VERTICAL EQUITY IN PROPERTY TAXATION: A SPATIAL ANALYSIS OF PROPOSITION 13 IN SAN DIEGO COUNTY, CALIFORNIA

BY

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THESIS

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ABSTRACT

Proposition 13 created disparities in property taxation throughout the state of California after passage of the law in 1978. This paper examines connections between disparities in taxation of differing land use types, specifically residential and commercial, to the fiscal health of local governments. Demographic factors and spatial relationships in San Diego County, CA were also examined in relationship to fiscal health. Using county level parcel and U.S. Census data, spatial analysis techniques and regression analysis are used to examine the impacts of Proposition 13 through testing the hypothesis that the greater the tax burden disparity between residential and commercial property, the poorer the fiscal health of the community. The findings indicate a positive relationship between poverty level, unemployment, and housing cost burden to areas of high inequality in residential to commercial tax burden. Conversely, census tracts with high income, homeownership, and college degree showed a negative relationship to residential/commercial tax disparity and also to municipal fiscal health. The population variable of race (white, black, and Hispanic) showed the strongest relationships to both property tax equity and municipal fiscal health. Each of the dependent variables considered exhibited spatial dependence signifying that the spatial occurrence of the variables is not random and depends on the existence of those variables at neighboring census tracts.

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Chapter 1

INTRODUCTION

America was founded in revolt and on a principle. The principle was ‘‘No taxation without representation,’’ protesting the absence of colonists’ representation in England on decisions relating to the colonial power’s ability to extract payment for the support of government. Over 200 years later, 1978’s Proposition 13 in California became the modern incarnation of taxpayer revolt in America. Voters found that they could go into a voting booth and award themselves a $7 billion property tax break. Other state and local tax and expenditure limitations (TELs) like Proposition 13 had been imposed throughout our nation’s history and the trend had accelerated in the 1970s. Both the level of, and dissatisfaction with, taxes swept across the United States.

In 1978, California voters approved Proposition 13 legislation, limiting property taxes to 1 percent of a property's market value and limiting the property's growth in market value to 2 percent per year. Additionally, when a property is sold, it is reassessed at its full market value AND local governments are prohibited from imposing any other property taxes, sales taxes, or transactions taxes on real property. The measure was drastic and instantaneous in both its effect on municipal tax rolls and overall tax fairness. Although this allocation scheme was designed to reflect local jurisdiction obligations and priorities at the time, much has changed since then and the constraints of local governments have led to many unintended consequences. Both local government officials and state legislators agree that the current system is unfair, outdated, inflexible, and has led to inefficient land use decisions (McCarty).

"Perhaps the most widely accepted principle of equity in taxation is that people in equal positions should be treated equally." The principle of equality, or horizontal equity, is fundamental to the ability-to-pay approach within taxation (Musgrave 1959, p. 160). Horizontal equity measures the taxation of people in similar position. In the case of property taxes this means that two houses of similar size and value should pay similar taxes. Conversely, the matter of vertical equity addresses how the taxation of people in different positions should vary. In this case equity is measured by the progressivity of the tax where property of high value should pay a higher tax than property of a lower value. Musgrave also offered, "The requirements of horizontal and vertical equity are but different sides of the same coin." In keeping with Musgrave's contention, this study considers both forms of equity.

The initial and obvious result of Proposition 13 in California is horizontal inequity in the property tax burden, in which properties are now taxed based on their value at the time of purchase rather than their true market value. In California properties of the exact same assessed value pay different property tax amounts.

Proposition 13 also highlighted the existence of vertical inequities, in which properties of differing value are proportionally taxed (higher value, higher tax). Vertical inequity has been documented in previous studies that show residential and commercial property values have shifted since the passage of Proposition 13 (California Tax Reform Association (CTRA)). This analysis will build upon previous work by measuring and assessing the spatial distribution of the vertical inequities that were created by Proposition 13. One theory is that vertical inequity is created by the turnover rates post Proposition 13. Properties types with high turnover rates will show more recent base assessed values

than properties with long term ownership and those values are typically associated with high income and commercial zoned property types.

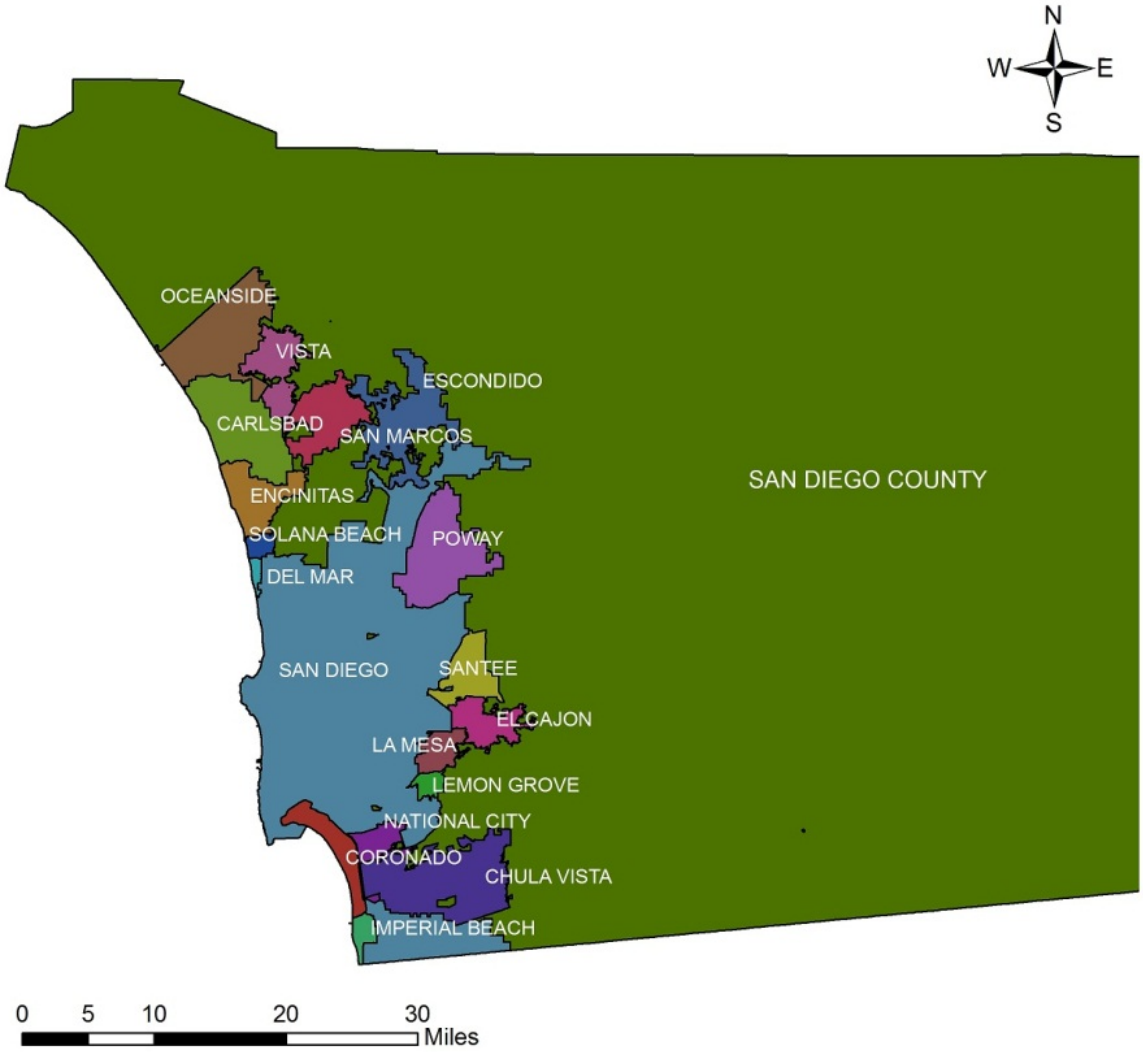
Vertical equity varies from context to context and is conceptualized in many different ways, as described in greater detail in Chapter 2. The basic idea is that persons or properties of a higher income or value should pay a higher tax if conditions are to be considered vertically equitable. It has been established that the conditions of residential to commercial property tax equity have changed in San Diego County since the passage of Proposition 13 (CAL). The fact is that commercial properties pay significantly less in taxes since the passage of Proposition 13, even when accounting for population and employment growth, according to a study by CAL comparing effective tax rates by land use before the passage of Proposition 13 and in 2010.

This study uses spatial data analysis techniques to examine whether the impacts of inequities created between residential and commercial land use taxation by Proposition 13 have a direct relationship to poor municipal fiscal health. More specifically, the research questions are: : (a) to what extent is municipal fiscal health in San Diego County predicted by disparities in assessed value by land use types in San Diego County and (b) are disparities in assessed value by land use types in San Diego County predicted by economic and demographic variables that indicate prosperity?

This analysis demonstrates that municipalities in San Diego County (IMAGE 1) that score low on a test of fiscal health also exhibit a greater reliance on residential property taxes instead of commercial property taxes. Regression analysis is also used to explore the linkages between demographic characteristics and fiscal health at the municipal level and census tract commercial property tax burden.

In the coming chapters I will first present a literature review that outlines the history of property taxation in the United States, basics on tax theory and tax fairness, and the modern tax revolt including the passage of Proposition 13. In Chapter 3, I detail the specific research problem and present the variables, materials, and instruments used to reveal the relationship between tax inequities in San Diego County and the variables chosen to study. Next, Chapter 4 includes the specific preparations and measures used to organize the data for regression and spatial analysis. This chapter also explains the exploratory spatial methods used to describe the data and the calculation of municipal fiscal health. The last two chapters contain the results tables of the regression and spatial analysis as well as findings, conclusions, and policy recommendations regarding both tax equity and Proposition 13.

IMAGE 1: San Diego County, Study Area



Chapter 2

LITERATURE REVIEW

History of Property Taxation in the United States

Unlike sales and income taxes, which are 20th Century phenomena, the taxation of land in the United States has a longer and more varied history. In fact, four states were listed as taxing the "mass of property" (Benson, et al) in a 1796 survey. By the time the first Census of Governments was taken in 1902, all states employed the property tax and it compromised more than 60 percent of revenue for state and local governments (Wallis, 2000). For many reasons discussed in this chapter, the property tax has been unpopular with Americans and resulting has a sordid history within public finance. By 1992, the property tax accounted for only 18 percent of state and local revenues (Wallis, 2000).

Wallis (2000) identified three distinct systems of government finance between 1790 and 1990. The first fiscal period extended from 1790 to about 1842, during which state governments took the lead in promoting economic development through infrastructure investment in transportation and legal innovation to promote corporations and banking. Canal transportation was critical to development of the western lands (Wallis 2001). Wallis noted that a property tax compromise in Ohio, which recognized that land near transportation, would have higher value, changed the land valuation basis from three flat per-acre rates to valuation and led to passage of the 1825 Canal Law that provided funding for construction of major canals in the state. The major source of funding for these projects still resided in corporate and banking taxes. When the financial markets struggled, many of the construction projects were scrapped and land value plummeted. By the late 1830s, the

combined states had eight times more debt than the national and local governments combined.

The second era of government finance began to unfold in the 1840s. An economic depression caused states to approach debt default status and local governments took the lead with most of the important infrastructure investment in education, highways, water systems, sewer systems, and public utilities, financed by the property tax, which grew to become the most important source of revenue for local and state governments. The Great Depression and the New Deal ushered in the third era of government finance that continued through the end of the 20th century. The third era has featured national domestic programs, including infrastructure investment, funded from the federal level by income tax revenues and administered by state and local governments, as well as a national system of defense and retirement security. Income and consumption taxes became the predominant forms of revenue at the national and state levels, while the property tax remained the main tax revenue source at the local government level.

According to Wallis (2001), government revenue in 1840 was about 4% of gross national product (GNP) with local government comprising about 33% of the total. By 1902, total government revenue had grown to 7.3% of GNP and local government accounted for over half of that amount. Wallis (2001) reported that between 1902 and 1992, local government revenue less than doubled from 4% to 7.3% of GNP, while federal government revenue increased seven-fold to 21% of GNP and state government revenue increased more than 11 times to 9.3% of GNP. During the same 90-year period, the property tax share of total revenue at all levels of government decreased from about 42% to less than 10%, with the national and state shares approaching zero and the local share declining from

approximately 74% to 45% Wallis (2001). The size of government relative to the GNP is determined by the cost of the functions and services that it commits to provide for its citizens, not by the revenue structure. After researching the history of American government finance, Wallis (2000, p.80) concluded that, "There is no substantive evidence to suggest that tinkering with the revenue structure will change the size of government."

As Proposition 13 had been put on the ballot through the legislative initiative process, its descendants appeared most rapidly and widely in those states where voters had direct access to the ballot. Legislators in states with the initiative process often either passed their own TEL measures or put legislatively crafted limits up for referendum in an effort to prevent more severe voter-initiated action. Legislators in states without the initiative often did the same, fearful of retribution at reelection time for failure to act. Within two years of the passage of Proposition 13, 43 states had implemented some kind of property tax limitation or relief, 15 lowered their income tax rates, and 10 indexed their income taxes for inflation (Mullins and Wallin 2004).

The main purpose of this historical review has been to provide a framework for understanding property tax administration as it relates to the subject of equity, which has been intertwined with a general debate about the theory and practice of its administration that has lasted at least 125 years. The value of a long historical view of the property tax is to recall an earlier time when states moved away from the property tax just as they did in the 1970s and 1980s. Local governments, though, rarely follow suit. The difference here is that local jurisdictions can match the benefit of the property tax to its constituents, where states cannot.

Tax Theory

The theory of real property taxation simply states that every property in a local municipality shall share in the cost of the services that its citizens require in proportion to the value of that real property. Additionally, according to Tiebout's Pure Theory of local expenditures, people would chose to live in an area with higher taxation with the expectation of a higher level of benefit (1956). Viewing the real property tax as a distributive allocation tool for the shared cost of local government public goods and services is widely known as the benefit view of taxation. Assessing the tax according to real estate value incorporates relative wealth in the allocation device. The tax could be levied as a fixed specific assessment upon each property, but including the wealth dimension insures equity in the formation of a progressive tax. The property tax is levied upon wealth as represented by the value of real estate. When the property tax is seen as a tax upon wealth, then for both taxpayers and voters, their homes represent the single largest asset and to a certain extent is a proxy for their relative wealth (Fischel, 2001). Other major forms of taxation in the United States at the start of the 21st Century were the federal income tax, state income tax, and general sales tax, and for the most part these are all 20th Century creations, as noted earlier. Note that some excise taxes such as tariffs, tobacco taxes, and alcohol taxes, that are not general sales taxes, existed before the Revolutionary War - the Boston Tea Party was essentially a protest against just such an excise tax.

A critical distinction is that the 20th Century tax innovations are based upon income or consumption rather than wealth. The United States is characterized by a tax structure and political economy of fiscal federalism where it is simpler to levy income taxes at the central government levels (federal and state) because those taxes are progressive and

redistribution can be conducted more efficiently. Consumption taxes in the form of excise taxes are less visible to the taxpayer who bears the burden because they are imposed earlier in the supply chain. For the sake of efficiency, consumption taxes in the form of general sales taxes are administered at the state level even if part of the tax revenue is distributed federally and locally.

The idealized property tax on wealth has evolved into a local tax that is directly tied to the benefits and services provided for the real estate owners that lie within the jurisdictional boundary from which it is collected. Hence, citizens determine their own total tax burden through their income, spending, and real estate investment decisions. When citizens purchase real estate, they "vote with their feet" about where to buy according to the Tiebout Model (Tiebout, 1956). The model posits that buyers evaluate the benefits of the public goods offered by alternative communities just as they would other goods, causing local governments to compete and thus, be responsive to the needs of their citizens and prospective citizens (Fischel, 2000).

Despite its intuitive appeal, scholars have not consistently interpreted the ability-to-pay approach. With respect to the property tax, many scholars (Musgrave, Plummer) have incorporated personal income levels in property tax equity research as a common yardstick for comparing differing state tax systems because the legal tax bases are different. However, this can easily lead to property tax regressivity because persons at lower income levels spend a greater portion of their income on housing than those at higher income levels (Martin and Citrin, 2009).

Rosen (1992) pointed out that although a great amount of economic research has considered how housing property taxation is based upon property value as a measure of wealth consistent with the ability-to-pay maxim, an argument can be made from the benefit view that the property tax is in fact a progressive tax because each property would receive similar benefits (police protection, public works, schools, streets, etc.), yet the higher valued properties must pay higher tax amounts and receive equal benefits. Hence, higher value property owners must pay more per unit of public benefit received, even though effective tax rates are equal. Thus, ability-to-pay is accounted for under the benefit view of the property tax.

Three theoretical views concerning the issue of who ultimately bears the burden of the property tax exist in the literature: (a) the traditional view, which argues that the property tax is fully shifted forward to consumers in the form of higher housing prices, (b) the benefit view, which argues that the property tax is simply a payment for local public goods and services received, and (c) the new view, which argues that the property tax is a distortionary tax on the use of capital within a local jurisdiction (Zodrow 2001). There is continuing debate among economists concerning the efficiency of the property tax. Some such as Fischel, support the benefit view and argue that the property tax is efficient, while others like Zodrow view the property tax much like excise taxes in that they have a distorting effect on local decisions and tend to discourage the use of capital.

Tax Fairness: Equity and Studies Measuring Equity

Though inequities exist in most forms of taxation, Proposition 13 focused attention on the regressive nature of this particular type of property taxation. By exacerbating the

level of both horizontal and vertical inequity within California taxation, the state may have contributed to its current financial crisis. There are several ways in which California's TEL contributes to horizontal inequity. Properties with high turn-over rates (e.g., low income residential and rental) typically pay a higher portion of the tax burden in a community than stable low turn-over properties (e.g., high value residential and commercial properties), further encumbering the most vulnerable citizens within a community. This is a clear example of the unintended consequences of keeping taxes low in California. For example, a home valued at $100,000 in California in 1978 would have a 2005 market value of $750,000 and an assessed value of approximately $170,000. A similar $100,000 home sold in 2005 would have a market value of $750,000 and an assessed value of $750,000. This amounts to low taxes and high values for long-time owners and high taxes for short term homeowners of a SIMILARLY valued property. This is the epitome of horizontal inequity. Further, when comparing California and the U.S. in 2007, home owners who occupied their homes before 1978 paid only $1,571 in property taxes compared to the national average of $1,994. In contrast, home owners who bought their homes between 2003 and 2007 paid $4,787 in property taxes compared to the national average of $2,848 (Meyers 2009).

Vertical inequity in Proposition 13 is a more difficult concept to measure. Sexton et al. (2002), found that vertical inequities due to acquisition have shifted the tax burden in California from commercial to residential properties. In the 10 years after Proposition 13 was enacted total assessed value in the state of homesteads increased from 32% to 40% (O'Sullivan, 1995). Acquisition value systems put residential properties at a tax disadvantage because homes typically change ownership more often than businesses. For

the purposes of this study, the portion of assessed value per residentially zoned census tract is used as the measure of vertical inequity.

The California Tax Reform Association (CTRA) released a report in 2010 that shows that the property tax burden has shifted from commercial and industrial property to residential property in virtually every county in the state since the passage of Proposition 13 in 1978. The data are consistent throughout California: in every county, the share of the property tax borne by residential property has increased since the passage of Proposition 13 in 1978, while the share of the property tax borne by non-residential property has decreased. For example, in Contra Costa County, the residential share of the property tax increased from 48% to 73% during this period and in Santa Clara County, the residential share grew from 50% to 64%, despite massive industrial/commercial growth. In Los Angeles County, it increased from 53% to 69%, went from 59% to 72% in Orange County, and climbed from 73% to 86% in San Diego County.

Proposition 13 significantly restricts the taxes that residential property taxpayers pay, but at the same time it restricts the taxes that commercial and industrial taxpayers contribute to the public coffers to a much greater degree. In particular, the CTRA report found that California's commercial property tax system is "inconsistently applied in many counties" and continues "We believe that there are many properties, particularly the banks and other commercial properties, which should have been reassessed but have not been, and found that some counties have assessed these properties while others have not." The property transfers examined are predominantly those of private equity buyouts, corporate purchases of companies, and bank mergers which have avoided reassessment. This oversight has allowed for many types of commercial property to avoid assessment upon

sale of the property resulting in commercial zoned properties paying a lesser portion of the tax burden. At this point, the tax levy shifts to properties that are less likely to avoid re-assessment: residential. For example, Hilton Hotels and its family of hotel chains (incl. Doubletree, Embassy Suites, and Hampton Inn) was bought by the Blackstone Group in October 2007 but many of their California-based hotel properties have not been reassessed. Similarly, Jiffy Lube was purchased by Shell Oil in 2002, but very few of the Jiffy Lube service centers have been reassessed. Finally, JP Morgan Chase bought Washington Mutual (WaMu) in 2008 for $1.9 billion, but many of WaMu's assets have also not been reassessed to date.

The Tax Revolt, Tax Limits, and Proposition 13

From the colonial period and throughout most of the 19th Century, a founding philosophy espoused by the citizens of the new United States of America was the concept of fair and uniform taxation–an equal sharing of the cost of operating the new government. In fact, the Northwest Ordinance of 1787, the first document organizing the land area that comprises the present-day states from Ohio to the northern border and west to the Mississippi River as part of the United States, set certain conditions for a property tax in that area in Article IV. It stated "No tax shall be imposed on lands the property of the United States, and in no case shall non-resident proprietors be taxed higher than residents" (Stark, 1992). However, during the 20th Century, this philosophy began to change as early as the 1930s. Special interest groups, especially homeowners and the elderly, sought tax relief in the form of various exemptions (Beito, 1996). Exemptions for the voting majority steadily gained in popularity and in 1978, passage of Proposition 13 in California

intensified a movement toward tax relief and non-uniformity across groups of property owners (O'Sullivan, Sexton & Sheffrin 1995). The property tax has been the most important source of revenue for state and local government finance in the United States. However, during the final quarter of the 20th Century, a popular tax revolt spread across America.

The modern tax revolt of the 1970s and 1980s can be summarized as follows. Due to inflation and low income growth since the Great Depression, the share of income absorbed by property taxes nearly doubled (O'Sullivan, 1995). To alleviate this pressure put on homeowners, cities and states passed legislation that limited taxes on real property in several different ways. The result was four different types of property tax limits: a) limits on the tax rate for a specific type of local government, b) limits on the tax rate for overall local spending, c) limits on property tax revenue growth, and d) limits on assessment growth.

Limits on the tax rate for specific type of government (a) are the most common form of tax and expenditure limits. They set a ceiling that cannot be exceeded without popular vote and only apply to specific types of local jurisdictions (e.g., counties, municipalities or school districts).

Overall local spending limits (b), like type a (above) set a ceiling that cannot be exceeded without a popular vote but applies to the aggregate tax rate of all local governments. Ten states limit rates across multiple classifications of property (sometimes at different rates): Arizona's limit applies only to residential property. Additional variations include the exclusion of debt service, special purpose and excess levies, exemptions for home rule jurisdictions, and general override provisions through popular

referenda. California's override system requires a two-thirds supermajority, but the passage of Proposition 39 in the November 2000 election lowers this threshold to 55% for bond issuances by local school districts (Mikhailov, 1998).

Property tax levy limits (c) constrain total revenue that can be raised from property tax, independent of the rate. This is often enacted as an allowable annual percentage increase in the levy. Property tax revenue (levy) limits specify the maximum annual increases in revenue. Some states impose restrictions on allowable increases only after property is revalued and 26 states currently employ overall levy limits (Mikhailov, 1998).

Limits on assessment increases (d) control the ability of local governments to raise revenue by reassessment of property or through natural or administrative escalation of property values. They are potentially binding if coupled with an overall or specific property tax rate limit and can otherwise easily be avoided through a rate increase. Limits on assessment increases restrict local government's ability to garner increased revenues from rising property values and/or windfalls from reassessments. The limit is generally expressed as an allowable annual percentage increase in assessed value. Eighteen states impose limits on assessment increases (Mikhailov, 1998). The least restrictive limit is in Iowa, where the assessment limit is applied statewide on classes of properties (residential, agricultural and commercial) rather than on individual properties. Other states apply the assessment limit individually to pieces of property. Allowable percentage increases range from up to 10 percent (Arizona, Maryland, and Texas) to 2 percent (California). In California, property assessments may increase with inflation up to 2 percent a year. If inflation is less than 2 percent, the assessment is equivalent to that percentage.

Though these measures provided immediate tax relief to voters and taxpayers, they also decreased the growth rate of property tax revenue and caused local government to seek and create new sources of income, sometimes offsetting any savings gained through the property tax limit. Most importantly, these limits reduced the amount of revenue controlled at the local level, weakening the connection between local taxes and local spending.

There is a cacophony of research concerning the long term effects of property tax limits and these studies typically focus first on their relationship with property tax revenue. Do property tax limits actually decrease property tax revenue? The second commonly-studied topic is the relationship between property tax limits (often increase) and other municipal revenue sources. Sexton, Sheffrin, and O'Sullivan (1999) note that in California, Proposition 13 decreased property taxes from 10.3 billion in 1977 to 5.6 billion in 1978. Even though tax revenue rose throughout the next decades, up to 19.5 billion in 1995, it was still lagging by almost 25% in real dollars. Shires (1999), Schwartz (2004) and Hoene (2009) all found that as the share of state and local revenue from taxes decreased the share of revenue from other sources such as intergovernmental grants, fees, and other charges. These studies also concluded that any decrease in school district tax share was nearly matched by the intergovernmental share.

One of the major changes in the wake of tax limits has been the provision of local services. According to Citrin (1979), 38% of California tax voters believed that state and local governments could absorb a 40% cut in revenue and still provide the same services. In a more recent study, Steel (1998) found that high sentiment regarding perceived government inefficiency and waste often precipitated voter support for tax limits.

Additionally, as property tax revenue decreased the share of income spent on K-12 education also decreased.

Martin (2003) argued that the delay in modernization of assessment practices in the United States attributable to political factors was a major contributor to the tax revolts. Hawkins (2006) posited that a "lax" constitutional amendment process in Florida (with similar conditions in California) was instrumental in creating the "fiscal train wreck" that he saw the state facing in the near future. Hawkins concluded that a process that facilitated voter initiative measures to qualify for the ballot permitted enactment of Amendment 10[1] was one of the four steps to fiscal disaster. The Save Our Homes provision allowed homesteaders to enjoy measured assessment increases in rapidly appreciating real estate bubble and transfer a significant part their share of the property tax burden to new buyers, homesteaders in slower appreciating markets, and non-homestead property owners. Hawkins concluded that the effect of the amendment over the 10-year period since its implementation in 1995 was an increase of 4700 percent in the differential between net assessed value and market value for qualified Florida properties. Enactment of Save Our Homes may have resulted in significant bias with the media broadcasting stories of citizens living in identical houses in the same neighborhood and receiving enormously different property tax bills. However, "one can only find anecdotal evidence on disproportionate benefits" (Hawkins,2006, p. 10). In an economic report prepared for Florida Tax Watch, Morrell (2006) stated: "Little did many of us know that a constitutional amendment narrowly passed by 53.6% in 1992 with the intent of keeping residents from

[1] Popularly known as Save Our Homes, a phrase coined by its proponents during the 1992 Florida election.

being taxed out of their homes would, by 2006, be a contributing source of tax inequity and a potential impact to the vibrancy of Florida's economy (p. 1)".

Florida's Amendment 10 is similar in some respects to California's Proposition 13. Both evolved in the relaxed constitutional amendment environment described by Hawkins, both limit the year-over-year increase in net assessed value, and both reset the base from which the allowable increase is calculated when the property sells to a new owner. Florida, however, differs in important ways from California and provides an opportunity to study the effect of factors never present on the ground in California. Florida's Save Our Homes provision only applies to owner-occupied homes, with other properties offering a natural control group for study. In addition, Florida property appraisers are statutorily required to estimate market value for all homes annually, whether they qualify for Save Our Homes or not.

Exploratory Spatial Data Analysis

Conventional statistical methods are often unable to effectively accommodate data with an explicit spatial dimension. Tobler's First Law of Geography holds that "everything is related to everything else, but near things are more related than distant things" (Tobler, 1970, p. 236), which is an intuitive description of the phenomenon known as spatial autocorrelation. Within a linear regression context, the existence of spatial autocorrelation is problematic for statistical inference because one or more of its underlying assumptions is violated. Typically, the results of t-tests (the source of significance indicators) are unreliable and the value of the R^2 statistic is inflated (Anselin, 1988). In this study, exploratory spatial data analysis (ESDA) tools are applied to test for the presence of a

detectable pattern in tax burden both within and across jurisdictions. Linear and spatial regression models supplement the ESDA results and allow the hypotheses articulated in the preceding chapters to be more rigorously tested.

Chapter 3

METHODOLOGY

Description of Research Design

I hypothesize that Proposition 13 has had the unintended consequence of exacerbating the tax burden disparity between high income persons and low income persons controlling for land use type. Specifically, I intend to show that municipalities in San Diego County that scored lower on a test of fiscal health also exhibited a greater reliance on residential property taxes instead of commercial property taxes. Additionally, I will demonstrate that demographic characteristics can be used to predict municipal health of a community as well as the level of inequity between residential and commercial assessed property values at both the census tract and municipality levels.

This analysis uses U.S. Census Bureau information coupled with San Diego County parcel data to examine spatial relationships between fiscal health and vertical equity. Spatial and standard statistical software were used to clean, compile, join, and analyze the data. This study also incorporates published city budgets and financial reports for every city in San Diego County to assess the relative fiscal health of each of those municipalities.

Variables

One of the non-disputed outcomes of the passage of Proposition 13 is that California and its cities have significantly less property taxes in their budgets than they did before Proposition 13. The municipalities, school districts, and county regions have found myriad ways to generate revenue in the wake of the loss of property taxes but most are still suffering fiscal woes. Any existing fiscal instability has certainly been exacerbated by the

current economic recession. The dependent variables in this study are municipal fiscal health, proportion of assessed value by land use type residential, and proportion of assessed value by land use type commercial, which capture several dimensions of the hypothesized impact of Proposition 13.

Additionally, previous studies have shown that Proposition 13 has exacerbated the lack of equitable share of the tax roll between land use types. The data is consistent throughout the state: in virtually every county, the share of the property tax borne by residential property has increased since the passage of Proposition 13 in 1978, while the share of the property tax borne by non-residential property has decreased.

There has also been no evidence of a shift in any of the counties at any level of significance. Again, the data is consistent when viewed from various angles, but differing approaches only led to marginal fluctuations in the numbers and did not affect the obvious trends. Even in instances where employment growth—an indication of the commercial/industrial sector—outstripped residential population growth, as it did in many counties, the burden still shifted away from non-residential property, as it did in San Diego despite limited population growth and substantial employment growth (McCarty, 2011). So the answer to the larger question of how the burden of the property tax has changed in the last 30 years is that it has shifted markedly away from the commercial sector and towards the residential sector.

The independent variables, or predictors used in this study are primarily measures of prosperity. In general, measures of wealth, income, and employment are indicative of healthy locations (Reese 2011, Isserman 2009). Building on this foundation, census tracts

that exhibit higher levels of prosperity using these indicators are also expected to show fiscal health at the community level (Reese, 2011). What constitutes a healthy, wealthy or prosperous community is a subject of debate—as there are many ways that prosperity can be measured. In an exploration of rural prosperity, Isserman et. al. (2009) developed an index that bases prosperity on four factors—the unemployment rate, the high school dropout rate, poverty rate, and the presence of certain housing conditions within the county. Similarly, comprehensive analyses of urban areas often consider the following among the dimensions of a healthy community: education, safety, adequate housing, meaningful work, and access to health care.

Measuring the prosperity of a census tract, city or region is not clear cut. In economic models prosperity is typically captured by income and job creation. For this analysis, a combination of indicators was chosen that represent both rural and urban prosperity measurement, informed by the availability of census data. Four basic dimensions of prosperity are considered here: employment, housing, education, and marital status. Table 4 at the end of this chapter presents the full list of variables as well as their derivation. In the employment dimension the measures used were unemployment, families below poverty level, and four categories of income representative of San Diego County. In the housing dimension, ten variables were considered including: renter occupied, percent of income spent on rent, differing levels of home value (low and high for San Diego County), and vacant housing units. For the education dimension, the measures used were adults with less than high school education, and adults with a bachelor's degree. Marital status contains only one variable, married persons above the age 25.

Tables 1, 2, and 3 show the most current figures available for unemployment, high school completion, and homeownership among different racial groups from the 2010 United States Census. In 2010, the unemployment rate in the United States was 8.7 percent for white-non Hispanic Americans, but 15.8 and 12.9 respectively for African Americans and Hispanic Americans. Likewise the homeownership rate for white-non Hispanics was 74.4 percent. Hispanic Americans lagged significantly behind at 47.5 percent as do African Americans at 45.4 percent. Additionally, "Racial and Ethnic Residential Segregation in the United States: 1980-2010", a report published by the U.S. Census bureau indicates that indices measuring racial segregation throughout the U.S. show that communities have increasingly segregated (2011). Noting that communities of color continue to lag behind whites in these indicators of prosperity, and increased spatial segregation by race, race was also included as a variable.

As previously mentioned, there was a shift in the property tax burden from a more equal division between residential and commercial property owners, to a marked decrease in the burden on commercial property in California since the passage of Proposition 13. In order to capture the effect of land use assessed value, especially in commercial and residential properties, the remaining indicators are total assessed value of the ten different land use type as indicated by land use zone in San Diego County.

Table 1: U.S. Unemployment Rates By Race

	Dec 2007	Dec 2010
White (non-Hispanic)	4.2	8.7
Black (non-Hispanic)	8.6	15.8
Hispanic	5.8	12.9
Asian	3.7	7.3
U.S. Total	4.6	9.1

TABLE 2: U.S. Homeownership Rates by Race and Ethnicity of Householder

	2006	2007	2008	2009	2010
U.S. total	68.8%	68.1%	67.8%	67.4%	66.9%
White, total	72.6	72.0	71.7	71.4	71.0
White, non-Hispanic	75.8	75.2	75.0	74.8	74.4
Black, total	47.9	47.2	47.4	46.2	45.4
American Indian	58.2	56.9	56.5	56.2	52.3
Asian or Pacific Islander	60.8	60.0	59.5	59.3	58.9
Hispanic	49.7	49.7	49.1	48.4	47.5
Non-Hispanic	71.2	70.5	70.3	69.8	69.4

NOTE: The homeownership rate is the percentage of home owning households among all households in the given demographic group.

Source: U.S. Census Bureau. Web: www.census.gov.

TABLE 3: High School dropout rates of 16 through 24 year-olds, by race/ethnicity: October 2000 through October 2010

		Race/Ethnicity		
Year	Total	White (non-Hispanic)	Black (non-Hispanic)	Hispanic
2000	10.9	6.9	13.1	27.8
2001	10.7	7.3	10.9	27.0
2002	10.5	6.5	11.3	25.7
2003	9.9	6.3	10.9	23.5
2004	10.3	6.8	11.8	23.8
2005	9.4	6.0	10.4	22.4
2006	9.3	5.8	10.7	22.1
2007	8.7	5.3	8.4	21.4
2008	8.0	4.8	9.9	18.3
2009	8.1	5.2	9.3	17.6

Source: U.S. Census Bureau. Web: www.census.gov.

Description of Materials and Instruments

To analyze the spatial relationship between these variables, I estimated an ordinary least squares (OLS) regression model testing for the hypothesized relationship between fiscal health and vertical inequity in the tax base. The first model used municipal fiscal health as the dependent variable. The hypothesis is that cities that exhibit distorted equity among properties will also score lower in the fiscal analysis. A second model used the ratio of residential to commercial tax burden (a measure of vertical equity), as the dependent variable. The central hypothesis being tested here is that demographic prosperity indices such as income, education, and homeownership are related to greater levels of inequity throughout the county.

The first component of the analysis was to contrast the fiscal health of municipalities in San Diego County, California with the proportion of their property tax revenue that comes from residential versus commercial properties (i.e., the ratio mentioned above). Commercial properties in San Diego County have a higher average value than residential properties and thus, should be paying a higher tax rate in order to be consistent with the vertical equity ideal. The second component of the analysis evaluated San Diego County by census tract, comparing tract-level tax burden inequity (i.e., which tracts show a higher relative residential tax burden) to other demographic characteristics (renting versus owning, income level, etc.).

The municipal and county level financial records were obtained from a variety of sources including each municipality's published fiscal year 2010-2011 financial budgets, Consolidated Annual Financial Reports (CAFR), and the U.S. Census Bureau's Census of Governments. Assessed value of each parcel in San Diego County was obtained from the

County of San Diego Assessor's office and additional geographic datasets for use in mapping and spatial analysis (e.g., state, county, and municipal boundaries) were obtained from the San Diego Geographic Information Source (SanGIS) and the U.S. Census TIGER/Line Data Base.

ArcGIS: ArcGIS is a geographic information system designed for managing and analyzing data with spatial components. Its functions are vast and range from basic mapping to manipulating large databases of spatial information. The majority of the analysis performed here, including the spatial data preparation and map creation, was conducted using two components of the ArcGIS suite of applications: ArcMap and ArcCatalog.

Open GeoDa: Open GeoDa is a free software program that supports a variety of more sophisticated spatial data analysis techniques. Both the exploratory spatial data analysis (ESDA) and regression analysis components of the present study were done within Open GeoDa.

R: R is a language used in statistical and graphic computing and is highly compatible with ArcGIS. R was used in this analysis in the data preparation stage, as the size of the raw datasets used proved to be too difficult and cumbersome to process with ArcGIS alone.

City Budgets and Consolidated Annual Financial Reports (CAFR): Budget reports for each municipality in San Diego County were obtained and downloaded in the spring of 2011 from their respective city's websites. Though a wealth of information is found in both, the projected 2011 budgets from each report were used to conduct a fiscal analysis of each city. The CAFR included debt and debt service information used in the fiscal analysis that was often not present in the annual budgets.

SanGIS: SanGIS is an agency in San Diego County committed to maintaining a regional geographic information clearinghouse for the San Diego area. The service is online and free to the public. SanGIS provided the full San Diego County Assessor Book, parcel shapefile and database, regional land and geographic shapefiles, government and taxing district shapefiles, and U.S. Census Bureau information in shapefile format.

Government Finance Officers Association (GFOA): The GFOA is an association of public managers and city financial officers that works to identify and promote best practices for city management in the U.S. and Canada. The GFOA periodically compiles a database of financial indicators compiled from 1500 U.S. city financial reports. The last database was published in 2006 and is available for purchase from their website. This database was used to compare the financial indicators created in this analysis for each city in San Diego County.

TABLE 4: Preparation of Variables for Ordinary Least Squares Regression

VARIABLE	INDICATOR CALCULATION USING CENSUS AND PARCEL DATA
Population Married	Total Number of Married Persons/ Total Population over 25
Renter Occupied	Total Renter Occupied/Total Housing Units
Rent 40-50% of Income	Total # Households with Gross Rent 40-49% of Income/Total # of Rent Occ. Households
Rent 50% or more of Income	Total # Households with Gross Rent > 50% of Income/Total # of Rent Occ. Households
Housing Units Vacant	Vacant Housing Units/Total Housing Stock
Housing Value $1 Million	# Housing Units Valued at $1 Million or More/Total Housing Stock
Housing Value $150,000	# Housing Units Valued at $150,000 or Less/Total Housing Stock
Unemployment Rate	Total # of civilians Unemployed/Total Population over 15
Income 10k-14k	# of Households with Income between 10-14K/Total Number of Households
Income 35K-39K	# of Households with Income between 35k-39k/Total Number of Households
Income 75K-99K	# of Households with Income between 75K-99K/Total Number of Households
Income 200K +	# of Households with Income over 200K/Total Number of Households
Households Poverty Level	# of Households below the Poverty Level/Total Number of Households
Education < High School	# of Civilians with a Few Years of High School or Less/ Total Pop. > 25
Education Bachelor's Degree	# of Civilians with Education Bachelor's Degree/Total Population > 25
Hispanic Population	Total Hispanic Population/Total Population
Asian Population	Total Non-Hispanic Asian Population/Total Population
Black Population	Total Non-Hispanic Black Population/Total Population
Non-Hispanic White Pop.	Total Non-Hispanic White Population/Total Population
Zone 30 Assessed Value	Total Assessed Value of Parcels Zoned 30 Single Family Residential
Zone 50 Assessed Value	Total Assessed Value of Parcels Zoned 50 Restricted Commercial
Residential Assessed Value	Total Assessed Value of Parcels Zoned 10-40 Residential
Zone 60 Assessed Value	Total Assessed Value of Parcels Zoned 60 Commercial
Zone 70 Assessed Value	Total Assessed Value of Parcels Zoned 70 Industrial
Zone 80 Assessed Value	Total Assessed Value of Parcels Zoned 80 Agricultural
Zone 90 Assessed Value	Total Assessed Value of Parcels Zoned 90 Special/Miscellaneous

TABLE 5: Descriptive Statistics of Independent Variables (Census Tract)

Measure	N = 605			
	Minimum	Maximum	Mean	Std. Dev.
EMPLOYMENT INDICATORS				
Percent Unemployment	1.0%	58.0%	4.0%	0.04208
Percent Families in Poverty	0.0%	34.0%	6.0%	0.06849
Percent Household Income $10-$14K	0.0%	41.0%	5.0%	0.04085
Percent Household Income $35-$39k	1.0%	17.0%	6.0%	0.02559
Percent Household Income $75-$79K	0.0%	100.0%	12.0%	0.07723
Percent Household Income > $200K	0.0%	49.0%	3.0%	0.05854
HOUSING INDICATORS				
Percent Rent Occupied	0.0%	100.0%	43.0%	0.25957
Rent as 50% or more of Income	0.0%	39.0%	8.0%	0.06675
Percent Owner Occupied	0.0%	100.0%	56.0%	0.26048
Percent Vacancy Rate	0.0%	21.0%	3.0%	0.15385
EDUCATION INDICATORS				
Percent High School Education or Less	0.0%	26.0%	9.0%	0.05492
Percent Bachelor's Degree	0.0%	42.0%	16.0%	0.09683
MARRIAGE INDICATOR				
Percent Married Population	18.0%	97.0%	51.0%	0.11248
RACE INDICATORS				
Percent Hispanic Population	0.0%	51.0%	11.0%	0.08479
Percent Black Population	0.0%	60.0%	5.0%	0.06811
Percent White Population	4.0%	97.0%	0.72	0.22771

Chapter 4

PROCEDURES

Measurement of Municipal Fiscal Health

Unfortunately, there is no single established standard for measuring municipal fiscal health and there is no database that ranks U.S. cities or calculates scores based on their respective fiscal responsibility. For this analysis, the fiscal health of each municipality was measured using a ten point scale (Brown, 2003) that gauges the fiscal health of each city relative to cities of similar size. An actual measure of fiscal health can therefore, serve as a dependent variable and support regression analysis of its relationship with tax equity and other demographic factors.

Using Brown (2003) as a starting point, a measure of fiscal health that allows for even-handed comparisons across jurisdictions was derived. This analysis allows to evaluation of cities of different sizes by comparing their fiscal standing to those of similar size within the GFOA database. The first step in this analysis involved gathering base information from each city's budget and current financial report including figures in four categories: revenue, expenditures, operating position, and debt structure. Using the published budgets and CAFR for each municipality, items 1a-10a were compiled for each city and can be found in the appendix along with step by step guidance of how the ten ratios are calculated and turned into a composite score for each city. The initial figures are not calculations, but figures pulled directly from budgets and financial statements.

REVENUE	1a. Total Anticipated Revenue 2010
	2a. Total Revenue in General Fund (GF)
	2b. Total Intergovernmental Grants in General Fund
	3a. Total Operating Transfers into General Fund

EXPENDITURE	4a. Total Expenditures minus Capital Funds 4b. Total Expenditures
OPERATING POSITION	5a. Total Revenues 5b. Total Expenditures 6a. Unreserved and Undesignated Funds in General 7a. Total Cash and Investments in GF 8a. Total General Fund Liabilities 8b. Total General Fund Revenues
DEBT STRUCTURE	9a. General Obligation Debt 10a. Total Expenditures in Debt Service Fund

The second step was to calculate ten comparison ratios based on the information in table 2 of the appendix. Using information given in each government published budget, ratios are calculated in the same four categories: revenue, expenditure, operating position, and debt structure. Detailed tables of the steps in the process are available in the appendix. These ratios are computed for all local governments in a state and then divided into quartiles. Governments receive points for each ratio depending on the quartile in which the ratio falls: two points for each ratio in the fourth quartile (75 to 100 percentile), one point for the third quartile (50 to 75 percentile), zero points for the second quartile (25 to 50 percentile) and minus one for the first quartile (0 to 25%). The ratios were calculated as follows (Brown, 2003).

REVENUE

1. $\frac{\text{Total Revenue}}{\text{Total Population}}$

2. $\frac{\text{Total General Fund Revenue from Own Sources}}{\text{Total General Fund}}$

3. $\frac{\text{General Fund Sources from Other Funds}}{\text{Total General Fund Sources}}$

EXPENDITURE

4. $\frac{\text{Operating Expenditure}}{\text{Total Expenditure}}$

OPERATING POSITION

5. $\frac{\text{Total Revenue}}{\text{Total Expenditure}}$

6. $\frac{\text{Unreserved General Fund Balance}}{\text{Total General Fund Liabilities}}$

7. $\frac{\text{Total General Fund Cash and Investment}}{\text{Total General Fund Liabilities}}$

DEBT STRUCTURE

8. $\frac{\text{Total General Fund Liabilities}}{\text{Total General Fund Revenues}}$

9. $\frac{\text{Direct Long Term Debt}}{\text{Total Population}}$

10. $\frac{\text{Debt Service}}{\text{Total Revenues}}$

Next, the comparative ratios were scored based on which quartile they fall into relative to other cities in the GFOA database in 2006 and inflating the dollar values using the growth in the municipal cost index (MCI) from 2006 and 2010. Each city is given a score of between -1 and 2 based on where in falls within the quartile range for each index [< 25% = -1, 25-50% = 0, 50-75% = 1, >75% = 2] on the quartile range charts in Table 12 and Table 13 in the appendix. Each city is matched with the appropriate chart based on population size and given a score of minus one to two for each of the ten ratios. The ten composite scores are then summed into one total score for each municipality (Table 14).

The scores can range from -10 to 20 with an average for 12 for all cities listed in the GFOA. Brown describes a value above 12 as "good" fiscal health and a value over 17 as "excellent" fiscal health.

Acquisition of GIS Data Files

Census Tract Income-Education Demographics Shapefile: Income and education information by population count for each census tract. This file includes 175 attributes such as educational attainment, commuting behavior, language spoken by household, marital status, occupation, and income.

Census Tract Population-Housing Demographics Shapefile: Population and housing information by population count for each census tract in San Diego County. This file includes 230 attributes including family size, racial demographics, ownership/rental behavior, housing stock, and population demographics by race and age cohort.

Municipal Boundary Shape Files: Boundary files for the 19 municipalities and unincorporated areas of San Diego County. The only attributes included are the shape, area, and name of the municipality as follows: Carlsbad (CB), La Mesa (LM), Lemon Grove (LG), Unincorporated (CN), National City (NC), Coronado (CO), Oceanside (OC), Chula Vista (CV), Poway (PW), Del Mar (DM), San Diego (SD), El Cajon (EC), San Marcos (SM), Encinitas (EN), Solana Beach (SO), Escondido (ES), Santee (ST), Imperial Beach (IB), and Vista (VS).

San Diego County Wide Parcel Shapefile: Legal information for every land parcel in San Diego County from the San Diego County Assessors Book. The parcel shapefile is updated monthly and the version used here was obtained in June 2011. There are 1,098,649 parcels in San Diego with 57 attributes including owners name and contact information, legal description, assessed value, and municipal designation. It is important to note that this parcel set does not include census tract or census block designation information.

Preparation of Census Data and Shapefiles

First, the census tract population data comes in two main file types. The first details population and housing demographics, the second income and education demographics. The two file types for the census tracts in San Diego County were joined using a simple table join in ArcMap with the census tract number serving as the common key between the two attribute tables. A new shapefile was then created from the joined tables. The next step was to join the parcel data set to the census data so each parcel would be attached to the specific census tract it resides in. The census table and parcel table do not have a common key on which to join them, so a spatial overlay join was performed. The spatial overlay join to combine the two data sets was based on the spatial characteristics of each file. An overlay join uses the center point of each parcel and matches it to the census tract in which that point falls. The resulting data set was saved as a new shapefile to preserve the linkages made via the spatial join. The last step involved joining the municipal boundary shapefile to the newly created shapefile. Both the census and parcel data sets list

the municipality as an attribute, the final join was conducted using the municipal code as the common key.

The second task in preparing the census data and shapefiles for use in the regression analysis involved summarizing count and numerical data from the parcel level to the tract and city levels. The first step here was to determine the assessed values of different land use types at the census tract level. Each parcel has an attribute that lists the assessed value of land, assessed value of improvements, and total assessed value. Using the data analysis tools in the attribute table of the newly created shapefile with both census and parcel attributes, a summary table was created that added the totals for the three assessed values across census tracts.

The next step was to create summary tables at the municipal level. The summary tables add together numerical counts present for each parcel within the database. A summary count at the municipal level totals the assessed values of every parcel within that municipality to yield the total assessed value. Another type of summary table was created to sum the demographic variables at the municipal level as well. After repeated attempts to create a summary table at the municipal level, it was determined that the dataset was too large to produce consistent results. To ensure accuracy at the municipal level the large shapefile with both census and parcel attributes was divided into its 19 municipal parts (see IMAGE 1) using ArcMap select by attribute queries and the summary tables were created on these separate municipal files. Finally, a summary table was created for the assessed value of land, assessed value of improvements, and total assessed value for each municipality. The resulting summary tables were exported and combined in an Excel table,

reimported into ArcMap, and joined by municipality to the shapefile with both census and parcel attributes.

In order to measure tax equity between land use types the percentage of assessed value per census tract contributed by each land use type must first be calculated. This was accomplished via the ArcMap data table analysis tools. In the attribute table of the shapefile with both census and parcel attributes 10 new fields were created representing the ten general land use types observed within San Diego County. Land use zones represented by both category name and number. For this analysis, the most general classification available was used and the land use types are un-zoned (0), single family residential R-1 (1), minor multiple residential (2), restricted multiple residential (3), multiple residential (4), restricted commercial (5), commercial (6), industrial (7), agricultural (8), and special/miscellaneous (9).

The field calculator was then employed to derive the proportion of total assessed value contributed by each of the land use types listed above using the expression:

Total Assessed Value (AV) Land Use X / Total Assessed Value All

Additionally, the residential and commercial zones were combined to create a ratio for each using the formulas where the numeric values correspond to the land use codes presented above:

Residential: (Total AV1 + Total AV2 + Total AV3 + Total AV4)/Total AV All

Commercial: (Total AV5 +Total AV6)/ Total AV All

Fiscal health for each municipality was derived from the scores described above. These scores were recorded in a spreadsheet along with the municipal name and municipal code and this information was then imported into ArcMap and joined to the shapefile with both census and parcel attributes using a simple join with the municipal code as the common key. The shapefile was then exported and saved with the new data attached.

Regression analysis was used to model equity in land use taxation. Specifically, the tax ratios described above served as the dependent variable with the aforementioned fiscal health scores, as well as demographic characteristics, functioning as the independent variables or predictors. Taken only as raw counts, the demographics have little explanatory power when compared across census tracts of varying sizes and populations. In order to offset the influence of variation in tract size, appropriate ratios were calculated for each of the demographic characteristics included in the study. This approach was replicated for each of the cities in San Diego County to mitigate the impacts of variations in land area and population. This was accomplished via the ArcMap data table analysis tools for the shapefile with both census and parcel attributes and for each municipal shapefile. In the attribute table of the shapefile new fields were created representing each of the demographic variables. The field calculator was then employed to create a ratio for each of the aforementioned variables. The specific field expression for each variable can be found in Table 4.

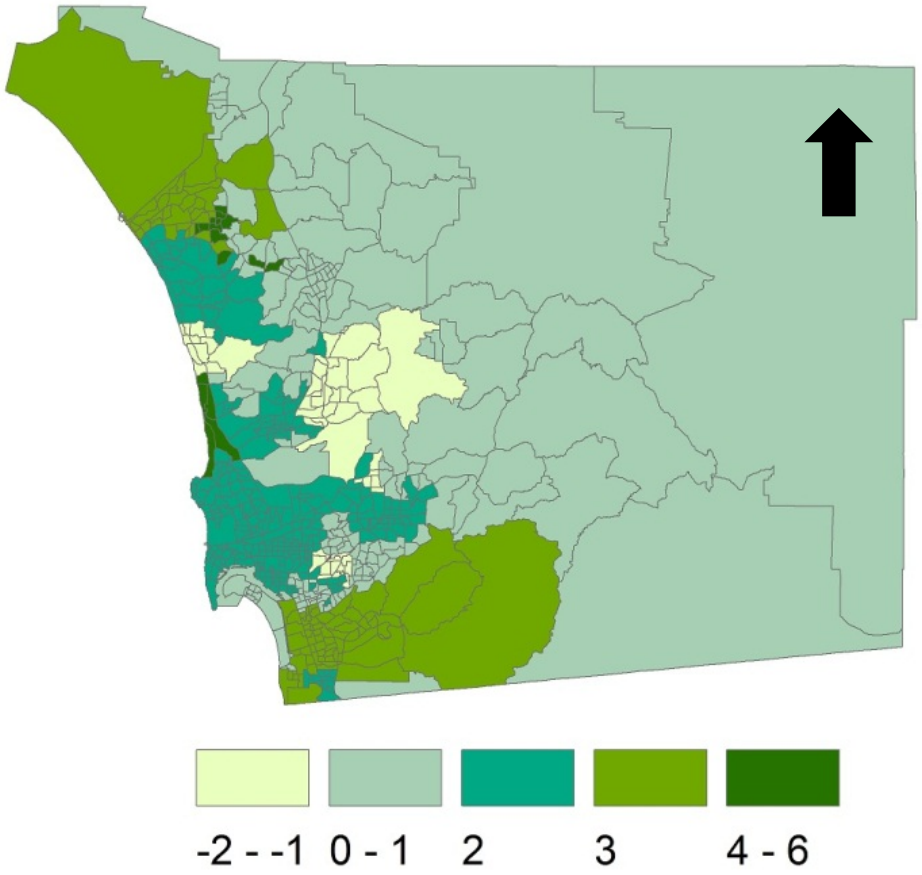
Not all land use types zoned in San Diego were included in this analysis because the primary focus here is on commercial versus residential land use types. Because there are several zones (2, 3, and 4) of residential type property and two zones (5 and 6) of

commercial property, these were combined to create one composite for both residential and commercial properties. Additionally, Zone 3 residential was separated from the total residential calculation to better isolate the effect of Single Family residential versus other types of residential property such as multi-family residential. This strategy allows the analysis to capture the non-uniform effects of residential density on both equity and fiscal health. Land use Zone 0 was not included as un-zoned areas have little or no monetary assessed value according to the San Diego Parcel Data Set.

Demographic Mapping

Beyond their most basic role as a descriptive tool, maps are often quite useful in identifying and communicating patterns and trends, especially when applied to demographic data. The initial aim of this analysis involves mapping demographic phenomena that may help explain why some areas have a higher relative residential tax assessment burden (than commercial assessments) and also explain the patterns of municipal fiscal health in San Diego County. This study focuses on characteristics that were purely demographic in nature or that are indicative of prosperity. Prosperity-related measures included income, education, home ownership, and unemployment. The demographic characteristics investigated were those of age, race, language spoken, commuting behavior, and marital status.

IMAGE 2: Fiscal Health by Census Tract[1]



Note in Image 2, that all of the cities in San Diego perform poorly compared to cities of similar size within the GFOA database. It is possible the California's fiscal stress, as evidenced by their scores, is a result of the limitations of the local governments imposed by Proposition 13. Images 3 through 6, at the end of this chapter, graphically highlight spatial relationships between how land is zoned and its assessed value. One of the major questions this study is asking is "Do those differences in assessment by land use type effect the fiscal health of the communities to which those assessments are levied?" It makes

[1] In this method of measurement, scores range from -10 to 20. In 2006 the average score for a municipality in the GFOA was 12.

sense that the images show the eastern portion of San Diego County with low assessment values for both commercial and residential zones at the area is high desert and mostly rural. As commercial and residential zones by far make up the largest portion of assessments, it is surprising to see them inversely related on Images 3 and 4. Residential and commercial development are found hand in hand as being close to consumers is often a prime goal for commercial development. It is possible that areas with high residential assessment revenue are lax about assessments of commercial properties or even that these spatial relationship are based on historical or transportation patterns that this study does not address. Images 5 and 6 highlight the agricultural and industrial hot spots that will be investigated further with regression analysis.

Exploratory Data Analysis

Exploratory spatial data analysis (ESDA) is a logical next step after mapping the raw data and gaining familiarity with general patterns observed in spatial datasets. Using the software, Open GeoDa, a series of scatter plots was created for each dependent variable, census tract fiscal health score, percent of census tract assessed value from residential land uses, percentage of census tract assessed value from commercial land uses, and then repeated at the municipal level. Open GeoDa allows you to choose an independent and dependent variable from amongst the attributes in the data table attached to the shapefile and plots their spatial occurrences against each other.

The strength of spatial correlation within the data depends on what weight matrix is used to plot the data. There are several different kinds of weight matrices, each using a different "formula" to calculate the relationship between a given data point and others

located near it. Theory and the analyst's conceptual understanding of the spatial relationships being studied inform the choice of weight matrix, and in the absence of compelling arguments for a particular specification, the basic queen contiguity matrix is typically employed. The matrix in this analysis was created from the relationship of each census tract to one another and a queen contiguity matrix was used to elicit any spatial patterns within the data.

Regression Analysis with Open GeoDa

Regression analysis was used to model the relationship between municipal fiscal health and the independent variables discussed above within San Diego County. This technique was also used to examine the determinants of the percentage of total assessed value derived from residential land uses at both the census tract and municipal levels. Ordinary least squares (OLS) regression is conducted in Open GeoDa by first opening a shapefile in which the attributes represent candidate variables in the regression model. For a detailed overview of spatial regression using Open GeoDa, see Anselin (2005).

Moran's I Exploratory Spatial Data Analysis with Open GeoDa

The Moran's I statistic is a well-established test for the presence of spatial pattern within a given set of data. When applied to single variable outside the regression context the observed values are compared with the spatially lagged version of the same data and the statistical significance of the test is established through a random permutation procedure (Anselin, 2005 p. 134). Values close to zero suggest that the data are completely spatially random, positive values suggest positive spatial auto-correlation, and negative values suggest negative spatial autocorrelation. For example, if the Moran's I statistic is

calculated for household income at the tract level and the random permutation procedure indicates a statistically significant result (i.e., the associated p-value is less than 0.05) the value of the statistic itself can be interpreted. A high value suggests that like values exhibit clustering or that high-income households tend to be located near other high-income households and low-income households tend to be located near other low-income households. Conversely, a negative value indicates a different type of pattern where low-income households are located near high-income households and vice versa.

Assumptions and Limitations

There are several underlying assumptions and limitations that bear mention here with respect to the analysis. First, for all appraisal work assumes that the valid sales used in the analysis are representative of the entire population. However, it is known that homes in some market areas and neighborhoods sell more frequently than others, resulting in over-representation and under-representation of parcels in the valid sales sample, influencing valuation of properties in those locations, and possibly skewing the analysis results.

Second, SanGIS was unable to provide time series data on the assessed value of the land parcels. If these data were available it would be possible to study both the land use types and land use values over time, perhaps before and after implementation of a property tax limit, and to more cleanly isolate the effect of these policy interventions. Time series data would also indicate which properties are turning over faster, which plays a major role in the valuation process within the Proposition 13 context.

Third, appraisal offices in California vary in their market value estimating process, so the accuracy of the annually reported values would be expected to vary from county to county throughout the state. As a result of this practice, properties sold have a consistently higher market value estimate (AV), much closer to the actual market value, than the rest of the properties. Another problem with the appraisal system is known as sales chasing in which appraisal districts often increase the appraised values of properties that have recently sold to their sales price, while leaving comparable properties unadjusted (McCullogh, 2009). Sales chasing is difficult to avoid because appraisers have knowledge of the prior year sales prices when they determine the current year market value estimates and that knowledge tends to influence the appraised values they assign to the sold properties.

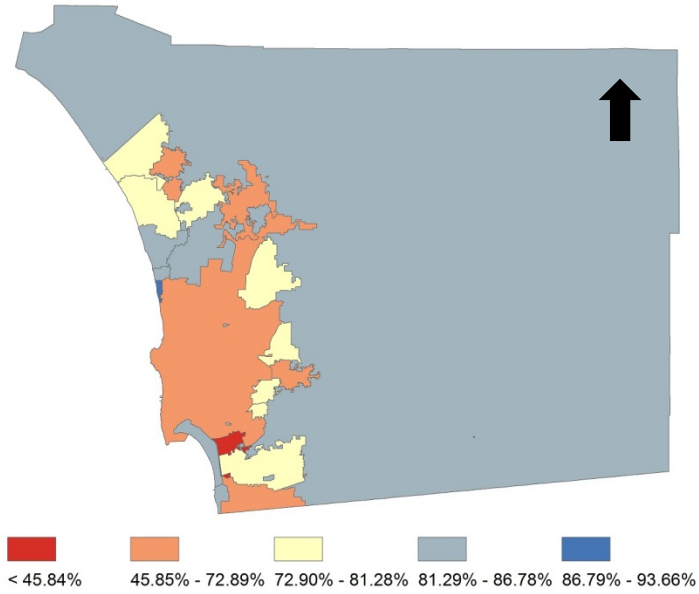
Fourth, the municipal health scores for the municipalities measured within this study did not show great variation with all the municipalities in San Diego County performing poorly in 2011. A comparison of community or many communities that exhibit greater variation in the level of municipal health might provide richer insights into relationships between the dependent and independent variables. It is likely that this comparative analysis would have to include municipalities outside of California because its cities' fiscal health is inextricably linked to the state's fiscal health woes.

Lastly, future analysis should focus on measuring vertical inequity by the date of purchase of the property as that is the only time the base assessed value becomes active under Proposition 13. The assumption is that properties purchased more recently will face a higher tax burden than those purchased further in the past and this will provide more compelling evidence of vertical inequity within property taxation.

TABLE 6: Variable Hypotheses and Scatter Plot Results (CENSUS TRACT) for Dependent Variable Municipal Fiscal Health

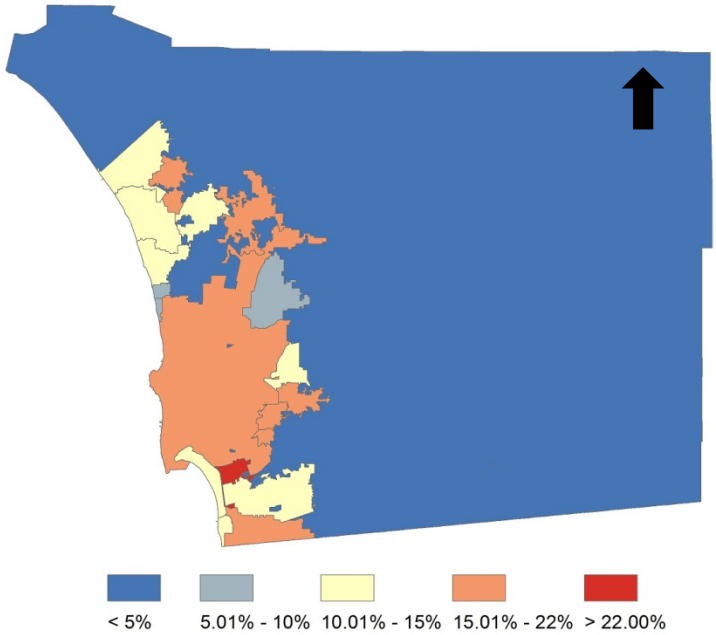
	HYPOTHESIS	SCATTER PLOT CORRELATION
EMPLOYMENT INDICATORS		
Unemployment	NEGATIVE	POSITIVE
Families in Poverty	NEGATIVE	POSITIVE
Household Income $10-$14K	NEGATIVE	POSITIVE
Household Income $35-$39k	NEGATIVE	NEGATIVE
Household Income $75-$79K	POSITIVE	NEGATIVE
Household Income > $200K	POSITIVE	NEGATIVE
HOUSING		
Percent Rent Occupied	NEGATIVE	POSITIVE
Rent as 50% or more of Income	NEGATIVE	POSITIVE
Percent Owner Occupied	POSITIVE	POSITIVE
Percent Vacancy Rate	NEGATIVE	POSITIVE
EDUCATION		
Percent High School Education or Less	NEGATIVE	POSITIVE
Percent Bachelor's Degree	POSITIVE	POSITIVE
MARRIAGE		
Percent Married Population	POSITIVE	NEGATIVE
RACE		
Percent Hispanic Population	NEGATIVE	POSITIVE
Percent Black Population	NEGATIVE	POSITIVE
Percent White Population	POSITIVE	NEGATIVE

IMAGE 3: RESIDENTIAL ZONES AS % OF TOTAL ASSESSED PROPERTY VALUE PER CITY



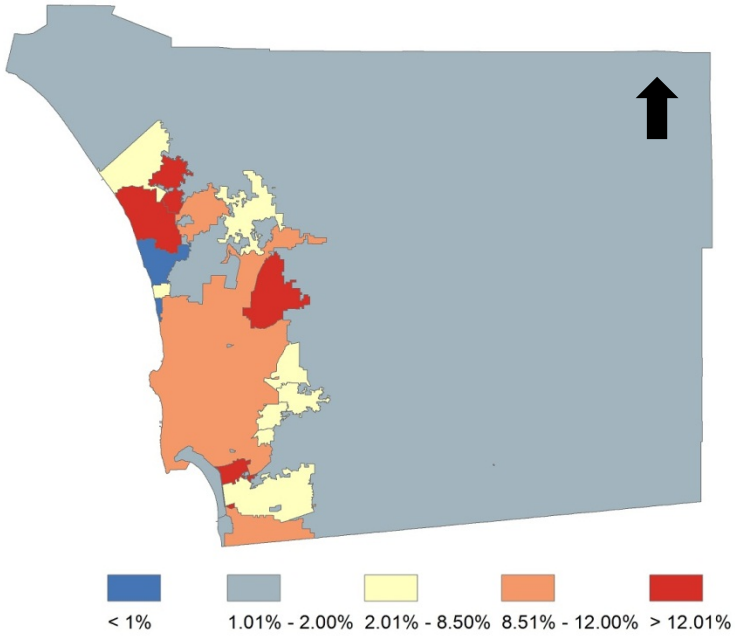
Residential Zones Value/Total Assessed Value

IMAGE 4: COMMERCIAL ZONES AS % OF TOTAL ASSESSED PROPERTY VALUE PER CITY



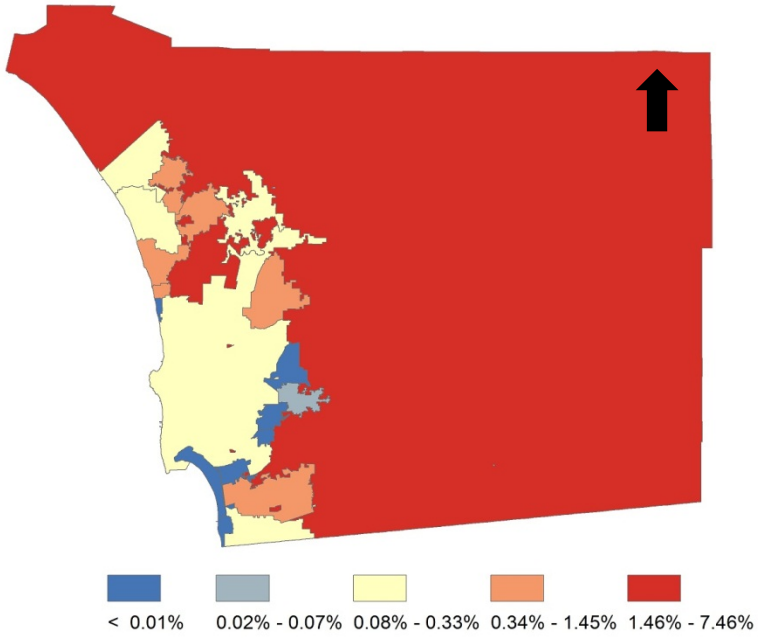
Commercial Zones Value/Total Assessed Value

IMAGE 5: INDUSTRIAL ZONE VALUE AS % OF TOTAL ASSESSED VALUE PER CITY



Industrial Zone Value/Total Assessed Value

IMAGE 6: AGRICULTURAL ZONE VALUE AS % OF TOTAL ASSESSED VALUE PER CITY



Agricultural Zone Value/Total Assessed Value

Chapter 5

FINDINGS

Vertical inequity is the presence of differences in effective tax rates among groups of properties or land use types based upon their relative value ranges. For example, if higher priced homes as a group have different effective tax rates than lower priced homes as a group, the condition of vertical inequity exists—property tax equity demands that all homes have the same effective tax rate.

Calculations of assessed value by land use type supported the theory that vertical property tax equity among land use types exists in California and is a result of assessment limits imposed by Proposition 13. In comparison to land use values before the implementation of Proposition 13, there has been a significant shift of the property tax burden towards residential properties. The residential property tax burden has increased from 73% in 1974 (CTRA) to 83.58% in 2010—a 2 point increase or 10% increase in the property tax burden on residential property owners since the passage of Proposition 13. Over the same period, the non-residential property tax burden dropped from 27% to 14%—a 2 point decrease or 7% decrease in the property tax burden on non-residential property (i.e. commercial).

Variable Maps

The first step in a general spatial analysis is to map variables from the data to note possible trends and relationships. Image 2 shows fiscal health score by municipality with a general trend of higher fiscal health south near the border of Mexico. This is consistent with the initial data analysis that found fiscal health to correlate positively with low levels of community prosperity. The general trend of higher fiscal health south near the border of

Mexico and east to the coast may be explained by the higher value of property and land of all types as you near coastal areas.

Scatter Plot Data Analysis

The OLS regression analysis used here carries an assumption of linearity, which means that there is a straight line relationship between the independent variables and the dependent variable. This assumption is important because regression analysis only tests for a linear relationship between independent and dependent variables. Violations of this fundamental assumption can often be identified by examining a bivariate scatterplot (i.e., a graph with the independent variable on one axis and the dependent variable on the other). Each of the dependent variables as plotted against the dependent variable for fiscal health score. Each plot contains a trend line that indicates a general relationship between the plotted data. Initial analysis of plots shows negative relationships between fiscal health score with all land use types except industrial and miscellaneous land use zones. One interpretation is that the fiscal health score is not as responsive to the zones from with the municipalities collect most of their levy because they are fairly consistent from year to year.

Additionally, when plotting the census tract fiscal health score against many demographic characteristics, there is an overwhelmingly clear relationship elucidated between negative or positive prosperity indices and percentage assessed value residential or commercial. Income greater than $200k, population white, and population married show a steep negative slope in relationship to percentage assessed value commercial and unemployment, low income, and vacancy rate show a positive relationship.

The initial findings within the Moran scatter plots were generally surprising. The initial hypothesis held that positive prosperity within an index would show higher levels of fiscal health, the exact opposite was found in many of the plots. The only negative correlations with fiscal health were found in household income categories above $35,000 (all), percent of population married, and percent of population white. All other indicators showed positively correlated relationships (Table 6).

Exploratory Results

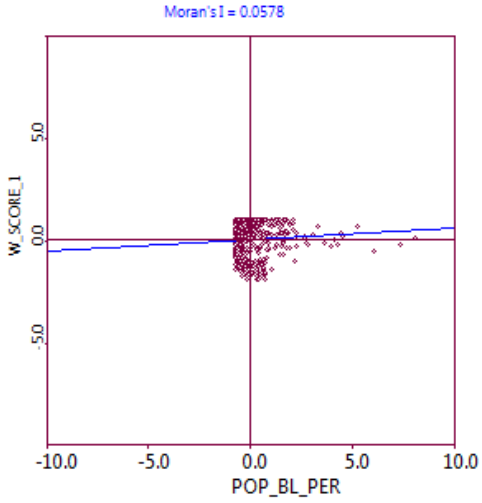
Images 7-9 are multivariate Moran's I scatter plots for each of the three dependent variables. In concert with other exploratory analyses, these images give a glimpse of which independent variables showed spatially dependent patterns and reveals any extreme outliers within the dataset. A slope moving from the top left quadrant to the bottom right indicates negative spatial autocorrelation and a slope moving from the bottom left to the top right indicates positive correlation. The steepness of the slope indicates the strength of the spatial dependence. The value of Moran's I for each bivariate plot is listed above the image.

Image 7 showed evidence of positive spatial autocorrelation in percent of population black, percent of population with a bachelor's degree and commercial assessed land value to fiscal health score in the population. Negative spatial autocorrelation is found in plots of percent white population, percent of population married, and residential assessed value to fiscal health score. Image 8 showed evidence of positive spatial autocorrelation in percent white population, percent owner occupied, percent Hispanic population and families in poverty to the total assessed value of residential property per census tract. Negative autocorrelation was seen in the percentage of parcels renter occupied, but no correlation is found in the percent Hispanic population to residential assessed value plot. Image 9 showed evidence of positive spatial autocorrelation in the

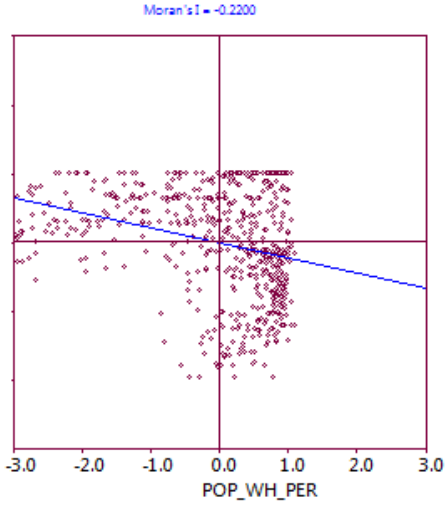
percent Hispanic population and percent of parcels renter occupied to total assessed value of commercial property. Negative autocorrelation is seen in percent white population and percent of parcels owner occupied.

IMAGES 7.1-7.7 Moran's I Exploratory Spatial Data Analysis (ESDA) Scatter Plots Comparing Fiscal Health Score to Independent Variables

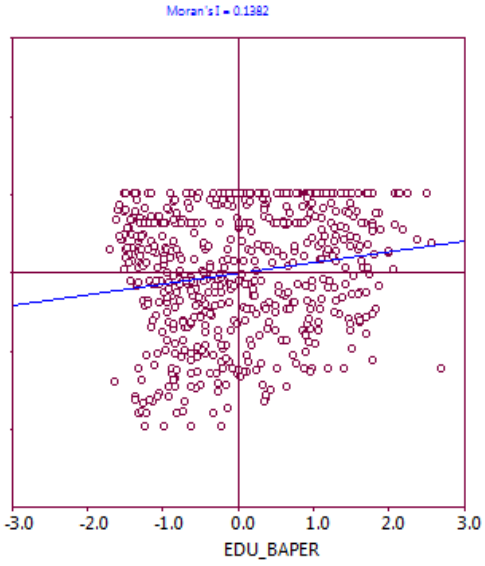
PLOT 7.1: FISCAL HEALTH SCORE TO BLACK POPULATION



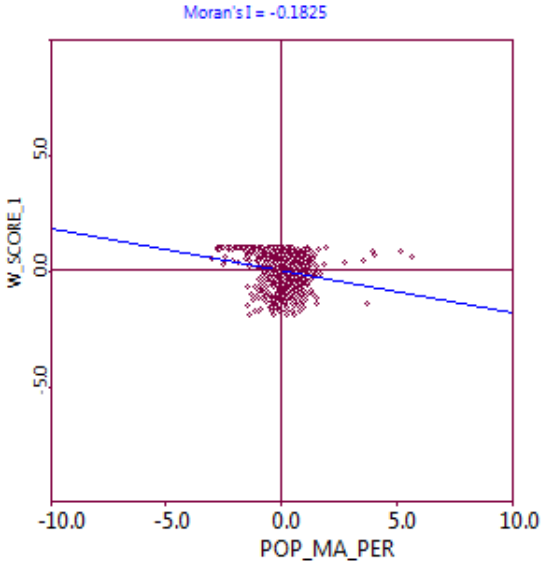
PLOT 7.2: FISCAL HEALTH SCORE TO WHITE POPULATION



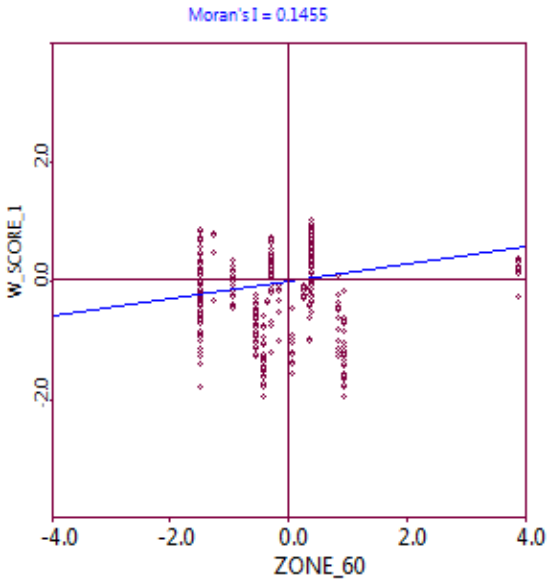
PLOT 7.3: FISCAL HEALTH SCORE TO PERCENT OF POPULATION WITH BACHELOR'S



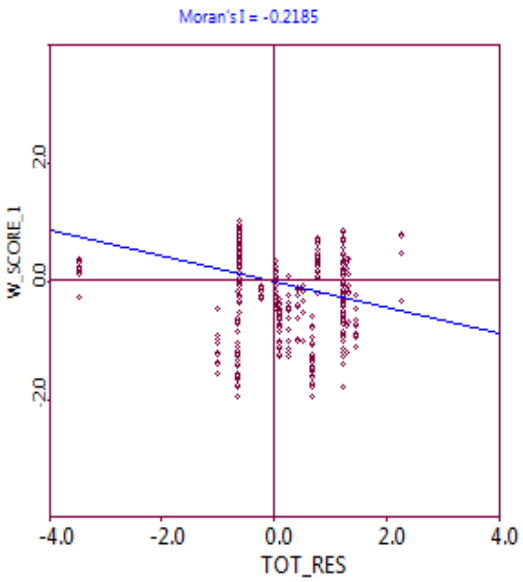
PLOT 7.4: FISCAL HEALTH SCORE TO POPULATION MARRIED



PLOT 7.5: FISCAL HEALTH SCORE TO ZONE COMMERCIAL ASSESSED VALUE

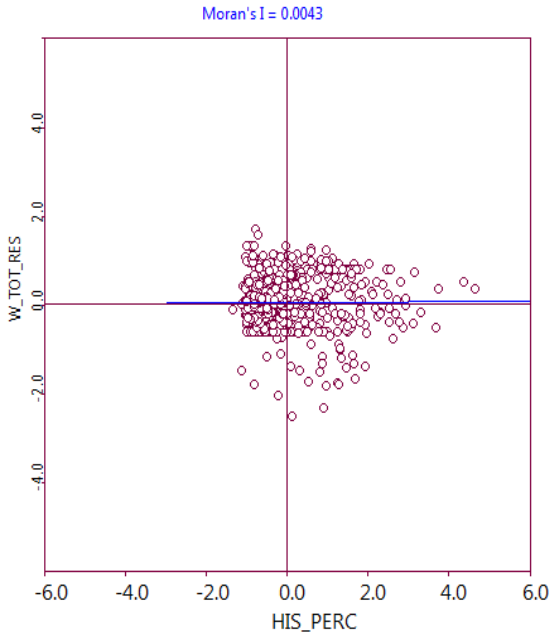


PLOT 7.6: FISCAL HEALTH SCORE TO ZONED RESIDENTIAL ASSESSED VALUE

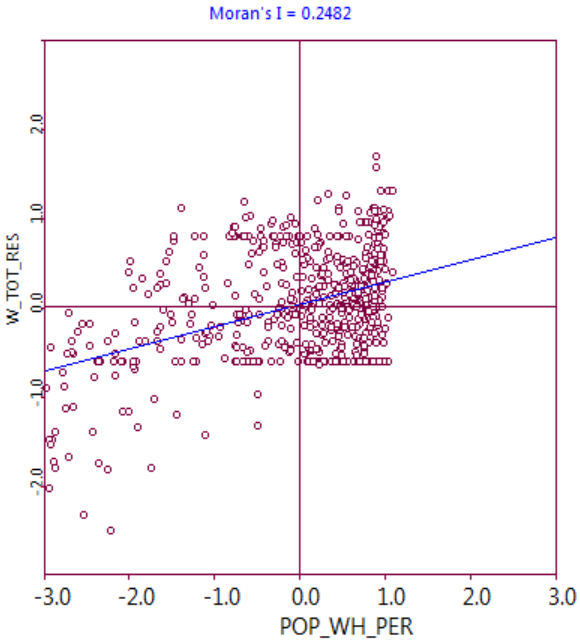


IMAGES 8.1-8.5: MORAN'S I EXPLORATORY SPATIAL DATA ANALYSIS (ESDA) SCATTER PLOTS COMPARING % OF ASSESSED VALUE PER TRACT RESIDENTIALLY ZONED TO CENSUS TRACT DEMOGRAPHICS

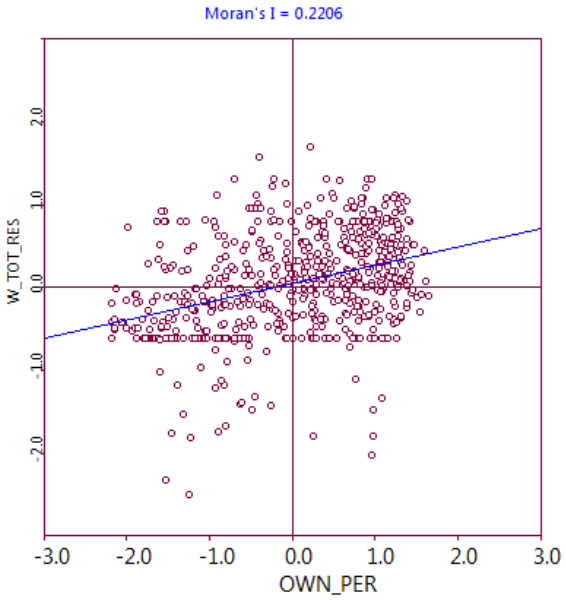
PLOT 8.1: RESIDENTIAL ASSESSED VALUE TO HISPANIC POPULATION



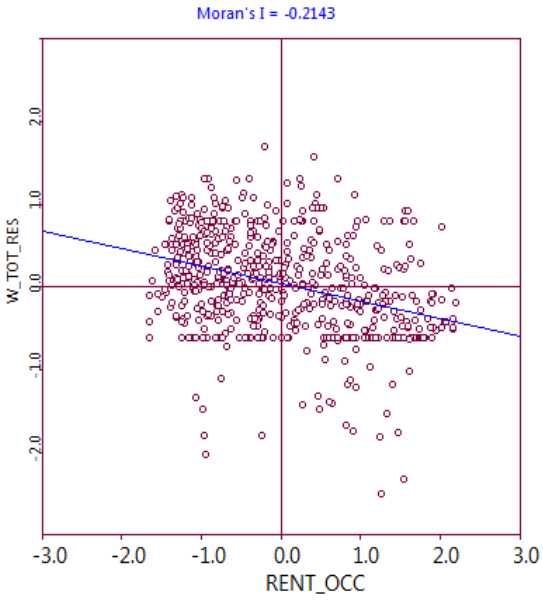
PLOT 8.2: RESIDENTIAL ASSESSED VALUE TO WHITE POPULATION



PLOT 8.3: RESIDENTIAL ASSESSED VALUE TO OWNER OCCUPANCY RATE

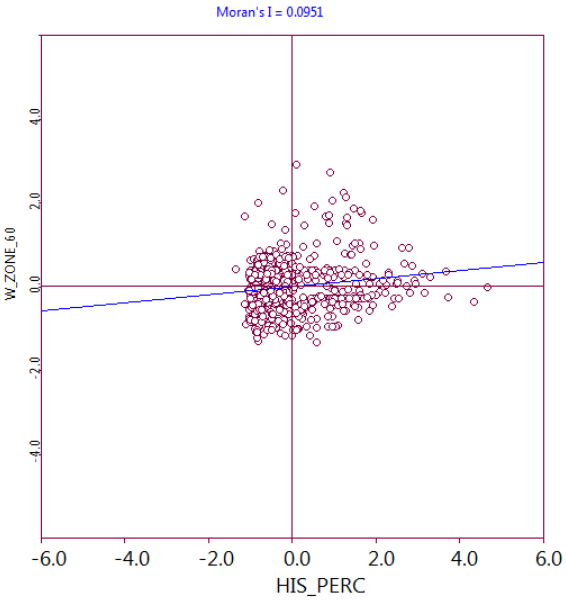


PLOT 8.4: RESIDENTIAL ASSESSED VALUE TO RENTER OCCUPANCY RATE

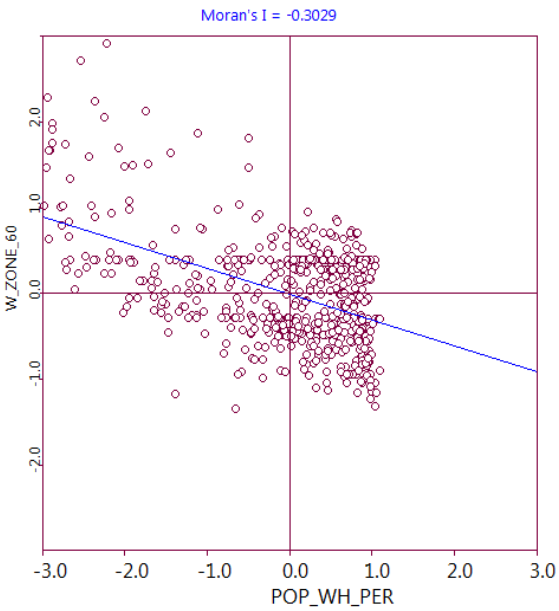


IMAGES 9.1-9.6: MORAN'S I EXPLORATORY SPATIAL DATA ANALYSIS (ESDA) SCATTER PLOTS COMPARING % OF ASSESSED VALUE PER TRACT COMMERCIALLY ZONED TO CENSUS TRACT DEMOGRAPHICS

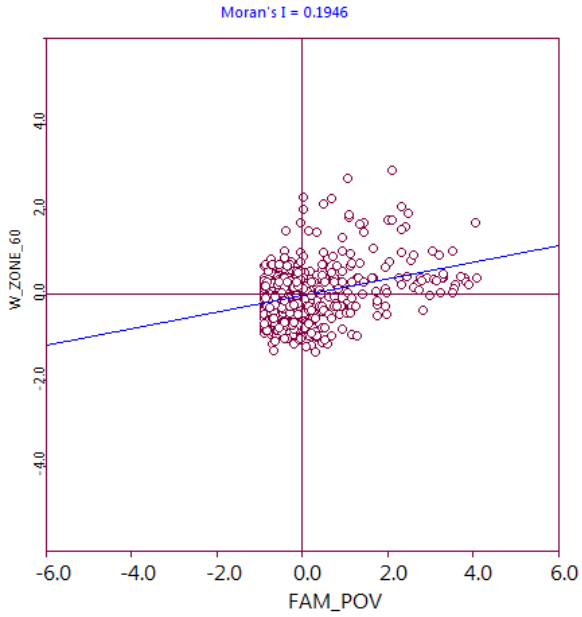
PLOT 9.1: COMMERCIAL ASSESSED VALUE TO HISPANIC POPULATION



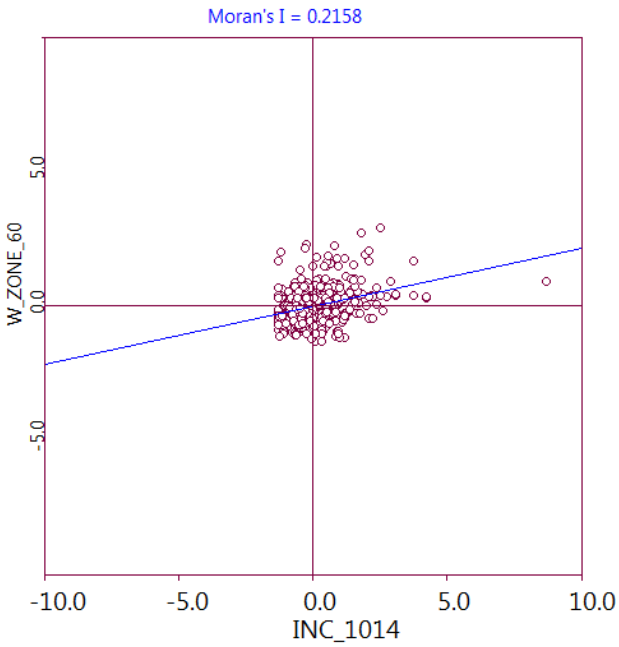
PLOT 9.2: COMMERCIAL ASSESSED VALUE TO WHITE POPULATION



PLOT 9.3: COMMERCIAL ASSESSED VALUE TO RATE OF FAMILY POVERTY

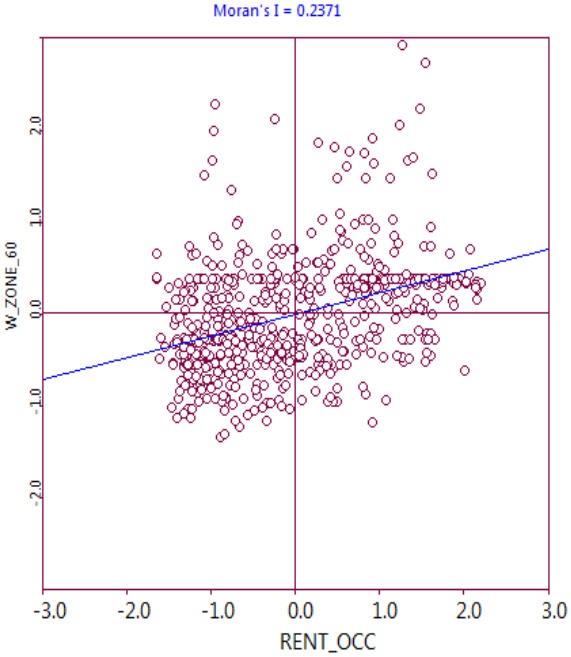


PLOT 9.4: COMMERCIAL ASSESSED VALUE TO HOUSEHOLD INCOME $10=$14K



PLOT 9.5: COMMERCIAL ASSESSED VALUE TO OWNER OCCUPANCY RATE

PLOT 9.6: COMMERCIAL ASSESSED VALUE TO RENTER OCCUPANCY RATE



Phenomena that are highly influenced by social factors are generally difficult to model. Humans and human systems are complex and there are numerous variables that are difficult or impossible to account for and data availability requires compromise on the part of researchers. With these caveats in mind, the results of the OLS regression analysis are presented in Table 7. The first model shows that the unemployment and low income measures have a negative relationship with fiscal health. Also, this model echoes what is also shown in the other models; race is the strongest predictor of both fiscal health and assessed value by line type. The assumption here is that since race is highly correlated with residential patterns (U.S. Census Segregation Pattern), it is not surprising that race has a strong spatial influence. The results of this analysis show the regression model for fiscal health score to be the strongest with and adjusted R^2 value of 0.27and a general positive linear relationship with all racial types and persons paying more than 50 percent of their income towards rent (Table 7).

The results of this analysis for percent assessed value commercial showed a strong negative predictive value in homeownership. The measure for homeownership is more likely to indicate single family or residential only neighborhoods which could be more likely to exclude zoning for commercial development. The model for percent assessed value also included population white, population Hispanic, low income, families in poverty, and percent of persons with a bachelor's degree. The last model shows percent assessed value residential to have a predictive relationship most strongly with the presence of Hispanic population. The model is also accounted for by percent rent occupied, percent married, and unemployment (Table 7). One conjecture as to why this is so is that higher value properties (which link to higher levels of prosperity such as income) are re-assessed

less often than lower value properties with the lower value properties then contributing more property tax to the local levy. Though this says little about the fiscal health of communities in San Diego County, it does begin to provide insight into the relationship between racial segregation in residential location patterns and land use characteristics. Fiscal health, on the other hand, has been more difficult to model. It is likely that including political and fiscal decisions in a spatial model might be more telling. The CFAR report (2010) found a surprising amount of commercial and high value sales that escaped assessment. Another conjecture is that these trends are evidence of the classic American settlement patterns in which automobile dependency, safety and similarity guide residential choices of these citizens.

The second regression model takes municipal fiscal health as the dependent variable and the key predictor is the percentage of assessed value that comes from different land use types. The results suggest negative correlations between municipal fiscal health and both residential and commercial percentage assessed value contribution as well as a positive relationship between Special/Misc. Land Use of Zone 9. It should be noted that special or miscellaneous land use includes tourist's destinations and these uses bring in large amounts of revenue. Although this result is significant, it is perhaps less meaningful than the previously regressed variables.

TABLE 7: OLS Regression for 3 dependent variables

	Model 1		Model 2		Model 3	
Predictors	Coef.	Std. Error	Coef.	Std. Error	Coef.	Std. Error
Constant	0.3447	0.0369**	0.3648	0.0442***	0.4856	0.0540***
Population Black	0.3194	0.0640***				
Population White	0.4175	0.2947*	-0.1158	0.0140*		
Population Hispanic	0.3517	0.0462***	-0.0971	.0432*	0.2348	.0425***
Income $10-$14k	-0.3242	0.0640***	0.2925	.0946**		
Unemployed	0.6130	0.1140**			-0.0821	.0756***
Rent > 50 % Income	0.0318	0.0935*				
Homeowners			-0.1514	.0436***		
Rent Occupied			-0.117	.0446**	-0.0579	.0132***
Education Bachelors			0.0244	0.0357		
Family Poverty			-0.1119	.0631*		
Zone Commercial	6.8169	.90611***				
Population Married					0.1393	.0155***
Model Summary						
Multicollinearity [4]	17.270785		55.421201		12.543061	
Breusch-Pagan test	44.30955***		38.94422***		42.2651***	
Adjusted R^2	0.33		0.17		0.19	
Moran's I [5]	0.0658***		0.1192**		-0.5712***	

*p < 0.05. **p < 0.01. ***p < 0.001.

[1] The dependent variable is the fiscal health score associated with each census tract in the study area.
[2] The dependent variable is the assessed value contributed by commercial uses for each census tract in the study area.
[3] The dependent variable is the assessed value contributed by residential uses for each census tract in the study area.
[4] Values over 30 are typically indicative of multicollinearity issues and require attention.
[5] Moran's I tests for spatial dependence in the model residuals.

TABLE 8: Spatial Error Regression Model for 3 dependent variables

	Model 1		Model 2		Model 3	
Predictors	Coef.	Std. Error	Coef.	Std. Error	Coef.	Std. Error
Constant	0.5228	0.0277***	0.3576	0.0438***	0.7252	0.0222***
Population Black	0.002	1.1817				
Population White	0.36412	0.0209***	-0.1094	0.0140***		
Population Hispanic	5.3857	0.9010***	-0.0956	0.0435	0.0648	0.0316*
Income $10-$14k	-0.58157	1.9618*	0.2858	0.0939*		
Unemployed	-0.0454	0.1140**			-0.2029	0.0846**
Rent > 50 % Income	0.2355	1.2371				
Zone Commercial	4.7097	0.8693***				
Homeowners			-0.1461	0.0433***		
Rent Occupied			-0.1154	0.0443	-0.0299	0.0171*
Education Bachelors			0.0141	0.0357		
Family Poverty			-0.1036	0.0680**		
Population Married					0.0648	0.0241***
Lambda	-0.7779	.1766***	-0.1718	.2201*	-0.5211	0.2041**
Model Summary						
Breusch-Pagan Test	21.28011*		196.6537***		5.81208	
Log Liklihood Test	62.48157***		0.7425235		7.227767**	
Adjusted R^2	0.22		0.18		0.08	

*p < 0.05. **p < 0.01. ***p < 0.001.

[1] The dependent variable is the fiscal health score associated with each census tract in the study area.
[2] The dependent variable is the assessed value contributed by commercial uses for each census tract in the study area
[3] The dependent variable is the assessed value contributed by residential uses for each census tract in the study area.

Spatial Regression Analysis (Moran's I)

Exploratory spatial data analysis shows patterns in the variables for which you can test for spatial autocorrelation using spatial regression analysis. Each of the dependent variables considered in the three models exhibit some level of spatial auto-correlation and represents a clear departure from the null hypothesis of complete spatial randomness. Though model one (fiscal health) shows the strongest evidence for spatial dependence with a statistically significant Moran's I value of 0.5395 when the residuals were tested, the model is problematic in that the fiscal health scores were calculated at the municipal level and then assigned to the census tracts within the municipality. As a result, spatial dependence is introduced due to this hierarchical relationship. Although using the municipal-level calculations in this way is not ideal, the sample size at the municipal level was too small (n = 21) to garner dependable results. One way to remedy this problem would be to calculate fiscal health and test for spatial dependency of many more municipalities within California, and this is a possible area for further research at a later date.

The next step in spatial regression analysis according to Anselin (2005) is to estimate a spatial error model. This step adjusts the standard errors in the first model to offset bias from spatial autocorrelation in the residuals. The corrected models are presented in Table 8. For comparison purposes, the estimated model contains the same set of controls as the first model in Table 7. The first considers fiscal health of each census tract as it is affected by its nearest neighbors based on its geographical position. Two of the independent variables that were significant in the OLS version of Model 1 (Population

Black, Rent > 50% Income) lose significance when the spatial autocorrelation is removed (see Table 8). Interestingly, the unemployment variable remains significant, but the direction of its relationship with fiscal health changes as evidenced by a shift in sign between Table 7 to Table 8. Finally, the Zone Commercial variable remains significant and the sign is unchanged, but the associated coefficient suggests a positive relationship between commercial properties and fiscal health. Specifically, for a one unit increase in Zone Commercial, the dependent variable (fiscal health) of Model 1 is expected to increase by a 6.8, which is surprising. This finding points to a more complex relationship between fiscal health and proportion of taxes levied from commercial to residential land use than was investigated in this study. One common rule of economic growth and stability for municipalities is diversity within revenue sources, including from the tax base. Another explanation would be that increased presence of commercial zoned parcels increases the amount of sales tax revenue of the municipality, thus the fiscal health.

In Table 7, spatial autocorrelation is also strongly exhibited by Model 3 where total residential land assessed value is the dependent variable with a Moran's I value of -0.5712, it remains statistically significant. This dependent variable, in particular, is very difficult to statistically model and may show spatial dependence due to omitted variables where supporting data were unavailable, and therefore could not be included at this point. The spatial relationships that exist show that percent rent occupied and percent of persons unemployed are negatively associated with residential assessed value in space. The commercial assessed value model shows very little spatial autocorrelation with a Moran's I value of 0.1192. One explanation is that commercial property is less predictable than residential property and the relatively poor performance of the model ($R^2 = 0.17$) simply

reflects a less mature theoretical understanding of these properties, relative to residential properties. The monetary assessed value of residential property is highly dependent on location, as in a high income neighborhood versus a low income neighborhood. In contrast, commercial property is more flexible in terms of assessed value. For example one may find a big box store (high value) located in a low income neighborhood or a specialty small business with one office (lower value) in a high income neighborhood.

Summary

The findings indicate that there is a significant relationship between factors of prosperity, municipal fiscal health, and proportion of assessed land value by use type. In San Diego County, municipal fiscal health score is directly related to census tracts in which the commercial tax burden is higher. One postulation is that increased diversity in the tax base, as evidenced by a larger share of taxes from commercially zoned parcels, has helped slow the negative fiscal effects as compared to cities with large swaths of residential only land use. Residentially zoned parcels are paying a greater relative burden of the tax levy for every community in San Diego County relative to that position pre 1978 (CAL). One explanation often put forward, that housing turns over more rapidly than commercial property, does not fully explain the phenomenon, as much research notes that turnover rates tend to equalize over time (O'Sullivan, 1995). It is more likely that commercial property is not as frequently reassessed as homeowner property, but commercial property frequently changes ownership. The problem is that an assessment is not often triggered, and that "a change in ownership" only occurs under limited circumstances. Additionally,

these residential versus commercial inequity patterns can be explained, spatially, through a host of demographic characteristics present within the community.

The findings also indicate that the cities in San Diego County are fiscally strained in comparison to cities of similar size throughout the United States. Using the ten point fiscal analysis, all cities in San Diego scored a six or below, with a ten being a "good" score for comparable cities. Though this study does not elaborate on the causes of the fiscal strain in San Diego County, it does show that demographic characteristics can be used to predict the financial health of communities in San Diego County.

Chapter 6

Conclusions and Recommendations

Conclusions

The results of the analysis provide evidence that assessment capping has had the undesirable result of damaging property tax fairness among taxpayers in San Diego County. This work also further supports the basis for legal challenges to the constitutionality of assessment capping.

The research questions were: (a) to what extent is municipal fiscal health in San Diego County predicted by disparities in assessed value by land use types in San Diego County and (b) are disparities in assessed value by land use types in San Diego County predicted by economic and demographic variables that indicate prosperity? The conclusion and answer to the first research question, based upon the results reported in this analysis, is that there is a significant correlation between variables of demographic affluence, such as percent of population married and homeownership, and an increased reliance on residential properties to support the local tax levies. Additionally, there is evidence that a census tracts fiscal health score is higher when that tract shows a higher percentage of property taxes from commercial land use, even though San Diego County has experienced a downward shift in the amount of commercial taxes levied since the passage of Proposition 13 in 1978 (CTRA). The answer to the second question is that yes, demographic and spatial variables correlate to levels of commercial to residential property tax fairness in San Diego County.

The strongest model found in this study, though, was the ability to predict municipal fiscal health from the independent variables such as white population, Hispanic population, black population, unemployment, low income, and paying too much for rent. The demographic model points to a relationship between patterns of racial segregation in residential location and indices of prosperity.

Recommendations

I recommend that measures be taken to improve property tax equity. The results of this study have provided evidence that Proposition 13, as a means of limiting property taxes, actually reduces tax equity among the taxpayers that the policies are intended to benefit. The very first thing Californians must do is to call for legislation that reassesses many or all commercial properties in order to avoid basic cuts in services and programs. There appear to be many millions of dollars in tax revenue which are going uncollected due to missed assessments and loop holes in the law that allows for transference of property. Second, the existing law should be changed to ensure that obvious changes of ownership, such as private equity buyouts and corporate takeovers, trigger a reassessment for all commercial properties automatically.

As for long term effects, one recommendation is to eliminate tax administration policies and return equity to property taxation throughout California by eliminating assessment limits for commercial properties. For whatever reason, commercial properties are able to avoid reassessment as often as residential properties resulting in a significantly lower tax burden in most areas of San Diego County.

It is highly unlikely that such action is possible legislatively due to the potential political costs associated with their elimination or by popular vote because the perception held by the majority of voters is that Proposition 13 benefits them. Hence, the only feasible means of returning property taxation to a true market value standard, which is the only manner by which it will function equitably for all taxpayers, is through the courts using the evidence produced by findings in this and other studies that examine equity in relation to taxable net assessed value.

Another recommendation is to provide a property tax circuit-breaker provision of the variety described in detail by Bowman (2008) that has an income-based need test, providing an inverse relationship between household income and tax relief amounts for those needing assistance. Programs based upon the circuit-breaker concept would offer a means of providing legitimate tax relief for the small number of homeowners truly in need of assistance, and as such, should have minimal equity impact for taxpayers.

A method shown to work effectively, even in the presence of citizen apathy, is to statutorily require an automatic rate reduction to enforce revenue growth limits after the aggregate assessed value has been determined. Kentucky is an example, where statutes limited total property tax revenue growth to a maximum of 4% per year irrespective of the amount that real estate assessments increased, by requiring that tax rates be reduced as necessary to limit revenue growth (Coffman, 1993). During the period of 1978 to 1992, when state-wide assessed property value increased 273%, state-wide property tax revenue only increased by 60%, which was the 4% maximum allowed annual revenue increase compounded over the 14 year period (Coffman, 1993, p. 111). The public has accepted the

myth of assessment increases as the cause of rapid property tax increases and has demanded assessment capping as the cure. Instead, a more effective and equitable response would be to use mandatory year-to-year revenue capping to control property tax increases.

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APPENDIX A

BROWN'S 10 POINT FISCAL ANALYSIS

TABLE A.1: Municipal Budget Deficits in San Diego County

Municipality	Population	Budget Deficit Anticipated 2010-2011	Percent of Budget
Carlsbad	98,607	-$8,134,081	-3.21%
Chula Vista	223,423	-$9,347,000	-3.22%
Coronado	26,248	-$4,480,899	-11.95%
Del Mar	4,524	$0	0.00%
El Cajon	96,867	-$52,147,075	-36.58%
Encinitas	62,815	-$1,425,115	-1.63%
Escondido	140,766	$0	0.00%
Imperial Beach	27,563	$0	0.00%
La Mesa	55,724	$0	0.00%
Lemon Grove	25,363	-$5,722,900	-28.31%
National City	63,537	-$4,236,126	-4.67%
Oceanside	174,925	-$4,344,000	-3.94%
Poway	50,542	-$395,490	-0.50%
San Diego	1,311,162	-$144,434,838	-5.16%
San Marcos	76,725	-$1,605,877	-2.12%
Santee	54,709	-$509,535	-1.67%
Solana Beach	13,327	-$2,178,640	-9.70%
Vista	94,440	$0	0.00%

TABLE A.2: Ten Point Fiscal Health Analysis, Base Indicators by City

	REVENUE				EXPENDITURE	
Municipality	**1a. Total Anticipated Revenues 2010**	**2a. Total Revenue in GF**	**2b. Total IG Revenue in GF (i.e. fed grants)**	**3a. Total Operating Transfers into GF**	**4a. Total Expenditures minus Capital funds**	**4b. Total Expenditures (incl. Capital funds)**
Carlsbad	$253,330,050.00	$109,300,000.00	$1,200,000.00	$6,656,000.00	$191,091,621.00	$261,464,131.00
Chula Vista	$290,639,000.00	$132,966,000.00	$9,700,000.00	$12,340,000.00	$269,243,000.00	$299,986,000.00
Coronado	$37,500,000.00	$37,545,050.00	$0.00	$2,310,000.00	$37,360,899.00	$41,980,899.00
Del Mar	$24,187,541.00	$10,329,127.00	$15,441.00	$0.00	$16,325,701.00	$24,187,541.00
El Cajon	$142,573,759.00	$52,786,487.00	$5,489,130.00	$530,000.00	$118,491,584.00	$194,720,834.00
Encinitas	$87,630,160.00	$53,669,000.00	$3,321,000.00	$437,800.00	$79,535,355.00	$89,055,275.00
Escondido	$189,358,255.00	$72,944,365.00	$3,010,000.00	$2,711,600.00	$171,642,110.00	$189,358,255.00
Imp. Beach	$38,973,099.00	$16,517,000.00	$237,000.00	$3,335,062.00	$23,909,017.00	$38,973,099.00
La Mesa	$122,245,590.00	$33,330,100.00	$1,494,300.00	$3,857,000.00	$74,922,630.00	$122,245,590.00
Lemon Grove	$20,212,700.00	$12,355,000.00	$11,000.00	$2,377,000.00	$25,935,600.00	$25,935,600.00
National City	$90,627,265.00	$37,686,329.00	$576,400.00	$1,159,859.00	$82,370,636.00	$94,863,391.00
Oceanside	$110,310,900.00	$110,310,900.00	$1,221,900.00	$14,914,400.00	$114,654,900.00	$114,654,900.00
Poway	$79,110,630.00	$31,283,110.00	$0.00	$1,134,305.00	$77,373,120.00	$79,506,120.00
San Diego	$2,799,847,867.00	$1,129,706,375.00	$1,160,315.00	$97,180,000.00	$2,465,844,789	$2,944,282,705
San Marcos	$75,815,184.00	$60,588,402.00	$2,698,083.00	$1,132,953.00	$77,421,061.00	$77,421,061.00
Santee	$30,580,870.00	$30,580,870.00	$3,040,380.00	$417,410.00	$31,294,204.00	$31,294,20.004
Solana Beach	$22,460,300.00	$13,655,168.00	$1,297,000.00	$1,046,467.00	$20,261,840.00	$24,638,940.00
Vista	$61,506,390.00	$58,809,277.00	$2,697,113.00	$6,214,815.00	$90,485,821.00	$109,770,209.00

TABLE A.2 (cont.): Ten Point Fiscal Health Analysis, Base Indicators by City

	OPERATING POSITION		DEBT STRUCTURE	
Municipality	**6a. Unreserved, Designated, Undesignated funds in GF**	**7a. Total C&I in GF**	**9a. General Obligation Debt (repaid from Property Tax Revenue)**	**10a. Total Expenditures in Debt Service Fund**
Carlsbad	$61,400,000.00	N/A	$129,125,000.00	$11,865,539.00
Chula Vista	$123,666,000.00	N/A	$268,436,422.00	$20,082,000.00
Coronado	$28,130,250.00	N/A	$140,402,300.000	$45,742.000
Del Mar	$8,242,705.00	N/A	$6,892,360.00	$968,492.000
El Cajon	$42,077,729.00	N/A	$113,396,603.00	$15,218,760.00
Encinitas	$33,389,000.00	$28,000,000.00	$75,058,982.00	$6,792,182.00
Escondido	$45,944,365.00	N/A	$233,216,572.00	$15,992,595.000
Imperial Beach	$12,386,424.000	N/A	$19,944,730.00	$8,899,792.00
La Mesa	$12,873,480.00	N/A	$153,010,522.00	$2,986,640.00
Lemon Grove	$10,217,400.00	N/A	$28,100,000.00	$3,303,400.00
National City	$30,186,329.00	N/A	$69,355,464.00	$6,379,013.00
Oceanside	$95,810,900.00	N/A	$247,729,592.00	$5,214,900.00
Poway	$13,183,110.00	N/A	$296,437,000.00	$8,030,360.00
San Diego	$1,054,284,974.00	N/A	$2,713,000,000.00	$201,700,000.00
San Marcos	$909,676.00	N/A	$9,233,039.00	$472,728.00
Santee	$8,097,206.00	N/A	$29,700,000.00	$202,690.00
Solana Beach	$8,723,856.00	N/A	$33,050,628.00	$1,721,835.00
Vista	$11,196,593.00	N/A	$53,873,800.000	$17,210,535.00

TABLE A.3: 10 Point Fiscal Health Analysis Computed Ratios

	REVENUE			EXPENSES
	1. Total Revenues / Population	**2. GF Revenues from Own Sources / Total GF Fund Revenue**	**3. GF Sources from Other Funds / Total GF Source**	**4. Operating Expenditures / Total Expenditures**
Carlsbad	$2,569.09	0.989	0.057	0.731
Chula Vista	$1,300.85	0.927	0.085	0.898
Coronado	$1,428.68	1.000	0.058	0.890
Del Mar	$5,346.49	0.999	0.000	0.675
El Cajon	$1,471.85	0.896	0.010	0.609
Encinitas	$1,395.05	0.938	0.008	0.893
Escondido	$1,345.20	0.959	0.036	0.906
Imp. Beach	$1,413.96	0.986	0.168	0.613
La Mesa	$2,193.77	0.955	0.104	0.613
Lemon Grove	$796.94	0.999	0.161	1.000
Nat. City	$1,426.37	0.985	0.030	0.868
Oceanside	$630.62	0.989	0.119	1.000
Poway	$1,565.25	1.000	0.035	0.973
San Diego	$2,135.39	0.999	0.079	0.838
San Marcos	$988.14	0.955	0.018	1.000
Santee	$558.97	0.901	0.013	1.000
Solana Beach	$1,685.32	0.905	0.071	0.822
Vista	$651.27	0.954	0.096	0.824

TABLE A.3 (cont.): 10 Point Fiscal Health Analysis Computed Ratios

	OPERATING POSITION			DEBT STRUCTURE		
Municipality	**5. Revenue / Expenditures**	**6. Unreserved GF Balance / GF Revenue**	**7. GF C&I / GF Liabilities**	**8. GF Liabilities / GF Reserves**	**9. Long-Term Debt / Population**	**10. Debt Service / Revenues**
Carlsbad	0.969	0.562	N/A	0.438	$1,309.49	0.047
Chula Vista	0.969	0.930	N/A	0.070	$1,201.47	0.069
Coronado	0.893	0.749	N/A	0.251	$5,349.07	0.001
Del Mar	1.000	0.798	N/A	0.202	$1,523.51	0.040
El Cajon	0.732	0.797	N/A	0.203	$1,170.64	0.107
Encinitas	0.984	0.622	1.381	0.378	$1,194.92	0.078
Escondido	1.000	0.630	N/A	0.370	$1,656.77	0.084
Imp. Beach	1.000	0.750	N/A	0.250	$723.61	0.228
La Mesa	1.000	0.386	N/A	0.614	$2,745.86	0.024
Lemon Grove	0.779	0.827	N/A	0.173	$1,107.91	0.163
Nat. City	0.955	0.801	N/A	0.199	$1,091.58	0.070
Oceanside	0.962	0.869	N/A	0.131	$1,416.20	0.047
Poway	0.995	0.421	N/A	0.579	$5,865.16	0.102
San Diego	0.951	0.933	N/A	0.067	$2,069.16	0.072
San Marcos	0.979	0.015	N/A	0.985	$120.34	0.006
Santee	0.977	0.265	N/A	0.735	$542.87	0.007
Solana Beach	0.912	0.639	N/A	0.361	$2,479.98	0.077
Vista	0.560	0.190	N/A	0.810	$570.46	0.280

TABLE A.4: 10 Point Fiscal Health Analysis Comparison Tables, POPULATION UP TO 30,000

		Population 15,000-30,000				Population less than 15,000			
	Index Ratio	1 < 25% (WORST)	2 50%	3 75%	4 75-100% (BEST)	1 < 25% (WORST)	2 50%	3 75%	4 75-100% (BEST)
1	**Total Revenue/ Total Population**	$1,271	$918	$622	$622	$1,405	$888	$702	$702
2	**Total General Fund Revenues/Total Revenues**	77.7	88.6	98.3	98.3	76.4	89.2	96.7	96.7
3	**General Fund sources from Other Funds/Total General Fund Sources**	5.987	1.157	0.001	0.001	8.089	1.27	0.001	0.001
4	**Operating Expenditures/Total Expenditures**	97.9	91.1	81.9	81.9	99	92.2	80.3	80.3
5	**Total Revenues/Total Expenditures**	0.876	0.954	1.034	1.034	0.868	0.962	1.038	1.038
6	**Unreserved general Fund Balance/Total General Fund Revenues**	0.104	0.218	0.986	0.986	0.173	0.278	0.444	0.444
7	**Total general fund cash and investments/total general fund liabilities**	0.819	1.865	4.719	4.719	1.162	2.522	5.761	5.761
8	**Total general fund liabilities/ Total general fund revenues**	0.208	0.104	0.061	0.061	0.189	0.102	0.0057	0.0057
9	**Direct Long Term Debt/Population**	$622	$254	$15	$15	$628	$166	$2	$2
10	**Debt Service/Total Revenues**	0.133	0.063	0.011	0.011	0.105	0.039	0.001	0.001

TABLE A.5: 10 Point Fiscal Health Analysis Comparison Tables, POPULATION GREATER THAN 30,000

		Population 100,000 +				Population 30,000-100,000			
		1	2	3	4	1	2	3	4
	Index Ratio	< 25% (WORST)	50%	75%	75-100% (BEST)	< 25% (WORST)	50%	75%	75-100% (BEST)
1	**Total Revenue/Total Population**	$1,363	$1,016	$819	$819	$1,205	$941	$762	$762
2	**Total General Fund Revenues/Total Revenues**	80.2	87.7	96.8	96.8	77.5	97.4	96.4	96.4
3	**General Fund sources from Other Funds/Total General Fund Sources**	7.285	2.083	0.003	0.003	6.598	2.438	0.001	0.001
4	**Operating Expenditures/ Total Expenditures**	95.8	88.9	81.6	81.6	94.4	86.5	77.4	77.4
5	**Total Revenues/ Total Expenditures**	0.0878	0.964	1.038	1.038	0.864	0.952	1.034	1.034
6	**Unreserved general Fund Balance/Total General Fund Revenues**	0.086	0.18	0.3	0.3	0.133	0.211	0.338	0.338
7	**Total general fund cash and investments/total general fund liabilities**	0.622	1.529	30372	30372	0.916	1.909	3.525	3.525
8	**Total general fund liabilities/ Total general fund revenues**	0.254	0.101	0.069	0.069	0.193	0.099	0.063	0.063
9	**Direct Long Term Debt/Population**	$788	$384	$40	$40	$794	$269	$29	$29
10	**Debt Service/Total Revenues**	0.134	0.074	0.041	0.041	0.146	0.08	0.025	0.025

TABLE A.6: 10 Point Fiscal Health Analysis Composite Scores

Municipality	Population	Index 1	Index 2	Index 3	Index 4	Index 5	Index 6	Index 8	Index 9	Index10	Composite Score
Carlsbad	98,607	-1	2	1	2	0	-1	-1	-1	1	2
Chula Vista	223,423	-1	1	1	1	0	-1	2	-1	1	3
Coronado	26,248	-1	2	1	1	0	-1	-1	-1	0	0
Del Mar	4,524	-1	2	2	2	1	-1	0	-1	1	5
El Cajon	96,867	-1	1	1	2	-1	-1	0	1	0	2
Encinitas	62,815	-1	0	1	0	1	-1	-1	-1	0	-2
Escondido	140,766	0	0	1	0	1	0	-1	-1	0	0
Imperial Beach	27,563	-1	2	1	2	1	0	-1	0	-1	3
La Mesa	55,724	-1	0	1	2	1	-1	-1	-1	1	1
Lemon Grove	25,363	1	2	1	-1	-1	-1	0	-1	-1	-1
National City	63,537	-1	2	1	1	0	-1	0	-1	0	1
Oceanside	174,925	2	2	1	-1	0	0	0	-1	0	3
Poway	50,542	-1	2	1	-1	1	-1	-1	-1	-1	-2
San Diego	1,311,162	-1	2	1	1	0	0	-1	-1	1	2
San Marcos	76,725	2	0	1	-1	1	2	-1	0	2	6
Solana Beach	54,709	2	0	1	-1	1	0	-1	-1	1	2
Santee	13,327	-1	0	1	1	0	0	-1	-1	0	-1
Vista	94,440	2	1	1	1	0	0	0	0	-1	4