An Economist's Perspective on Urban Sprawl, Part II

Influences of the "Fiscalization of Land Use" and Urban-Growth Boundaries

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Influences of the "Fiscalization of Land Use" and Urban-Growth Boundaries

Prepared by

Robert W. Wassmer

Professor
Graduate Program in Public Policy and Administration
California State University

Visiting Consultant
California Senate Office of Research

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Executive Summary

California policy-makers and think tanks often talk of the "fiscalization of land use." This is just a shorthand way of suggesting that local planning and zoning decisions are driven by the goal of maximizing the local tax revenues that local land can produce. While it has been assumed this phenomenon encourages urban sprawl – as "big box stores," auto malls and other high-volume retailers spring up on once-open lands – no one has studied whether the appropriate data does, indeed, show that fiscal considerations are driving many local land-use decisions.

This paper shows that they are. The quest for local sales-tax revenue, in particular, is statistically linked to retail activities on the urban fringes ever farther from the central places of California and other western states.

If California's cities and counties received a smaller share of the sales taxes generated in their jurisdictions (*situs*-based), their central places – the areas where jobs and housing historically have dominated – would do significantly more retail business.

For example, this study found that if statewide discretionary revenue reliance on *situs*-based local sales taxes was reduced by just one-third, the metropolitan areas of Oakland, Ventura, Sacramento, Orange, and Visalia-Tulare-Porterville would have respectively generated 34, 34, 27, 25, and 18 percent more retail activity in 1997. The reason being that an outlying jurisdiction would have less of an incentive to zone local land uses in a manner (retail) that generates more general sales-tax revenue. Retail business that now locates in a metropolitan area's non-central places would have instead gone to the area's central places.

Under the current system of reliance on *situs*-based sales taxation for local discretionary revenue in California, central places in the state's metropolitan areas have less retail activity than their population, income, demographics, land prices, and previous decade's growth warrant. A statistically based simulation shows that central places in the Sacramento metropolitan area would have done $800 million more business in 1997 if municipal reliance on locally generated sales taxes was reduced by one-third. Instead that business went to the suburbs. In the metropolitan area of Los Angeles-Long Beach, downtown areas lost nearly $3.4 billion in business activity to the urban fringes that year. In the Oakland

metropolitan area, the shift in retail business from downtown neighborhoods to the urban fringes was $1.3 billion.

The urban fringes in these metropolitan areas have disproportionately more retail business activity than economic factors and population alone would justify. The likely result is that central-place residents need to drive to non-central places to purchase retail goods. The results of this fiscalization of land use are excessive driving in metropolitan areas, greater air pollution, loss of downtown vitality, and perhaps greater congestion on the metropolitan area's streets and highways.

If downtown residents tire of commuting to suburban retail businesses, they may move to those areas. A pattern emerges: site-based local sales taxation encourages the fiscalization of land use, which, as shown here, results in greater retail sales in non-central places than those area's economics justify, which yields greater urban sprawl.

Further, the statistical analysis presented here offers some of the first data-driven evidence that certain types of urban-growth boundaries really do slow at least one form of urban sprawl. For every year that a "closed-region urban containment"[1] growth boundary was in place, for instance, retail sales for the average metropolitan area's urban fringes declined by $89.5 million. After 20 years in place, this results (on average) in about 47 percent less retail sales on the urban fringe than would have occurred without it, demonstrating that the boundary effectively curbs retail business growth in non-central places in the western United States.

Legislatures throughout the country continue to examine issues of urban sprawl and options to mitigate its effects. In California, the Legislature has convened a "Smart Growth" caucus, and lawmakers often deal with bills that directly and indirectly relate to policy challenges arising from sprawl. To assist in this effort, this paper answers the following general questions:

- What have urban planners, economists, and the public thought about sprawl?

- Has the system of local government finance in California, adopted after the 1978 passage of Proposition 13, that minimizes local reliance on property taxes and encourages reliance on site-based local sales taxes, contributed to land-use decisions in the state that have aggravated urban sprawl?

- Have various forms of local urban-growth boundaries slowed urban sprawl, where they're used, in California and other areas of the West?

[1] This is a metropolitan-wide boundary that preserves the open space outside it and explicitly tries to shift demand for regional development to within it.

Background

The term "urban sprawl" is widely used in the United States by planners and the public as a pejorative label for undesirable urban land-use patterns. Economists underscore that the metropolitan decentralization of people and economic activity has been driven by population increases, real income increases, and decreases in the cost of automobile transportation. To most economists, metropolitan decentralization represents an "undesirable pattern" only if the total costs generated by it exceed the total benefits.

Conversely, some policy analysts point out that a purely market-based approach to defining and correcting urban sprawl ignores the institutional environment in which people, businesses, and local governments make metropolitan land-use decisions. These analysts highlight the fact that regulations, including state-imposed ways of raising local revenue and boundaries specifying where development can occur, influence local land-use decisions in the United States. In this report, this recognition is taken a step further by developing a data-driven test to measure any relationship that retail urban sprawl has to local government finance and the presence of urban-growth boundaries.

The initial study in this two-part series, Wassmer (2001), *An Economist's Perspective on Urban Sprawl, Part I: Defining Excessive Urbanization in California and Other Western States*, offered a method for using available data to account for the degree of sprawl in metropolitan areas. Among other things, it empirically illustrates that development in many metropolitan areas in California during the 1990s tended to be most commonly characterized by sprawl.

Overview

As a complete reading of this report demonstrates, a reliance by local governments on some forms of self-generating revenue, such as the sales tax, encouraged a higher degree of retail sprawl in metropolitan areas in California and in the western United States over the period 1977 to 1997. The continuing presence of one kind of urban-growth boundaries reduced the degree of retail decentralization, or sprawl.

The full report is laid out in the following manner:

- First, the general concept of defining urban retail sprawl is examined.

- Second, a brief review of the previous literature on the location of retail activity in metropolitan areas is offered and reasons why the methods used by local governments to raise revenues can influence the location of retail activity.

- Third, there is a description of differences in the degree of retail sprawl in the 54 metropolitan areas in the western portion of the United States for the years 1977, 1987, and 1997.

- Fourth, a statistical test is used to determine if policies governing reliance on local revenues statewide and the containment of urban development exert an influence on the location of retail activity in metropolitan areas.

- The concluding section contains the policy implications of this research.

Urban Retail Sprawl

The inherent difficulty in performing a data based examination of sprawl is that it is difficult to measure. Planning experts may know sprawl when they see it, but such an identification does not lend itself to an objective measure of the degree of sprawl in an urban area. Fortunately, a few researchers have recognized this shortcoming and developed a list of land-use characteristics that are most often associated with what planners and the public usually regard as urban sprawl:

- Low-density, strip, scattered, and "leapfrog" development.

- "Non-compact" development.

- Unlimited outward extension of new development, low-density developments in new areas, and transportation dominance by private automobiles.

Building upon these characterizations, in this report, the amount of retail activity in urban fringes that is greater than justified by economic factors is used to measure the degree of sprawl in a metropolitan area.

The Location of Retail Activity in a Metropolitan Area

The discipline of economics predicts that a retail firm chooses a location in a metropolitan area based upon the location of its customers, transportation costs, agglomeration economies, and its degree of economies of scale in retail production. But beyond these factors, suburban communities also use land-use controls and subsidies to attract business that can offer a net fiscal gain for local coffers and do little to damage the local environment.

If suburban communities actively seek retail activity for the fiscal gain it generates, then greater statewide reliance on a local revenue instrument that can generate a local net gain through greater local retail activity may be a factor in promoting retail sprawl. Local fiscal structure does not induce *more* retail activity in a metropolitan area, but may induce changes in *where* it locates. Urban fringe communities draw retail activity from the central places where it has been

historically located. The use of local economic-development incentives makes this possible.

As Part I of this series noted, central places are the dominant working and living areas in urban regions, and their stability reflects the strength of the urban core. Thus it seems useful to quantify the extent that specific policies may contribute to – or discourage – decentralized retail activities that lure more businesses and people to the urban fringes. The less desirable alternative is to simply hypothesize on their consequences, intended or unintended.

Metropolitan Retail Decentralization in California and the Western United States

This empirical study of the degree and causes of retail sprawl uses 1977, 1987, and 1997 data from the 61 metropolitan areas in what the U.S. Census Bureau defined in 1990 as the continental western United States, less the seven metropolitan areas in Idaho, Montana, and Wyoming. This includes the states of Arizona, California, Colorado, Nevada, New Mexico, Oregon, Utah, and Washington.

Since the focus of this report is retail activity in suburban locations, the suburban area within a metropolitan area is defined as the component counties, less the central places that were included in 1990. It is hard to draw any specific conclusions from the raw data – other than that there is a great deal of variation in the degree of retail activity that occurred outside of central places between 1977 and 1997 in western metropolitan areas. A statistical analysis is needed.

Statewide Local Revenue Choices and Retail Decentralization

Holding other factors that determine non-central retail sales constant, the "fiscalization of land use" expectation that is tested here is that the greater the percentage of statewide reliance on a local-government revenue source that generates net fiscal gain for local retail activity, the more likely that non-central places in a state possess greater retail activity. This likelihood is calculated after controlling for economic factors that legitimately justify greater retail activity in non-central places.

The model used to explain retail activity outside of central places also contains six variables that control for the three different types of growth-containment policies that can be used to alter the path of urban development in the area. These growth limits are designed to reduce urban sprawl and could thus reduce the amount of retail activity outside central places where they exist.

For the average suburban area in the western United States, specific findings are:

- As expected, each 1 percent increase in suburban population results in an increase of about 0.8 percent in suburban retail sales.

- A 1 percent increase in the per-acre price of agricultural land results in a decrease of about 0.1 percent in suburban retail sales. This is the expected effect – higher prices for suburban land slow the amount of suburban retail expansion and subsequent retail sales.

- For every year that the average western metropolitan area used a growth-control policy of closed-region urban containment, the value of retail activity in urban fringes, holding other factors constant, fell by about $89.5 million. After 20 years in place, this represents on average a 47 percent decrease in retail activity occurring outside central places.

- For every 1 percent increase in reliance by local governments on their self-generated discretionary share of general sales taxes statewide, retail sales in urban fringes in the western United States rose by 0.28 percent.

Policy Implications

The analysis presented here confirms the hypothesis put forth earlier that retail sprawl – in the form of greater retail activity on urban fringes than population, population growth, demographics, land prices, and income warrant – is advanced by some forms of local government revenue reliance and reduced by the more restrictive forms of urban-containment policies. One policy implication that follows from this analysis is that states consider reducing reliance on local sales taxation even further. However, the reality is that most voters prefer sales taxation to other forms of raising local revenue.

The real connection between retail sprawl and local sales taxation comes from the local retention of all, or even a significant portion, of the sales-tax revenue generated in a jurisdiction. If this bond is broken, then it is unlikely that urban fringes will continue to desire and draw retail activity from central places for fiscal gain. A workable alternative would be to collect a portion of local retail-sales revenue on a regional basis and distribute it back to communities in the region on a basis other than the site of retail sales. Since the desire is to only change future land use decisions, it is also reasonable to talk about only distributing the growth in local sales tax revenue. The California Legislature is currently considering such a proposal in the form of Assembly Bill 680 (Steinberg, 2001).

Section I: Sprawl as a Policy Concern

> *Perhaps diffusion is too kind of word… In bursting its bounds, the city actually sprawled and made the countryside ugly… uneconomic [in terms] of services and doubtful social value.*
>
> **-- Earle Draper, Planner, Tennessee Valley Authority, 1937**
>
> *Retail sprawl leads to urban sprawl, which leads to traffic, pollution, and generally a pretty poor quality of life for communities. These communities could otherwise have been balanced with jobs and housing located near each other, full services provided by each level of local government and less fighting and more cooperation between local leaders. It is not rocket science. It is the incentives.*
>
> **-- Dede Alpert, California State Senator, spring 2000**

The pejorative use of the term "sprawl" has been traced by Black (1996) back to the first quote made in a 1937 speech to a national conference of planners. Sixty years after Earle Draper first expressed his opinion on some forms of metropolitan land use, policy-makers in California – like state Senator Dede Albert – continue to raise the issue and question whether the state needs to do something about it. Beginning in the early 1990s, such disparate groups as the Sierra Club and the National Association of Homebuilders took an active stance against sprawl and embraced a development agenda based on the now-common term "smart growth."

The Economic Perspective

Given the renewed national interest in the manner in which spatial growth occurs in U.S. urban areas, prominent urban economists, such as Gordon and Richardson (1997), Mills (1999), and Brueckner (2000), have weighed in on the issue with articles that summarize an economic view of urban sprawl. Economists underscore that the decentralization of people and economic activity that has been occurring in the United States for well over 50 years has been driven by population increases, real income increases, and decreases in the cost of automobile transportation. To most economists, metropolitan decentralization

represents an "undesirable land-use pattern" only if the total costs it imposes upon a metropolitan region are greater than the total benefits it generates. Such violations occur when people, business, and local governments in a metropolitan area ignore the social costs (or benefits) that their actions impose (or bestow) upon others.

Others' Perspectives

Conversely, analysts such as Ewing (1997), Downs (1999), and Myers and Kitsuse (2000) point out that a purely market-based approach to defining urban sprawl – or excessive spatial growth that violates a benefit-versus-cost test – ignores the institutional environment in which economic actors in a metropolitan area make land-use decisions. These analysts highlight that regulations, including state-imposed ways of raising local revenue, also influence local land-use decisions and can generate urban sprawl. In this report, this recognition is taken a step further by performing a statistical test of the relevance of a state's system of local government finance to the generation of retail urban sprawl in the state's metropolitan areas.

As discussed in Nelson and Duncan (1995) and Nelson (2001), urban-growth boundaries and other forms of metropolitan-wide containment have been used in some metropolitan areas in the western United States as a way to slow the spread of activity into urban fringes. The statistical analysis within this report also accounts for the possible influence that the presence of these policies can have on reducing retail urban sprawl.

The factors that drive the decentralization of retail activity in a metropolitan area are discussed in the next section. The third and final section contains a simulation of what the average effect would be on urban retail sprawl in California's metropolitan areas if local sales-tax revenues were no longer distributed on a *situs* basis. The policy implications of this research are also included.

Urban Retail Sprawl

Planning experts may know sprawl when they see it, but such an identification does not easily lend itself to an objective measure of the degree of sprawl in an urban area. Fortunately, a few researchers have recognized this shortcoming and developed a list of land-use characteristics that are most often associated with what planners and the public regards as urban sprawl.

Ewing (1994, 1997) surveyed academic articles written between 1957 and 1992 and found that low-density, strip, scattered, and leapfrog are the forms of urban development most often labeled urban sprawl. Similarly, Downs (1999) defines urban sprawl by traits such as unlimited outward extension of new development, low-density developments in new areas, and transportation dominance by private

automobiles. Myers and Kitsuse (1999) frame the issue of sprawl in terms of undesirable patterns of density in urban development.

In his surveys of the literature, Ewing (1994, 1997) stresses that urban sprawl must always be considered a matter of degree. There is a fine distinction between what may be undesirable non-compact development in a metropolitan area and what can be desirable polycentric development. Polycentric development, which now characterizes most large metropolitan areas in the United States, is often more efficient (in terms of clustering land uses to reduce trip lengths and reduce congestion) than development in a compact centralized pattern.

Given this background, and the desire to test whether the statewide structure of raising local revenue influences the degree of sprawl observed in a metropolitan area, the amount of retail activity outside central places is used to measure an area's degree of sprawl. This is a reasonable choice because retail sales activity, and the "big-box" and "strip-mall" ways in which it generally occurs in the suburbs, represent much of what planners and the public perceive as sprawl. Retail activity outside central places is only considered sprawl if it is greater than justified by economic factors.

Retail Activity in a Metropolitan Area

Economic theory predicts that a retail firm chooses a location in a metropolitan area based upon the location of its customers, transportation costs, agglomeration economies, and degree of economies of scale in retail production. In a metropolitan area with a dominant central city, these factors push retailers that exhibit high and even moderate-scale economies in production to primarily locate in the central city.

Between 1950 and 1990, the percentage of the U.S. metropolitan population living in central cities fell from 64 to 38 percent. A reflection of this decline is the fall in metropolitan retail employment from about two-thirds of the U.S. work force in 1950 to a little less than half in 1990. Retail activity moved to urban fringes because larger percentages of metropolitan residents chose to live in the suburbs, and falling automobile transportation costs reduced ties to a central shopping location.[2]

Suburbanization partially reflects the result of citizen desires to form and fund more homogenous communities. In doing this, suburban communities use land-use controls and subsidies to attract residents and businesses that offer fiscal gain.

Retail activity that, in most instances, requires relatively few local-government services and generates relatively little environmental damage offers a good choice

[2] Lang (2000) also writes about the declining percentage of metropolitan office space in U.S. central cities and refers to it as "office sprawl." In 1979, 74 percent of office space was in central cities; by 1999 the central city share of office space dropped to 58 percent.

of self-generated funding for local treasuries. If suburban communities actively seek retail activity for the purpose of the fiscal gain it generates, then their actions may be a factor in the generation of further retail sprawl. The concept does not mean that the choices made in the raising local government revenue can induce more or less retail activity in a metropolitan area, but such choices may induce changes in where the fixed amount of retail locates.[3]

Misczynski (1986) coined the term "the fiscalization of land use" to describe what he increasingly expected to happen after California's post-Proposition 13 abandonment of property taxation as a discretionary source of local revenue. Innes and Booher (1999) continue with Misczynki's theme and point to the complex and fragmented system of local finance in California, with its heavy reliance on sales taxation as a source of local discretionary revenue, as the single most important factor driving local land-use decisions in the state. Atkinson and Oleson (1996) believe the automobile to be the major culprit of sprawl, but maintain that this would not have been possible without complimentary local finance policies.

In a monograph-length study of sales taxation in California, Lewis and Barbour (1999, p. 126) conclude that local sales-tax reliance motives local land-use decisions in the state, "…although [such reliance is] unlikely to systematically alter broad patterns of retail development." They argue that retailers primarily base location on economic factors that are not subject to much control by local government.

Brueckner and Fansler (1983) conducted one of the only statistical studies of the determinants of the size of a U.S. urban area. They offer their results as empirical support for fringe development generated through an ordinary market process.

[3] This is a restatement of the most stringent hypothesis that Lewis and Barbour (1999) believe must hold true in order for the fiscalization of land use to be occurring.

Section II: Metropolitan Retail Decentralization in the Western United States

Data

A databased study of the degree and causes of retail decentralization in western United States metropolitan areas must begin with a unit of analysis. For this study it is the 61 metropolitan areas in what the U.S. Census Bureau defined in 1990 as the continental western United States, less the seven metropolitan areas in Idaho, Montana, and Wyoming. These are excluded because the pattern of metropolitan development in those three states are much different than what has been observed in the remaining American West.[4]

Table 1 in the Appendix contains a description of the 54 metropolitan areas in the states of California, Arizona, Colorado, Nevada, New Mexico, Oregon, Utah, and Washington. The Appendix's Table 2 compares the ratio of urban-fringe retail sales to total retail sales for each of the 54 metropolitan areas used in the analysis.

Statewide Local Revenue Choices and Retail Decentralization

The variable examined in this study is the real value of retail sales outside central places for the 54 metropolitan areas for the years 1977, 1987, and 1997. Retail sales, along with all other variables measured in dollar terms have been placed in "real" 1997 terms. This means that the effects of inflation on dollar values have been removed.

This data enables a regression test of whether statewide averages for pertinent forms of own-source municipal revenue reliance exert significant influences on the amount of non-central retail sales in a state's metropolitan areas. A model of what determines non-central retail sales in a metropolitan area is necessary to formulate this regression test. The model that follows builds upon the earlier work of Brueckner and Fansler (1983).

Economic theory indicates that the real dollar value of retail sales in the non-central portion of a metropolitan region increases as non-central population and real household income increases. Suburban retail activity may be slowed by a

[4] The largest central cities in each of these excluded states only had 1992 populations of 136,000, 84,000, and 52,000 respectively.

higher acquisition price for agricultural land upon which to build new retail centers on. The availability of transportation options can also influence where people in a metropolitan area shop. These four factors (population, income, price of agricultural land, and transportation options) are what Brueckner and Fansler expect to influence the size of an urbanized area.[5] With the exception of proxies for transportation options, the model of suburban retail sales used here also relies on these same causal factors. Metropolitan transportation options are excluded for two reasons: (1) demographics, population, and income largely determine the transportation options available in a metropolitan area, and (2) the influence of transportation options on suburban retail activity is not the focus of this investigation.[6]

Further refinement of Brueckner and Fansler's model of urban size is necessary to accurately assess the influence of local government fiscal institutions on non-central retail activity. This is in the form of controlling for demographic differences in the type of population located in non-central places, previous decade's growth in non-central population, and any forms of urban growth controls that may be present. The explanatory variables expected to influence the observed amount of non-central retail activity in a western United States metropolitan area is thus:

- Population,
- Income,
- Percent of population less than age 18,
- Percent of population greater than age 64,
- Previous decade's population growth,
- Price of agricultural land,
- Presence of an urban-containment policy,
- Percentage statewide discretionary municipal revenue from property taxes,
- Percentage statewide discretionary municipal revenue from general sales taxes,
- Percentage statewide discretionary municipal revenue from other taxes.

The degree of reliance by all municipalities in a state on different forms of self-generated local revenue can influence the amount of retail sprawl through local zoning and economic-development incentives.[7] Both of these activities can result

[5] A mathematical description of the formal urban model that yields these four causal factors – originally developed by Muth (1969) and Mills (1972) – is contained in Brueckner and Fansler (1983).

[6] If metropolitan transportation options were included as explanatory variables in the regression analysis they would need to be considered simultaneously determined and appropriately modeled. Brueckner and Fansler (1983) found their variable proxies for commuting cost (percentage of commuters using public transit and percentage of households owning one or more autos) to never be statistically significant factors in explaining the size of an urbanized area.

[7] Municipal revenue reliance is calculated as a percentage of self-generated revenue, as opposed to total revenue, because municipalities have little control over revenue received from the state and federal governments. Reliance on a local revenue source, whose base a municipality could conceivably alter,

in greater retail activity in the urban fringes than economic factors alone would dictate.

Holding other factors constant, the greater the percentage statewide reliance on a local revenue source that generates local gain from local retail activity, the more likely that local officials may zone for retail land uses and use local incentives to try and encourage it.

Explanatory Variables

Municipal revenue reliance for a specific category is calculated as a percentage of locally generated revenue from sources most likely to be influenced by local land use decisions. The term used here to describe this form of local revenue source is "discretionary". Discretionary revenue sources include locally generated property taxes, sales taxes, other taxes, and user charges/special assessments.[8] The chosen term discretionary also refers to the fact that if a statewide policy were instituted to reduce percentage reliance on one of these local revenue instruments, the percentage reliance on the others would likely have to increase. Only three of the four discretionary revenue sources are accounted for in the regression model because the third, Percentage Statewide Discretionary Municipal Revenue from Charges, equals 100 percent less the sum of the included three.

As widely documented, municipalities and unincorporated areas of counties in the United States regulate local land uses with an eye on the fiscal bottom-line.[9] Municipal and county governments in the United States also use local incentives to attract desirable land uses within their boundaries.[10] Both of these activities can result in greater local retail activity in a metropolitan area's non-central places than economic factors alone would dictate. Different degrees of statewide reliance, on different forms of own-source municipal revenue, could thus yield different amounts of fiscal surplus generated by local land devoted to retail activity. The greater the reliance on a municipal revenue source that generates a local fiscal surplus from local retail activity, the more likely that local officials zone for retail land uses and use local incentives to encourage it. Kotin and Peiser

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should influence the municipality's desire to expand the base (i.e., increase the amount of retail activity within its boundaries).

[8] In 1997 these four sources of local revenue accounted, on average, for nearly 50 percent of the total local revenue collected in the western states in the sample. Statewide average reliance on local revenue reliance, rather than metropolitan-wide averages or local reliance, is used to insure the exogenous nature of these explanatory variables to each metropolitan area. Since pertinent land use decisions are made in the unincorporated portions of U.S. counties, statewide municipal revenue reliance is intended to also proxy for the average reliance that counties in a state have upon these forms of local revenue.

[9] Fischel's (1985) book on *The Economics of Zoning Laws*, especially Chapter 14, offers an excellent introduction to zoning in the United States and the use of fiscal zoning described here. Ladd (1998) provides a recent summary of land use regulation as a local fiscal tool widely used in the United States.

[10] See Bartik (1991) and Anderson and Wassmer (2000) for book-length descriptions of the use and influence of local economic development incentives in the United States. Lewis and Barbour (1999, pp. 73-74) describe the specific forms of local incentives that are available to local governments in California.

(1997), in their study of the fiscal benefits that retailers offer cities in California, include local sales taxes, property taxes, and business license fees (which fall into the category of other taxes used above) as the three forms of city revenues that need to be accounted for.

The U.S. *Census of Governments* divides municipal own-source revenue into two categories: current charges/miscellaneous revenue and taxes. The Census describes current charges as fees for specific local services delivered to a local citizen or business. For the purpose of this study, charges equal current charges plus special assessments. Special assessments are included with charges because of their Census definition as "compulsory contributions collected from owners of property benefited by special public improvements". The Census includes interest earnings, special assessments, sale of property, and other general revenue under its definition of miscellaneous revenue. With the possible exception of special assessments, these forms of miscellaneous revenue are unlikely to generate a local fiscal surplus through greater retail activity and excluded from the regression model.

The Census classifies municipal taxes in the forms of property, sales, individual income, corporate income, motor vehicle license, and other taxes. None of the eight western states under consideration here allow local personal or corporate income taxes. All other forms of local taxation, except motor vehicle taxes, are accounted for in the regression analysis because they offer the potential for a local suburban government to benefit from a fiscal surplus gained through the attraction of greater retail activity within its boundaries.[11]

Brueckner and Kim (2000) have theoretically shown that the expected influence of greater local reliance on property taxation on urban decentralization through capital use is uncertain. Aside from altering capital use, greater local reliance on property taxes can also encourage local land use decisions that are more likely to generate a fiscal surplus through property taxation (property tax revenue greater than the cost of local services required by the retail property). The influence that this has on suburban retail activity depends upon how retail does in generating a property tax fiscal surplus relative to alternative uses (housing or manufacturing) for a municipality's land.[12]

Throughout a state, greater average local reliance on general sales taxation as a source of discretionary local revenue offers a reason for suburban governments in

[11] Business taxes and franchise/license fees are included in the explanatory variable category of Percentage Statewide Discretionary Municipal Revenue from Other Taxes. In most states, revenue from businesses make up more than half of the amount accounted for in this category, with the other half coming from various sources like severance taxes, death taxes, and gift taxes. It is impossible to separately account for business related fees because distinct business values are not given.

[12] For the *a priori* purpose of predicting the expected influence of local property taxation on non-central retail activity, it would be informative to know the amount of fiscal surplus through property taxation generated by retail activity, relative to alternative forms of local activity. Unfortunately a search of the literature revealed no previous estimates of this and a full evaluation would require at least another paper-length treatment.

the state to lure retailers away from traditional business districts in central place communities and increase the amount of retail sales in the suburbs. In support, Lewis and Barbour (1999) found through a survey of officials in 300 California cities, that asked them to rank 18 different motivations for evaluating the desirability of various forms of development projects, that "new sales tax revenues" always finished first or second in terms of the position most often given. Interestingly, only the 36 central city officials in the sample systematically ranked sales tax considerations consistently lower. The lure of collecting other taxes, like a license fee or other business tax, from retailers offers an additional motivation for non-central place governments to draw retail activity away from traditional central place locations.

Economic theory indicates that suburban income and population should exert a positive influence on suburban retail sales, while the influence of the price of agricultural land in the metropolitan area should be negative. After a previous decade's surge in population growth, retail developers may have not been able to keep pace with the amount of development specified by population and retail sales may be smaller, holding other factors constant, in an area that previously experienced high population growth. Likewise, suburban areas with a higher percentage of senior citizens or families with children are likely to exhibit different retail consumption patterns; though, the directions of these influences are uncertain.[13]

The regression model used to explain non-central retail activity in a metropolitan area also includes six explanatory variables that account for whether a certain type of Urban Containment Policy (UCP) exists in a metropolitan area, and if it does, how long has it been in existence. UCPs are commonly referred to as urban growth boundaries and are designed to slow the degree of decentralization in a metropolitan area that would have occurred over time. The presence of a UCP could thus reduce the amount of non-central retail activity in metropolitan areas where they are in place.

The regression accounts for the three different types of UCPs cataloged by Nelson (2001) in his recent examination of these policies. The first type is "closed-region containment". Nelson defines this as metropolitan wide, explicitly preserving land at the urban fringe, and attempting to shift displaced development back to the center. The second type is "open-region containment". It is also metropolitan wide, but does nothing to explicitly preserve open space at the fringe, but does endeavor to shift development back to the center of the urban area. The final type of UCP is "isolated containment". By Nelson's definition, a policy of isolated containment does not exist on a metropolitan wide basis, intends to only preserve limited land outside some jurisdictional boundaries, and does nothing to shift

[13] To account for the spillover of retail customers between contiguous metropolitan areas a dummy variable representing such metropolitan areas was included in preliminary regressions. This dummy was never statistically significant in the OLS and random effect models, and could not be included in the fixed effect regression model due to perfect colinearity. A separate dummy for whether a metropolitan area is a PMSA yielded similar results. Both of these dummies are not included in the final regression analysis.

development occurring outside of these intrametropolitan boundaries back to the urban core.

As taken from Nelson, a description of the western metropolitan areas that had one of the three urban containment policies in place in 1997 is offered below. Further investigation yielded the recorded information on the approximate year that each of these UCPs began. Since development patterns are more likely to be constrained by an urban containment policy the longer it has been in place, the explanatory variables in the regression include three dummy variables for whether a type of UCP exists, and three other variables that account for the number of years since a certain UCP began in the metropolitan area.

Types of Urban Growth Boundaries in Western Metropolitan Areas and Year Begun

Western Metropolitan Areas with Urban-Growth Boundaries	Closed-region Containment	Open-region Containment	Isolated Containment
Yuma, AZ			1996
Chico-Paradise, CA			1983
Fresno, CA			1984
Sacramento, CA			1993
San Diego, CA	1979		
San Jose, CA			1972
Santa Rosa, CA			1996
Vallejo-Fairfield-Napa, CA			1980
Visalia-Tulare-Porterville, CA			1974
San Luis Obispo-Atasc.-Paso Robles, CA		1981	
Santa Barbara-Santa Maria-Lompoc, CA			1989
Yuba City, CA			1989
Yolo CA, PMSA			1987
Boulder-Longmount, CO			1978
Fort Collins-Loveland, CO			1980
Santa Fe, NM		1991	
Eugene-Springfield, OR	1982		
Medford-Ashland, OR	1982		
Portland-Vancouver, OR	1979		
Salem, OR	1981		
Bellingham, WA	1992		
Olympia, WA	1992		
Seattle-Bellevue-Everett, WA	1992		
Tacoma, WA	1992		
Yakima ,WA	1992		

The high level of variation in own-source municipal revenue reliance across states and across time is indicated by the values recorded in Table 3 in the Appendix. For instance, on average between 1977 and 1997, municipal governments in New Mexico drew only 22.4 percent of their discretionary local revenue from property taxation. The comparable figure for municipal governments in Oregon was 52.6 percent. For general sales taxation over the same 20-year period, municipal governments in Oregon relied on it for none of their own-source revenue, while municipal governments in Colorado gained 41.1 percent of their discretionary revenue from it. As well, within state variations over time for some states were large. In 1977, local governments in California drew 41.7 percent of discretionary revenue from property taxation; by 1997 this value fell to 25.7 percent. General sales taxation totaled 12.1 percent of New Mexico's own-source municipal revenue in 1977; by 1997 it had risen to 37.0 percent. Nevada municipalities relied on other taxes for 22.9 percent of their discretionary revenue in 1977; by 1997 this figure fell to 15.0 percent.

The top of Table 4 lists the mean and standard deviation of the regression's dependent variable in millions of dollars. The same descriptive statistics are given for each of the explanatory variables in the table's first data column. The non-central place values of median household income and population are calculated from the U.S. Department of Housing and Urban Development's *State of the Cities Data System*.[14] Actual income values were not available for 1997 and had to be extrapolated from the available 1979 and 1989 values. Interpolation from the available decennial census years was also necessary to determine population and income values for 1967, 1977, and 1987. The 1997 population value is an estimate provided by the Census. Various editions of the U.S. Census *City and County Databook* offer the data necessary to calculate the desired measures of metropolitan age distribution. Interpolation yields the 1977 and 1987 values, while extrapolation results in the values for 1997. A suitable proxy for the real price of agricultural land in a metropolitan area's non-central places is the real value of agricultural products sold in the metropolitan area divided by the number of agricultural acres in the area. These amounts come from the U.S. *Census of Agriculture.*

Statistical Analysis

A concern for the regression analysis is how to control for non-measurable factors that are fixed in a given year across all areas, or fixed in a given area for all years, and can influence the real value of non-central retail activity. Since the factors fixed in a given year are likely related to the position of the national economy in the business cycle, a dummy variable for observations from 1987, and another dummy variable for observations from 1997 are included in all regressions.

[14] Available at http://webstage1.aspensys.com/SOCDS/SOCDS_Home.htm .

To control for factors fixed across all observed years, but that vary by metropolitan area, a few regression options are available.[15] The first is the "fixed effect" method of dropping the constant term and including a set of dummy variables representing each of the metropolitan areas in the sample. This allows different constant terms to control for the fixed contribution of the unmeasured characteristics of a specific area. A second option is to treat ignorance on the specific fixed contribution of an area to its retail sales in the same manner as the general ignorance represented by the regression's error term. Using this "random effect" method the regression's error is composed of the traditional component plus a second component that varies by each of the 54 specific metropolitan locations in the sample. A final option is to do nothing to account for specific area effects. The regression results recorded in Table 3 include two of these possibilities and the results of statistical tests that indicate which is preferred.[16]

The second column of numbers in Table 5 is the ordinary least squares (OLS) result and includes no attempt to calculate a constant intercept term for each metropolitan area. These results, and the fixed effect regression results next to them that include a separate constant term for each of the 54 metropolitan areas, use White's method of adjusting the regression coefficient's standard errors for possible heteroskedastic bias from an unknown source.[17] The regression entries in Table 5 first contain, in bold, the mean elasticity values for the statistically significant regression coefficients.[18] Below these are the actual regression coefficients, and in parenthesis the coefficient's standard errors.[19] The statistical significance of the F statistic, recorded at the bottom of the table, indicates that the group of area dummies included in the fixed effect model exerts a significant influence on retail sales. The statistical significance of the Lagrange Multiplier statistic, also at the bottom of Table 5, indicates that the use of the fixed or random effect model is preferred to simple ordinary least squares. A Hausman statistic, which indicates whether the random effect model is preferred to the fixed effect model, could not be calculated due to correlation between the calculated random effect errors and the random effect regressors. Such correlation is likely to bias the regression coefficients in the random effect model. Based upon these test statistics, the preferred results are from the fixed effect regression model. The ordinary least squares regression results are provided to show the difference in

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[15] See Kennedy (1992, pp. 222-223) for a further description of these possibilities.

[16] There is also the specification issue of whether a log-linear functional form is more appropriate than the linear form used here. A log-linear form uses the log of the dependent variable and allows for non-linear relationships between explanatory variables and the dependent variable. This specification was tried and the result was less statistical significance for all regression coefficients and a few unexpected signs. Thus the final decision to use the linear form recorded in Table 5.

[17] See Kennedy (1992, Chapter 8) for a description of what heteroskedasticity is and the problems it presents for regression analysis. White's method of correction is described on p. 130.

[18] Statistical significance is defined at greater than 90 percent confidence in a two-tailed test.

[19] The regressions use only 161 of the possible 162 observation (54 areas over three areas) because the Yuba City CA, MSA was not in existence in 1977 and hence needed explanatory data could not be gathered for it.

magnitude and statistical significance of regression coefficients after area specific effects are appropriately controlled for.

As expected, non-central place population exerts a significant influence on non-central place retail sales. In the fixed effect model, a one-percent increase in suburban population from its mean results in about 0.83 percent increase in real retail sales from its mean for the average metropolitan area in the sample. Brueckner and Fansler (1983), using ordinary least squares for a single cross section of U.S. metropolitan areas recorded a slightly larger 1.1 percent increase in urbanized land area for a one percent increase in urbanized population. Notice that this is the same as the population elasticity of non-central retail sales recorded in the OLS regression in Table 5.

In the fixed effect regression, household income exerted no statistically significant influence on real retail sales. Though, in the OLS regression, an increase in suburban household income did result in a statistically significant increase in suburban retail sales.[20] Another significant influence in the fixed effect regression, that is non-fiscal in nature, is that a one-percent increase in the price per acre of agriculture land in the metropolitan area resulted in about a 0.14 percent decrease in real retail sales. This is the expected effect of higher prices for suburban land slowing down suburban retail expansion.[21] Brueckner and Fansler (1983) record a higher elasticity of –0.20 for a similar explanatory variable's effect on the size of urbanized land area, but recall this came from a regression analysis using a single cross section and no controls for fixed effects. In addition, a one-percent increase in the percentage of the non-central population over age 64 yields about 0.29 percent increase in non-central retail sales.

Particularly notable are the six regression coefficients calculated for the three different forms of urban containment policies. The presence of a closed-region urban containment policy (a metropolitan-wide urban growth boundary which preserves land outside it and attempts to shift demand for regional development to within it) is correlated with about one billion more dollars of retail activity in the metropolitan area's non-central places. But this effect should not be observed in isolation, for the fixed effect regression also reveals that for every year that closed-region containment in place, the real value of retail activity in non-central places (holding other causal factors constant) fell by about $90 million. Though this yearly decrease is not large relative to the average real value of non-central retail activity of $3.8 billion, after 20 years of closed-region urban containment, the resulting $1.8 billion reduction in non-central retail sales is a sizable amount.

[20] The non-significance of the income coefficient in the fixed-effect regression may be due to the fact that 1997 income values are extrapolated. To test this hypothesis, the fixed effect regression was rerun using only the 1977 and 1987 samples and again the regression coefficient on median household income was statistically insignificant; thus the basis for the decision to use the full sample.

[21] The negative impact of higher agricultural prices on slowing retail decentralization is only expected if the price of urban land in the area is held constant. Though no direct control for this in regression, the fixed effect method of including dummies for the year that observation from and for each specific metropolitan area offers reasonable controls for this.

The fixed effect regression indicates that a region that institutes a policy of closed-region containment at first exhibits more non-central retail activity; however, after 12 years (calculated by dividing 1,031 by 90) it begins to have less. These findings are as expected if regions with greater sprawl are more likely to adopt closed-region containment and over time this policy reduces decentralization. The increased effect over time is likely due to outer development patterns being increasingly constrained the longer a given closed-region policy has been in place. Isolated urban containment (open space preservation in place at only sub-metropolitan jurisdictional boundaries and no effort to direct development back to central places) exhibited no statistically significant influence on the amount of real retail activity in non-central places.

The positive regression coefficient on the variable representing the number of years that open-region urban containment in place in the metropolitan area deserves explanation. Recall that this form of urban containment policy is less restrictive than the closed-region form since it does not attempt to preserve open space outside of drawn boundaries. The adoption of such a policy in the San Luis Obispo-Atascadero-Paso Robles and Santa Fe metropolitan areas was likely a response to a belief that sprawl is coming and a desire to do something about it. But as the regression indicates, without concentrated efforts to preserve open space at the fringe, open-region urban containment policies do not reduce the decentralization of retail activity. The positive coefficient on years of open-region urban containment is unlikely to be causal and just picking up the increased retail decentralization that was anticipated in the earlier adoption of this ineffective policy.

Regression coefficients of equal interest are the ones relating to how statewide measures of reliance on various forms of own-source municipal revenue affect non-central retail sales. In the fixed effect regression, the percentage of statewide own-source municipal revenue from property taxes exerted no statistically significant influence on the value of real non-central retail sales. Though the simulation finding of Brueckner and Kim (2000), and the additional motivation of suburbs seeking fiscal surplus indicates an expected positive influence, there is also the possibility that property tax reliance discourages capital consumption, promotes greater density, and reduces retail decentralization. These offsetting occurrences could be the reason for the insignificant influence that this variable exerts on non-central retail sales.

Alternatively, the percentage of statewide discretionary municipal revenue from general sales taxation exerted a significant positive influence on non-central retail activity. For every one-percent increase in sales tax reliance, real retail sales in non-central metropolitan places in the West rose by 0.24 percent. Statewide reliance on other taxes, which includes various types of business taxes and franchise/license fees, also yielded a significant influence. For every one-percent

increase in reliance on these other forms of local taxation, real retail sales in non-central places rose by 0.28 percent.[22]

[22] To measure the independent influence of Percentage Statewide Discretionary Municipal Revenue from Charges on non-central activity, this category replaced the general sales tax category in another fixed effect regression run. The result was that the explanatory variable representing other taxes remained positive and statistically significant, the property tax variable continued to exert a statistically insignificant influence, while the charge variable also exerted no significant influence. Considering that the legal intent of charges is to generate little to no fiscal surplus, the insignificance of charges to non-central retail activity is as expected.

Section III: Conclusion

Simulation

The Table below offers the results of a simulation designed to measure the result of California always operating under a system of general local sales taxation where jurisdictions get to keep only two-thirds of the current one percent of all local sales occurring within their boundaries. Two-thirds is chosen for this simulation because it represents the percentage proposed in California Assembly Bill 680 (2001) designed to slow the fiscalization of land use in the Sacramento Region. The bill, offered by Assemblyman Darrell Steinberg, proposes that one after January 2003, a third of a jurisdiction's yearly growth in local sales tax revenue (from a base of January 2003) be distributed among all jurisdictions in the Sacramento Region based upon their population.

To assess the possible long-term impacts of such legislation, the previous regression results can be used to simulate the impact on non-central retail sales if such a system of per-capita distribution of this portion of one-third of local sales tax revenue had always been in place in California. If this had been the case, the fraction of own-source municipal revenue from sales taxation in California in 1997 would be approximately one-third less than it was in 1997.

As derived in the previously explained statistical analysis, for every 1 percent *increase* in the fraction of self-generated municipal revenue from sales taxes, the real value of metropolitan retail sales in urban fringes *increases* by 0.242 percent. Thus, the simulated 33.3 percent *decrease* would yield about an 8.1 (0.242 x percent *decrease* in urban-fringe retail sales in each of California's 25 metropolitan areas.

The table below provides the actual numbers associated with this simulated change. The first data column of the chart gives the dollar value of retail sales in non-central places for all areas. The second data column represents 8.1 percent of the value in the first data column. In the absence of site-based sales taxation, this would be the dollar amount of retail sales that would likely not have occurred in 1997 in the urban fringes and instead would have occurred in the metropolitan area's central places. For instance, the gain in retail business in Bakersfield's downtown areas would have been nearly $150 million in 1997. In the multiple

Simulated Effects of Reducing Site-Based General Sales Taxation by One-Third

Metropolitan Area Name	1997 Dollar Value of Retail Sales in Non-Central Places ($1,000s)	Dollar Value Gained by Central Places if Site-Based General Local Sales Taxation Reduced by One-Third ($1,000s)	1997 Dollar Value of Retail Sales in Central Places ($1,000s)	Percentage Gain in Central Place Retail Sales if Site-Based General Local Sales Taxation Reduced by One Third
Bakersfield	1,842,178	149,216	2,382,176	6.26
Chico-Paradise	514,805	41,699	987,820	4.22
Fresno	2,512,416	203,506	3,589,549	5.67
LA-Long Beach	42,392,616	3,433,802	27,141,548	12.65
Merced	427,443	34,623	674,665	5.13
Modesto	1,163,884	94,275	2,118,355	4.45
Oakland	15,988,000	1,295,028	3,793,753	34.14
Orange	19,727,951	1,597,964	6,444,872	24.79
Riverside-San Bernardino	15,411,402	1,248,324	6,540,443	19.09
Redding	226,196	18,322	1,128,293	1.62
Sacramento	10,056,044	814,540	3,039,615	26.80
Salinas	1,322,341	107,110	1,713,517	6.25
San Diego	10,366,767	839,708	11,848,574	7.09
San Francisco	10,111,138	819,002	6,795,006	12.05
San Jose	4,347,713	352,165	12,325,860	2.86
San Luis Obispo-Atas.-P.R.	948,665	76,842	832,037	9.24
Santa Barbara-S. Mar.-Lo.	906,919	73,460	2,276,623	3.23
Santa Cruz-Watsonville	1,089,189	88,224	880,983	10.01
Santa Rosa	1,408,781	114,111	2,737,385	4.17
Stockton-Lodi	1,378,459	111,655	2,301,098	4.85
Vallejo-Fairfield-Napa	659,776	53,442	3,082,220	1.73
Ventura	5,226,824	423,373	1,249,786	33.88
Visalia-Tulare-Porterville	1,479,613	119,849	656,128	18.27
Yolo	295,598	23,943	731,139	3.27
Yuba City	322,511	26,123	528,785	4.94

downtown areas of the Los Angeles-Long Beach metropolitan region it would have been nearly $3.5 billion.

Finally, to put the dollar value of additional central-place retail sales in perspective, the value in data column four represent the percentage increase in 1997 retail sales in central places that would likely have occurred if site-based sales taxation never existed in California. The percentage gains in central-place retail sales would vary widely across California's metropolitan areas. But central places in the metropolitan areas of Oakland, Ventura, Sacramento, Orange, and Visalia-Tulare-Porterville have most likely been hurt the greatest by the state's local reliance on site-based general sales taxation. The simulation described above indicates that the central places in these metropolitan areas (as designated in Table 1) had respectively 34, 34, 27, 25, and 18 percent less retail activity in 1997 than they would have had under a redistribution plan of the type proposed in AB680.

This should be of concern because these central places have less retail activity than their population, income, demographics, land prices, and previous decade's growth warrant. At the same time, non-central places in these metropolitan areas have more retail activity than these factors warrant. The likely result is that central-place residents drive to non-central places to purchase retail goods. The results of this fiscalization of land use are excessive driving in metropolitan areas, greater air pollution, loss of downtown vitality, and perhaps greater congestion on the metropolitan area's freeways.

As Senator Alpert observed, central-place residents may eventually tire of these shopping trips to the suburbs – and choose to move to the suburbs. If that becomes the case, the chain of events is clear: site-based local sales taxation encourages the fiscalization of land use which, as shown here, results in greater retail sales in non-central places than the economics justifies, which yields greater urban sprawl.

Policy Implications

Surveys of local taxpayers indicate that most prefer sales taxation to other forms of raising local revenue.[23] The real connection between retail sprawl and local sales taxation comes from the local retention of all, or even a significant portion, of the sales-tax revenue generated in a jurisdiction. If this bond is broken, then it is unlikely that non-central places in metropolitan areas will continue to desire, and draw, retail activity from central places solely for the fiscal gain it provides. As proposed in AB680, a workable alternative would be to collect at least a portion of local retail sales revenue on a regional basis, and then distribute it back to communities in the region on a per-capita basis. Even prior to AB680, California lawmakers have considered similar legislation.[24]

[23] For a poll supporting this, see the Advisory Council on Intergovernmental Activity (1987).
[24] See Johnson (2000) for a description of previous legislation.

Further, the statistical analysis presented here offers some of the first data-driven evidence that certain forms of urban-containment policies really do slow at least one form of urban sprawl. On an average value of $3.84 billion in retail sales in non-central places, the analysis indicates that for every year that a closed-region urban containment policy is in place, retail sales in non-central places decline by $89.5 million. After 20 years in place, this results in 47 percent less retail sales in non-central places than would have occurred without it.

As the earlier table on page 20 shows, California jurisdictions have been at the forefront of adopting isolated urban-containment policies. These preserve limited land in a metropolitan area at only some jurisdictional boundaries, but are not metropolitan area-wide and do nothing to actively try to shift development outside of these boundaries back to the urban core. But as shown here, this has had very little effect on slowing urban sprawl. This research indicates that the adoption instead of more closed-region urban containment policies is needed to truly contain urban retail decentralization.

A closed-region urban-containment policy crosses county boundaries, explicitly attempts to move development back to the urban center, and preserves land at the entire urban fringe around a metropolitan area. The San Diego metropolitan area is the only one in California where such a form of urban containment exists. It can exist in San Diego County because the metropolitan area there consists of only county. Wider use of this approach in California likely would require state legislation, since multi-county participation usually is needed. The necessary legislative authority for such multi-county use was granted in Oregon in 1974 and in Washington State in 1992.

Appendix:
Tables and References

Table 1
Urban Area Definitions for the Western United States

This table contains a description of the 54 metropolitan areas used in the analysis. Column 3 contains the names of the component counties for each MSA or PMSA.[25] Column 4 offers the names of the 1990 Census defined "urbanized areas" that are included in each metropolitan area, and column 5 provides the 1990 Census defined "central places" that are in each of the urbanized areas. The U.S. Census Bureau defines an urbanized area as having a population of at least 50,000 and including at least one central place and a surrounding area with a population density exceeding 1,000 per square mile. The Census considers central places to be the dominant employment and residential centers in each urbanized area.

1990 Metropolitan Area Name	1990 Metropolitan Area Square Miles	1990 Counties in Metropolitan Area	1990 Urbanized Areas in Metropolitan Area	1990 Central Places (Cities) in Metropolitan Area
Phoenix-Mesa, AZ; MSA	14,574	Maricopa, Pinal	Phoenix	Mesa, Phoenix, Scottsdale, Tempe
Tuscon, AZ; MSA	9,187	Pima	Tucson	Tucson
Yuma, AZ; MSA	5,514	Yuma	Yuma	Yuma
Bakersfield, CA; MSA	8,142	Kern	Bakersfield	Bakersfield
Chico-Paradise, CA; MSA	1,640	Butte	Chico	Chico
Fresno, CA; MSA	8,102	Fresno, Madera	Fresno	Fresno
Los Angeles-Long Beach, CA; PMSA	4,060	Los Angeles	Lancaster-Palmdale, Los Angeles-Long Beach, Oxnard-Ventura	Lancaster, Long Beach, Los Angeles, Pasadena
Merced, CA; MSA	1,929	Merced	Merced	Merced
Modesto, CA; MSA	1,495	Stanislaus	Modesto	Modesto, Turlock

[25] A PMSA consists of integrated counties that are divisible into smaller, integrated units that consist of one or more counties. A MSA consists of counties that are not divisible into smaller, integrated units.

1990 Metropolitan Area Name	1990 Metropolitan Area Square Miles	1990 Counties in Metropolitan Area	1990 Urbanized Areas in Metropolitan Area	1990 Central Places (Cities) in Metropolitan Area
Oakland, CA; PMSA	1,458	Alameda, Contra Costa	Antioch-Pittsburgh, San Francisco-Oakland	Alameda, Berkeley, Oakland
Orange, CA; PMSA	790	Orange	Los Angeles-Long Beach	Anaheim, Irvine, Santa Ana
Redding, CA; MSA	3,786	Shasta	Redding	Redding
Riverside-San Bernardino, CA; PMSA	27,270	Riverside, San Bernardino	Henet-San Jacinto, Hesperito-Apple Valley-Victorville, Indio-Coachella, Los Angeles-Long Beach, Palm Springs, Riverside-San Bernardino	Hemet, Palm Dessert, Palm Springs, Riverside, San Bernardino, Temecula
Sacramento, CA; PMSA	5,094	El Dorado, Placer, Sacramento	Sacramento	Sacramento
Salinas, CA; MSA	3,322	Monterey	Salinas, Seaside-Monterey, Watsonville	Monterey, Salinas
San Diego, CA; MSA	4,205	San Diego	San Diego	Coronado, Escondido, San Diego
San Francisco, CA; PMSA	1,016	Marin, San Francisco, San Mateo	San Francisco-Oakland	San Francisco
San Jose, CA; PMSA	1,291	Santa Clara	San Jose	Gilroy, Palo Alto, San Jose, Santa Clara, Sunnyvale
San Luis Obispo-Atascadero-Paso Robles, CA; MSA	3,305	San Luis Obispo	San Luis Obispo	Atascadero, Paso Robles, San Luis Obispo
Santa Barbara-Santa Maria-Lompoc, CA; MSA	2,739	Santa Barbara	Lompoc, Santa Barbara, Santa Maria	Lompoc, Santa Barbara, Santa Maria

1990 Metropolitan Area Name	1990 Metropolitan Area Square Miles	1990 Counties in Metropolitan Area	1990 Urbanized Areas in Metropolitan Area	1990 Central Places (Cities) in Metropolitan Area
Santa Cruz-Watsonville, CA; PMSA	446	Santa Cruz	Santa Cruz	Santa Cruz, Watsonville
Santa Rosa, CA; PMSA	1,576	Sonoma	Santa Rosa	Petaluma, Santa Rosa
Stockton-Lodi, CA; MSA	1,399	San Joaquin	Lodi, Stockton	Lodi, Stockton
Vallejo-Fairfield-Napa, CA; PMSA	1,582	Napa, Solano	Fairfield, Napa, Vacaville	Fairfield, Napa, Vacaville, Vallejo
Ventura, CA; PMSA	1,846	Ventura	Los Angeles-Long Beach, Oxnard-Ventura, Simi Valley	San Buena Ventura (Ventura)
Visalia-Tulare-Porterville, CA; MSA	4,824	Tulare	Visalia	Porterville, Tulare
Yolo, CA; PMSA	1,012	Yolo	Davis, Sacramento	Davis, Woodland
Yuba City, CA; MSA	1,233	Sutter, Yuba	Yuba	Yuba
Boulder-Longmount, CO; PMSA	743	Boulder	Boulder, Longmount	Boulder, Longmount
Colorado Springs, CO; MSA	2127	El Paso	Colorado Springs	Colorado Springs
Denver, CO; PMSA	3,761	Adams, Arapahoe, Denver, Douglas, Jefferson	Denver	Denver
Fort-Collins-Loveland, CO; MSA	2,601	Larimer	Fort Collins	Fort Collins
Grand Junction, CO; MSA	3,328	Mesa	Grand Junction	Grand Junction
Greeley, CO; MSA	3,993	Weld	Greeley	Greeley
Pueblo, CO; MSA	2,389	Pueblo	Pueblo	Pueblo
Las Vegas, NV & AZ; MSA	39,370	Clark, Mohave, Nye	Las Vegas	Las Vegas
Reno, NV; MSA	6,343	Washoe	Reno	Reno

1990 Metropolitan Area Name	1990 Metropolitan Area Square Miles	1990 Counties in Metropolitan Area	1990 Urbanized Areas in Metropolitan Area	1990 Central Places (Cities) in Metropolitan Area
Albuquerque, NM; MSA	5,944	Bernalillo, Sandoval, Valencia	Albuquerque	Albuquerque
Las Cruces, NM; MSA	3,807	Dona Ana	Las Cruces	Las Cruces
Santa Fe, NM; MSA	2,019	Los Alamos, Santa Fe	Santa Fe	Santa Fe
Eugene-Springfield, OR; MSA	4,554	Lane	Eugene-Springfield	Eugene, Springfield
Medford-Ashland, OR; MSA	2,785	Jackson	Medford	Medford
Portland-Vancouver, OR-WA; PMSA	5,028	Clackamas, Columbia, Multnomah, Washington, Yamhill, OR; Clark, WA	Portland-Vancouver OR-WA	Portland OR, Vancouver WA
Salem, OR; PMSA	1,926	Marion, Polk	Salem	Salem
Provo-Orem, UT; MSA	1,998	Utah	Provo-Orem	Provo, Orem
Salt Lake City-Ogden, UT; MSA	1,618	Davis, Salt Lake, Weber	Salt Lake City, Ogden	Salt Lake City, Ogden
Bellingham, WA; MSA	2,120	Whatcom	Bellingham	Bellingham
Bremerton, WA; PMSA	396	Kitsap	Bremerton	Bremerton
Olympia, WA; PMSA	727	Thurston	Olympia	Olympia
Richland-Kennewick-Pasco, WA; MSA	2,945	Benton, Franklin	Richland-Kennewick-Pasco	Kennewick, Pasco, Richland
Seattle-Bellevue-Everett, WA; PMSA	4,925	Island, King, Snohomish	Seattle	Auburn, Everett, Seattle
Spokane, WA; MSA	1,764	Spokane	Spokane	Spokane
Tacoma, WA; PMSA	1,678	Pierce	Tacoma	Tacoma
Yakima, WA; MSA	4,296	Yakima	Yakima	Yakima

Table 2
Distribution of Retail Sales and Changes in Retail Sales for Non-Central Places and Metropolitan Areas in the Western United States

This table offers a comparison of the ratio of non-central place retail sales to total metropolitan area retail sales for all 54 metropolitan areas in the states of California, Arizona, Colorado, Nevada, New Mexico, Oregon, Utah, and Washington. Information on the dollar amount of retail activity in the relevant metropolitan areas comes from the 1977, 1987, and 1997 *U.S. Census of Retail Trade*. The corresponding value for a non-central place equals the metropolitan-wide value less the values for 1990-defined central places contained in the metropolitan area.

The first three data columns in Table 2 illustrate the variation in the degree of retail sales decentralization across metropolitan areas and within a metropolitan area over time. The last two data columns indicate the percentage change in retail decentralization for each area, for the periods 1977 to 1987, and 1987 to 1997. The top eight data rows in this table report the averages for each state using metropolitan area as the unit of observation.

1990 Metropolitan Area Name	1977 Non-Central Place Retail Sales / Metro Retail Sales	1987 Non-Central Place Retail Sales / Metro Retail Sales	1997 Non-Central Place Retail Sales / Metro Retail Sales		1977 to 1987 % Change in (Non-Central Place Retail Sales / Metro Retail Sales)	1987 to 1997 % Change in (Non-Central Place Retail Sales / Metro Retail Sales)
Arizona average for MSAs	**0.190**	**0.180**	**0.260**		**-4.28**	**45.39**
California average for (P)MSA	**0.461**	**0.461**	**0.477**		**0.52**	**4.57**
Colorado average for (P)MSAs	**0.257**	**0.258**	**0.282**		**0.00**	**5.99**
Nevada average for MSAs	**0.423**	**0.439**	**0.406**		**5.71**	**-8.25**
New Mexico average for MSAs	**0.140**	**0.123**	**0.117**		**-9.41**	**-1.54**
Oregon average for (P)MSAs	**0.412**	**0.422**	**0.397**		**2.30**	**-3.13**
Utah average for MSAs	**0.403**	**0.470**	**0.492**		**22.04**	**-0.69**
Washington average for (P)MSAs	**0.406**	**0.420**	**0.463**		**1.66**	**6.75**
Phoenix-Mesa AZ, MSA	0.202	0.190	0.238		-5.83	25.31
Tucson AZ, MSA	0.160	0.177	0.216		10.34	22.41
Yuma AZ, MSA	0.209	0.173	0.326		-17.33	88.44
Bakersfield CA, MSA	0.445	0.431	0.436		-3.05	1.09
Chico-Paradise CA, MSA	0.581	0.555	0.343		-4.45	-38.32
Fresno CA, MSA	0.417	0.364	0.412		-12.76	13.24
LA-Long Beach CA, PMSA	0.524	0.557	0.610		6.42	9.38
Merced CA, MSA	0.410	0.383	0.388		-6.73	1.36
Modesta CA, MSA	0.250	0.250	0.355		-0.11	41.74
Oakland CA, PMSA	0.720	0.748	0.808		3.89	8.06
Orange CA, PMSA	0.757	0.773	0.754		2.16	-2.54
Riverside-San Bernard. CA, PMSA	0.598	0.691	0.702		15.58	1.59
Redding CA, MSA	0.272	0.227	0.167		-16.54	-26.41
Sacramento CA, PMSA	0.694	0.722	0.768		4.05	6.41
Salinas CA, MSA	0.394	0.395	0.436		0.26	10.17
San Diego CA, MSA	0.450	0.477	0.467		6.02	-2.18
San Francisco CA, PMSA	0.532	0.555	0.598		4.20	7.79
San Jose CA, PMSA	0.326	0.299	0.261		-8.27	-12.67
SLO-Atasco-Paso Robles CA, MSA	0.436	0.353	0.533		-19.03	50.89
Santa Barb-S. Maria-Lom. CA, MSA	0.263	0.323	0.285		22.75	-11.82
Santa Cruz-Watsonville CA,PMSA	0.355	0.452	0.553		27.33	22.31
Santa Rosa CA, PMSA	0.446	0.312	0.340		-30.04	8.97
Stockton-Lodi CA, MSA	0.330	0.289	0.375		-12.34	29.57
Vallejo-Fairfield-Napa CA, PMSA	0.133	0.193	0.176		44.72	-8.61

1990 Metropolitan Area Name	1977 Non-Central Place Retail Sales / Metro Retail Sales	1987 Non-Central Place Retail Sales / Metro Retail Sales	1997 Non-Central Place Retail Sales / Metro Retail Sales		1977 to 1987 % Change in (Non-Central Place Retail Sales / Metro Retail Sales)	1987 to 1997 % Change in (Non-Central Place Retail Sales / Metro Retail Sales)
Ventura CA, PMSA	0.760	0.761	0.807		0.14	6.02
Visalia-Tulare-Porterville CA, MSA	0.691	0.689	0.693		-0.27	0.58
Yolo CA, PMSA	0.280	0.248	0.288		-11.35	16.13
Yuba City CA,MSA	na	0.466	0.379		na	-18.65
Boulder-Longmount CO, PMSA	0.225	0.211	0.204		-6.10	-3.60
Colorado Springs CO, MSA	0.097	0.080	0.069		-17.13	-14.08
Denver CO, PMSA	0.632	0.711	0.735		12.41	3.45
Fort Collins-Loveland CO, MSA	0.401	0.361	0.411		-10.15	14.00
Grand Junction CO, MSA	0.105	0.156	0.162		49.19	3.85
Greeley CO, MSA	0.271	0.222	0.338		-18.21	52.30
Pueblo CO, MSA	0.069	0.063	0.054		-9.99	-13.99
Las Vegas NV & AZ, MSA	0.607	0.617	0.576		1.72	-6.75
Reno NV, MSA	0.238	0.261	0.236		9.71	-9.75
Albuquerque NM, MSA	0.154	0.117	0.168		-24.10	43.84
Las Cruces NM, MSA	0.098	0.104	0.098		6.84	-6.24
Santa Fe NM, MSA	0.167	0.149	0.086		-10.98	-42.23
Eugene-Springfield OR, MSA	0.362	0.212	0.235		-41.42	10.85
Medford-Ashland OR, MSA	0.308	0.438	0.370		42.31	-15.54
Portland-Vancouver OR, PMSA	0.593	0.670	0.612		12.98	-8.67
Salem OR, PMSA	0.386	0.368	0.371		-4.68	0.86
Provo-Orem UT, MSA	0.249	0.338	0.273		35.96	-19.33
Salt Lake City-Ogden UT, MSA	0.557	0.603	0.711		8.12	17.94
Bellingham WA, MSA	0.309	0.325	0.327		5.29	0.33
Bremerton WA, PMSA	0.400	0.597	0.731		49.09	22.39
Olympia WA, PMSA	0.450	0.407	0.472		-9.71	16.14
Richland-Kennewick-Pasco WA, MSA	0.344	0.139	0.097		-59.44	-30.51
Seattle-Bellevue-Everett WA, PMSA	0.541	0.626	0.663		15.68	5.94
Spokane WA, MSA	0.339	0.326	0.420		-3.71	28.91
Tacoma WA, PMSA	0.490	0.535	0.601		9.25	12.31
Yakima WA, MSA	0.375	0.401	0.395		6.81	-1.48

Table 3
Percentage Statewide Discretionary Municipal Revenue from Component Sources for Western United States

Year and State	Percentage Statewide Discretionary Municipal Revenue from Property Taxes	Percentage Statewide Discretionary Municipal Revenue from General Sales Tax	Percentage Statewide Discretionary Municipal Revenue from Other Taxes	Percentage Statewide Discretionary Municipal Revenue from Charges
1997 Arizona	15.6	39.0	5.5	39.9
1997 California	25.7	20.1	11.9	42.4
1997 Colorado	10.8	40.3	4.1	44.8
1997 Nevada	24.9	0.0	15.0	60.1
1997 New Mexico	14.6	37.0	2.7	45.7
1997 Oregon	46.7	0.0	12.7	40.6
1997 Utah	24.5	28.9	5.7	41.0
1997 Washington	24.5	22.0	10.5	43.0
1987 Arizona	18.7	36.0	5.5	39.8
1987 California	28.1	23.2	13.7	35.0
1987 Colorado	14.6	43.1	4.9	37.5
1987 Nevada	23.8	0.0	22.6	53.6
1987 New Mexico	18.3	31.5	2.6	47.6
1987 Oregon	55.7	0.0	7.2	37.0
1987 Utah	29.1	27.6	4.7	38.6
1987 Washington	25.9	22.5	12.1	39.5
1977 Arizona	25.5	43.4	3.9	27.2
1977 California	41.7	23.1	10.2	25.0
1977 Colorado	23.8	39.8	5.1	31.4
1977 Nevada	37.0	0.9	22.9	39.2
1977 New Mexico	34.3	12.1	8.7	44.8
1977 Oregon	55.3	0.0	8.0	36.7
1977 Utah	28.1	31.8	5.6	34.5
1977 Washington	31.5	18.4	12.4	37.7

Table 4
Descriptive Statistics and Regression Results Using Real value Metropolitan Retail Sales ($1,000,000s) in Non-Central Places as Dependent Variable

Dependent Variable's Mean (Standard Deviation): $3,844.12 ($7,017.49)

	Mean		Fixed Effect
Explanatory Variables	**(Standard Deviation)**	**Ordinary Least Squares**	**Ordinary Least Squares^**
Constant		-1.853.64	*not reported*
		(1,966.63)	
1987 Year Dummy		-713.90**	-255.37
		(365.06)	(204.05)
1997 Year Dummy		-1,341.80***	-184.95
		(514.26)	(288.14)
Real Value Median Household	$41,808	**0.598**	
Income in Non-Central Places	($8,543)	0.055***	-0.006
		(0.014)	(0.019)
Population in Non-Central	453,085	**1.061**	**0.825**
Places	(730,899)	0.009***	0.007***
		(0.001)	(0.001)
Previous 10 Year Percentage	28.99	**-0.090**	
Growth in Non-Central Places	(19.01)	-11.97**	-0.847
		(5.71)	(3.737)
Dummy if Closed-Region Urban	0.099		
Containment in Place	(0.300)	662.87	1,031.15***
		(625.23)	(374.84)
Years that Closed-Region Urban	0.894		**-0.021**
Containment in Place	(3.152)	-42.85	-89.53**
		(59.47)	(35.41)
Dummy if Isolated Urban	0.130		
Containment in Place	(0.338)	19.31	122.22
		(485.40)	(145.03)

	Mean		Fixed Effect
Explanatory Variables	**(Standard Deviation)**	**Ordinary Least Squares**	**Ordinary Least Squares^**
Years that Isolated Urban	1.354		
Containment in Place	(4.297)	-0.538	-9.50
		(38.04)	(9.38)
Dummy if Open-Region Urban	0.019		
Containment in Place	(0.136)	-92.33	-306.18
		(1,544.92)	(239.90)
Years that Open-Region Urban	0.174		**0.003**
Containment in Place	(1.421)	39.11	72.79***
		(145.43)	(23.20)
Real Value Agriculture Products	$860.85		**-0.135**
in Metro Area Per Acre in Agric.	($891.76)	0.068	-0.601***
		(0.114)	(0.203)
Percentage Population in Non-	29.16		
Central Places Less than Age 18	(6.43)	8.23	0.727
		(17.39)	(16.82)
Percentage Population in Non-	10.80		**0.288**
Central Places Greater than Age 64	(3.10)	51.16	102.73**
		(40.01)	(40.79)
Percentage Statewide Discretionary	29.14		
Mun. Revenue from Property Taxes	(10.45)	-15.99	17.92
		(25.59)	(20.57)
Percentage Statewide Discretionary	23.47		**0.242**
Mun. Revenue from General Sales Taxes	(11.36)	-4.48	39.60**
		(22.70)	(17.49)
Percentage Statewide Discretionary	10.03		**0.282**
Municipal Revenue from Other Taxes	(4.02)	-10.91	107.94**
		(39.66)	(45.28)

	Mean		Fixed Effect
Explanatory Variables	**(Standard Deviation)**	**Ordinary Least Squares**	**Ordinary Least Squares^**
Observations	161	161	161
R-Squared Statistic		0.976	0.995
Adjusted R-Squared Statistic		0.973	0.992
F-Test Statistic			7.022***
Lagrange Multipler Test Statistic			36.81***
White Heteroskedsaticity Corrected		yes	yes
Significant elasticities, calculated from means, in bold.			

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About the Author

Rob Wassmer is a professor of public policy and economics in the Graduate Program in Public Policy and Administration at California State University, Sacramento. Professor Wassmer earned his doctorate in economics from Michigan State University in 1989. He previously taught at Wayne State University and Eastern Michigan University. For the 2000-2002 academic years he is serving as a visiting consultant to the California Senate Office of Research.

Wassmer's research and teaching interests are in policy-orientated microeconomic analysis, state and local public finance, and urban economics. He has authored over 20 published articles on these subjects and two books: *Readings in Urban Economics: Issues and Public Policy* (Blackwell, 2000) and *Bidding for Business: The Efficacy of Local Economic Development Incentives in a Metropolitan Area* (with co-author John Anderson, W.E. Upjohn Institute, 2000).

As the past coordinator of the system-wide California State University Faculty Research Fellows Program, between 1997 and 2001 he also managed a group of academic public policy consultants to the state of California. In the fall of 2000, he received the President's Award for Research and Creative Activity from Sacramento State. Visit his web site at www.csus.edu/indiv/w/wassmerr .