observations	23,275	15,826	23,162	15,980
R-squared	0.040	0.012	0.037	0.027
Number of Units	3,093	2,766	3,091	2,763

Dependent variables in log form. Cluster-robust standard errors in parentheses. Time fixed effects included. ***p<0.01, **p<0.05, *p<0.1

Although parks and recreation spending has generally increased from 1972-2012 the time dummy variables are negative for each category. There are two plausible explanations for this result: compared to the base year, parks and recreation spending grew more slowly in the successive years, or, the independent regressors of focus are picking up the changes in spending; remember that these coefficients represent the average effects based on each individual variable, holding constant the other predicted variables in the model. Further, note that the R-squared – the measure of how close the data are to the fitted regression line – is quite low, varying from 0.012 to 0.04; Wooldridge (2010) states that this is not an issue if the model regressors are still significant and implies that there are exogenous factors not included in the analysis that are influencing parks and recreation spending in this case; these factors could be non-socioeconomic determinants such as weather and location, or alternative leisure activities.

Beginning with column (1) presenting results for total parks and recreation expenditures, income is important, however the superior good effect I hypothesized based on Inman (1979) is not apparent: if median income increases by 1%, parks and recreation spending increases by 0.169% and individuals with top ten percentile income increase that percent by 0.5%. Note that since top ten income has grown faster, and the individuals likely have higher property taxes, the jurisdictions are receiving more money to provide services. Generally, as income for a community increases, the results show an expectation that parks and recreation funding will increase. Population has an elasticity of 1.433 meaning parks and recreation spending grows faster than the percent increase in population; this could be due to expansion periods, resulting in increased demand for services. As hypothesized based on Cohen et al. (2016) the female household rate has a negative effect on parks and recreation spending with a negative elasticity of 2.457; this could be due to decreased leisure time being a single parent or intercorrelation with

the poverty rate. While the coefficient on the percentage of the Caucasian population is positive, since the Caucasian population rate is generally declining, there is an inverse effect that infers the growth in the Asian and Hispanic population in communities are increasing parks and recreation demand as discussed in Chapter 4. Lastly, tax and expenditure limits and school finance reform negatively affect parks and recreation spending as a one unit increase in the number of each type of statute decreases expenditures at 1% and 3% respectively. While right to work has a positive coefficient – it was originally hypothesized the lack of labor union power would decrease spending – first differencing the variables only leaves 6 states with any change due to the fact that many states have not had right to work laws or have had right to work laws over the entire period; therefore, after first differencing the analysis of right to work legislation should be taken cautiously.

Turning to charge revenues in column (2) the model does not have many significant variables and possesses the lowest R-squared. Only top ten income and population are significant, excluding right to work. The results show the portion of the population with top ten percentile income provides approximately a 3% increase in revenue with a 1% increase in top ten income; this makes intuitive sense as these higher income individuals would be more likely to pay an entrance fee to a swimming pool or be involved in rented events. Population possesses an elasticity of 1.735; both results are similar total expenditures. Surprisingly median income was not significant suggesting the median income individual is indifferent to paying for park access and would prefer free entrance facilities. Further, it makes intuitive sense that tax and expenditure limits and school finance reform were not significant for charge revenues because charges are usually reserved for activities like a public swimming pool or renting a baseball

field; therefore, revenue would not be affected by these institutional controls if the parks or recreation facility was already constructed.

Operating expenditures in column (3) and capital outlay expenditures in column (4) comprise the two portions of total expenditures. Surprisingly, for operating expenditures, income is not significant for either income variables. However, it is negative and significant for the mobile home rate with an elasticity of 1.124 suggesting my initial hypotheses could be correct in that individuals that live in a mobile home use the private facilities in a mobile home park. Population was again positive with a slightly smaller elasticity compared to total expenditures by about -.15 points. Similarly, the percent of the population that is Caucasian again has a negative elasticity at 0.898 suggesting that increasing minority populations may have more interest and thus stimulate spending on parks. Tax and expenditure limits and school finance reform are negative as expected.

Unlike operating expenditures, capital outlay expenditures have several significant independent variables, but also a lower R-squared in comparison to operating expenditures. The median income elasticity of 0.211 and the top ten income elasticity of 0.966 are larger than total expenditures suggesting that the growth of total expenditures as it relates to income is best described by an increase in demand for capital outlays. Several other socioeconomic determinants are also significant with a negative elasticity of 2.7 for the poverty rate, a negative elasticity of 11.62 for female household and a negative elasticity of 5.3 for the elderly population rate; this suggests that these groups are either unable to invest in park infrastructure or they are not needed. Further the analysis infers that the minority population has a high demand for new facilities as the percent of the population that is Caucasian has an inverse elasticity of 2.858;

Caucasians tend to live in rural areas at a higher rate than other races, so this effect could be attributed to less need or wants for parks and recreation services in rural areas.

Across all four of the revenue and expenditures for parks and recreation, population was highly elastic with more spending growth in comparison to the growth in population. Both median income and top ten income were generally positive; however, this effect was not seen for operating expenditures. Institutional controls were generally negative as expected except for charge revenues. The capital outlay expenditure regression is the most interesting with the results suggesting jurisdictions with more lower income residents are less likely to invest in parks and recreation, possibly inferring they would like their local government officials to invest more in other services such as utilities or public safety, or perhaps limited income prevents them from demanding local services. Further, this could be due to lower income households that live in rural areas where there is less of a need or want for parks. The changing age structure of local communities – and the general trend throughout the United States – of more elderly individuals and less children seems to have no effect on the socioeconomic determinants of parks and recreation spending; the former goes against my hypotheses that elderly will decrease spending based on Cohen et al. (2016), and the latter might confirm that children are using school facilities rather than local government parks.

6.2 Asymmetric Population Regressions

Turning to the asymmetric regressions; note that about 25% of the counties in the sample experienced population decline, while 75% of the counties experienced an increase in population. As before, and as expected from the previous results, these regressions also have negative time dummies and low R-squared values. Further, the z-test comparison across the coefficients in each group (the bolded coefficients) were not statistically significant at the 90%

confidence interval for any economic, demographic, or institutional variables that were both significant for each individual group. For example, median income was statistically significant in the difference between declining and growing regressions, but median income was only statistically significant for declining total expenditures, and while the percent under 18 for charge revenue was statistically significant across growing and declining jurisdictions, neither were statistically significant for either group; these results highlights the importance of evaluating declining and growing jurisdictions at the local level. I leave out the cross-comparison discussion between the groups and instead present the general results; I also leave out the discussion for the institutional control variables as these are not the central point to the analysis and are similar to the previous standard results.

This section focuses on the differences between median income and top ten percentile income for each parks and recreation spending type. I then focus on significant demographic forces and asymmetric responses for capital outlay expenditures. The interested reader can peruse the total expenditures, charge revenues and operating expenditures, but they will not be discussed in detail.

Table 13: Asymmetric Population Parks and Recreation Regressions

	(D1) Declining: P&R Total Expenditure	(G1) Growing: P&R Total Expenditure	(D2) Declining: P&R Charge Revenue	(G2) Growing: P&R Charge Revenue.
Dummy 1982	**-0.568*** **	**-0.346*** **	**-0.0568**	**0.196*** **
	(0.0630)	(0.0371)	(0.101)	(0.0506)
Dummy 1987	**-0.533*** **	**-0.340*** **	0.191	0.205***
	(0.0729)	(0.0391)	(0.123)	(0.0605)
Dummy 1992	-0.455***	-0.312***	0.0600	0.121**
	(0.0729)	(0.0406)	(0.123)	(0.0596)
Dummy 1997	-0.396***	-0.363***	0.0794	0.0281
	(0.0775)	(0.0449)	(0.119)	(0.0675)
Dummy 2002	**-0.475*** **	**-0.286*** **	**-0.149**	**0.0103**
	(0.0838)	(0.0447)	(0.130)	(0.0678)
Dummy 2007	-0.447***	-0.365***	-0.297*	0.0123
	(0.111)	(0.0475)	(0.159)	(0.0746)
Dummy 2012	-0.502***	-0.510***	-0.0620	0.0467
	(0.0982)	(0.0478)	(0.151)	(0.0724)
ln(Median Income)	**0.819***	**0.00508**	**-0.0691**	**-0.0835**
	(0.462)	(0.102)	(0.645)	(0.105)
ln(Top Ten Income)	-0.151	0.398***	0.0405	0.684***
	(0.252)	(0.137)	(0.388)	(0.221)
Poverty Rate	0.0819	-0.737	1.798	-1.747*
	(1.172)	(0.629)	(2.230)	(0.977)
Pct BA Degree	-0.717	0.385	0.0851	0.0294
	(0.676)	(0.286)	(1.165)	(0.597)
Mobile Home Rate	0.918	-0.720	2.663	-1.573*
	(1.189)	(0.574)	(2.512)	(0.951)
ln(Population)	1.033*	1.345***	1.512	1.554***
	(0.622)	(0.211)	(0.927)	(0.338)
Female HH Rate	-1.864	-2.125	-2.807	4.279
	(2.930)	(1.707)	(5.088)	(2.645)
Pct Over 65	1.649	-1.502	-3.604	2.031
	(2.329)	(1.502)	(3.931)	(2.296)
Pct Under 18	2.046	1.058	**3.816**	**-2.527**
	(1.877)	(1.043)	(3.475)	(1.665)
Pct White	0.398	1.445***	1.666	0.234
	(1.067)	(0.460)	(1.519)	(0.812)
Right to Work	0.275*	0.0448	0.0220	-0.247***
	(0.141)	(0.0585)	(0.169)	(0.0815)
Tax & Exp. Limits	-0.0202*	-0.00606	-0.00312	-0.0112
	(0.0113)	(0.00556)	(0.0222)	(0.00766)
School Finance Reform	-0.0454*	-0.0217*	-0.0133	0.00419
	(0.0254)	(0.0125)	(0.0375)	(0.0185)
Constant		0.569***		0.0790
		(0.0435)		(0.0705)
Observations		23,275		15,826
R-squared		0.043		0.016
Number of Units		3,093		2,766

Dependent variables in log form. Cluster-robust standard errors in parentheses. Time fixed effects included. ***p<0.01, **p<0.05, *p<0.1.
BOLD indicates that the difference in coefficients across declining and growing regressions are statistically significant at p<0.1.

Table 13 (cont'd)

	(D3) Declining: P&R Operating Expenditure	(G3) Growing: P&R Operating Expenditure	(D4) Declining: P&R Capital Expenditure	(D5) Growing: P&R Capital Expenditure
Dummy 1982	**-0.481*** **	**-0.294*** **	**-0.953*** **	**-0.576*** **
	(0.0581)	(0.0330)	(0.170)	(0.0863)
Dummy 1987	-0.381***	-0.276***	**-1.080*** **	**-0.565*** **
	(0.0680)	(0.0352)	(0.208)	(0.0968)
Dummy 1992	**-0.424*** **	**-0.292*** **	**-0.607*** **	**-0.360*** **
	(0.0680)	(0.0367)	(0.204)	(0.102)
Dummy 1997	-0.304***	-0.351***	**-0.995*** **	**-0.438*** **
	(0.0715)	(0.0411)	(0.214)	(0.110)
Dummy 2002	**-0.446*** **	**-0.303*** **	**-0.895*** **	**-0.188* **
	(0.0766)	(0.0403)	(0.226)	(0.110)
Dummy 2007	-0.426***	-0.400***	**-0.960*** **	**-0.258** **
	(0.101)	(0.0432)	(0.281)	(0.116)
Dummy 2012	-0.434***	-0.479***	-1.039***	-0.705***
	(0.0895)	(0.0428)	(0.263)	(0.114)
ln(Median Income)	**0.729* **	**-0.0519**	1.823	0.183
	(0.418)	(0.0924)	(1.173)	(0.183)
ln(Top Ten Income)	-0.264	0.268**	0.726	1.298***
	(0.230)	(0.129)	(0.639)	(0.365)
Poverty Rate	0.881	-0.230	**3.313**	**-4.443*** **
	(1.081)	(0.554)	(3.972)	(1.536)
Pct BA Degree	-0.854	0.216	1.217	0.653
	(0.678)	(0.293)	(2.181)	(0.855)
Mobile Home Rate	0.305	-1.409***	0.922	-1.304
	(1.113)	(0.541)	(3.454)	(1.460)
ln(Population)	1.314**	1.093***	**-1.892**	**1.788*** **
	(0.596)	(0.198)	(1.588)	(0.523)
Female HH Rate	-0.202	-1.584	**-22.77*** **	**-5.151**
	(2.560)	(1.568)	(8.266)	(4.776)
Pct Over 65	2.099	-1.795	**-18.01** **	**-4.540**
	(2.240)	(1.350)	(7.344)	(3.522)
Pct Under 18	1.039	0.869	9.413*	0.993
	(1.681)	(0.964)	(5.414)	(2.421)
Pct White	0.476	1.010**	2.967	2.742**
	(0.955)	(0.429)	(3.027)	(1.139)
Right to Work	**0.250*** **	**-0.0339**	-0.377	0.0313
	(0.0962)	(0.0520)	(0.492)	(0.177)
Tax & Exp. Limits	-0.0254***	-0.00949*	0.0156	0.00399
	(0.00985)	(0.00506)	(0.0307)	(0.0123)
School Finance Reform	-0.0273	-0.0147	-0.0711	-0.0509*
	(0.0236)	(0.0116)	(0.0696)	(0.0306)
Constant		0.569***		0.596***
		(0.0403)		(0.108)
Observations		23,162		15,980
R-squared		0.040		0.029
Number of Units		3,091		2,763

Dependent variables in log form. Cluster-robust standard errors in parentheses. Time fixed effects included. ***p<0.01, **p<0.05, *p<0.1.
BOLD indicates that the difference in coefficients across declining and growing regressions are statistically significant at p<0.1.

Table 14 presents the coefficient results for median income and top ten income across all four parks and recreation spending types, comparing the coefficients between the standard regressions, and declining and growing jurisdictions.

Table 14: Asymmetric Population – Median Income versus Top Ten Income

		Total Expenditure	Charge Revenue	Operations	Capital Outlays
Median Income	Standard	.169*	X	X	.311*
	Declining	.819*	X	.729*	X
	Growing	X	X	X	X
Top Ten Income	Standard	.211 *	.297*	X	.996***
	Declining	X	X	X	X
	Growing	.398***	.684***	.268**	1.298***

Note: X = Not Significant; ***p<0.01, **p<0.05, *p<0.1

As previously discussed, median income was positively significant for total expenditures and capital outlays in the standard regressions, and top ten percentile income was positively significant for all spending categories other than operating expenditures, with capital outlays possessing an elasticity close to 1. However, once the standard regressions were broken down and based on the population change subgroups of declining and growing, both median income and top ten percentile income results changed. For declining counties, total expenditures were significant with an elasticity of 0.819, while median income was not a driver of total parks spending in growing places. Charge revenues were again not significant based on median income for either group. Interestingly, even though operations were not significant in the standard regressions, it is highly significant for declining places suggesting the median income voter values the upkeep and maintenance of their park system. Median income was not significant for capital outlays for either group even though it was significant in the standard regressions; the reason for these last two results are unclear. Interestingly, top ten percentile income

was not significant for any of the declining jurisdictions, but it is clear that parks and recreation in growing jurisdictions is driven by higher income individuals; this explains the top ten percentile significance in the standard regressions. In fact, top ten percentile income has a positive 1.298 for capital outlays suggesting higher income individuals are willing to invest in new park infrastructure in growing places.

Finally, I turn to capital outlay expenditures for declining and growing jurisdictions in columns (D4) and (G4); these results are the most interesting as they were in the standard regressions. Beginning with declining jurisdictions, neither median income nor top ten income were significant; however, the demographic variables – female household rate, percent of the population over 65 and the percent under 18 were significant. The female household rate generated an elasticity of -22.77, the largest elasticity of any variable out of all the regressions; this suggest a 1% increase in the female household rate generates a 22.77 percent decline in parks and recreation spending. Further, a 1% increase in the elderly population generates a decrease of 18% in parks and recreation spending. Both results suggest that female households and the elderly choose not to invest in new parks and recreation facilities or improve existing parks and recreations facilities in declining jurisdictions. Interestingly, the percent of the population under 18 generates an inverse negative elasticity of 9.4 and this was the only case where children were significant in the regressions; the reason for this effect is not clear. For growing jurisdictions, median income was not significant like it was for standard regressions, but top ten income had a high elasticity of 1.298 – this again suggests that individuals with higher income in growing jurisdictions have an increased demand for new park facilities. Similar to the standard regressions, the poverty rate had a negative

elasticity and the percent of the population that is Caucasian had an inverse positive elasticity following the results from the previous section and implies poor households are not willing to fund capital outlays, while the minority population has an increased demand for local parks. Population possessed a positive elasticity of 1.788 as expected.

Generally, separating the jurisdictions in to two groups based on population change provided more insight in to the socioeconomic determinants of parks and recreation spending. It is interesting that the general summary statistics and trends for the growth in parks and recreation spending, along with the economic and demographic variable trends were similar on average for each group, but asymmetric differences between the socioeconomic determinants were present. Also, parks and recreation spending increased in both declining and growing jurisdictions, with more burden put on the individuals that live in declining jurisdictions based on per capita parks and recreation expenditures. Based on the analysis, the socioeconomic determinants for the demand for parks and recreation capital outlays are more apparent compared to the drivers of operating expenditures and fee charge revenue.

CHAPTER 7: CONCLUSION

Parks and recreation is an amenity service provided by general purpose local governments. Being that local governments are the closest functioning government body to individuals, socioeconomic factors of a community are thought to influence the demand for local government services. Based on the conceptual framework of the Median Voter Hypothesis – where the community decides on the allocation and provision of public services based on majority rule, generating a politic equilibrium wherein the outcome is most preferred by the median vote – I investigate the relationship between a wide variety of economic, demographic and institutional variables on total parks and recreation expenditures, user fee charges, and operating and capital expenditures from 1972-2012 at the aggregated county level in the United States.

Studies that focus on the socioeconomic determinants of local government services are limited, with most of the literature exploring the relationship between age characteristics and K-12 education funding. Further, there has only been one study that evaluated local park usage and facilities. Secondly, because local governments experience population decline in their jurisdictions over the period, I evaluate the differing socioeconomic determinants between declining and growing jurisdictions – an exploratory study that is also limited in economic and public finance literature.

Across local governments, expenditures for parks and recreation increased by 238% over the period and have remained constant at about 2% of total expenditures. Even in declining counties, parks and recreation spending increased. Generally, most parks and recreation services are provided at the municipal government level, however special districts are becoming more popular, which is the case for many local government services; user charge revenues have been

the fastest increasing expenditure, while capital outlays grew the least. I discussed how parks and recreation services have grown in popularity during the period, and constituents are willing to find interesting ways to finance park projects. Further, parks and recreation services provide a wide variety of services and are not just local neighborhood playgrounds; local governments provide additional recreation activities such as swimming pools, recreation piers, museums and zoos.

Due to the large number of individual counties in the data set and the 40-year period I evaluate, along with county level trends in both expenditures and socioeconomic characteristics of each county community, I employ a robust empirical model that utilizes first differenced variables in a standard fixed effects within transformation regression. This model allows for the trends to be removed and better analyzes the causal relationships between socioeconomic factors and park spending.

I found that population and income were the significant drivers for parks and recreation spending growth. As population increased by 1%, total parks and recreation spending increased by 1.44%; median income had a positive increase of 0.169% for a 1% increase, and a 1% increase in top ten percentile income increased spending by 0.211%. Further, the analysis revealed systematic differences between the four different parks and recreation expenditures; charge revenues seem to be less influenced by the socioeconomic determinants in the model, while capital outlays were more positively affected by increasing income and population, along with demographic factors such as the poverty rate, the female household rate, and the elderly portion of the population.

In the asymmetry analysis, median income and top ten percentile income had different impacts on parks and recreation spending for growing and declining counties; namely, median

income in declining counties possessed an elasticity of 0.819 suggesting as population declines for a jurisdiction, the demand to keep the parks maintained is a priority. Top ten percentile income was highly significant in growing jurisdictions across all four spending types, with capital outlays having a positive elasticity of 1.298, suggesting higher income individuals are willing to invest in new parks and recreation services. Further, in declining jurisdictions, female household rates and the percent of the population that is elderly affects investment in park infrastructure.

There are two limitations in this study that future research of local government service demand might consider including. As can be seen in Appendix Figure A1, there is considerable regional variation throughout the United States on parks and recreation local government spending. For future socioeconomic determinant studies of local government services, it would be valuable to consider the growth (or decline) of the service by region, and the inclusion of regional dummy variables may be needed. Second, local parks and recreation areas are often near state and national parks or schools that provide similar park amenities; therefore, the growth (or decline) of non-local government parks could be influencing local park demand.

Overall, this study reveals the socioeconomic determinants of local parks and recreation demand. As income and population increases, the analysis suggests that parks and recreation will increase as well. Further, there were several demographic factors that influenced the different parks and recreation spending categories. This analysis reveals that socioeconomic determinants are important and could provide local communities information about the changing demand for parks and recreation services as the socioeconomic determinants of a community changes. This type of analysis can also be extended to explore the drivers of other local government services such as public safety.

APPENDICES

APPENDICES

Figure A1: Percent Change in Per Capita Total Parks and Recreation Expenditure

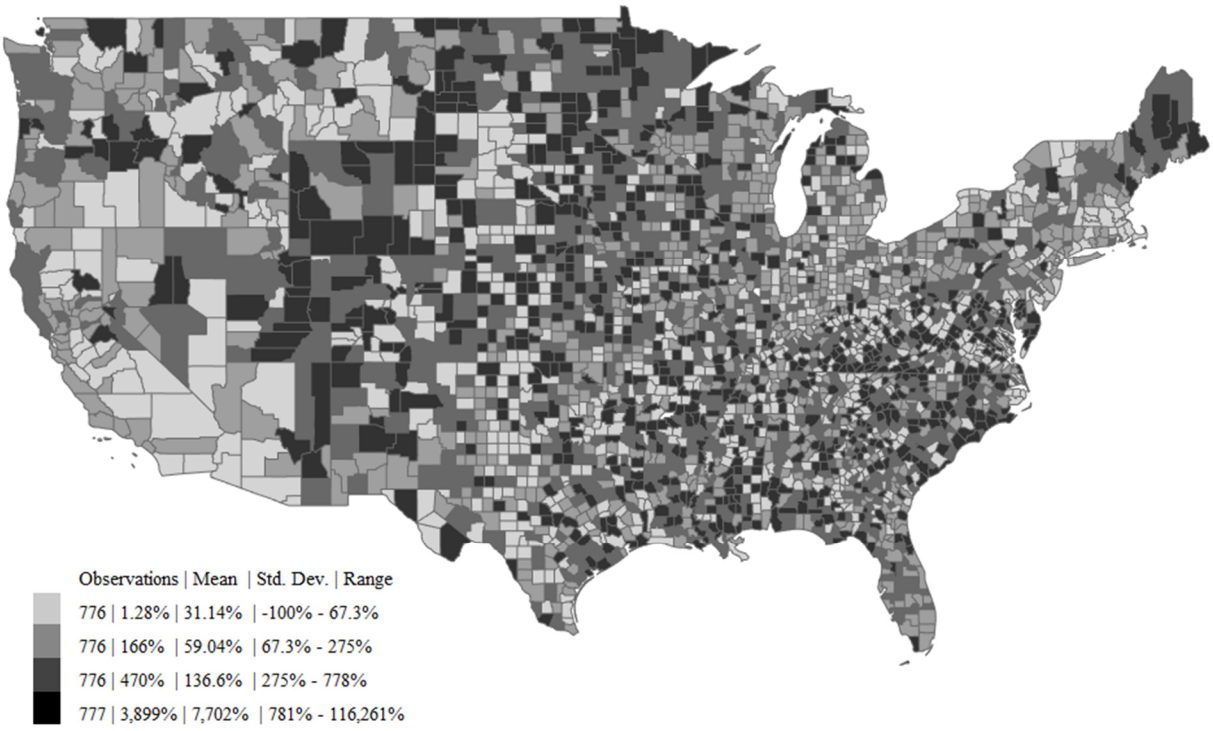


Figure A2: Asymmetric Change in Per Capita Total Parks and Recreation Expenditure

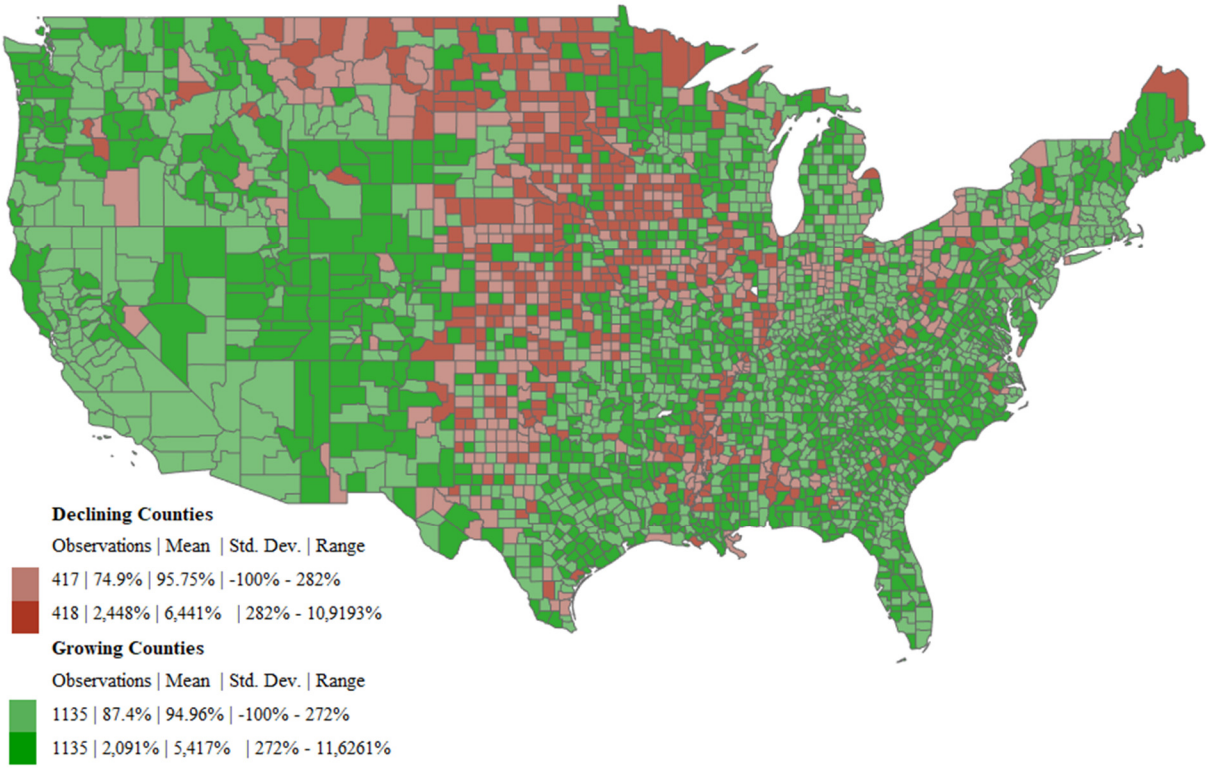


Figure A3: Bailey Park, East Lansing, MI Conceptual Layout Plan

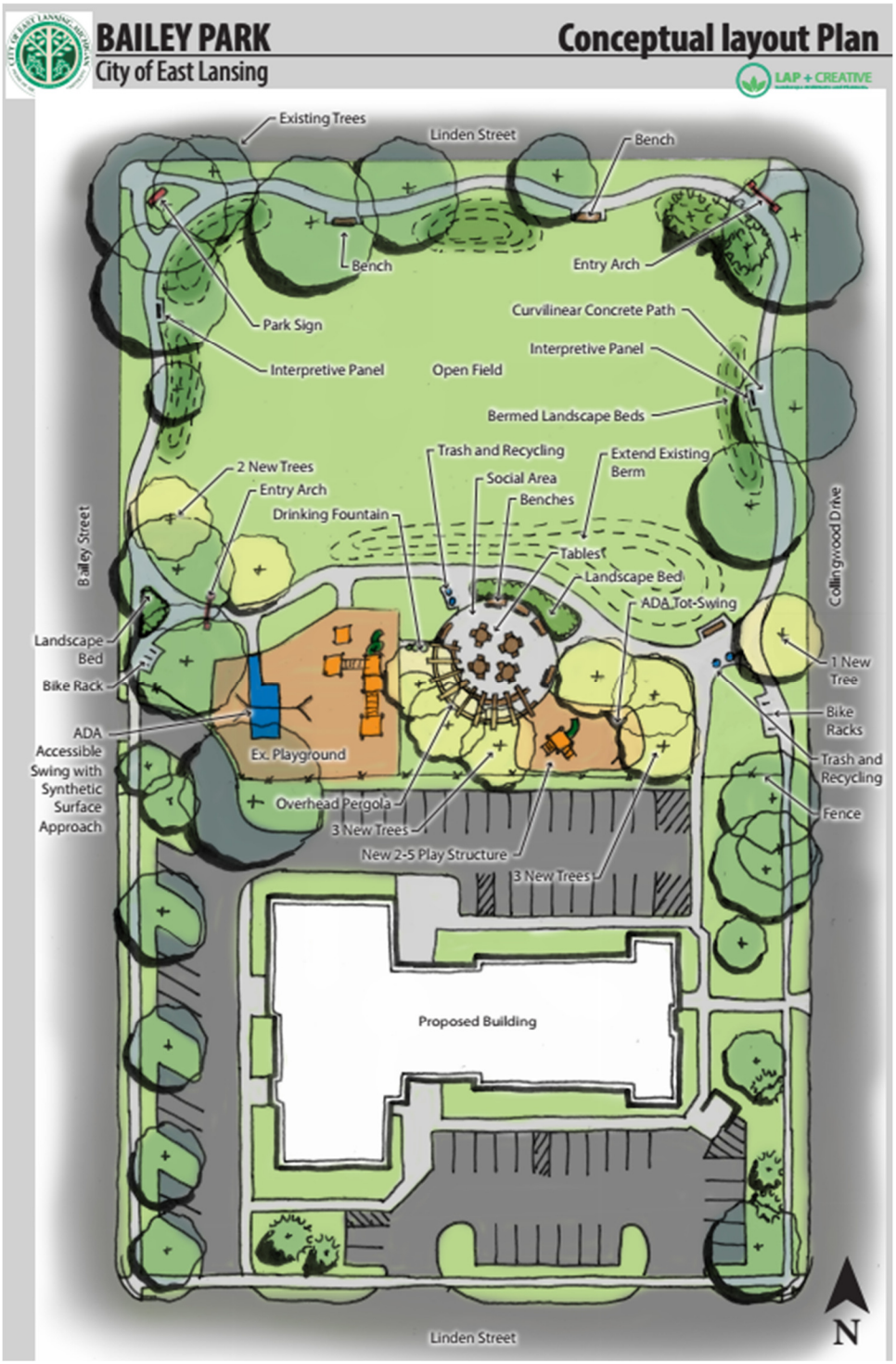


Table A1: Fixed Effects Parks and Recreation Regressions

	P&R Total Expenditure	P&R Charge Revenue	P&R Operating Expenditure	P&R Capital Outlay Expenditure
Dummy 1977	0.480***	-0.00236	0.444***	0.520***
	(17.45)	(-0.0583)	(17.60)	(9.669)
Dummy 1982	0.586***	0.217***	0.579***	0.346***
	(14.84)	(3.624)	(16.09)	(4.707)
Dummy 1987	0.778***	0.535***	0.839***	0.237**
	(15.92)	(6.758)	(18.27)	(2.528)
Dummy 1992	0.985***	0.739***	1.050***	0.368***
	(16.04)	(7.459)	(18.14)	(3.103)
Dummy 1997	1.180***	0.897***	1.251***	0.503***
	(16.02)	(7.591)	(17.95)	(3.551)
Dummy 2002	1.443***	0.981***	1.497***	0.752***
	(17.11)	(7.260)	(18.71)	(4.585)
Dummy 2007	1.696***	1.077***	1.740***	0.847***
	(17.51)	(7.050)	(18.85)	(4.459)
Dummy 2012	1.828***	1.304***	1.911***	0.656***
	(16.98)	(7.678)	(18.58)	(3.080)
ln(Median Income)	0.0985	-0.109	0.0287	-0.0314
	(1.286)	(-0.587)	(0.406)	(-0.241)
ln(Top Ten Income)	0.206**	0.274*	0.104	0.726***
	(2.195)	(1.919)	(1.154)	(3.820)
Poverty Rate	-3.395***	-2.215***	-3.466***	-1.425**
	(-9.097)	(-3.466)	(-9.830)	(-2.217)
Pct BA Degree	0.256	1.312***	0.263	1.101**
	(1.097)	(3.514)	(1.195)	(2.113)
Mobile Home Rate	-0.276	-2.526***	-0.412	-0.630
	(-1.090)	(-5.870)	(-1.639)	(-1.361)
ln(Population)	1.202***	1.293***	1.142***	1.456***
	(27.07)	(18.88)	(27.30)	(19.99)
Female HH Rate	-2.038**	-2.169*	-1.705**	-4.717***
	(-2.576)	(-1.700)	(-2.194)	(-3.089)
Pct Over 65	1.162*	2.231**	1.288**	-0.604
	(1.882)	(2.194)	(2.226)	(-0.519)
Pct Under 18	0.853	-1.391	0.552	-0.372
	(1.475)	(-1.564)	(1.032)	(-0.347)
Pct White	1.494***	0.0771	1.416***	0.884**
	(5.930)	(0.209)	(5.949)	(2.014)
Right to Work	-0.0551	-0.0327	-0.0741*	-0.0540
	(-1.224)	(-0.506)	(-1.916)	(-0.582)
Tax & Exp. Limits	0.00789***	0.0112***	0.00551**	0.0196***
	(3.098)	(3.057)	(2.428)	(3.748)
School Finance Reform	-0.0454***	-0.0507***	-0.0291***	-0.0902***
	(-5.361)	(-3.660)	(-3.565)	(-5.560)
Constant	-11.35***	-10.67***	-8.967***	-18.92***
	(-8.805)	(-4.604)	(-7.209)	(-7.977)
Observations	26,715	19,819	26,628	20,719
R-squared	0.508	0.379	0.550	0.148
Number of Units	3,104	2,979	3,104	3,039

Dependent variables in log form. Cluster-robust standard errors in parentheses. Time fixed effects included. ***p<0.01, **p<0.05, *p<0.1

Table A2: Standard Parks and Recreation Regressions by Jurisdiction Type

	County P&R Total Expenditure	Municipal P&R Total Expenditure	Township P&R Total Expenditure	Special District P&R Total Expenditure
Dummy 1982	-0.504***	-0.285***	-0.111	-0.113
	(0.0607)	(0.0336)	(0.102)	(0.170)
Dummy 1987	-0.473***	-0.235***	-0.126	-0.247
	(0.0639)	(0.0368)	(0.116)	(0.193)
Dummy 1992	-0.439***	-0.226***	0.0438	-0.127
	(0.0644)	(0.0373)	(0.127)	(0.195)
Dummy 1997	-0.476***	-0.251***	0.0239	0.0627
	(0.0720)	(0.0396)	(0.154)	(0.223)
Dummy 2002	-0.403***	-0.201***	0.0915	-0.455**
	(0.0724)	(0.0402)	(0.137)	(0.219)
Dummy 2007	-0.564***	-0.260***	-0.228	-0.382*
	(0.0775)	(0.0457)	(0.141)	(0.230)
Dummy 2012	-0.661***	-0.354***	-0.294**	-0.424*
	(0.0768)	(0.0448)	(0.135)	(0.243)
ln(Median Income)	0.00815	0.301**	-0.110	0.0657
	(0.144)	(0.120)	(0.115)	(0.463)
ln(Top Ten Income)	0.264	0.314***	0.326	-0.165
	(0.203)	(0.121)	(0.402)	(0.576)
Poverty Rate	-0.0267	-0.189	2.815	5.080
	(0.937)	(0.600)	(2.244)	(3.178)
Pct BA Degree	0.596	0.144	-1.359	0.889
	(0.529)	(0.296)	(2.306)	(1.575)
Mobile Home Rate	-0.256	-0.981*	-1.365	3.364
	(0.774)	(0.585)	(2.919)	(3.886)
ln(Population)	1.417***	1.192***	2.465***	1.394
	(0.320)	(0.236)	(0.831)	(1.046)
Female HH Rate	-4.542*	-1.389	3.765	-12.65
	(2.519)	(1.532)	(5.598)	(10.05)
Pct Over 65	1.239	1.219	0.711	-4.841
	(2.040)	(1.335)	(4.270)	(6.050)
Pct Under 18	0.157	1.452	-4.902	-0.258
	(1.556)	(0.957)	(3.355)	(4.361)
Pct White	0.509	1.039**	1.317	5.029
	(0.833)	(0.459)	(3.266)	(4.786)
Right to Work	-0.0455	-0.00201	0.0920	-0.630
	(0.107)	(0.0561)	(0.102)	(0.577)
Tax & Exp. Limits	-0.0228	-0.00123	0.0766	-0.0943
	(0.0184)	(0.0161)	(0.0767)	(0.0610)
School Finance Reform	0.0143	-0.0305***	-0.0743***	-0.00626
	(0.0211)	(0.0118)	(0.0230)	(0.0583)
Constant	0.604***	0.400***	0.133	0.585**
	(0.0818)	(0.0444)	(0.162)	(0.270)
Observations	14,336	21,113	3,620	2,728
R-squared	0.027	0.020	0.026	0.019
Number of Units	2,545	2,948	628	557

Dependent variables in log form. Cluster-robust standard errors in parentheses. Time fixed effects included. ***p<0.01, **p<0.05, *p<0.1

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