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SOUTHERN CALIFORNIA REGIONAL PROGRESS REPORT 2014

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METROPOLITAN FUTURES INITIATIVE (MFI)
IN THE SCHOOL OF SOCIAL ECOLOGY AT THE
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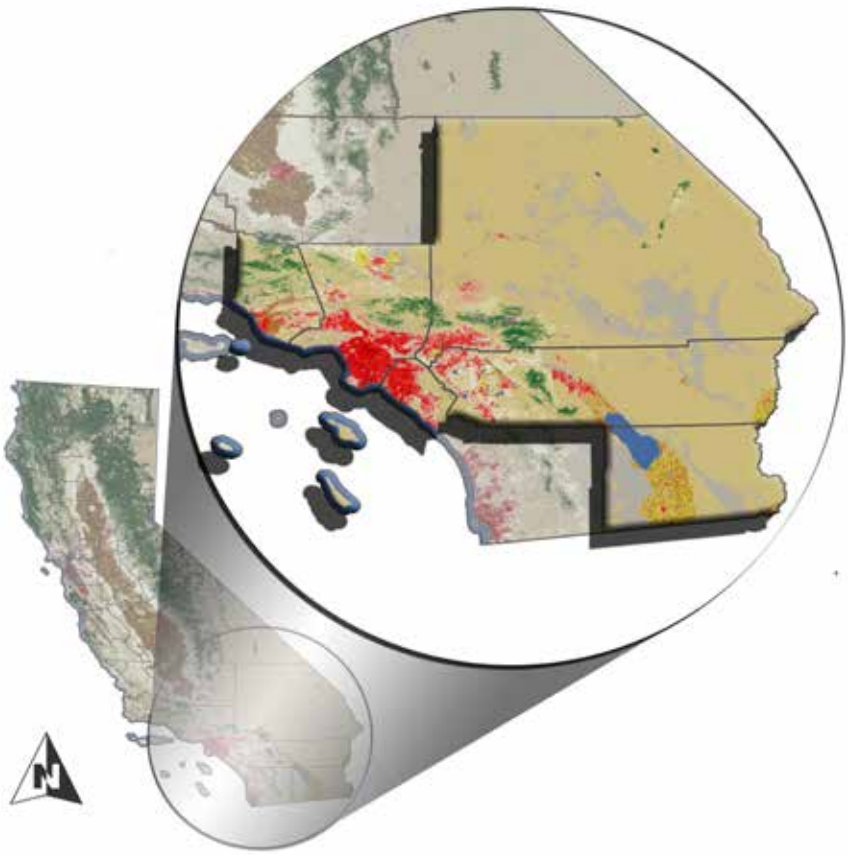

EXECUTIVE COMMITTEE

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We would like to thank the following persons.

The Metropolitan Futures Initiative (MFI) is a team project. We therefore would like to recognize several individuals who contributed to this report in significant ways.

Valerie Jenness, Dean of the School of Social Ecology, has supported this project from its inception in many key and important ways, most notably by providing leadership. Victor Becerra, Director of UCI's Community Outreach Partnership Center offered strategic and instrumental organizational, intellectual, and economic contributions, which helped move the project forward in its earliest stages. Marlon Boarnet and Doug Houston have provided intellectual contributions since the inception of the MFI.

Mickey Shaw and Patricia DeVoe provided invaluable administrative support throughout. Our team of talented graduate student researchers who worked on the project includes Adam Boessen, Harya S. Dillon, Peter Hanink, Hiroshi Ishikawa, Asiya Natekal, and Amrita Singh. Undergraduate researchers included Linet Mardyrosian, Jacqueline Martinez, and Marissa Tolero. We are grateful for their efforts and know that the report is better as a result of their involvement.

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Introduction from the Dean of Social Ecology

It is entirely fitting that The Metropolitan Futures Initiative (MFI) and this particular report come from the School of Social Ecology at University of California, Irvine where faculty and students are committed to interdisciplinary problem-driven research that makes a difference in our lives, in our communities, and in our world. It is with that commitment upfront and center that we present this illuminating report.

This First Regional Progress Report derived from the examination of an unprecedented dataset composed of fourteen different data sources and advanced our understanding of the dynamic interrelationships between demographics, transportation, housing and jobs, crime, and safety in the five county Southern California region. Adding to the findings presented in the first report, this Second Regional Progress Report draws on additional data to reveal factors that influence stability and change in jobs, home values, land use, crime and the economy. Because the Great Park continues to be a significant development in Orange County, this report focuses particular attention on the relationship between land use development and home values and jobs, as well as the relationship between parks and safety.

In both reports (as well as future MFI Regional Progress Reports) our goal is the same: to provide systematically collected and meticulously analyzed data that can advance basic knowledge about our communities and inform our elected leaders, urban planners, community developers, and other decision makers about the changing contours of our communities. Hopefully, they will use information in this report to work in concert with residents impacted by their decisions to create better communities and improve the quality of life for all of us.

On behalf of the University of California, Irvine, it is my pleasure to present this report to the public. I do so with the hope that it informs public policy and community development.

Valerie Jenness, Dean
School of Social Ecology
University of California, Irvine

About the MFI Executive Committee

John R. Hipp

John R. Hipp is the Director of the Metropolitan Futures Initiative (MFI). He is a Professor in the department of Criminology, Law and Society, the department of Policy, Planning, and Design, and the department of Sociology, at the University of California Irvine. He is also co-director of the Irvine Lab for the Study of Space and Crime (ILSSC). His research interests focus on how neighborhoods change over time, how that change both affects and is affected by neighborhood crime, and the role networks and institutions play in that change. He approaches these questions using quantitative methods as well as social network analysis.

Jae Hong Kim

Jae Hong Kim is a member of the MFI Executive Committee. He is an assistant professor in the Department of Planning, Policy, and Design at the University of California, Irvine. His research focuses on regional economic development, land use change, and the nexus between these two critical processes. His academic interests also lie in (i) institutional environments: how institutional environments shape urban and regional development processes, particularly economic development, land use, and their interactions and (ii) analytical frameworks: how to model and simulate the dynamics of economic and physical land development processes and thus support a broad range of planning activities.

Victoria Basolo

Victoria Basolo is a founding member of the MFI Executive Committee and a faculty member in the Department of Planning, Policy and Design at UC Irvine. She conducts research on housing and community development policy, urbanization, urban governance, and environmental hazards in urban settings. Professor Basolo currently is working on several projects in California and in Mexico. She is part of a collaborative team of researchers from the Department of Planning, Policy, and Design and the School of Engineering engaged in a National Science Foundation-funded study of flood hazard in Newport Beach and the Tijuana River Valley; a member of the School of Social Ecology's cross-departmental research effort, the Metropolitan Futures Initiative; and principle researcher on a study of housing planning and policy in California. Her work includes theoretically-grounded scholarship and applied, empirical research published in a range of housing, urban studies, planning and environmental venues. Professor Basolo teaches housing policy, research design, and quantitative methods. She is actively engaged in the UC Irvine and the broader community through her research and service.

Chapter 1

Introduction to the Problems and Challenges

Following a century of uninterrupted growth, the Southern California region is now the second largest metropolitan area in the United States. As highlighted in our first Regional Progress Report (RPR), the region's urban landscape has transformed drastically during this time.

Although trends such as population and employment decentralization and suburban and exurban expansion continue, traditional development patterns such as sprawl cannot by themselves account for this transformation. Given the sheer magnitude of this continued growth and the ongoing tumult in the housing markets, this issue of the RPR is timely and consequential.

Consider Irvine. While other cities in the region have struggled with shrinking tax bases and inability to attract new investment, Irvine has grown into a thriving economic hub with the highest jobs to housing ratio among large Southern Californian cities. Although complex, this regional transformation has not occurred in a random fashion. Rather, it has resulted from actions taken by individuals, groups, and agencies with specific goals in mind.

The way in which this transformation unfolds will determine the vitality of our neighborhoods and the health of the entire region. Understanding the nature and consequences of these transformation patterns is thus vital in planning for growth, development, and quality of life.

In this second Southern California RPR, we reveal the complexity and dynamics of our ever changing region. We analyze patterns in land development alongside socioeconomic changes within the six-county Southern California region – Imperial, Los Angeles, Orange, Riverside, San Bernardino, and Ventura counties – over the last 20 years.

First, we describe the changes in land use patterns for clusters of cities during this period. We follow with statistical models that explain why development happens as it does in certain locations. Second,

we assess the consequences of this land use change for neighborhoods, paying particular attention to their impact on the economic health of neighborhoods.

Although these first two foci can provide some meaningful insights into the nature of development in the broader Southern California region, the latter part of the Report utilizes the insights from these analyses to make projections about a key development site in Orange County: the Great Park area.

Consistent with the larger goals of the RPR series, we hope that our models, using detailed demographic, social, environmental, economic, and quality of life trends, will provide valuable knowledge and information for policy makers and the public alike, and thus help inform public discussion about the future of the region.

The Plan of the Report

The remainder of this regional progress report is organized as follows. In Chapter 2, we describe the pattern of land use change in the Southern California region from 1990-2005. We first describe general trends for the entire region, and then focus on each of the separate counties.

We follow with a discussion of land use change for selected city clusters. Rather than presenting the results for all of the cities in the region, we created city clusters to present the results (note that in the later analyses we retain cities as distinct units of interest).

This novel approach, pioneered in our first RPR, groups together sociodemographically similar cities, allowing for a more parsimonious presentation while emphasizing the similarity between neighboring cities. At the end of Chapter 2, we describe statistical models that explain why certain types of development occur in some neighborhoods but not others.

Understanding the nature and consequences of these transformation patterns is vital in planning for growth, development, and quality of life.

In Chapter 3, we examine the consequences of land use development patterns. We begin by highlighting city clusters that have experienced either very positive, or very negative, changes in economic health over the last 20 years. We then describe the results of statistical models that explain why some neighborhoods experience more economic vibrancy than others with explicit consideration of the impacts of land development patterns. These longitudinal models use data from 1990 to 2012, and focus on the change in house prices, income of new residents, unemployment rates, and job growth.

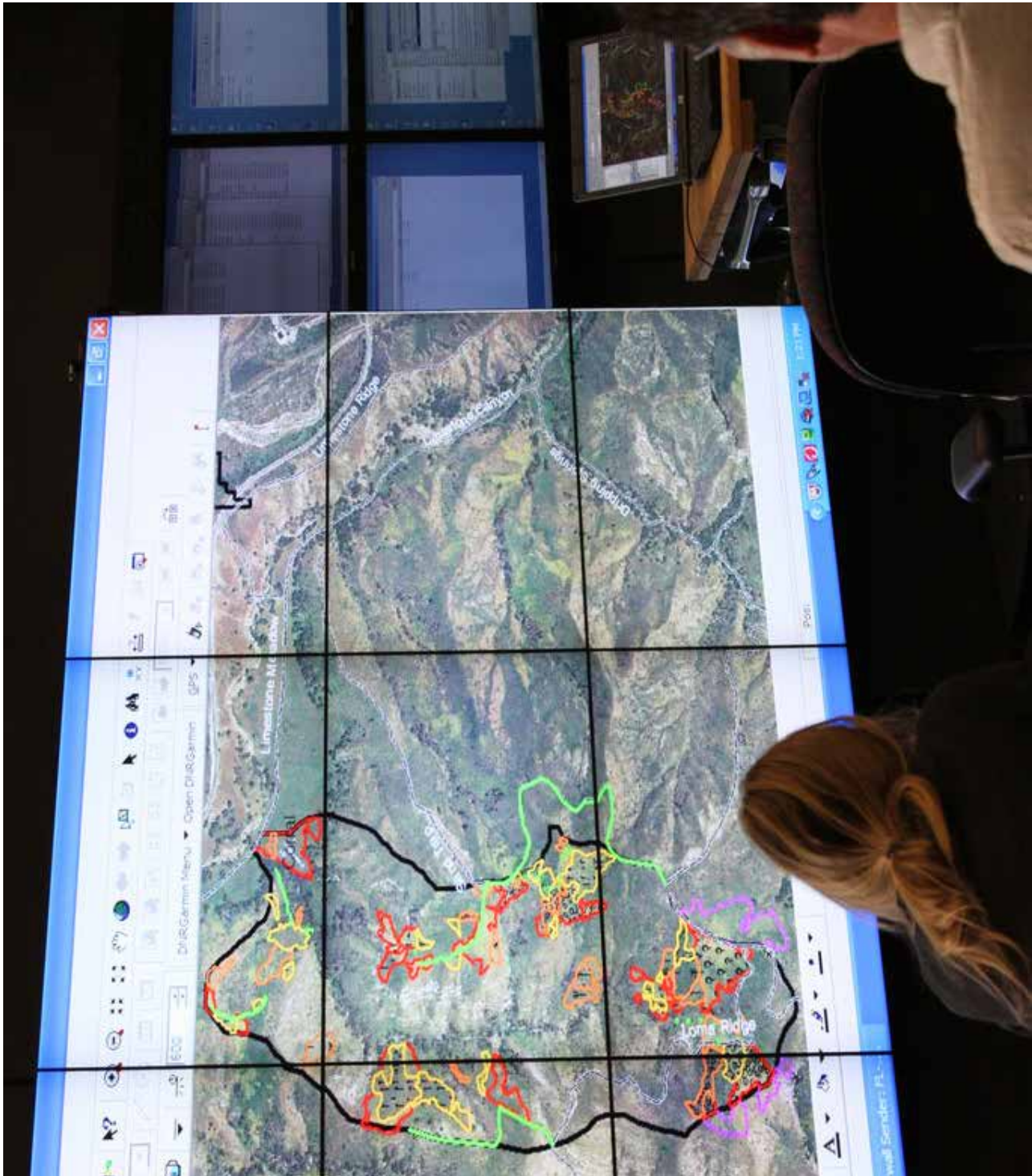
In Chapter 4, we discuss the relationship between land use, parks and crime in the region. We use data on crime events for 184 cities and census designated places

(unincorporated locations) in the region and explain which parks experience more crime than others and whether blocks near parks with certain types of land use experience more crime than blocks with other land use types.

In Chapter 5, we narrow our focus to the Great Park area in Irvine. Given how important development is for the future economic health of an area, we consider the economic consequences of types of development in this area. The first part of the chapter uses the results from our statistical models in Chapter 2 to predict the most likely development of this area based on what has occurred in the region over this earlier time period. The second part of the chapter considers various scenarios of types of development that might occur in this area, and then uses the results from our statistical models in Chapter 3 to make projections forward in time for the likely economic consequences of these development choices.

Chapter 6 concludes with a discussion of the lessons learned from the research presented in this second RPR.

This report is also available at:
http://socialecology.uci.edu/mfi


Limestone Ridge
Limestone Canyon
Limestone Mountain
Open DNRGarmin
DNRGarmin Menu
GPS
Loma Ridge

Chapter 2

Land Use Change Trends in Southern California

In this chapter we focus on how the land use composition of the region has changed between 1990[1] and 2005. We first outline general changes in regional land use patterns, focusing upon urban development purposes (e.g., single-family residential, multi-family residential, retail, etc.). Then, we break out these changes by each of the six counties in Southern California.

The Southern California Association of Governments (SCAG) land use dataset, originally constructed based on aerial photography and periodically updated, provides detailed parcel-level actual land use information in a GIS shapefile format. It contains nearly 4.7 million parcels within the six-county southern California region.

In the dataset, each parcel's land uses in 1990, 1993, 2001, 2005, and 2008 are identified based on SCAG's disaggregated land use coding system (having more than 100 categories) based on the parcel's 2008 boundaries. We reclassified the data to 15 categories. Our careful assessments found that the 2008 data had too many methodological differences to be included in a longitudinal analysis, and therefore 2005 is the last time point of land use data we use in this Report.

1 We selected 1990 as a starting point as the earliest land use information for Imperial County begins in 1993 and the county-specific analyses start in 1990.

Results in Brief

- From 1993 to 2005, a consistent trend in Southern California was the development of single-family housing units. Single-family residential land increased by 14% (in parcels) or by 15% (in acres), a pace that matched regional population growth rate (approximately +14.6% from 15.5M to 17.6M).
- While single-family residential increased in all six counties, the net growth rates varied substantially, from Los Angeles County's 5% increase in acres to Riverside's 45% increase in acres.
- Nearly 95% of all new single-family housing was developed on vacant or converted agricultural lots. In other words, the transition from other urban uses, such as other type of residential and open space & recreation, to single-family housing was not substantial.
- The rates of multi-family residential land increase was slower (approximately +4% in terms of parcel counts and +8% in terms of acres) than those of single-family residential in the region.
- The higher percentage increase in acres (compared to the rate in parcel counts) suggests that the average lot size of multi-family housing construction went up (i.e., a large scale of the new projects in recent years).
- Los Angeles County lagged behind all other counties in multi-family residential land development in both numbers of parcels and area. Los Angeles only added 900 acres, while Orange added 3,000 acres and Riverside added 1,600 acres.
- Non-residential urban land uses also expanded substantially within the region. In particular, "Mixed Development" uses increased by more than 50% (in acres) between 1993 and 2005. However, industrial uses (i.e., light industrial, heavy industrial, and extraction) actually shrank in Los Angeles and Orange counties, though it increased in the region overall.

Each county had distinct patterns of land use conversion:

1. Imperial County extensively developed farmland areas.
2. Los Angeles County was outpaced by Orange, Riverside, and San Bernardino in acres of various types of new development.
3. Orange County saw a large expansion of multi-family residential but a substantial decline in industrial land and military uses.
4. Riverside County rapidly grew in single-family residential and public facilities, which are associated with population increase
5. San Bernardino County saw substantial gains in land for commercial & services, industrial, and transportation, communication & utilities.
6. Ventura County experienced a modest expansion of its urban territory, falling between Los Angeles and rapidly expanding Riverside and San Bernardino.

Table 2.1 Changes in Single-family Residential Areas (in thousand parcels)

Area	Y1993	Y2001	Y2005	Change 1993-2001	Change 2001-2005	Change 1993-2005
Region	2,690.8	2,887.8	3,054.3	+197.0 (7.3%)	+166.5 (5.8%)	+363.5 (13.5%)
Imperial	20.3	22.8	26.3	+2.4 (11.9%)	+3.6 (15.7%)	+6.0 (29.5%)
Los Angeles	1,392.3	1,42 0.5	1,44 0.6	+28.2 (2.0%)	+2 0.2 (1.4%)	+48.4 (3.5%)
Orange	443.4	488.8	507.7	+45.5 (10.3%)	+18.9 (3.9%)	+64.3 (14.5%)
Riverside	290.7	356.4	441.3	+65.7 (22.6%)	+84.9 (23.8%)	+15 0.6 (51.8%)
San Bernardino	386.9	424.0	453.2	+37.1 (9.6%)	+29.2 (6.9%)	+66.3 (17.1%)
Ventura	157.2	175.3	185.2	+18.1 (11.5%)	+9.8 (5.6%)	+28.0 (17.8%)

Source: MFI analysis of Southern California Association of Governments (SCAG) land-use data
Notes: Parenthesis ( ) indicates each source's share.

Table 2.2: Changes in Single-family Residential Areas (in thousand acres)

Area	Y1993	Y2001	Y2005	Change 1993-2001	Change 2001-2005	Change 1993-2005
Region	602.8	649.8	693.1	+47.0 (7.8%)	+43.3 (6.7%)	+90.3 (15.0%)
Imperial	4.7	5.3	5.9	+ 0.6 (12.5%)	+ 0.7 (12.6%)	+1.3 (26.7%)
Los Angeles	278.9	286.5	292.8	+7.6 (2.7%)	+6.2 (2.2%)	+13.9 (5.0%)
Orange	84.7	93.8	98.0	+9.1 (1 0.7%)	+4.2 (4.4%)	+13.3 (15.6%)
Riverside	79.3	94.6	115.2	+15.3 (19.3%)	+20.6 (21.8%)	+35.9 (45.3%)
San Bernardino	111.0	119.9	128.4	+8.9 (8.0%)	+8.5 (7.1%)	+17.4 (15.7%)
Ventura	44.3	49.7	52.8	+5.4 (12.3%)	+3.0 (6.1%)	+8.5 (19.1%)

Source: MFI analysis of Southern California Association of Governments (SCAG) land-use data
Notes: Parenthesis ( ) indicates each source's share.

Table 2.3: Composition of New Single-Family Residential Land, 1993-2005 (in thousand parcels)

Area	Urban Vacant	Non-Urban Vacant	Agricultural	All Other Uses
Region	20.1 (21.2%)	53.0 (56.0%)	16.0 (17.0%)	5.5 (5.8%)
Imperial	0.1 (6.3%)	0.6 (47.0%)	0.6 (44.1%)	0.0 (2.6%)
Los Angeles	3.9 (26.0%)	9.4 (63.1%)	0.6 (3.7%)	1.1 (7.2%)
Orange	3.8 (27.7%)	6.3 (46.6%)	2.0 (14.7%)	1.5 (11.0%)
Riverside	7.9 (21.4%)	18.1 (49.1%)	9.6 (26.0%)	1.3 (3.4%)
San Bernardino	2.8 (14.8%)	13.2 (69.4%)	1.6 (8.2%)	1.5 (7.7%)
Ventura	1.6 (18.6%)	5.2 (6 0.3%)	1.7 (19.9%)	0.1 (1.3%)

Source: MFI analysis of Southern California Association of Governments (SCAG) land-use data
Notes: Parenthesis ( ) indicates each source's share.

Table 2.4: Changes in Multi-family Residential Areas (in thousand parcels)

Area	Y1993	Y2001	Y2005	Change 1993-2001	Change 2001-2005	Change 1993-2005
Region	304.8	311.5	316.3	+6.6 (2.2%)	+4.9 (1.6%)	+11.5 (3.8%)
Imperial	1.3	1.4	1.4	+ 0.0 (2.4%)	+ 0.1 (5.1%)	+ 0.1 (7.7%)
Los Angeles	135.6	136.0	136.2	+ 0.4 (0.3%)	+ 0.2 (0.2%)	+ 0.6 (0.5%)
Orange	71.5	73.9	74.6	+2.4 (3.4%)	+ 0.7 (1.0%)	+3.1 (4.4%)
Riverside	28.1	29.2	29.9	+1.1 (3.8%)	+ 0.7 (2.3%)	+1.7 (6.2%)
San Bernardino	34.2	35.4	37.3	+1.2 (3.4%)	+1.9 (5.3%)	+3.0 (8.8%)
Ventura	34.1	35.6	37.0	+1.6 (4.6%)	+1.3 (3.7%)	+2.9 (8.4%)

Source: MFI analysis of Southern California Association of Governments (SCAG) land-use data
Notes: Parenthesis ( ) indicates each source's share.

Table 2.5: Changes in Multi-family Residential Areas (in thousand acres)

Area	Y1993	Y2001	Y2005	Change 1993-2001	Change 2001-2005	Change 1993-2005
Region	90.4	93.9	97.3	+3.5 (3.9%)	+3.3 (3.6%)	+6.9 (7.6%)
Imperial	0.4	0.4	0.5	+ 0.0 (4.9%)	+ 0.1 (15.8%)	+ 0.1 (21.5%)
Los Angeles	40.6	41.1	41.5	+ 0.5 (1.2%)	+ 0.4 (1.1%)	+ 0.9 (2.3%)
Orange	24.1	25.8	27.1	+1.7 (7.0%)	+1.4 (5.3%)	+3.0 (12.6%)
Riverside	11.0	11.8	12.6	+ 0.7 (6.8%)	+ 0.8 (6.8%)	+1.6 (14.1%)
San Bernardino	7.6	7.9	8.4	+ 0.3 (3.9%)	+ 0.4 (5.3%)	+ 0.7 (9.4%)
Ventura	6.7	6.9	7.2	+ 0.3 (4.3%)	+ 0.3 (3.8%)	+ 0.5 (8.3%)

Source: MFI analysis of Southern California Association of Governments (SCAG) land-use data
Notes: Parenthesis ( ) indicates each source's share.

I. Detailed Patterns of Land Use Conversion

A. Change in the Entire Region

From 1993 to 2005, all six southern California counties – Imperial, Los Angeles, Orange, Riverside, San Bernardino, and Ventura – experienced a substantial increase in single-family residential land use. Overall, the increase rate was approximately 14% (in terms of parcel counts) or by 15% (in terms of acres). This pace of single-family residential land expansion was almost identical to the regional population growth rate (approximately +14.6% from 15.5M to 17.6M).

Though single-family residential land was added to all six counties, the growth rate varied substantially by county. While Los Angeles County saw a net increase of just 5% in terms of acres, Riverside County exhibited 45% of growth.

- The net increase in single-family residential is based on new development

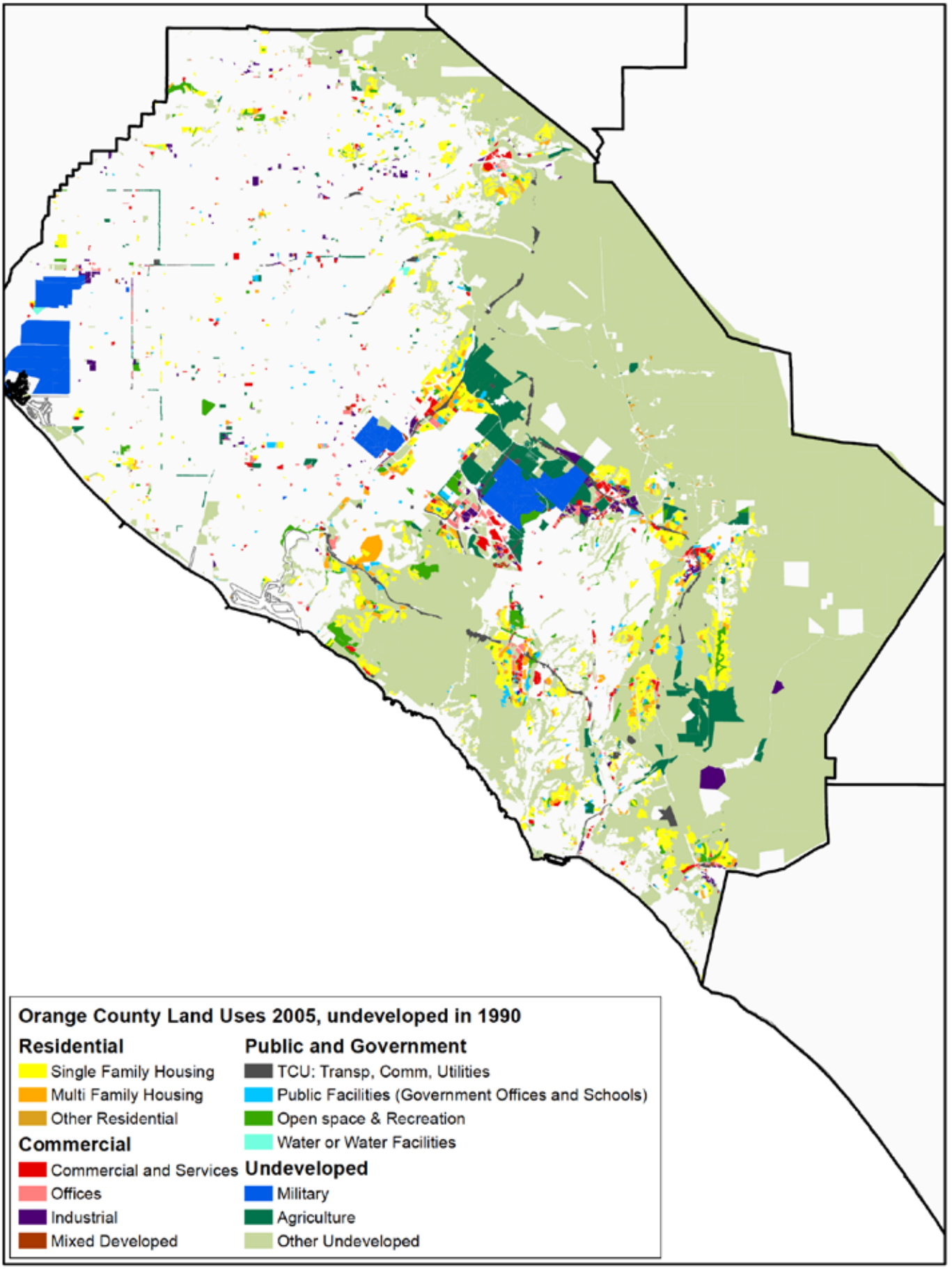
Table 2.6: Changes in Non-residential Areas, 1993-2005 (in thousand acres)

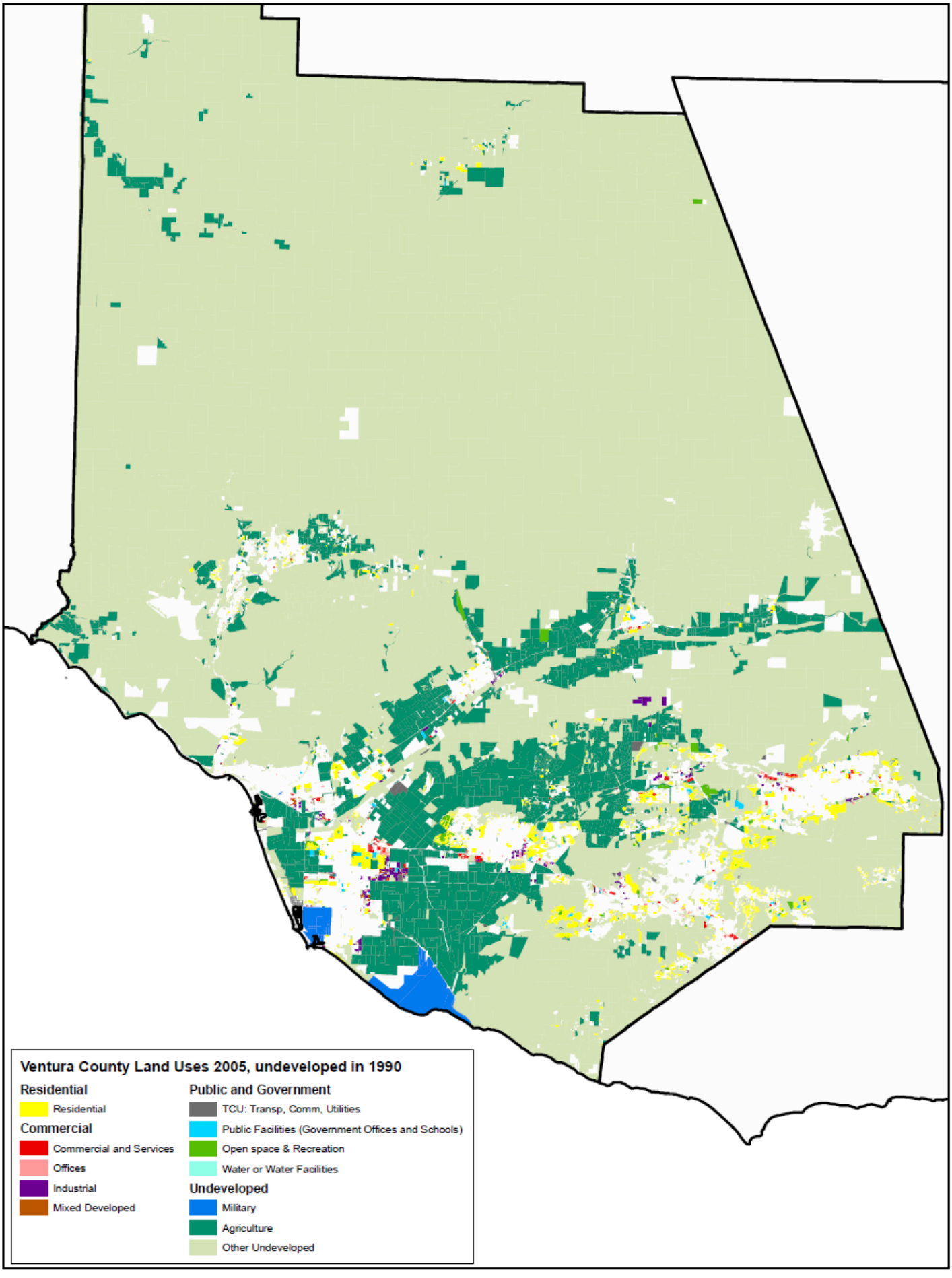
Area	Commercial & Services	Industrial	Transportation, Communication, & Utilities	Public Facilities (e.g., Gov't. Offices & Schools)	Mixed Development	Open space & recreational
Region	+16.4~17.4 (N/A)	+11.5~44.6 (N/A)	+18.2~59.1 (N/A)	+12.2 (15.6%)	+1.8 (52.1%)	+21.3~23.7 (N/A)
Imperial	+ 0.3 (23.9%)	+ 0.6 (5.0%)	+1.1 (3.6%)	+ 0.3 (17.9%)	+ 0.0 (98.7%)	+1.6 (14.6%)
Los Angeles	+3.6 (8.2%)	– 0.6 (– 0.9%)	+3.1 (5.0%)	+2.7 (7.1%)	+ 0.3 (21.4%)	+3.0 (6.6%)
Orange	+3.6 (35.1%)	–1.3 (–6.1%)	+3.3 (37.0%)	+1.6 (11.9%)	+ 0.6 (8 0.2%)	+3.5 (25.3%)
Riverside	+3.8 (41.9%)	+5.9 (29.9%)	+3.3 (9.0%)	+3.6 (4 0.1%)	+ 0.5 (8 0.0%)	+9.5 (1.3%)
San Bernardino*	+3.9~4.9 (N/A)	+6.5~39.6 (N/A)	+6.8~47.7 (N/A)	+3.5 (3 0.4%)	+ 0.3 (71.9%)	+1.6~4.0 (N/A)
Ventura	+1.2 (22.0%)	+ 0.4 (3.2%)	+ 0.5 (5.0%)	+ 0.6 (11.2%)	+ 0.1 (4 0.8%)	+2.0 (24.6%)

Source: MFI analysis of Southern California Association of Governments (SCAG) land-use data
Notes: Parenthesis ( ) indicates each source's share.
* San Bernardino County's 1993 land use data involve a number of unclassified parcels that were later identified as commercial & services, industrial, transportation, communication, & utilities, or open space & recreational in 2005. Therefore, in this table, the area increases are presented with and without consideration of such land use changes.

minus conversion from single-family residential to more intensive urban uses. Virtually all new single-family residential purposes development occurred on former urban and non-urban vacant lots or agricultural land. Conversion from other urban uses (including other types of residential, commercial, industrial, and open space & recreation) to single-family residential accounted for just a marginal portion of new housing supply.

- During the same period of time, multi-family residential land increased by approximately +4% in parcel counts or +8% in acres. These rates of growth were much lower than those of single-family residential expansion (+14% and +15%, respectively) in the region. The rates here do not necessarily represent the pace of multi-family housing unit increase, which largely depends on the building density of newly built apartments.
- The higher percentage increase rate in acres (compared to the rate in parcel counts) seems to suggest that the scale of multi-family housing construction became larger in recent years. This pattern (i.e., a larger growth in terms of area than in the number of parcels) is particularly apparent in Los Angeles (0.5% vs. 2.3%) and Orange County (4.4% vs. 12.6%).


Orange County Land Uses 2005, undeveloped in 1990
Residential
Single Family Housing
Multi Family Housing
Other Residential
Commercial
Commercial and Services
Offices
Industrial
Mixed Developed
Public and Government
TCU: Transp, Comm, Utilities
Public Facilities (Government Offices and Schools)
Open space & Recreation
Water or Water Facilities
Undeveloped
Military
Agriculture
Other Undeveloped


Ventura County Land Uses 2005, undeveloped in 1990
Residential
Residential
Commercial
Commercial and Services
Offices
Industrial
Mixed Developed
Public and Government
TCU: Transp, Comm, Utilities
Public Facilities (Government Offices and Schools)
Open space & Recreation
Water or Water Facilities
Undeveloped
Military
Agriculture
Other Undeveloped

- Although multi-family housing units traditionally tend to be located in Los Angeles County, its net increase rate of multi-family residential land was lower than those of the other six counties. In acres of multi-family residential land expansion, Los Angeles County (+900 acres) placed behind Orange (+3,000 acres) and Riverside (+1,600 acres).
- In addition to residential areas, urban space for various non-residential urban uses, such as commercial, public facilities, and open space & recreation, expanded substantially between 1993 and 2005. In particular, land areas classified into "Mixed Development" increased by more than 50% (in acres) in the region.
- Unlike other categories, industrial land areas actually decreased in Los Angeles and Orange counties.
- Industrial land, however, increased substantially in the remaining four counties, particularly in San Bernardino County. As a result, the total area of industrial sites (covering light industrial, heavy industrial, and extraction) went up by more than ten thousand acres within the region.

As previously noted, new single-family housing was developed on urban and non-urban vacant or agricultural land. Non-residential urban land uses and multi-family housing were also typically developed on vacant or agricultural parcels.

B. County-specific Changes in Land Use

- Imperial County saw rapid expansion of urban areas, including single-family residential (+27%), multi-family residential (+22%), commercial & services (+24%), and open space & recreational (+15%). However, in absolute terms, its expansion was smaller than other counties. While its farmland was likely to be exploited to accommodate such growth (cf. in other counties, relatively higher percentages of new development occurred on urban vacant parcels), the total area of agricultural land did not decline due to the conversion from non-urban vacant to agricultural.
- From 1990 to 2005, Los Angeles County continued to expand its urban land uses (except industrial). However, it grew at a much slower rate than other counties in most urban land use categories. In terms of its actual size of expansion (as opposed to net increase rates), it was behind Orange, Riverside, and San Bernardino in residential, commercial & services, TCU, and public facilities.
- Orange County underwent rapid transformation of its built environment with a substantial decline in industrial land which was contrasted to large expansion of other types of urban land uses, particularly multi-family housing. It accounts for nearly 45% of the total regional net gains in multi-family residential areas (3.0 out of 6.9 thousand acres). Other notable patterns include the conversion of military sites for a broad range of civilian

uses in the county and the depletion of agricultural (-39%) and urban vacant (-54%) land stock.

- Riverside County had the largest share of the regional net gains in single-family residential areas (approximately 40%: 35.9 out of 90.3 thousand acres) between 1990 and 2005. It also showed the faster increase rate of land for public facilities including government offices and schools (+40%: from 9 to 12.6 thousand acres) than any other counties. New development for such land uses might be needed to accommodate its rapid population growth during this period of time (+47%: from 1.3 to 1.9 million).
- San Bernardino County gained large areas of new development for commercial & services, industrial, and TCU. As noted previously, the county's 1990 land use data had many unclassified parcels that were later classified into the three urban land use categories. Even if these changes are not taken into account, San Bernardino had the largest net addition in these categories among the six southern California counties.
- Ventura County showed modest increases in most urban land use categories. Generally, its expansion rates were falling between Los Angeles and rapidly growing counties in the region, such as Riverside and San Bernardino. This may, in part, be due to the fact that county and eight of its cities approved initiatives to limit development/conversion of agricultural land (SOAR, or Save Our Agricultural Resources). It is also possible that there is substantial agricultural land in preserve due to the Williamson Act.

II. City Clusters Experiencing The Largest Changes In Land Use Composition

In this section, we focus on city clusters that have experienced the sharpest decreases or increases in land use composition. Note that we first computed the percentage of a city cluster's land area that is composed of different land use categories. Then, we standardized the land use composition for each city cluster such that a value of 100 indicates a city cluster with the average level of land use type in the region; values greater than 100 indicate city clusters greater than the average (e.g., a value of 150 indicates that the city has 50% more of a land use compared to the average in the region), and values less than 100 indicate city clusters less than the average (e.g., a value of 50 represents a city in which its land area composed of a certain type is just 50% of the average in the region). For example, if the average city in the region has 60% of its land area as residential, then a city with 90% of its land area as residential would have a value of 150, a city with 60% of its land area as residential would have a value of 100, and a city with 30% of its land area as residential would have a value of 50. In essence, we are comparing city clusters to what would be expected of other city clusters in the region.

In each table, we present the five city clusters experiencing the sharpest decrease in the composition for a particular land use based on this standardized measure, and the five city clusters experiencing the sharpest increase.

Trend	Description
Falling Behind	**Declines** in particular land use and 2005 measure is **below** average (100).
Losing Ground	**Declines** in particular land use but 2005 measure is **above** average (100).
Catching Up	**Increases** in particular land use but 2005 measure is **below** average (100).
Gaining Ground	**Increases** in particular land use and 2005 measure is **above** average (100).

Table 2.7: School land uses in city clusters in Southern California, 1990-2005

City Cluster	1990	2005	% Change	Region	Trend
Blythe	92	44	-53%	*Riverside County*	*Falling Behind*
Huntington Beach	83	63	-23%	*Orange County*	*Falling Behind*
Seal Beach	74	61	-17%	*Orange County*	*Falling Behind*
Garden Grove	122	102	-16%	*Orange County*	*Losing Ground*
Cerritos	135	115	-15%	*Los Angeles County*	*Losing Ground*
Hesperia	18	28	58%	*S.B. County*	*Catching Up*
Lake Elsinore	34	57	66%	*Riverside County*	*Catching Up*
Rancho Santa Margarita	38	74	94%	*Orange County*	*Catching Up*
Temecula	22	47	118%	*Riverside County*	*Catching Up*
Victorville	19	47	155%	*S.B. County*	*Catching Up*

Table 2.8: Retail land uses in city clusters in Southern California, 1990-2005

City Cluster	1990	2005	% Change	Region	Trend
Westside	74	57	-23%	*Los Angeles City*	*Falling Behind*
Orange	105	87	-17%	*Orange County*	*Falling Behind*
Whittier	157	132	-16%	*Los Angeles County*	*Losing Ground*
Buena Park	132	114	-14%	*Orange County*	*Losing Ground*
Long Beach	155	137	-12%	*Los Angeles County*	*Losing Ground*
Lake Forest	37	53	45%	*Orange County*	*Catching Up*
Chino	36	54	49%	*S.B County*	*Catching Up*
Barstow	90	140	55%	*S.B. County*	*Gaining Ground*
Temecula	36	69	889%	*Riverside County*	*Catching Up*
Rancho Santa Margarita	3	40	1096%	*Orange County*	*Catching Up*

Table 2.9: Residential land uses in city clusters in Southern California, 1990-2005

City Cluster	1990	2005	% Change	Region	Trend
El Monte	113	104	-8%	*L.A. County*	*Losing Ground*
South-central Los Angeles	21	20	-7%	*Los Angeles City*	*Falling Behind*
East Los Angeles	95	87	-8%	*L.A. County*	*Falling Behind*
Central San Fernando Val.	99	92	-7%	*Los Angeles City*	*Falling Behind*
Santa Monica	101	94	-7%	*L.A. County*	*Falling Behind*
Barstow	51	63	22%	*S.B. County*	*Catching Up*
Blythe	53	68	30%	*Riverside County*	*Catching Up*
Lake Forest	88	114	30%	*Orange County*	*Gaining Ground*
Temecula	57	101	77%	*Riverside County*	*Gaining Ground*
Rancho Santa Margarita	68	115	68%	*Orange County*	*Gaining Ground*

Table 2.10: Religious land uses in city clusters in Southern California, 1990-2005

City Cluster	1990	2005	% Change	Region	Trend
San Clemente	75	52	-31%	*Orange County*	*Falling Behind*
S.W. San Fernando Valley	172	127	-26%	*Los Angeles City*	*Losing Ground*
Torrance	127	101	-21%	*L.A. County*	*Losing Ground*
Fullerton	196	160	-18%	*Orange County*	*Losing Ground*
Upland	160	134	-16%	*S.B. County*	*Losing Ground*
Moreno Valley	36	67	86%	*Riverside County*	*Catching Up*
Santa Monica	18	42	134%	*L.A. County*	*Catching Up*
Lake Forest	17	43	146%	*Orange County*	*Catching Up*
Victorville	29	74	152%	*S.B. County*	*Catching Up*
Rancho Santa Margarita	9	31	246%	*Orange County*	*Catching Up*

Table 2.11: Recreational land uses in city clusters in Southern California, 1990-2005

City Cluster	1990	2005	% Change	Region	Trend
Fullerton	147	95	-35.1	*Orange County*	*Falling Behind*
Garden Grove	52	39	-25.9	*Orange County*	*Falling Behind*
N.W. San Fernando Valley	111	87	-21.9	*Los Angeles City*	*Falling Behind*
Seal Beach	182	143	-21.2	*Orange County*	*Losing Ground*
Mid-Wilshire	74	60	-19.4	*Los Angeles City*	*Falling Behind*
Lancaster	19	29	49.3	*L.A. County*	*Catching Up*
Northeast Los Angeles	55	90	62.5	*Los Angeles City*	*Catching Up*
Barstow	35	67	89.3	*S.B. County*	*Catching Up*
Hesperia	12	25	10 0.0	*S.B. County*	*Catching Up*
Temecula	40	148	272.7	*Riverside County*	*Gaining Ground*

Table 2.12: Office land uses in city clusters in Southern California, 1990-2005

City Cluster	1990	2005	% Change	Region	Trend
Seal Beach	157	60	-62%	*Orange County*	*Falling Behind*
Sunland / Tujunga	112	51	-54%	*Los Angeles City*	*Falling Behind*
Willowbrook	18	12	-33%	*L.A. County*	*Falling Behind*
Chino	13	9	-31%	*S.B. County*	*Falling Behind*
N.W. San Fernando Valley	66	46	-30%	*Los Angeles City*	*Falling Behind*
Diamond Bar	28	44	57%	*L.A. County*	*Catching Up*
Temecula	23	43	87%	*Riverside County*	*Catching Up*
Moreno Valley	9	17	89%	*Riverside County*	*Catching Up*
Lake Forest	67	140	109%	*Orange County*	*Gaining Ground*
Lake Elsinore	16	34	113%	*S.B. County*	*Catching Up*

Table 2.13: Industrial land uses in city clusters in Southern California, 1990-2005

City Cluster	1990	2005	% Cluster	Region	Trend
Yorba Linda	138	75	-46%	*Orange County*	*Falling Behind*
Rancho Palos Verdes	16	9	-39%	*L.A. County*	*Falling Behind*
Temecula	69	46	-33%	*Riverside County*	*Falling Behind*
Huntington Beach	113	84	-26%	*Orange County*	*Falling Behind*
Upland	127	99	-22%	*S.B. County*	*Falling Behind*
Chino	73	106	45%	*S.B. County*	*Gaining Ground*
Rubidoux	52	79	52%	*Riverside County*	*Catching Up*
Barstow	49	82	68%	*S.B. County*	*Catching Up*
Lake Forest	26	51	94%	*Orange County*	*Catching Up*
Rancho Santa Margarita	12	26	125%	*Orange County*	*Catching Up*

Table 2.14: Government land uses in city clusters in Southern California, 1990-2005

City Cluster	1990	2005	% Change	Region	Trend
Oxnard	164	70	-57%	*Ventura County*	*Falling Behind*
Whittier	87	42	-52%	*L.A. County*	*Falling Behind*
Lake Elsinore	36	19	-48%	*Riverside County*	*Falling Behind*
Ontario	198	110	-45%	*S.B. County*	*Losing Ground*
Westwood / Beverly	251	167	-33%	*Los Angeles City*	*Losing Ground*
Calabasas	68	133	96%	*L.A. County*	*Gaining Ground*
Rancho Santa Margarita	11	22	108%	*Orange County*	*Catching Up*
Sunland / Tujunga	25	58	136%	*Los Angeles City*	*Catching Up*
Seal Beach	50	230	358%	*Orange County*	*Gaining Ground*
Victorville	21	116	446%	*S.B. County*	*Gaining Ground*

III. Key Factors Influencing Development and Redevelopment

In this section, we describe the results of statistical models that explain why parcels are developed into different uses. In one set of models, we use the characteristics of the parcels and their neighborhoods in 1990 to understand which type of development will occur in undeveloped parcels by 2005. By development, we mean construction on undeveloped land, such as vacant and agricultural parcels. In a second set of models, we use the characteristics of the parcels and their neighborhoods in 2001 to project which type of development will occur in undeveloped parcels by 2005.[2]

While these models assess the determinants of development, we also estimated models explaining *redevelopment* over the same two time periods. By redevelopment we mean changing from one urban land use type to another. The 1990 to 2005 models allow us to look at development and redevelopment over longer time periods, whereas the 2001-05 models illustrate the impact of more recent trends. These models simultaneously account for all of the parcel, nearby amenity, and neighborhood characteristics that we describe in this section.[3]

2 These models are multinomial logistic models. An important caveat is that the size of the parcel refers to its current constitution. For example, a large parcel in 1990 that has since been split into 10 smaller parcels would appear in our data has the 10 smaller parcels.

3 Because the very large sample size provides us very strong statistical power, we report the results of variables from the statistical model when significance level is less than $p < 0.01$.

The categories of land use development were: single-family units; multi-family units; other residential; commercial/services; industrial; transportation, communication & utilities (TCU); public facilities; mixed development; recreation/open space; and offices.

Results in Brief

- Proximity to business subcenters increased the likelihood of single and multi-family housing, public infrastructure, and commercial development. Proximity to the beach and transit stations also had positive effects on development. Proximity to central business districts reduced the likelihood of development, suggesting the force of continued urban expansion.
- The impacts of proximity to amenities on redevelopment varied, and were generally less pronounced.
- Larger and flatter parcels were more likely to see development and redevelopment.
- A greater mixture of land-use and housing types increased the likelihood of development and redevelopment.
- Different population characteristics (e.g., income, density, age) had varying impacts on development, and less pronounced impacts on redevelopment.

A. Characteristics of the Land Parcels

These measures capture the characteristics of the land parcels that can significantly

affect the profitability of various types of development. Arguably, the shape, size and slope of the parcel presents limitations on the possible ways a parcel could be developed or redeveloped.

Size: larger parcels are more likely to be developed or redeveloped

- Larger parcels were more likely to be developed into other residential, commercial, industrial, public infrastructure, and mixed-use development in both time periods.
- Larger parcels were more likely to be redeveloped into other residential, commercial, public facility, mixed-use, open space & recreation, and office in both time periods, and into TCU in 2001-05.
- However, larger parcels were less likely to be developed into multi-family housing in both time periods, and redeveloped into multi-family housing in 2001-05.

Slope: flatter parcels are more likely to be developed

- The slope of the parcel also significantly decreased the likelihood of all residential, commercial, industrial, public infrastructure, mixed-use, and office space development in both time periods; it also decreased the likelihood of open space & recreational development in the 2001-05 model.
- The slope negatively affected redevelopment into commercial and industrial in both time periods, and into public facilities in the 1990 to 2005 model.

Shape: parcels with a high area to perimeter ratio are less likely to be developed

- Parcels with a higher area to perimeter ratio (i.e., square shaped, whereas low values indicate rectangular shaped parcels) were less likely to experience single-family, other residential, commercial, industrial, and mixed development in both time periods, and office space development in the 1990 to 2005. But such parcels increased the likelihood of multi-family housing development.
- The shape of parcels had weaker effects on redevelopment. Whereas more square parcels were more likely to have land redeveloped into multi-family housing in 2001-05, they were less likely to have land redeveloped into other residential from 1990 to 2005.

Proximity to the Beach: parcels on the beach are less likely to be developed

- Parcels on the beach were less likely to be developed into single-family, multi-family, commercial, industrial, public infrastructure, mixed-use, open space & recreation, and office space in 1990 to 2005.
- From 2001-05, beach parcels were less likely to experience other residential, commercial, industrial, public infrastructure, mixed-used, open space & recreation, and office space development.

B. Distance from Amenities and Facilities

These measures capture the proximity of a parcel to various amenities and facilities. Various amenities nearby can enhance the desirability of certain land use development, whereas certain facilities nearby can either enhance, or discourage, specific types of development.

Proximity to business subcenters, beaches, transit stations, and airports increases new development

- Proximity to business subcenters[4] and the beach increased the likelihood of single-family housing, multi-family housing, commercial, industrial, public infrastructure[5], mixed-use, open space & recreation, and office space development from 1990 to 2005. However, proximity to business subcenters only increased the likelihood of industrial, open space & recreation, and office space development in 2001-05.
- Proximity to the beach only increased the likelihood of public facility development in 2001-05.
- Proximity to transit stations increased the likelihood of single and multi-family residential, commercial, industrial, public infrastructure, mixed-use, and office space development in both time periods.
- Proximity to airports increased the likelihood of industrial and TCU development in 1990 to 2005. Proximity to airports increased the likelihood of multi-family units and TCU development, but not industrial, in 2001-05.

Proximity to the region's central business district reduces new development

- Proximity to the central business district[6] (CBD) reduced the likelihood of single-family housing and recreational development from 1990 to 2005. The 2001-05 model showed a similar effect on single-family housing, but not on recreational development. Thus, the CBD and business subcenters had opposite effects on single-family housing development.
- However, proximity to the CBD increased the likelihood of industrial development in 1990 to 2005, and industrial and TCU development in 2001-05.

Freeways influence type of development

- The proximity to freeways reduced the likelihood of single-family units, but increased the likelihood of commercial and TCU development in both time periods.

Proximity to amenities increase likelihood of redevelopment

- Proximity to CBDs increased the likelihood of redevelopment into industrial

4 "Business subcenters" are secondary centers located outside of the main business area of a city.

5 "Public infrastructure" includes TCU and public facilities.

6 "Central business district" refers to the commercial and geographic heart of the region, such as downtown Los Angeles.

parcels from 1990 to 2005, and public facilities and mixed-use from 2001-05.

- Proximity to business subcenters also increased the likelihood of redevelopment into recreation/open-space and office space from 1990 to 2005, but had no effect in 2001-2005.
- Proximity to transit stations increased the likelihood of redevelopment into commercial, public facilities, and office space in both time periods.
- Proximity to freeways increased the likelihood of land being redeveloped into multi-family housing, commercial, and industrial in both time periods; and it increased redevelopment into public infrastructure from 1990 to 2005.
- Proximity to the beach reduced the likelihood of land being redeveloped into commercial and industrial in 1990 to 2005, and into mixed-use in 2001-05.

C. Diversity of Land Use, Housing, Jobs, and Racial Composition

These measures capture how diversity in various neighborhood characteristics can impact parcel development and redevelopment dynamics. Specifically, we focus on diversity of land-use, housing, jobs, and the racial composition of people in the neighborhood by measuring the degree of mix with an entropy metric.

Land Use: mix of land uses increases development / redevelopment

- A mixture of land-uses (i.e., land-use entropy) increased the likelihood of single and multi-family, commercial, industrial, public infrastructure, and office development in both time periods. It also increased mixed-use development in the 1990 to 2005 model.
- A mixture of land-uses increased the likelihood of land being redeveloped into commercial, industrial, public infrastructure, and open space & recreational from 1990 to 2005, and being redeveloped into industrial, mixed-use, and open space & recreational from 2001-05.

Housing: mix of types of housing has little impact on form of development / redevelopment

- A high mix of housing types increased the likelihood of other residential and office space development from 1990 to 2005. It increased redevelopment into multi-family housing and open space & recreational from 1990 to 2005. But it did not impact development or redevelopment in the more recent period.

Jobs: mix of type of jobs has little significant effect

- A mixture of types of jobs made public facility development less likely in both time periods. But a mixture of jobs increased the likelihood of commercial, industrial, and office space development in 2001-05.
- For redevelopment, a mixture of jobs only reduced the likelihood of land being redeveloped into recreational and increased the likelihood of land being

redeveloped into multi-family housing from 1990 to 2005, and land being redeveloped into commercial and office space from 2001-05.

Racial/ethnic heterogeneity decreases certain types of development

- Neighborhoods with more racial and ethnic heterogeneity (i.e., a mix of different racial/ethnic groups) were less likely to experience single-family, multi-family, commercial, mixed-use, and office space development from 1990 to 2005. But such neighborhoods only made commercial and public facility development less likely in 2001-05, and no effect on redevelopment.

Higher percentages of Latinos and Asians increase development

- Neighborhoods with a higher percentage Latinos were more likely to experience multi-family, commercial, industrial, mixed-use, and office space development from 1990 to 2005. But such neighborhoods only experienced more open space & recreational development in 2001-05.
- Neighborhoods with a higher percentage Asians had increased likelihood of commercial and office space development from 1990 to 2005, and increased likelihood of public facility and open space & recreational development in 2001-05.
- The presence of more African Americans did not impact development.
- For redevelopment, neighborhoods with more Latinos were less likely to experience redevelopment into multi-family housing and other residential from 1990 to 2005, and less likely to have land redeveloped into multi-family housing and public facilities in 2001-05. However, such neighborhoods were more likely to experience redevelopment into industrial in 2001-05.
- Neighborhoods with more Asian Americans were more likely to experience redevelopment into mixed-use in 2001-05.
- Neighborhoods with more African Americans were less likely to have land redeveloped into office space from 1990 to 2005, but more likely to have land redeveloped into mixed-use in 2001-05.

D. Population Characteristics

These measures capture some additional neighborhood population characteristics and how they impact parcel development and redevelopment. The characteristics of the neighborhood may have important effects on how parcels are developed, above and beyond the effects of the characteristics of the parcel itself, as well as the presence of nearby amenities and facilities.

Per capita Income: Higher per capita reduces mixed-use and office development, but has minimal effect on redevelopment

- Neighborhoods with higher per capita income were less likely to see mixed-use and office space development from 1990 to 2005, but more likely to

see open space & recreational development in 2001-05.

- Neighborhoods with higher per capita income had more mixed-use redevelopment in 2001-05.

Population Density: higher density increases the likelihood of development

- Neighborhoods with a higher population density (in the initial year) were more likely to experience single-family, industrial, public facilities, mixed-use, and office space development from 1990 to 2005. Such neighborhoods experienced more commercial and public facility development from 2001-05, but less industrial and other residential development.
- Higher population densities increased the likelihood that land would be redeveloped into industrial from 1990 to 2005, but reduced the likelihood that land would be redeveloped into industrial and offices from 2001-05.

Age of population: younger population increases likelihood of single-family housing

- Neighborhoods with more children (less than 18 years of age) were more likely to experience single-family housing development in both periods.
- The presence of elderly (aged 65 and up) reduced redevelopment of land into multi-family housing from 1990 to 2005.

Occupancy: higher vacancy rates impacts industrial and public facilities

- Neighborhoods with more vacant units experienced less industrial development, but more public facility development from 1990 to 2005. Higher vacancy rates decreased the likelihood of single-family and other residential development from 2001-05.
- Neighborhoods with higher vacancy rates were more likely to experience land redeveloped into recreational usage from 1990 to 2005.

Ownership: higher percentage of owners

- Neighborhoods with a higher homeowner percentage were more likely to experience other residential development in both time periods, and more single-family development from 2001-05. But public facility development was less likely from 2001-05 in such neighborhoods.
- Neighborhoods with a higher percentage of homeowners had the opposite effect on redevelopment. In such neighborhoods, land was less likely to be redeveloped into office space in both time periods, or to other residential from 1990 to 2005. But they were more likely to see land redeveloped into open space & recreational from 1990 to 2005.

Education: lower levels of education are associated with reduced development but increased redevelopment

- Neighborhoods with a higher percentage of residents without a high school degree were less likely to experience single-family, multi-family, commercial, mixed-use, and office space development from 1990 to 2005. They experienced less single-family, multi-family, and public facility development from 2001-05.
- In contrast, neighborhoods with a lower percentage of residents without a high school degree were more likely to have land redeveloped into other residential, commercial, industrial, and public facility from 1990 to 2005, and redeveloped into multi-family housing, industrial, and public facilities from 2001-05.

Chapter 3

Economic Vibrancy of Communities

In this chapter we explore the consequences of land use development for changes in the socio-economic status of neighborhoods. We first explore the changes in home sales prices and unemployment in the entire region both before (2003-07) and after (2008-12) the bursting of the housing bubble.

In the second part of the chapter, we explore how some of these changes have been more pronounced in certain city clusters in the region in the last decade. In the third part of the chapter we use statistical models to determine which types of land use, as well as other neighborhood characteristics, are associated with greater changes in average home sales prices over time, the change in average loan amount of new home loans, the level of income of new residents over time, and the change in the unemployment rate in the neighborhood over time.

I. Trends in Home Prices

A. Home Sales Price and Unemployment

As can be seen in Figure 3.1, unsurprisingly, home sales prices and the unemployment rate are negatively correlated. That is, as home sales prices increase, the unemployment rate declines. Figure 3.1 shows that between 2003-07 and 2008-12, the data cluster moved up and to the left, meaning that all city clusters saw declines in their home sales prices and increases in their unemployment rates. This is consistent with our expectations about how the Great Recession would affect unemployment and home prices. Notably, while the data cluster moved, the negative correlation between the two appears a durable phenomenon.

B. Home Loan Amount and New Resident Income

As can be seen in Figure 3.2, home loan amounts and new resident income are positively correlated. That is, as new resident incomes rise, home loan amounts increase as well. As with home sales price and unemployment, the effect of the Great Recession is obvious. The data cluster moved down and to the left, revealing that in all city clusters new resident incomes and home loan amounts rose less during the 2008-12 period than they had during the 2003-07 pre-recession period. Again, as with home sales price and unemployment, the positive correlation appears durable.

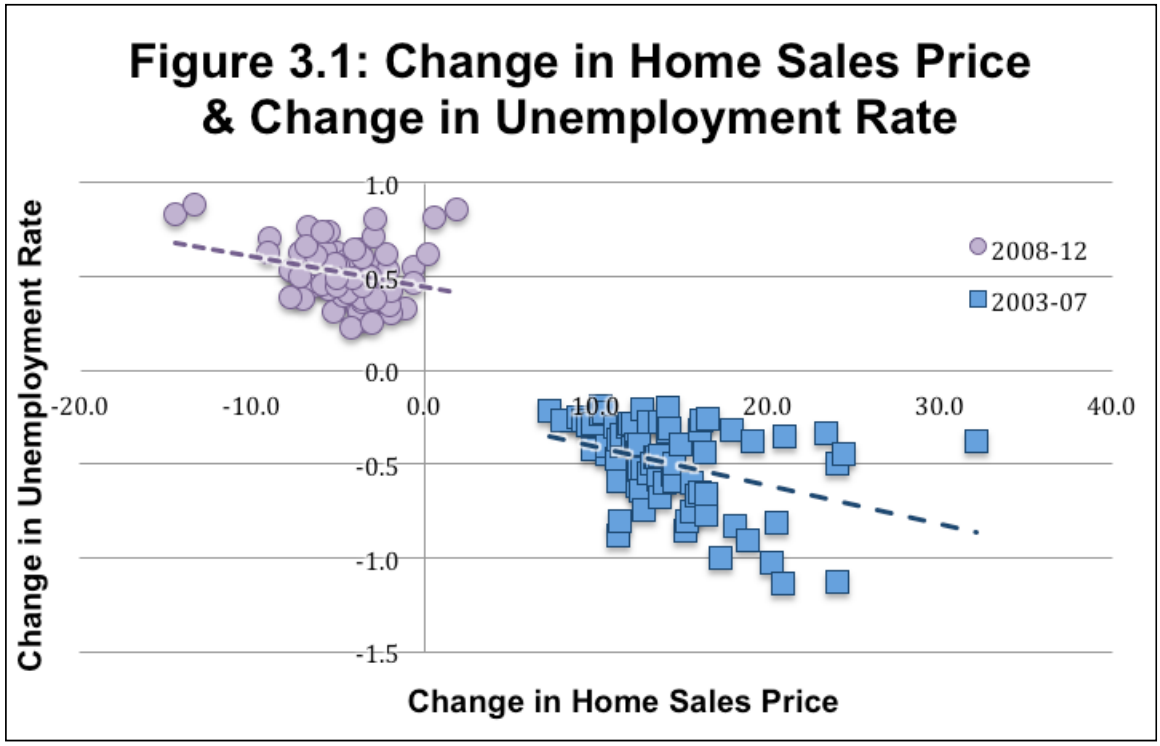


Figure 3.1: Change in Home Sales Price & Change in Unemployment Rate
Change in Unemployment Rate
1.0
0.5
0.0
-0.5
-1.0
-1.5
-20.0
-10.0
0.0
10.0
20.0
30.0
40.0
2008-12
2003-07
Change in Home Sales Price

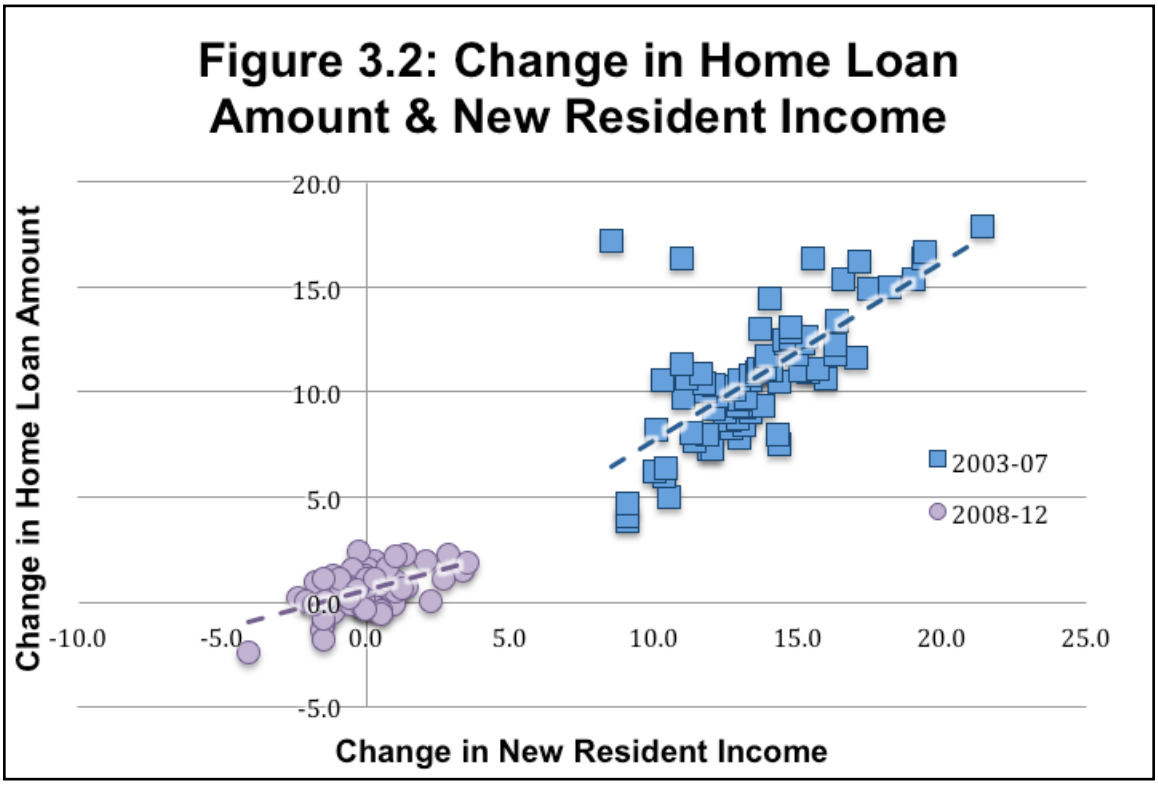


Figure 3.2: Change in Home Loan Amount & New Resident Income
Change in Home Loan Amount
20.0
15.0
10.0
5.0
0.0
-5.0
-10.0
-5.0
0.0
5.0
10.0
15.0
20.0
25.0
2003-07
2008-12
Change in New Resident Income

II. Models Explaining Change in Sales Price, Loan Amount, Income of New Owners, Unemployment Rate

In this section, we describe the results of longitudinal statistical models that determine which types of neighborhood characteristics and land use are associated with greater changes in the following key neighborhood economic variables: average home sales price, average purchase home loans, the level of income of new residents over time, and the change in the unemployment rate in the neighborhood over time.[1] The data for these models span the last two decades.

We use two different definitions of "neighborhood" in these models. One set of models uses zip code tabulation areas as neighborhoods, whereas the other set uses census tracts. In part, we do this because of data limitations—certain measures are only available at tracts, or in zip codes. We also do this because it allows us to assess how robust our results are to using these two different definitions of neighborhood.

In general, we find that the results are similar when using these two different definitions of neighborhood. For all of these models, we take advantage of the longitudinal nature of our data to estimate models in which measures at one point in time are used to project the level of the measure of interest during the subsequent years (e.g., average home sales prices). In technical terms, all models use one-year lags to predict the outcome measure.[2]

The description of all variables is provided in Technical Appendix 1. The complete set of results can be obtained in an online Appendix (available at:

http://socialecology.uci.edu/mfi).

In the language below, a "large" amount more, or a "large" change, refer to a one standard deviation change in a variable. As is to be expected, there is a strong stasis effect, as the sales price in the prior year strongly affects the sales price in the current year. Thus, all of the results we discuss below are above and beyond this stasis effect.

1 Average home loan is a proxy for the sales price of residences. This is not a perfect proxy, as in some neighborhoods the down payments may be higher as a percentage of the loan than in other neighborhoods. This will introduce error for this measure, which should be kept in mind when interpreting results. Therefore, the findings using sales price in zip codes are a useful comparison for the results using home loan values in tracts.

2 These are panel models of annual data including the lagged outcome variable as a covariate. They include fixed effects for years.

Results in Brief

- New urbanism styles of development (e.g., higher population density and walkability) are associated with rising housing prices and loan amounts.
- Retail land uses are associated with increasing home values. A similar pattern is found between residential land use and rising home loan amounts.
- Neighborhoods with low levels of residential and high levels of retail land use are the most likely to experience decreases in unemployment.
- Parks matter. Neighborhoods near parks have higher property values and lower unemployment. Each additional kilometer from a park reduces loan amounts and home sales prices.
- Crime matters. An increase in a city's violent crime rate reduces future loan amounts, future sales prices, and new residents' income.
- A city's fiscal health and education matter. An increase in the revenue to expenditure ratio and the proportion of highly educated residents lead to a rise of future loan amounts, future housing sales prices, and income of new residents.
- White-collar jobs grow faster in areas surrounded by many white-collar jobs. The presence of a large number of retail or blue-collar jobs are also found to contribute to white-collar job increases.
- Within one mile, retail jobs appear to have a competition (or crowding-out) effect (i.e., if there has been a large increase in retail jobs within one mile in the previous year, the retail job increase in the following year will be substantially smaller). This effect is reversed when measuring longer distances. Retail employment can be promoted by white-collar jobs in the nearby areas.
- Blue-collar jobs are significantly influenced by retail jobs: while blue-collar jobs are likely to increase more in an area with a large number (and increase) of retail jobs, the presence and growth of retail jobs in the nearby areas seem to affect blue-collar job changes negatively.
- Jobs generally are more likely to grow rapidly in the areas having more park accessibility, and highly educated residents. In particular, white-collar jobs increase more if the nearby park is larger. In contrast, poverty, crime, and vacancy show negative effects on job increase.
- Land use matters. The presence of more industrial land leads to an increase in blue-collar jobs and a decrease in retail jobs. Neighborhoods with more office space tend to experience an increase in white-collar jobs, while blue-collar and retail job expansion is likely to be smaller in such areas.

A. Detailed Results – Impacts on Housing, Income, and Unemployment

Factors Associated with New Urbanism

- Neighborhoods with more population density experience greater increases in loan amounts (+0.7% per year), sales prices (+1.1% per year), and income of new residents (+0.9% per year). They also, however, experience more unemployment over time.
- Older housing units appreciate at a greater rate. A one standard deviation increase in average housing age (from 34 to 46 years) increases loan amounts 4.2%.
- Walkability matters. A one standard deviation increase in intersection density is associated with 0.7% higher loan amounts and 0.7% higher income of new residents.
- Neighborhoods with longer average commuting distance have 3.4% lower loan amounts, 1.4% lower sales prices, and 3% lower average income of new residents. They also experience increasing unemployment over time.

Effects of Land Use in Neighborhood and Nearby

We assessed the complicated interrelationships between four features of the environment for home loan values: the amounts of residential and retail land use in the neighborhood, and the amounts of residential and retail land use in the area surrounding the neighborhood. In Figure 3.3, the *x*-axis shows that as the amount of retail in the neighborhood increases, there is greater loan appreciation over time.

- On the right side of the figure, the three clumps of bars show that home loan appreciation is higher if the neighborhood not only has high amounts of retail, but also high amounts of retail in nearby neighborhoods.
- *The middle three clumps of bars show a similar story*: home loan appreciation is higher if the neighborhood has average amounts of retail, but also higher amounts of retail in nearby neighborhoods.
- *The three clumps of bars on the left side of the figure tell a different story*: for neighborhoods with low levels of retail, home loan appreciation is higher if there is *less* retail in nearby neighborhoods.
- *Within each clump of bars, we see that home loan appreciation is greater for neighborhoods with higher levels residential and also surrounded by high residential areas*: this effect is most pronounced if the neighborhood and surrounding area have average or high levels of retail.
- Nearby land use matters. A higher proportion of recreation, offices or industrial in nearby tracts results in higher loan amounts.

Effects of Land Use in Neighborhood and Nearby for Unemployment Over Time

We assessed the complicated interrelationships between four features of the environment for the change in unemployment: the amounts of residential and retail land use in the neighborhood, and the amounts of residential and retail land use in the area surrounding the neighborhood.

Figure 3.3: Effect of residential and retail land use (in neighborhood and nearby) on future loan values (% change)

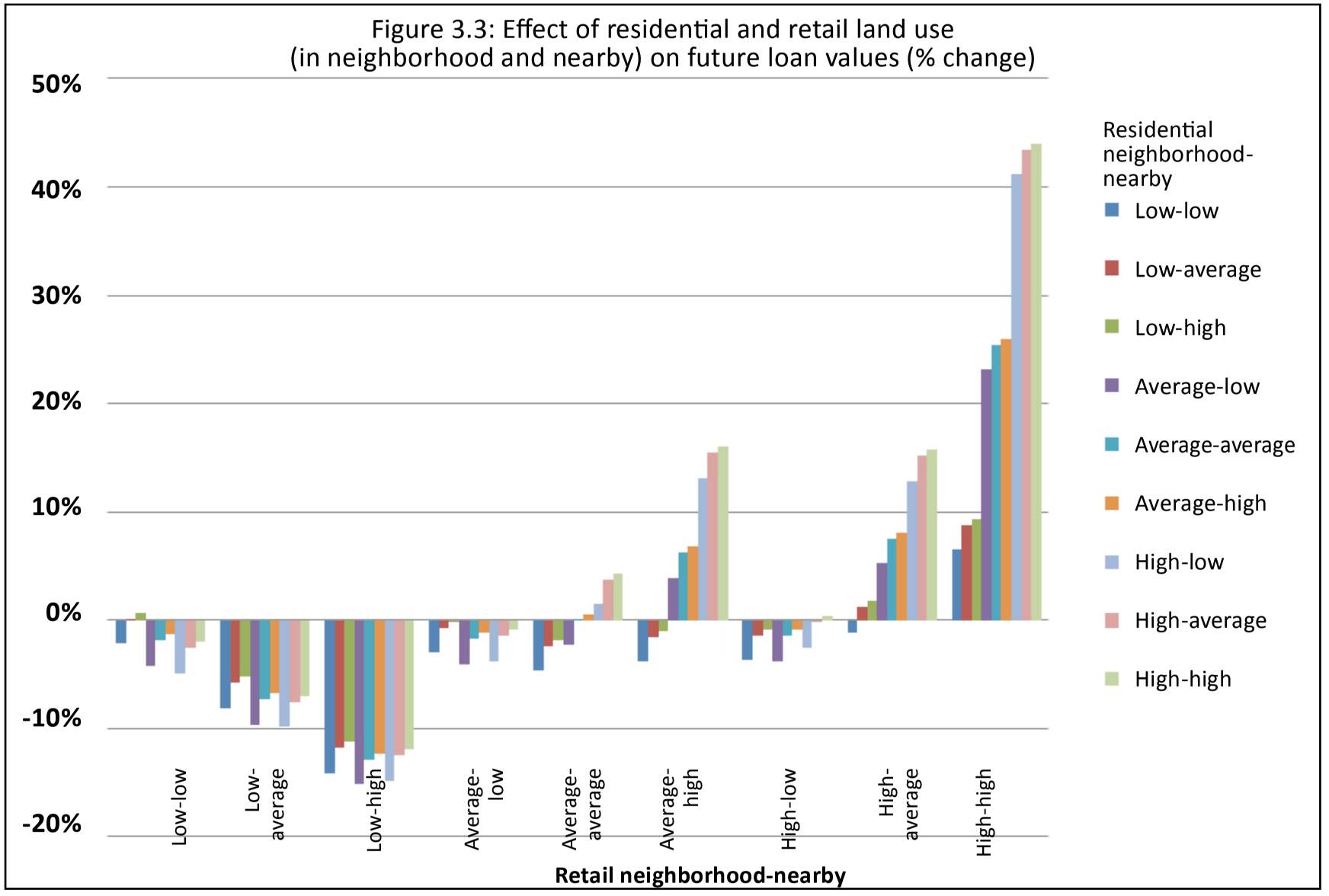
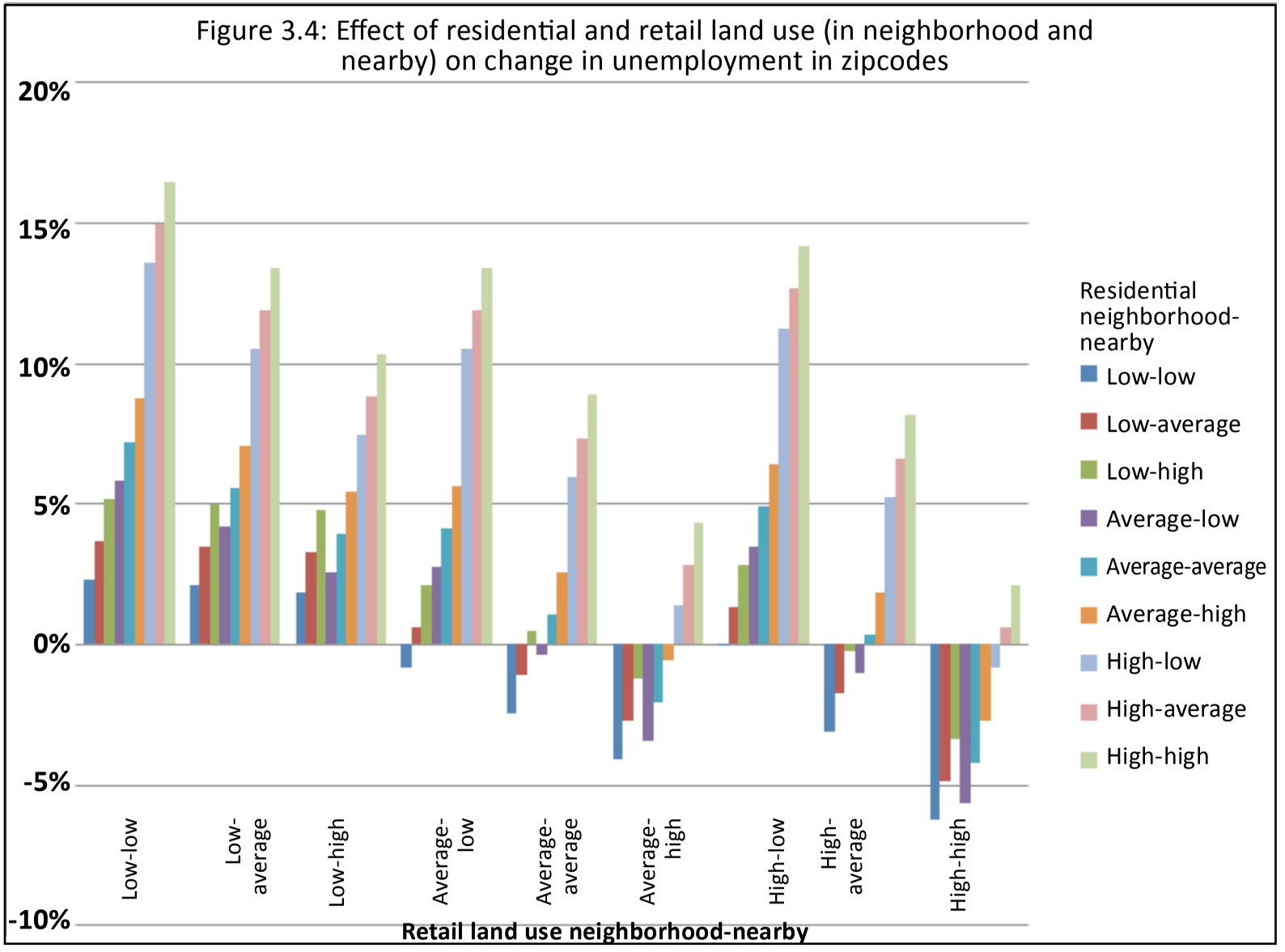
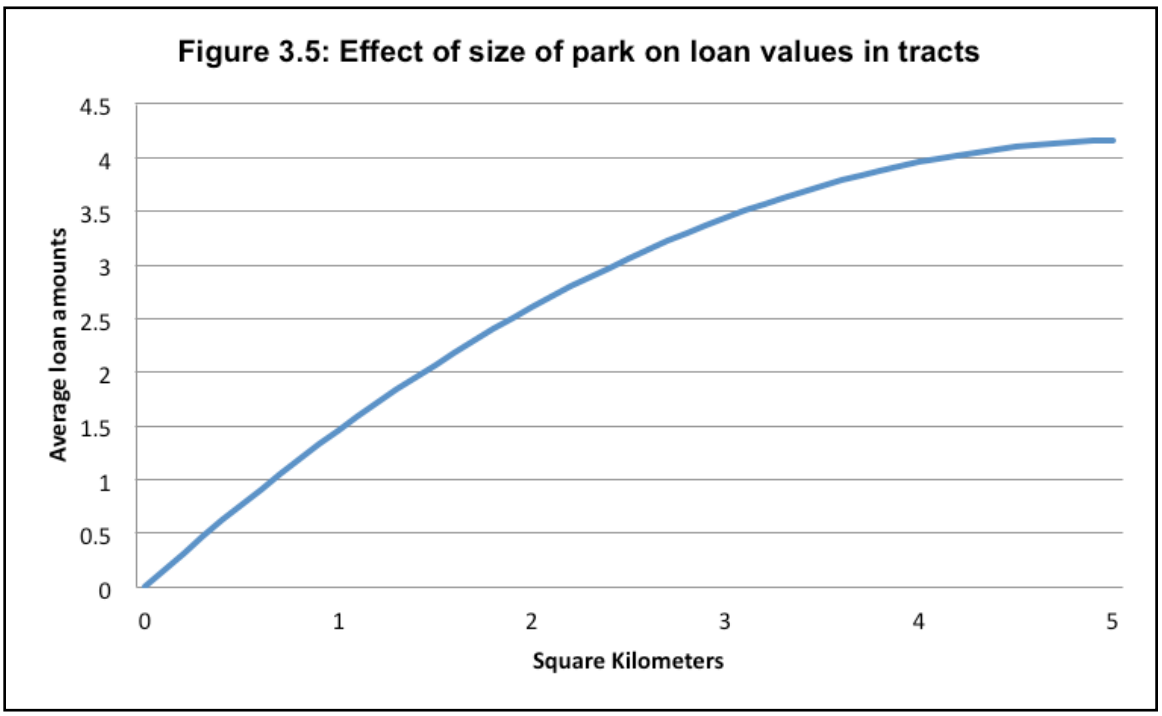


Figure 3.4: Effect of residential and retail land use (in neighborhood and nearby) on change in unemployment in zipcodes





- In Figure 3.4, we see that as the percentage of residential land use increases (i.e., decreases in other types of urban land uses) in a neighborhood, the unemployment rate is more likely to increase over time (this is seen by the increasing bars within each clump).
- Neighborhoods with more retail in the neighborhood or nearby experience the smallest increases in unemployment (the right side of the figure).
- Thus, neighborhoods with high levels of residential in the neighborhood and nearby, but accompanying low levels of retail in the neighborhood and nearby, are the most likely to experience increases in unemployment.
- In contrast, neighborhoods with low levels of residential in the neighborhood and nearby, but accompanying high levels of retail in the neighborhood and nearby, are the most likely to experience decreases in unemployment.

Parks

- Proximity matters. Neighborhoods near parks have higher home values and lower unemployment. Each additional kilometer from a park reduces loan amounts 1.8% and sales prices by 3-4%.
- Size matters. As seen in Figure 3.5, the size of parks has a nonlinear effect on home values. A larger nearby park has more positive effects. A 5 km^2 park increases home loan values 3.4% more than if the park is 0.5 km^2, and increases sales prices 2.4% more.

City Context

- Crime has a negative effect on home prices: a 10% increase in the city's violent crime rate reduces future loan amounts 1% and future sales prices 0.05%, and income of new residents 0.6%.

- City fiscal health matters: a 10% increase in the revenue to expenditure ratio of a city increases future loan amounts 0.2% and future sales prices 0.55%, and increases income of new residents 0.44%.
- There are mixed effects for cities that get more of their income from property taxes: A 10 point increase in the percentage of city income that comes from property taxes increases home loan amounts by 0.8%, new resident income by 0.7%, and lowers unemployment rates. However, it lowers sales prices by 0.65%.
- Cities with more building permits have greater price increases: 4000 more building permits in a city (one standard deviation) is associated with 3.2% higher loans and 2% higher sales prices. They also have lower unemployment over time.

Racial Composition

- There are some race effects. A 10 point increase in percent African American reduces loan amounts 1.8%. A 10 point increase in percent Asian or percent Latino reduces loan amounts 0.5%. A 10 point increase in racial/ethnic heterogeneity reduces loan amounts 1.5% and income of new residents 1.2%.

Socioeconomic Status

- The presence of highly educated persons has a positive effect. A 10 point increase in percent with at least a bachelor's degree increases loan amounts 7.5% and sales prices 6%; it also increases the income of new residents 10% and results in lower unemployment rates over time.
- The presence of unemployed reduces home values. A 10 point increase in unemployed reduces loan values 1.4% and sales prices 7.6%. But it has no effect on the income of new residents.
- The effect of children is mixed. The presence of more children has a positive effect on prices in the tract models, but a negative effect in the zip code models. And neighborhoods with more children tend to have lower unemployment rates over time.

III. Types of Jobs and Unemployment

When interpreting the effects of job gains and losses on a city's unemployment rate, it is important to remember that as a regional economy made up of dozens of cities, Southern California's workers often live and work in different places. Thus, while a city's unemployment rate is calculated based upon the employment status of its own residents, its blue-collar, white-collar, and retail jobs are counted based upon the numbers of jobs located in the city, regardless of where the workers actually live.

In the following section, we present job data from selected city clusters. In each graph, unemployment refers to the change in the unemployment rate during

2003-07 and 2008-12 (e.g., if the unemployment rate was 7% in 2003 and 6.5% in 2007, the bar graph would be –0.5% for the 2003-07 period). White-collar refers to the percentage change for white-collar jobs during 2003-07 and 2008-12 (e.g., if a city cluster had a 2% increase in white-collar jobs, the bar graph would be +2%). Blue-collar refers to the percentage change for blue-collar jobs during 2003-07 and 2008-12. Retail refers to the percentage change for retail jobs during 2003-07 and 2008-12.

As seen in Figure 3.6, Calabasas weathered the Great Recession better than most other city clusters in the MFI study. It experienced a small increase in its unemployment rate. Its decline in retail jobs was offset by its increase in white-collar and blue-collar jobs.

As seen in Figure 3.7, Rancho Palos Verdes initially presents a puzzle. While it experienced the smallest increase in the unemployment rate of all city clusters in the MFI study, it saw declines in all job

Figure 3.6: Calabasas

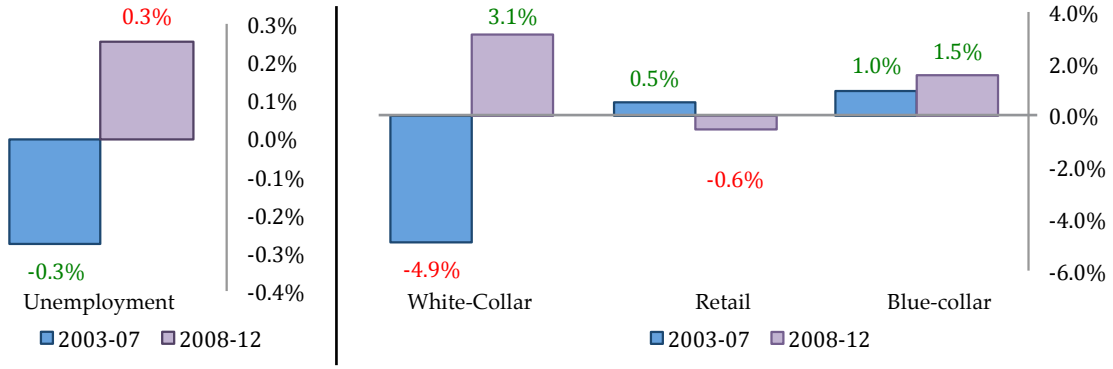
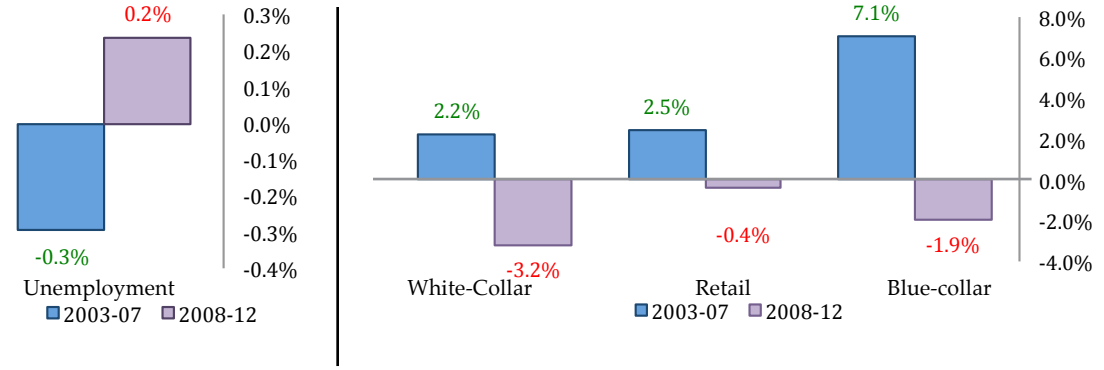


Figure 3.7: Rancho Palos Verdes



categories, with its greatest decrease in white-collar jobs. This is telling as Rancho Palos Verdes enjoys a reputation as a wealthy community of professionals. This result could be explained by the difference in the way the two measures are defined. While the numbers of jobs within Rancho Palos Verdes declined, the residents themselves kept their jobs. Furthermore, as a primarily residential community, the decreases in retail and blue-collar jobs may well not have much of an impact upon the total unemployment rate if the cities in this cluster have few of these jobs to begin with.

In contrast, as seen in Figure 3.8, Yorba Linda presents a much more intuitive result. The city cluster experienced one of the lowest increases in unemployment in the MFI study and saw increases (albeit small ones) in all job categories, indicating that the job situation in Yorba Linda improved relative to other city clusters in Southern California.

Figure 3.8: Yorba Linda

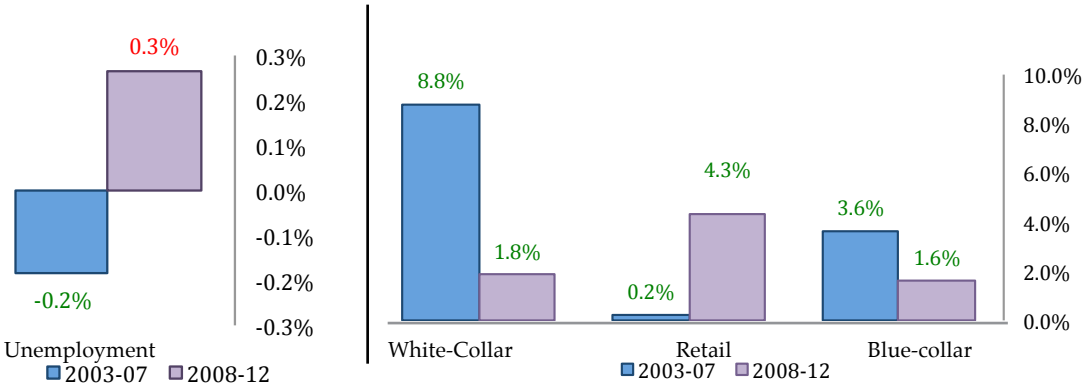
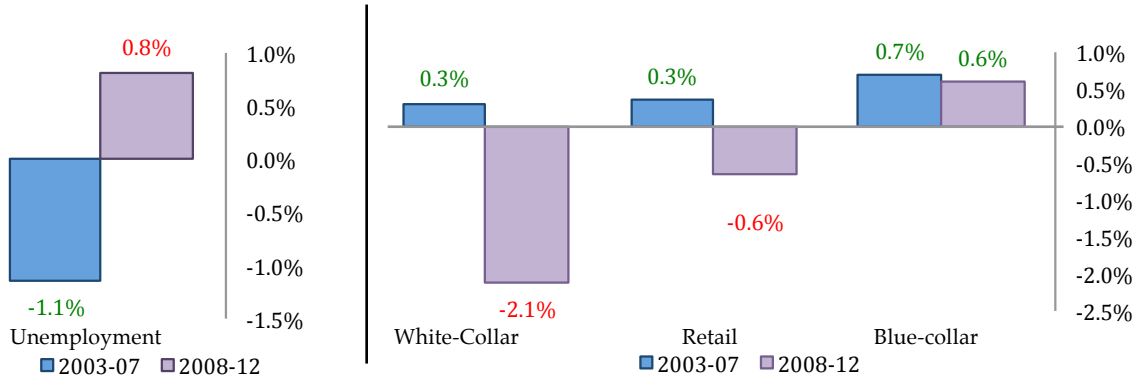


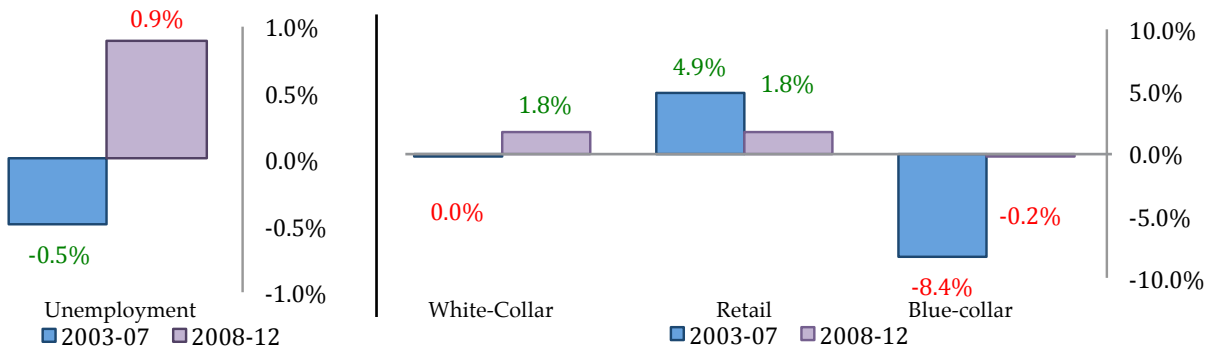
Figure 3.9: South-east Los Angeles



As seen in Figure 3.10, South-east Los Angeles was one of the areas hardest hit by the recession. While its blue-collar jobs increased, it fell behind other cities in Southern California in white-collar and retail jobs.

Finally, as seen in Figure 3.10, Victorville was the city cluster hit hardest by the recession and housing bubble. While it saw modest gains in white-collar and retail jobs, it saw a continued decline in blue-collar jobs within its borders.

Figure 3.10: Victorville



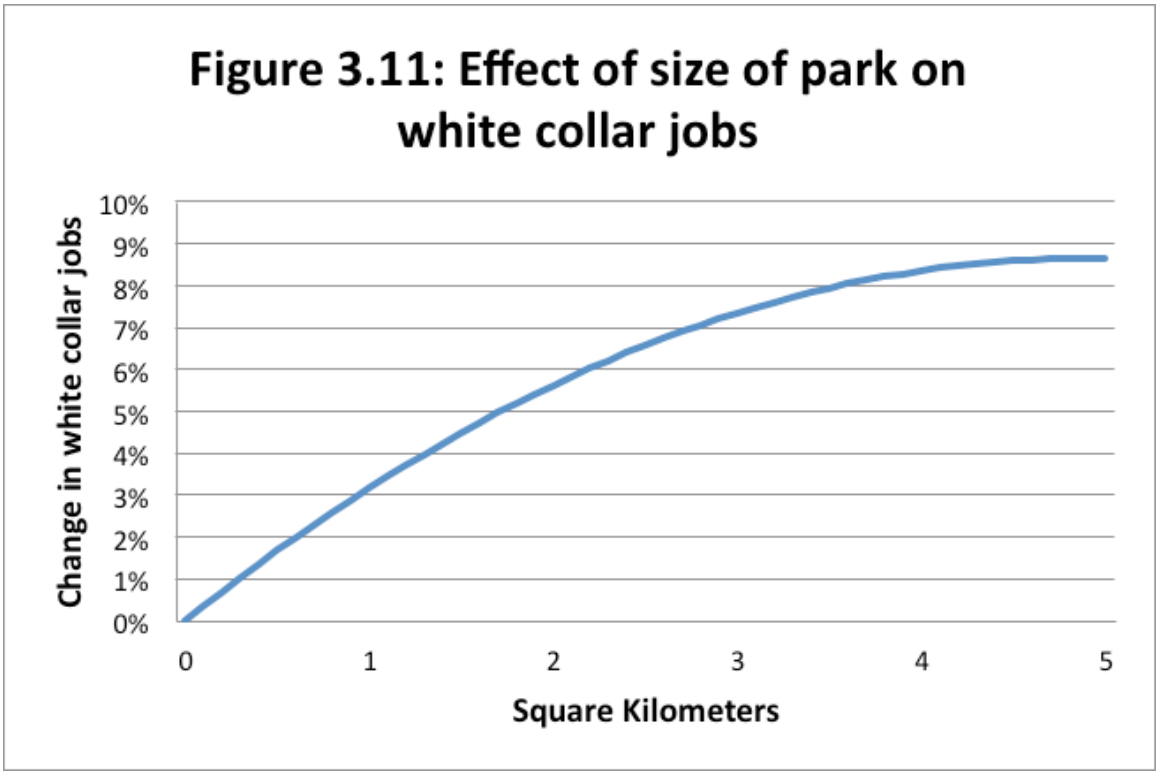
IV. Results Predicting Change In Jobs

In this section, we focus on the consequences of land use and other neighborhood characteristics for the change in jobs by sector. We classify jobs into three categories: 1) white-collar jobs; 2) blue-collar jobs; 3) retail jobs.[3] These models again use the characteristics of the neighborhood in one year to project the change in the number of jobs from that year to the next year. In these models, "neighborhood" is defined based on the zip code tabulation area boundaries, given data constraints.

In addition to the neighborhood scale investigation, we also estimated models with cities as the unit of analysis, and we provide those results also.

To account for the dynamic nature of job growth that occurs both over time, and spatially, we included a broad range of potential predictors in each model. Specifically, to explain the annual change in jobs at a zip-code area scale, we considered the change in jobs between the two previous years, and the number of jobs in the previous year. We also included several measures of the number of jobs in the spatial area around a zip code area: we include measures of the number of jobs of the same type within one mile, from 1-5 miles, and from 5-10 miles, as well as

3 Given that the outcome measure is the difference in the number of jobs (logged) at time 2 minus the number of jobs (logged) at time 1, we can exponentiate the predicted change in Y to capture the expected percentage change in the number of jobs.



similar spatial measures showing how the number of such jobs changed in the prior two years.[4] These are meant to capture both agglomeration economies (the tendency of some jobs to prefer to co-locate near each other – e.g., the stores in a mall benefit from the foot traffic patronizing other stores in the same mall) and diseconomies (i.e., competition effects that refer to the fact that sometimes too many jobs in a location can lead to congestion that drives some firms out of business, resulting in the loss of jobs).

To assess how other jobs affect the growth in one type of jobs, we included both neighborhood and "nearby" measures. For example, in the models describing the change in white-collar jobs, we used as predictors of this growth the number of retail jobs in the same neighborhood as well as the number of retail jobs in the surrounding 10-mile area.

In the language below, a "large" amount more, or a "large" change, refer to a one standard deviation change in a variable.

As expected, the models exhibit stability in that there are negative effects from a particular land use, or the change in the land use, and future change for that land use. Thus, zip codes with more white-collar jobs, and a bigger increase in the number of white-collar jobs in the prior

4 For all of these spatial buffers, we computed the measures with an inverse distance decay function. This essentially means that neighborhoods closer to the neighborhood of interest have a stronger effect than do neighborhoods further away. The inverse distance decay is the particular mathematical function capturing this decay effect.

year, will experience a smaller growth in white-collar jobs in the current year. This can be viewed as an equilibrating force in the models.

Results Explaining Growth in White-collar Jobs

- There are spatial effects of white-collar jobs on nearby white-collar jobs.
- A zip code with many white-collar jobs within one mile will have about 13% more white-collar jobs. If it has a similarly large number of white-collar jobs within 1-5 miles or 5-10 miles it will have 4% to 7% more white-collar jobs.
- This positive influence can also be seen in our city-level analysis.
- A large increase in the number of white-collar jobs within 1-5 miles in the previous year is associated with a 1.2% increase in white-collar jobs in the following year.
- But a big increase in white-collar jobs 5-10 miles away is associated with a 1.4% decrease in the number of white-collar jobs the following year (suggesting a competition effect).

Effect of Other Jobs on White-collar Jobs

- A zip code with a large number of retail or blue-collar jobs will have 13-14% more white-collar jobs the next year.
- A large number of retail or blue-collar jobs also shows a slight positive effect on city-level white-collar job growth.
- A zip code that sees a large increase in the number of retail or blue-collar jobs will have 1.6% or 0.7%, respectively, more white-collar jobs the next year.
- The positive effect of retail job growth on white-collar job growth is also detected on a city scale; however, no such effect for blue-collar jobs was detected in city-level analyses.

Effect of Other Nearby Jobs on White-collar Jobs

- A large number of retail jobs in the nearby areas will increase the growth in white-collar jobs 7.4%.
- But a large increase in the number of retail jobs in the nearby areas will decrease white-collar jobs 2%.
- A large number of blue-collar jobs in the nearby areas will decrease white-collar jobs 7.1%.

Results Explaining Growth in Retail Jobs

- There is no effect of the number of retail jobs in nearby areas on growth in retail jobs.
- However, if there has been a large increase in the number of retail jobs within one mile in the previous year there will be a 1.7% decrease in retail jobs in the following year (suggesting a competition effect).
- A similar increase in retail jobs within 1-5 miles or 5-10 miles results in about a 1% increase in retail jobs in the neighborhood the following year.
- Similarly, cities surrounded by places with increasing retail jobs tend to experience a higher increase in retail jobs.

Effect of Other Jobs on Retail Jobs

- A zip code with a large number of blue-collar jobs will have 6% more retail jobs the next year.
- A zip code that experiences a large increase in the number of white-collar jobs will have 1% fewer retail jobs the next year, although such an effect is not found on a city scale.

Effect of Other Nearby Jobs on Retail Jobs

- A large number of white-collar jobs in the nearby areas will increase the growth in retail jobs 18%.
- A large increase in the number of white-collar jobs in the nearby areas will increase them 1.2%.
- A large number of blue-collar jobs in the nearby areas will decrease retail jobs 5%.

Results Explaining Blue-collar Job Growth

- If a zip code has more blue-collar jobs within one mile there will be a 8% decrease in blue-collar jobs in the next year.
- If it has a similarly large number of blue-collar jobs within 5-10 miles the increase in blue-collar jobs in the next year will be 5.6%.
- A recent increase in blue-collar jobs in nearby areas has no effect.

Effect of Other Jobs on Blue-Collar Jobs

- A zip code with a large number of retail jobs will have 17.6% more blue-collar jobs the next year.
- A zip code that experiences a large increase in the number of retail jobs will have 2% more blue-collar jobs the next year.
- The positive effects of retail job presence and growth on blue-collar jobs are also statistically significant on a city scale.

Effect of Other Nearby Jobs on Blue-collar Jobs

- A large number of retail jobs in the nearby areas will decrease blue-collar jobs 12%.
- A large increase in the number of retail jobs in the nearby areas will decrease blue-collar jobs about 2%.

Effects of Other Measures on Job Growth

- **Parks**
  - Proximity matters. Zip codes that are further from parks have about 6% fewer retail jobs.
  - Size matters. As seen in Figure 3.11, larger parks are associated with white-collar job gains.

- **Racial Composition**
  - A zip code with more African Americans or Latinos or other race will have 2.2%, 2.8%, and 1.4% respectively more retail jobs the next year. But the presence of more African Americans or Latinos in nearby areas reduces the number of retail

jobs about 1% the next year. More Asians in nearby areas reduces the number of blue-collar jobs 1.8% the next year.

- **Socio-economic Status**
  - A zip code with a higher poverty rate will have 2% fewer white-collar jobs the next year.
  - A zip code with more highly educated residents (at least a bachelor's degree) will have 3.6% more white-collar jobs the next year. But, the presence of highly educated in the surrounding areas has no effect.
  - Educational attainment also shows a significant positive effect on city-level white-collar jobs, whereas it has no effect on blue-collar jobs.
  - A zip code with more unemployed will have 5.5% and 8.2% fewer retail and blue-collar jobs, respectively, the next year.

- **Crime**
  - A city with a higher violent crime rate will have about 2-3% fewer white-collar, blue-collar, and retail jobs the next year.

- **Vacancies**
  - A zip code with more vacant units will have 2% fewer white-collar jobs and 3.2% fewer blue-collar jobs the next year.

- **Land Use**
  - Zip codes with more industrial area experience an increase in blue-collar jobs and a decrease in retail jobs. Zip codes with more office space experience an increase in white-collar jobs and a decrease in blue-collar and retail jobs the next year. On a city-scale, each type of jobs is found to increase more in the municipalities with a high percentage of the corresponding land use (e.g., office space for white-collar jobs and industrial land for blue-collar jobs), suggesting the agglomeration economies.

- **Age Structure**
  - Compared to zip codes with more children, a zip code with more young adults (aged 19-29) will have 1.8% more white-collar jobs the next year. Zip codes with more middle aged residents (aged 30-64) or older residents (aged above 65) have about 2% fewer white-collar jobs the next year. We find strong effects of the age structure of nearby areas (within 10 miles) for retail jobs: a larger number of children (aged less than 18) in the surrounding area leads to greater growth in retail jobs in subsequent years.

Chapter 4

Land Use, Parks and Crime

This chapter focuses on the questions of how much crime there is in parks, and why some parks might have more crime than others. We address several questions. First, do parks have more crime than other locations? Second, which land use characteristics in the blocks surrounding a park explain which parks have more crime than others? Third, is there more crime in blocks that are near parks? Fourth, does the amount of crime in blocks near parks differ based on the land use characteristics of that block? And finally, for all of these questions we distinguish between parks in general, and large parks, to determine whether the patterns differ based on the size of the park.

For these analyses we used crime data collected for 184 cities and census designated places (nonincorporated locations) across the Southern California region. We used crime data for the three most recent years (2009-11).[1] We focus on five serious types of crime: 1) aggravated assault; 2) robbery (these first two are violent crimes); 3) burglary; 4) motor vehicle theft; 5) larceny (these last three are property crimes). We are able to aggregate crime events to very small geographic units (blocks), and we can therefore more precisely determine whether such locations have more or less crime than other locations. Although there is not one particular definition of a "big" park, for these analyses we define "big" parks as those whose size is more than 1 million square meters (approximately 0.386 square mile). For example, in Orange County this would include parks such as O'Neill Regional Park (3.3 sq miles), Irvine Regional Park (0.84 sq miles), Featherly Regional Park (0.54 sq miles), and Fairview Park (0.52 sq miles).

To measure the area near a park, we used a geographic information system to construct buffers around each park of: 1) 400 feet (approximately one block); 2) 800 feet (approximately 2 blocks); 3) 1200 feet (approximately ¼ mile). We then constructed measures of the land use characteristics within each of these buffers.[2]

1 Multiple years are used to smooth over year-to-year fluctuations in these small units.

2 We estimated negative binomial regression models to account for the count nature of the outcome variable. The models also

Results in brief

- Blocks in parks have more crime than a residential block.
- Blocks in parks typically have less crime than a block in a commercial area, industrial area, or a school.
- Notably big parks and small parks exhibit different patterns. For small parks, crime appears lowest if they are surrounded by residential or recreation areas. However, big parks have less crime when surrounded by government, retail, or office buildings. Big parks have the most property crime when surrounded by industrial areas.

How Much Crime Do Parks Have?

- A block in a park has about 150% more aggravated assaults than a block in a residential area. It also has about 60% more robberies, motor vehicle thefts, and larcenies, and about 30% more burglaries.
- The level of crime is less in a big park, compared to smaller parks. A block in a big park has about 50% more aggravated assaults and robberies than a block in a residential area. It also has about 40% more larcenies, 35% more burglaries, and 25% more motor vehicle thefts.
- Nonetheless, it is worth noting that blocks with other types of land use have even more crime than blocks in a park. For example, compared to a residential block, a block with industrial land use has between 80% and 300% more crime, a block with retail has 200% to 1300% more crime, and a block with a school has 15% to 370% more crime. These values are all much larger than the difference between parks and residential blocks.

Which Parks Have More, Or Less, Crime?

- Parks surrounded by more recreation land use within ¼ mile tend to have fewer aggravated assaults and motor vehicle thefts than parks surrounded by residential areas.
- Parks surrounded by more vacant units within ¼ mile tend to have more burglaries than parks surrounded by residential areas.
- Parks surrounded by schools within ¼ mile tend to have more robberies, burglaries, and larcenies than parks surrounded by residential areas.
- Parks surrounded by more retail land use within ¼ mile tend to have more robberies, motor vehicle thefts, and larcenies than parks surrounded by residential areas.
- Parks surrounded by more office buildings within ¼ mile tend to have more larcenies than parks surrounded by residential areas.

Which Big Parks Have More, Or Less, Crime?

- Big parks surrounded by more government buildings within ¼ mile tend

accounted for key demographic characteristics of the block, and the ½ mile area surrounding the block.

to have fewer aggravated assaults and motor vehicle thefts than big parks surrounded by residential areas.

- Big parks surrounded by more office buildings within ¼ mile tend to have fewer burglaries and motor vehicle thefts than big parks surrounded by residential areas.
- Big parks surrounded by more recreation land use within ¼ mile tend to have fewer motor vehicle thefts than big parks surrounded by residential areas.
- Big parks surrounded by more retail land use within ¼ mile tend to have fewer motor vehicle thefts than big parks surrounded by residential areas.
- Big parks surrounded by more schools within ¼ mile have somewhat fewer motor vehicle thefts than big parks surrounded by residential areas.
- Big parks surrounded by more vacant units within ¼ mile tend to have more burglaries than big parks surrounded by residential areas.
- Big parks surrounded by more industrial land use within ¼ mile tend to have more motor vehicle thefts and larcenies than big parks surrounded by residential areas.

What Types Of Blocks Near Parks (Regardless Of Size) Have More, Or Less, Crime?

- A block with more government buildings and within 1 to 3 blocks of a park will have fewer aggravated assaults and robberies, and somewhat fewer property crimes than a residential block near a park.
- A block with more mixed development and within 1 to 3 blocks of a park will have fewer aggravated assaults than a residential block near a park.
- A block with more office buildings and within 3 blocks of a park will have fewer robberies and motor vehicle thefts than a residential block near a park.
- A block with more recreation land use and within 1-3 blocks of a park will have fewer aggravated assaults than a residential block near a park, and fewer larcenies if it is within one block of a park.
- A block with more retail and within 1 block of a park will have fewer robberies and property crimes than a residential block near a park.
- A block with a school and within 3 blocks of a park will have fewer aggravated assaults, and somewhat fewer burglaries and larcenies than a residential block near a park.
- A block with a transportation land use and within 1 block of a park will have fewer aggravated assaults and fewer property crimes than a residential block near a park.

What Types Of Blocks Near Big Parks Have More, Or Less, Crime?

- A block with more medical buildings and within 1 to 3 blocks of a big park will have fewer aggravated assaults, motor vehicle thefts, and larcenies

than a residential block near a big park.

- A block with more recreation land use and within 1 to 3 blocks of a big park will have fewer aggravated assaults and property crime than a residential block near a big park.
- A block with more vacant units and within 1 to 3 blocks of a big park tends to have less crime than a residential block near a big park.
- Blocks with retail are no different from residential blocks near a big park.
- A block with more government buildings and within 1-3 blocks of a big park will have fewer aggravated assaults and property crimes, but more robberies than a residential block near a big park.
- A block with more transportation land use within 1-2 blocks of a big park will have less crime, but one 3 blocks away tends to have more aggravated assault, burglary, and larceny than a residential block near a big park.
- An office block within 1-3 blocks of a big park will have more aggravated assaults but fewer motor vehicle thefts and larcenies than a residential block near a big park.
- An industrial block within 2-3 blocks of a big park will have more burglaries than a residential block near a big park.

Chapter 5

Orange County Great Park Scenarios

Development Models for Orange County Great Park (OCGP)

In this chapter, we utilize the insights gleaned from the analyses in the earlier chapters to address a question of local interest to Orange County: what are the likely development patterns for the Great Park area, and what are the possible economic consequences of this development? In other words, we use results from the development patterns and consequences of the larger region to make projections about what will occur in this particular area, and the possible consequences.

In the first section of the chapter, we use our earlier models from Chapter 2 that explained why some parcels are developed into a particular type of land use. Based on those models, we ask what is the most likely development to occur in the Great Park area? Note that these results are not implying what would be the best use of the land (however one would define "best"). Nor are they implying the most desirable use of the land. What they are doing is looking at the pattern of development from 1990 to 2005, and asking which development would be most likely at this location based on prior patterns of development? As another way to think about this, one could consider finding other areas that are somewhat similar to this area and asking what type of development they experienced. Our statistical model is doing something akin to this.

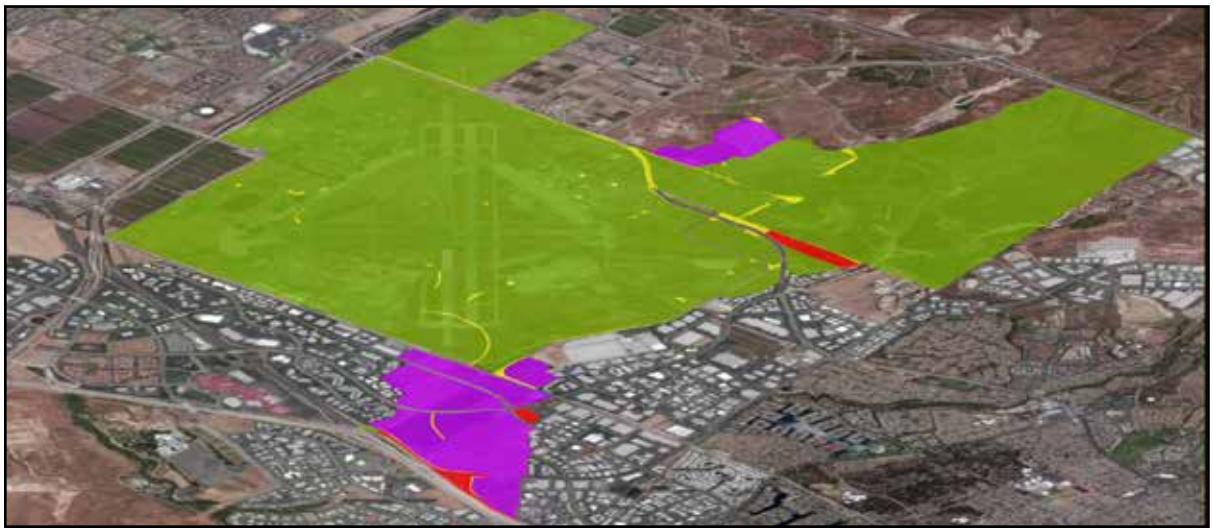
We also present two sets of results: 1) the most likely development of the parcels based on the model over the entire time period (1990 to 2005); 2) the most likely development of the parcels based on the model from 2001-2005. This latter model is thus asking what is the most likely development of this area given what has happened in other locations during a more recent time period? It needs to be noted that the model estimates are contingent upon the assumption that the Great Park parcel sizes and shapes cannot change. Changing the size and shape, as well as the grade, of the parcels would affect the model results.

Results in Brief

- If "no development" is not an option, the 1990 to 2005 model indicates that open space & recreational would be the most likely land use, and the 2001 to 2005 model indicates that mixed development would be the most likely land use in the Great Park area.
- If no development is an option, both the 1990 to 2005, and 2001 to 2005, models indicate that no development would be the most likely outcome for the Orange County Great Park (OCGP) parcels.
- The various models show that single-family, multi-family, other residential, and commercial all have low probabilities of development.
- Although not widespread, the 2001 to 2005 mixed-development model showed that mixed-development had probabilities as high as 50% and above (75% to 99%) for development.
- The 1990 to 2005 model showed high probabilities (30% to 75%) that approximately half of the OCGP land would be developed into open space & recreational.

Land Use Code Key	
0	No development
1	Single-family residential
2	Multi-family residential
3	Other residential
4	Commercial & Services
5	Industrial
6	Transportation, Communication, & Utilities
7	Public facilities
8	Mixed development
9	Open space & recreational

OCGP Development Model 1, 1990-2005, "No Development" is not an option



1	single-family residential
4	commercial & services
5	industrial
9	open space & recreational

Based on land use trends in the region, our model for the entire time period (1990 to 2005) projects that open space & recreational would be the most likely form of land use in the OCGP if no development were not an option. Large parcels of land would be used for open space, with a few on the periphery used for industrial land usage. Commercial & services and single-family residential would be scattered throughout OGCP.

OCGP Development Model 2, 1990-2005, "No Development" is an option

0	no development
1	single-family residential
9	open space & recreational

For this map, we allowed no development to be an option. The model for the whole time period projects that the most likely form of land use in the OCGP would be no development. A few swaths would be projected for open space & recreational, with very few single-family residential.

OCGP Development Model 1, 2001-2005, "No Development" is not an option

1	single-family residential
5	industrial
6	TCU facilities
8	mixed development

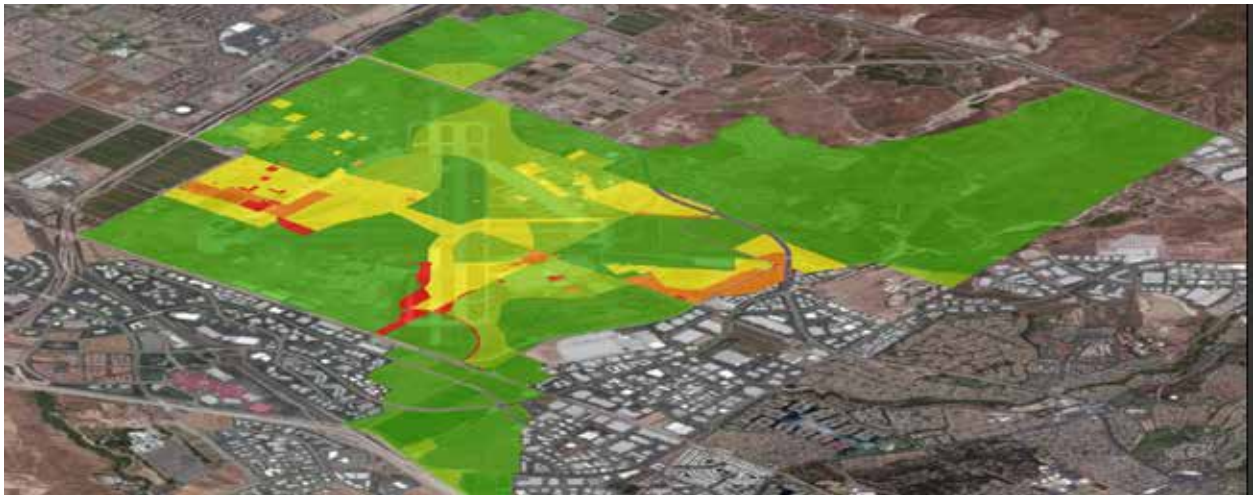
These next maps show the projected land development when using the model for just the years from 2001 to 2005. This model focuses on more recent development patterns, and shows that mixed development would be the most likely form of land use in the OCGP if "no development" were not an option. The bulk of the land would be developed for mixed development, with some parts of the periphery used for industrial land usage. The southern portion would be developed as transportation, communications, and utilities (TCU), with just a few single-family residential.

OCGP Development Model 2, 2001-2005, "No Development" is an option

0	no development
1	single-family residential
8	mixed development

If no development is a potential option, the model based on the most recent years (2001 to 2005) projects that no development would be the most likely form of land use in the OCGP. Nonetheless, the model projects that large parcels would be used for mixed development.

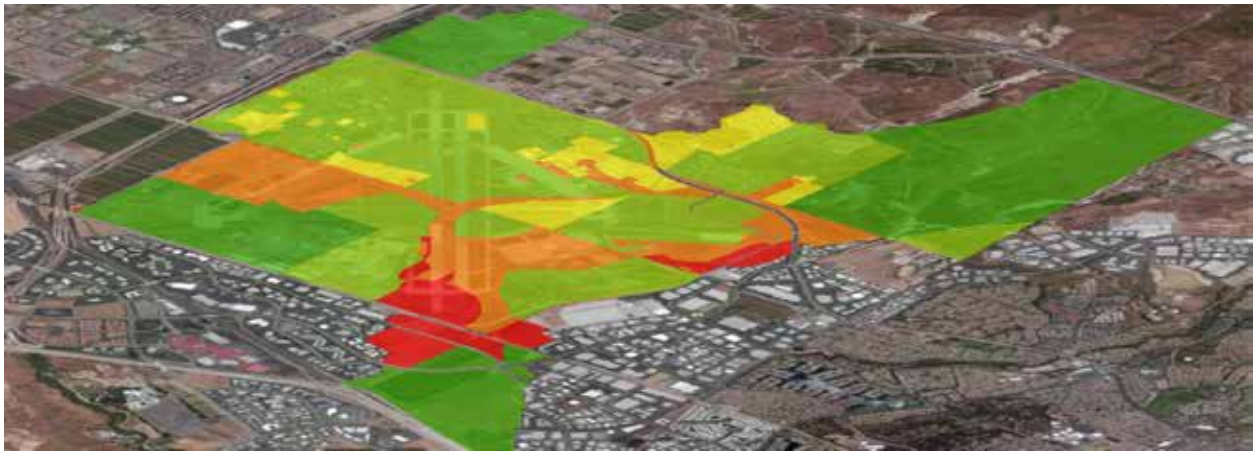
Probability OCGC Land will be Developed Into Mixed Development (1990-2005)



- less than 2%
- 2 – 4.5%
- 4.5 – 7.5%
- 7.5 – 10%
- 10% or greater

The next two maps show the probability that various parcels would be developed into mixed use. The first map shows the projections based on the model from the entire time period, whereas the second shows the projections based on the more recent period of 2001-2005. These maps starkly show how the probability of mixed use development is much higher when looking at the model for the most recent years compared to the model over the entire time period. This first map based on the model for the entire time period shows that the probability of mixed use development is typically less than 10% for the parcels in the OCGP area (with only a few ranging as high as 18% probability).

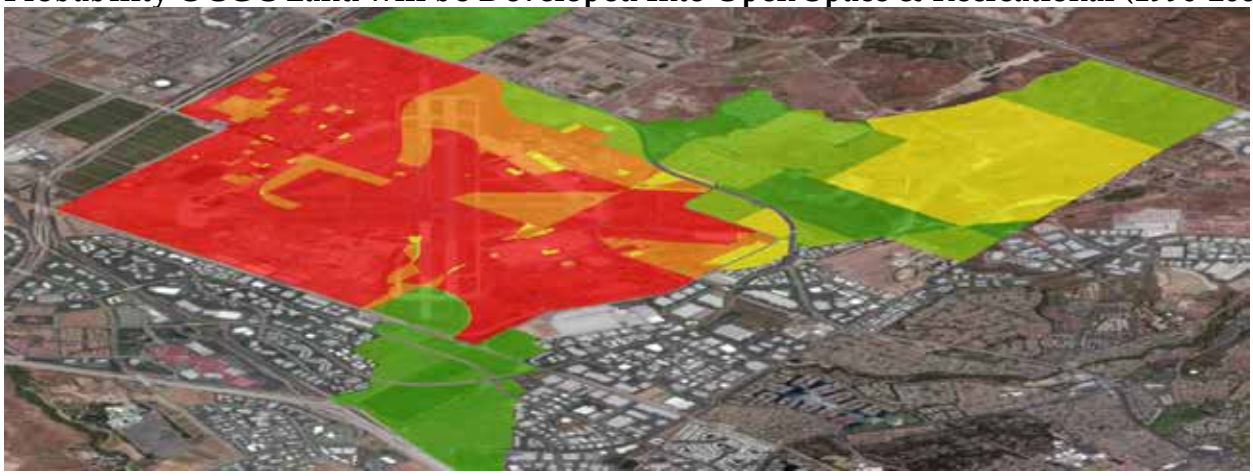
Probability OCGC Land will be Developed Into Mixed Development (2001-2005)



- less than 10%
- 10 – 40%
- 40 – 50%
- 50 – 70%
- 70% or greater

In this map based on the model for 2001 to 2005, many of the OCGP land parcels have a probability of 40% and higher of being developed into mixed development land. Several parcels show a probability of 50% or greater, and some parcels show probabilities as high as 70% to 99%

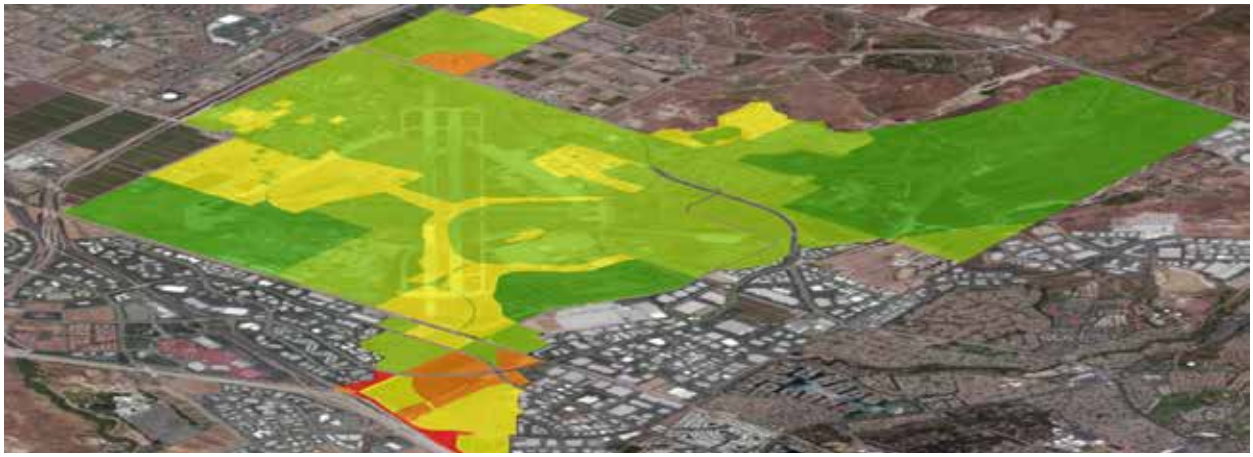
Probability OCGC Land will be Developed Into Open Space & Recreational (1990-2005)



- less than 5%
- 5 – 15%
- 15 – 20%
- 20 – 30%
- 30% or greater

These next two maps compare the predicted probabilities of these parcels being developed as open space/recreation for the model on the entire time period versus the model for just the more recent years (2001-2005). This first map is based on the model for the entire time period, and shows that many of the OCGP parcels have a probability of 15% and higher of being developed into open space/recreational land. Approximately half of the parcels show a probability as high as 30% to 75%.

Probability OCGC Land will be Developed Into Open Space & Recreational (2001-2005)



- less than 0.1%
- 0.1 – 0.2%
- 0.2 – 0.5%
- 0.5 – 1.2%
- 1.2% or greater

This map uses the results from the model on the most recent years (2001 to 2005), and here there are very low projections of the land being developed into open space & recreational land. Only a few parcels have a probability even above 1% of being developed in this way.

Validation of projection models

We validated our statistical models by estimating the model for the entire region in the earlier years (up until 2001), and then using that model to project land use change from 2001 to the present. We are then able to assess how well our model does in explaining the economic dynamism of various neighborhoods. Specifically, we computed the land use change that occurred from 2001-05, and used that to make projections about neighborhood economic growth from 2005-current.

Zip code data for average sales price and unemployment rate

For the models using sales price data aggregated to zip codes, we first estimated the model over the years 1992-2001. We obtained the coefficients from that model and multiplied them by the values of the exogenous variables in the model for the years 2006-09.

We computed the predicted value of sales price in a zip code area in 2005 based on the model, and then computed the predicted values of sales price for each subsequent year by multiplying the coefficients by the values of the exogenous variables and the predicted value of sales price from the previous year.

Thus, the model projections are at risk of diverging further from actual values further into the future.

For example, whereas the correlation between the predicted value of the model and the actual sales price value ranges from 0.92 to 0.97 from 1992-2001 (when the data are actually being used to estimate the model), the correlations fall to 0.64 to 0.67 during 2002-06 (when the data are outside the range of the model, and we do not use the predicted values of the prior year sales price to compute new predicted values, but rather the actual prior year sales price values).[1]

The key question then is how the model does when projecting time points beyond the data:

- Our validation checks suggest that for the average sales price models, the correlations between our predicted values and actual values were 0.51 in 2007, 0.45 in 2008, 0.43 in 2009, 0.41 in 2010, 0.40 in 2011 and 0.40 in 2012.
- The validation checks for the unemployment models using data aggregated to zip codes showed correlations of 0.66 in 2007, 0.53 in 2008, 0.46 in 2009, 0.39 in 2010, 0.35 in 2011, and 0.31 in 2012.
- For the average loan values models using data aggregated to tracts, the validation checks

1 For the unemployment models in zip codes, the correlations in the earlier years were above 0.98 from 1992-2001, and 0.87 to 0.99 from 2002-06. For the average loan values models using data aggregated to tracts, the earlier year correlations ranged from 0.57-0.92 from 1991-2001 (when the data are actually being used to estimate the model), and about 0.91 to 0.92 during 2002-06 (when the data are outside the range of the model, but we do not use the predicted values of the prior year sales price to compute new predicted values, but rather the actual prior year sales price values). For the average income level of new residents the earlier year correlations were 0.34 to 0.91 from 1991-2001, and about 0.86 to 0.89 during 2002-06.

showed correlations of 0.82 or 0.83 from 2007-10.[2]

- For the average income level of new residents in tracts, the validation checks showed correlations of 0.75 to 0.82 from 2007-10.
- For the models predicting types of jobs, validation checks showed correlations for white-collar jobs of 0.97 or 0.98 from 2007-10.
- The retail jobs validation correlations were 0.97 or 0.98 from 2007-10.
- The blue-collar jobs validation correlations were 0.97 to 0.98 from 2007-10.

2 We first estimated the model over the years 1995-2001. We obtained the coefficients from that model and multiplied them by the values of the exogenous variables in the model for the years 2006-09. Since the model is describing the change in number of jobs in the year, in the projections we must use this predicted value to update the static count of number of jobs each year. We computed the predicted values of number of jobs for each subsequent year by multiplying the coefficients by the values of the exogenous variables and this new estimated predicted number of jobs from the previous year. Thus, the model projections can possibly pull further from reality further into the future.

Projections for Area Around Orange County Great Park Based on Various Scenarios

In this next section, we use the information we learned from our models in Chapter 3 explaining which neighborhoods will see the most economic growth to ask: what are the most likely consequences for the neighborhoods in Irvine given various scenarios for development of the Great Park area? In these hypothetical scenarios, we recalculate the values for the land use measures in these neighborhoods given how the area might be developed and then run our model forward in time.

For these simulations, we used estimates for our models from 1990 to the most recent year. We then substituted values for the land use measures in the key zip code or tracts of interest in the Great Park. We then projected forward in time based on the models to compute predicted probabilities of home values, income, unemployment, and jobs.

For each scenario, we set the percentage park area to 20% where the Great Park is located. The scenarios are:

Scenario 1:

Housing-heavy: housing at 80%, others at 0%

Scenario 2:

Retail-heavy: housing at 40%, retail at 40%

Scenario 3:

Industrial-heavy: housing at 40%, industrial at 40%

Scenario 4:

Mixed: housing, retail, offices, & industrial at 20%

Table 5.1: Economic Change In Great Park Neighborhoods Under Four Different Scenarios

Scenario	Sales price (zip code)	Loan amount (tracts)	Average income (tracts)	Unemployment (zip code)	White-collar jobs	Retail jobs	Blue-collar jobs
1 - Housing-heavy	baseline	+4.6%	+1.4%	8.0	+19.5%	+13.6%	+17.4%
2 - Retail-heavy	+45.0%	+5.2%	+1.5%	8.5	baseline	+25.0%	baseline
3 - Industrial-heavy	+15.3%	+7.7%	+4.6%	8.4	+13.2%	+11.0%	+13.8%
4 - Mixed development	+14.2%	baseline	baseline	8.7	+38.8%	baseline	+29.9%

We consider the expected outcomes under the various scenarios. In scenario 1, a housing-heavy development is generally expected to result in the weakest growth in sales prices and loan amounts and relatively lower income of new residents. Under this scenario, the average growth in jobs across the three sectors relative to the other scenarios would be a 17% increase in jobs (19% for white-collar, 17% for blue-collar, and 14% for retail). This scenario projects to the lowest unemployment rate among the residents.

In scenario 2, a retail-heavy development projects to the highest increase in sales price but the weakest job growth of the various scenarios. Under this scenario, the average growth in jobs across the three sectors relative to the other scenarios would be less than an 8% increase in jobs (25% for retail, but none for blue-collar or white-collar).

In scenario 3, industrial-heavy development projects mid-level sales price and loan amount appreciation, and high appreciation in the average income of new residents. Under this scenario, the average growth in jobs across the three sectors relative to the other scenarios is relatively weak, with just a 13% increase in jobs (with relatively similar increases across sectors).

In scenario 4, mixed development results in somewhat weaker sales price appreciation, but the highest job growth. Under this scenario, the average growth in jobs across the three sectors relative to the

other scenarios would be a 23% increase in jobs (39% for white-collar and 30% for blue-collar).

Thus, we see that the largest job growth occurs under scenario 4, the mixed development. Job growth is next highest in the housing-heavy scenario, but lowest under the industrial-heavy or retail-heavy scenarios. Given that the new large park is present in all scenarios, its projected positive effect on sales prices is a constant across scenarios. However, our scenarios do not account for the possible effect on crime (which negatively impacts sales prices): this may imply that the sales price increases forecasted in scenario 3 under heavy industrial development are overestimated given that our chapter 4 results implied that big parks surrounded by industrial land use tend to have more crime, which will reduce sales price increases.

Chapter 6

What We Have Learned, and Future Directions

The analyses in this report showed that the development patterns of the Southern California region have important consequences for the economic vibrancy of our neighborhoods and the region as a whole. The longitudinal data revealed the considerable changes that have occurred over the past 20 years. The report has outlined how various development patterns are interconnected with the economic vibrancy of neighborhoods and communities, and therefore have consequences for the daily lives of 18 million residents. This Regional Progress Report has aimed to provide solid empirical evidence to form the basis of informed discussions about development in Southern California. In this section, we highlight the major report findings, and then turn to a discussion of policy implications.

Development Patterns

Considerable development and redevelopment has occurred over the study period (the last 20 years). A consistent trend in Southern California was the development of single-family housing units as they increased about 15% from 1993-2005. This growth rate ranged from approximately 5% in Los Angeles County to 45% in Riverside County. Almost 95% of the new single-family housing was developed on vacant urban and non-urban, and converted agricultural lots. The growth in multi-family residential land was about half the rate of single-family units (about 8%), although the scale of these multi-family projects appears to have increased over this period. This increase in scale seems most pronounced in Los Angeles County and Orange County.

Although mixed development started the period as a much smaller composition of the area, there has nonetheless been almost 50% growth in mixed development over this period. In contrast, industrial land actually shrank in Los Angeles and Orange counties; although it did increase in the other counties and therefore showed a modest increase in the region as a whole. There were additional distinct land use conversion patterns across the counties. For example, whereas Imperial County experienced development through the extensive use of farmland areas, Ventura County experienced modest expansion of its urban territory. Orange County's transformation entailed a large expansion of multi-family residential along with a substantial decline in industrial land and military uses. Whereas Riverside County experienced rapid growth in single-family residential and public facilities that were tightly associated with population increase, San Bernardino County experienced considerable gains in commercial & services, industrial, and TCU. Los Angeles County, however, exhibited much slower growth than the other counties.

Explaining Land Use Development

Our statistical models explained patterns of land use development. One key finding was that proximity to amenities had important effects on which types of development occurred. For example, closer proximity to business subcenters and the beach increased the likelihood of single-family housing, multi-family housing, commercial, industrial, public infrastructure, mixed-use, open space & recreation, and office space development. And proximity to transit stations increased the likelihood of single and multi-family residential, commercial, industrial, public infrastructure, mixed-use, and office space development. Proximity to transit stations also increased the likelihood of redevelopment into commercial, public facilities, and office space. On the other hand, proximity to freeways reduced the likelihood of single-family units, which is preferable from the perspective of reducing exposure to noxious fumes on highways; instead such parcels were more likely to experience commercial or transportation, communications, and utilities development. Whereas proximity to freeways increased the likelihood of land being redeveloped into commercial and industrial, it also increased redevelopment into multi-family housing, which may be less than ideal.

Diversity in neighborhoods appeared important for some development. For example, neighborhoods with a mixture of land-uses were more likely to experience single and multi-family, commercial, industrial, public infrastructure, and office development. Although racial and ethnic heterogeneity in neighborhoods appeared to reduce single-family, multi-family, commercial, mixed-use, and office space development, this effect weakened in the most recent decade; furthermore, this racial heterogeneity appeared to have no effect on redevelopment.

The education level of the residents impacted development. Neighborhoods with a higher percentage of residents without a high school degree were less likely to experience single-family, multi-family, commercial, mixed-use, and office space development. And such neighborhoods were more likely to experience redevelopment into commercial, industrial, and public facilities.

Finally, other demographic characteristics of neighborhoods influenced development patterns. For example, neighborhoods with a higher population density (in the initial year) were more likely to experience single-family, industrial, public facilities, mixed-use, and office space development. Neighborhoods with more children (less than 18 years of age) were more likely to experience single-family housing development. The presence of elderly (aged 65 and up) in a neighborhood reduced redevelopment into multi-family housing. Finally, higher income neighborhoods were less likely to see mixed-use and office space development from 1990 to 2005, but more likely to see open space & recreational development from 2001 to 2005.

Consequences of Land Use Development

These development patterns, along with other characteristics of neighborhoods and communities, have consequences for the economic vibrancy of our neighborhoods. New urbanism styles of development (e.g., higher population density and walkability) appeared to induce more rapid increases in neighborhood housing prices and loan amounts. They also experienced incoming residents with higher incomes over time. The mix of land use in a neighborhood also appeared to increase sales prices: thus, home loan appreciation was higher if the neighborhood not only had high amounts of retail, but also high amounts of retail in nearby areas. In fact, there appeared to be an "all in" quality to such mixed development, as the highest home loan appreciation occurred in neighborhoods with higher levels of mixed residential and retail in the neighborhood itself as well as the nearby areas. In contrast, a neighborhood that has retail in nearby areas, but not in the neighborhood itself, appeared to show the lowest appreciation rates.

It was also the case that such mixed use neighborhoods experienced lower unemployment rates over time. In contrast, residentially isolated neighborhoods – those with high rates of residential in the neighborhood and the nearby area, along with low levels of retail in the neighborhood and nearby—experienced the largest increases in unemployment over time. Consistent with the push for more dense developments, there appears to be a strong preference for shorter commutes as neighborhoods with longer average commuting distance experienced lower appreciation in home sales prices and home loan amounts over time, as well as lower average income for incoming residents and increasing unemployment rates.

Nearby parks have positive consequences for neighborhoods. Closer proximity to a park for homes in a neighborhood led to greater increases in home sales prices and home loan amounts. Such neighborhoods also experienced greater increases in retail jobs over time, and lower unemployment rates. It was also the case that the size of the park mattered, as larger parks showed positive effects as well. Home sales prices and home loan amounts increase more strongly if the nearby park is larger than if it is a small park. Neighborhoods near large parks also experience a stronger growth in white-collar jobs over time.

The presence of highly educated persons had notable positive effects for neighborhoods over time. Neighborhoods with more highly educated residents (at least a bachelor's degree) experienced larger increases in home sales prices and loan amounts over time. Such neighborhoods also experienced a greater influx of higher income residents over time, as well as falling unemployment rates. These neighborhoods also experienced a larger increase in white-collar jobs.

The presence of unemployed residents had additional negative effects on a neighborhood over time. Neighborhoods with higher unemployment experienced smaller increases in home sales prices and home loan amounts over time. Such neighborhoods also saw losses in retail and blue-collar jobs over time. Another measure of neighborhood disadvantage—the poverty rate—had a negative effect on white-collar job growth over time. And neighborhoods that suffered from a higher vacancy rate of housing units experienced fewer white-collar and blue-collar jobs over time.

Another measure of disadvantage for neighborhoods and cities—the level of violent crime—had important consequences for the economic health of the city's neighborhoods over time. Thus, neighborhoods experienced smaller increases in home sales prices and home loan amounts over time if they were in cities with higher violent crime rates. And the income level of residents moving into neighborhoods in high violent crime cities were also lower over time. We also found that cities with higher violent crime rates experienced decreases in white-collar, blue-collar, and retail jobs over time. Relatedly, a city's financial health had important consequences, as cities with a higher revenue to expenditure ratio had greater increases in home sales prices and home loan amounts, as well as greater increases in the income of incoming residents.

Land use tended to have the expected effects on job growth. Specifically, neighborhoods with more industrial area experienced an increase in blue-collar jobs and a decrease in retail jobs, whereas neighborhoods with more office space experienced an increase in white-collar jobs and a decrease in blue-collar and retail jobs. Such effects were also found on a city-scale—e.g., office space increased white-collar jobs and industrial land increased

blue-collar jobs—suggesting agglomeration economies.

There was strong spatial patterning to job growth. For example, there was spatial clustering of white-collar jobs, as neighborhoods surrounded by many white-collar jobs experienced larger growth in white-collar jobs. This spatial patterning was found within one mile, and up to 10 miles away. Changes in the level of nearby jobs had different effects: whereas a large increase in white-collar jobs within 1-5 miles led to an increase in white-collar jobs in the neighborhood, an increase in white-collar jobs from 5-10 miles away actually led to a decrease in white-collar jobs in the neighborhood, suggesting a competition effect. On the other hand, retail jobs exhibited a competition pattern. That is, neighborhoods in which there was a large increase in the retail jobs within one mile in the previous year experienced a decrease in retail jobs the following year. However, increasing numbers of retail jobs further away (from 1-10 miles) led to an increase in retail jobs in the neighborhood the following year.

This spatial patterning also led to some evidence of cross-sector job growth. For example, an increase in the number of retail or blue-collar jobs in a neighborhood led to more white-collar jobs the next year. Likewise, white-collar jobs appear to spur job growth, as neighborhoods with a large number of white-collar jobs in nearby areas have greater growth in retail jobs; furthermore, a large increase in the number of white-collar jobs in nearby areas increases retail jobs in the neighborhood the following year. Blue-collar jobs are impacted by retail jobs: whereas blue-collar jobs are likely to increase more in a neighborhood with a large number (or an increase) of retail jobs, the presence and growth of retail jobs in the nearby areas actually has a negative effect on blue-collar job growth over time.

Land Use, Parks, and Crime

We found evidence that the land use patterns around parks have consequences for the amount of crime in parks, and the amount of crime on the blocks surrounding a park. Whereas blocks with parks have more crime than a residential block, they typically have less crime than a block in a commercial area, industrial area, or a school. Furthermore, big parks in our study have less crime than do smaller parks.

Among smaller parks, the park will tend to have less crime if it is surrounded by more recreation use. However, it will tend to have more crime if it is surrounded by vacant lots, schools, retail, or office buildings. On the other hand, big parks will tend to have less crime if they are surrounded by government buildings, office buildings, retail, or recreation use. But big parks will tend to have more crime if they are surrounded by vacant lots or industrial land use.

The blocks near a smaller park will tend to have less crime if they have more government buildings, office buildings, retail,

mixed use, transportation use, recreation, or a school, rather than being a residential area. The blocks near a big park will tend to have less crime if they have more medical buildings, recreational land use, or vacant lots. Office use near a big park will tend to have more aggravated assaults, but fewer property crimes. But blocks near a big park will tend to have more crime if they have more industrial land use.

Projecting Great Park Development

We also used the insights of our analyses of the larger region to make estimates about the possible future consequences of various development scenarios for the Great Park area of Irvine in Orange County. Based on our models of land use development over the entire period, we found that the most likely development for the area would be open space & recreational usage. It is interesting to note that based on our model for just the most recent decade, the most likely land use in the Great Park area would be mixed development.

We also considered how the economic vibrancy of the Great Park area may differ based on different scenarios of potential development patterns. From a jobs perspective, the "mixed development" scenario projected by far the largest growth in number of jobs in the area among the various scenarios. Given that the housing-heavy, retail-heavy, and industrial-heavy scenarios all projected to lower job growth, along with the evidence from Chapter 4 that industrial areas near large parks may actually result in more crime, suggest that the mixed development scenario may be the most optimal.

Policy Implications

Public decision makers are faced with a complex and challenging policy environment when considering development patterns. Such policy decisions undoubtedly have consequences for neighborhoods, communities, and hence the region, and should not be made without a solid understanding of the linkages between land use and economic vibrancy, among other characteristics. Taking into consideration that policy decisions are extremely difficult and pose many challenges, we offer a range of empirical analysis findings in this report that can enhance our understanding of the linkages and support more informed policy decision making, even though the report itself is not designed to evaluate a certain development or conservation policy instrument.

Overall, our analysis findings reveal multidimensional interdependence: 1) temporal, 2) spatial, and 3) cross-construct interdependence. Temporal interdependence is highlighted by the significant influences of the previous year's state on subsequent development patterns detected in our analysis using longitudinal datasets. The transformation of our neighborhoods, communities, and the entire region is dynamic in nature and largely path-dependent. This reinforces our long-standing belief that today's decision-making and actions will modify our trajectories tomorrow. In particular, southern California's transformation seems to be shaped by

strong forces of cumulative causation that in many respects trap some communities in a vicious circle that deserves more attention.

Another element to be stressed is spatial interdependence. Our results indicate that land use changes in an area impact the uses in neighboring areas. This relationship suggests that local policies for development review should include requirements for potential impacts on land use change in nearby areas (a suitable buffer could be suggested using the data from this study) around the proposed development.

With this information, a jurisdiction can ask vital questions such as: Is the proposed development likely to produce land use changes inconsistent with the city or county's vision as presented in a general plan? And, can they act on the response either by ensuring development is consistent with their vision or by reimaging their vision to accommodate a more dynamic development environment?

Moreover, in the case where the effects of the proposed development extends beyond the host jurisdiction, understanding the potential impacts on both jurisdictions (and on the entire region, more broadly) may lead to an opportunity for cross-jurisdictional collaboration and potentially more efficient land use decisions.

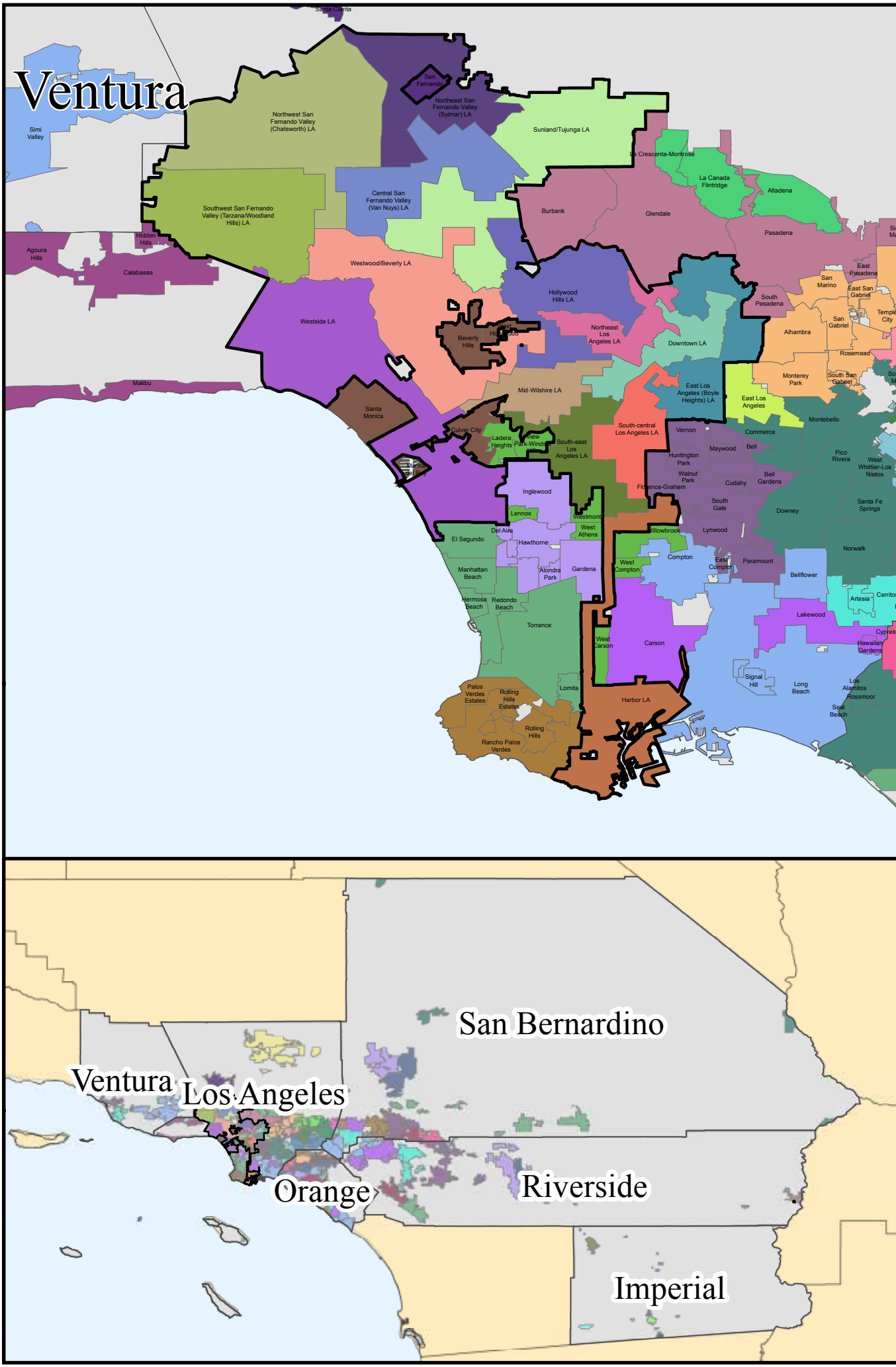
Cross-construct interdependence is an additional dimension that should not be underestimated. The analyses reveal a bi-directional association between socio-demographic characteristics and land/house values. For example, neighborhoods with lower education levels and higher unemployment rates had lower housing price increases. However, mixed development areas had higher housing price increases. Given that demographic factors tend to be clustered spatially (i.e., lower educated, lower income, higher poverty, etc.), policies that encourage mixed-income and mixed development in a neighborhood may, on balance, yield positive benefits.

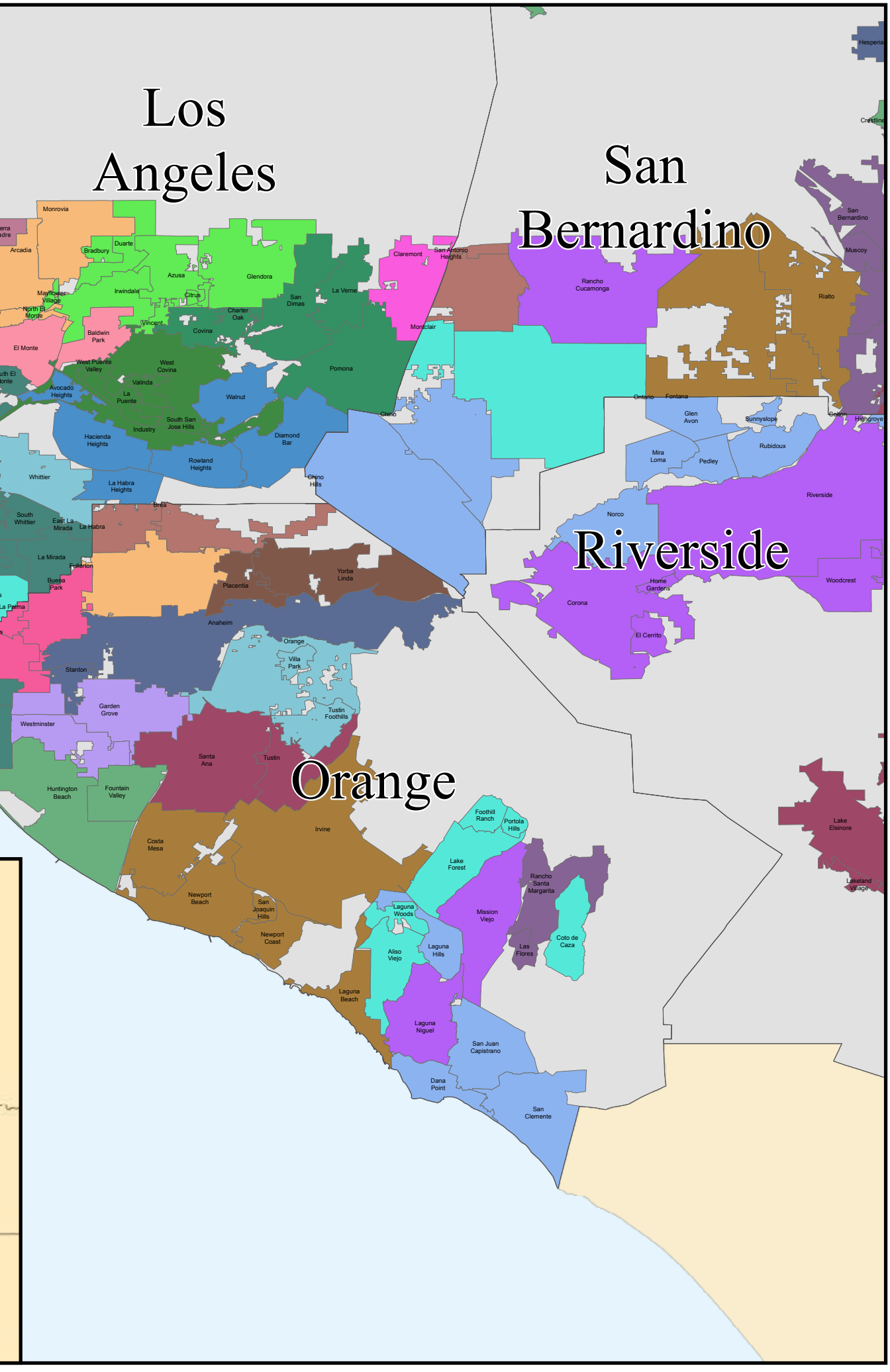
Findings concerning parks and crime suggest that policies to convert vacant or under-utilized lots to a small neighborhood park or a "vest pocket" park in a densely developed commercial area are not necessarily the best approach for the health of the neighborhood. Small parks may not yield the anticipated benefits and, depending on adjacent uses, may experience more crime.

Conclusion

Given the various moving parts in any region, and the additional complexity presented by the Southern California region, policy decisions are clearly a challenge. Nonetheless, it is imperative that such decisions are based on solid evidence. One goal of this Regional Progress Report was to provide such evidence. The School of Social Ecology at the University of California, Irvine, welcomes hosting public discussions of the findings contained in this report and subsequent reports. Indeed, independent empirical analyses of our communities are the first step to planning a future that enhances our com-

munities and contributes to our lives. The second step is to engage the findings to inform how we build and serve communities in the region in the future.


Ventura
Simi Valley
Northwest San Fernando Valley (Chatsworth) LA
San Fernando
Northeast San Fernando Valley (Sylmar) LA
Sunland/Tujunga LA
La Crescenta-Montrose
La Canada Flintridge
Altadena
Pasadena
Burbank
Glendale
Southwest San Fernando Valley (Tarzana/Woodland Hills) LA
Central San Fernando Valley (Van Nuys) LA
Hidden Hills
Agoura Hills
Calabasas
Westwood/Beverly LA
Hollywood Hills LA
Westside LA
Beverly Hills
Northeast Los Angeles LA
Downtown LA
East Pasadena
San Marino
East San Gabriel
South Pasadena
San Gabriel
Alhambra
Rosemead
Monterey Park
South San Gabriel
Malibu
Santa Monica
Mid-Wilshire LA
East Los Angeles (Boyle Heights) LA
East Los Angeles
Montebello
Culver City
Ladera Heights
View Park-Windsor Hills
South-east Los Angeles LA
South-central Los Angeles LA
Vernon
Commerce
Maywood
Bell
Huntington Park
Pico Rivera
West Whittier-Los Nietos
Walnut Park
Cudahy
Bell Gardens
Florence-Graham
Inglewood
South Gate
Santa Fe Springs
Downey
Lennox
Westmont
West Athens
Del Aire
El Segundo
Hawthorne
Willowbrook
Lynwood
Norwalk
Compton
East Compton
Paramount
West Compton
Manhattan Beach
Alondra Park
Gardena
Bellflower
Artesia
Hermosa Beach
Redondo Beach
Torrance
Lakewood
West Carson
Carson
Cypress
Hawaiian Gardens
Signal Hill
Long Beach
Los Alamitos
Rossmoor
Lomita
Harbor LA
Palos Verdes Estates
Rolling Hills Estates
Rolling Hills
Rancho Palos Verdes
Seal Beach
San Bernardino
Ventura
Los Angeles
Orange
Riverside
Imperial


Los Angeles
San Bernardino
Riverside
Orange
Monrovia
Arcadia
Bradbury
Duarte
Azusa
Glendora
Irwindale
Citrus
Mayflower Village
North El Monte
Vincent
Charter Oak
San Dimas
La Verne
Claremont
San Antonio Heights
Montclair
Baldwin Park
El Monte
Covina
West Puente Valley
West Covina
Pomona
Valinda
Avocado Heights
La Puente
Walnut
Industry
South San Jose Hills
Hacienda Heights
Diamond Bar
Rowland Heights
Whittier
La Habra Heights
Chino
Chino Hills
Rancho Cucamonga
Rialto
San Bernardino
Muscoy
Ontario
Fontana
Glen Avon
Sunnyslope
Colton
Highgrove
Mira Loma
Pedley
Rubidoux
Riverside
Norco
Corona
Home Gardens
Woodcrest
El Cerrito
Lake Elsinore
Lakeland Village
South Whittier
East La Mirada
La Habra
Brea
La Mirada
Fullerton
Buena Park
La Palma
Placentia
Yorba Linda
Anaheim
Orange
Villa Park
Stanton
Garden Grove
Westminster
Tustin Foothills
Santa Ana
Tustin
Huntington Beach
Fountain Valley
Irvine
Costa Mesa
Newport Beach
San Joaquin Hills
Newport Coast
Foothill Ranch
Portola Hills
Lake Forest
Rancho Santa Margarita
Mission Viejo
Laguna Woods
Aliso Viejo
Laguna Hills
Las Flores
Coto de Caza
Laguna Beach
Laguna Niguel
San Juan Capistrano
Dana Point
San Clemente

Technical Appendix 1

To address the question of how these cities in have changed over this time period, we utilized data from several sources. Much of the data comes from the U.S. Census. Depending on the analysis, the data are aggregated to block groups, tracts, or zip codes.

We measured the age composition of the neighborhood as the percentage of the population in the following categories: 1) 0-4; 2) 5-14; 3) 15-19; 4) 20-24; 5) 25-29; 6) 30-44; 7) 45-64; 8) 65 and up. The racial/ethnic composition was measured as the percentage of the population in the following categories: 1) white non-Hispanic; 2) black non-Hispanic; 3) Asian non-Hispanic; 4) Latino; 5) other. We constructed a measure of the racial/ethnic heterogeneity in the city by using a Herfindahl index (Gibbs and Martin 1962: 670) of these same five racial/ethnic groupings, which takes the following form:

(1) $$H = 1 - \sum_{j=1}^{J} G_j^{\,2}$$

where G represents the proportion of the population of ethnic group j out of J ethnic groups.

We computed economic resources as percentage below the poverty line, or per capita income. We constructed a measure of the percentage of the labor force unemployed. To measure the educational level of the neighborhood, we constructed measures of the percentage with at least a bachelor's degree (high education), and the percentage with less than a high school degree (low education). Overall income inequality was measured with the Gini coefficient, which is defined as:

(2) $$G = \frac{2}{\mu n^2} \sum_{i=1}^{n} i x_i - \frac{n+1}{n}$$

where x_i is the household's income for 1999 as reported in the 2000 census, μ is the mean income value, the households are arranged in ascending values indexed by i, up to n households in the sample. To capture the binning of the data (as income is coded into various ranges of values), we utilize the Pareto-linear procedure (Aigner and Goldberger 1970; Kak-

wani and Podder 1976), which Nielsen and Alderson (1997) adapted from the U.S. Census Bureau strategy.[1]

Residential stability was measured as the average length of residents in the neighborhood. We constructed a measure of the % of housing units that are vacant.

We capture characteristics of the housing units with the average number of rooms in units, and the average age of housing units.

We computed the average commuting distance with data from the Census Transportation Planning Package (CTPP) for 2000 and the Longitudinal Employer-Household Dynamics (LEHD) for 2002-10. We computed the distance between all origination and destination tracts for the residents of a tract, and computed the weighted mean based on the number of residents commuting to a particular tract.

Land use shapefiles provided by the Southern California Association of Governments (SCAG). These are parcel data that were geocoded and then aggregated into the appropriate geographic unit. These were categorized into 16 types of land use.

The variables measuring the "average distance" to the nearest river, park, or highway were constructed as the minimum distance for each block in the unit, then the average of these block measures was constructed for the unit. For example, the average distance to a park for residents in a neighborhood is the average distance to a park for each block within the neighborhood.

We measure walkability with a measure of the street network in the tract: intersection density is number of intersections per unit of area.

We measured the presence of jobs in zip codes using annual data from the Economic Census.

We computed the number of jobs in three main categories based on two digit NAICS codes: 1) white-collar jobs; 2) blue-collar jobs; 3) retail jobs.

We used the HMDA dataset to construct tract-level annual measures of: 1) the average loan amount of purchase loans; 2) the average income of new residents purchasing homes.

1 We used the prln04.exe program provided by Francois Nielsen at the following website: http://www.unc.edu/~nielsen/data/data.htm.

The measures of the average sales price of all units sold in the ZIP code during a particular month (log transformed) were constructed from data obtained from RAND. This includes both detached and attached single-family housing units including condominiums.

For the models predicting land use, we used the SCAG land use data and the ArcGIS shapefiles to compute distance in kilometers to: 1) central business district (CBD) (i.e., LA downtown); 2) the nearest job sub-center; 3) beach; 4) freeways / arterial roads; 5) transit stops; 6) major airports. The SCAG data provided information on the size of the parcel in square meters, and the slope of the parcel. The parcel's shape was measured as the parcel's area/perimeter ratio: larger values indicate more square parcels. We constructed indicator variables for parcels at the beach, or under construction.

From the U.S. Census, we constructed an entropy index based on 1990 land use info (15 land use categories) in each 1990 block group. From the CTPP we constructed a measure of job entropy based on the 14 or 18 2-digit NAICS job categories.

Spatial measures: For many of the measures describe above, we constructed measures that captured the construct in the nearby area. For these, we used a geographic information system to draw buffers around each geographic unit and then computed the measure of interest within various sized buffers (weighted by an inverse distance decay to account for the fact that nearby locations likely have stronger effects on the neighborhood than more distant locations).

City-level measures were also constructed. We used the Historical Finances of Individual Governments database to construct annual measures of: 1) the ratio of city revenue to expenditures; 2) The percentage of city revenue from property taxes; 3) The percentage of city revenue from sales taxes. From the SOCDS Building Permits Database we computed the number of building permits issued for each year. From the Uniform Crime Reporting data, we constructed a measure of the violent crime rate per 100,000 population. Violent crimes included homicides, aggravated assaults, and robberies.

Technical Appendix 2

We accomplished this clustering of cities by first performing a factor analysis for the following characteristics for the cities within a county in 2000: percent aged 65 or more; percent with children aged 6 to 17; percent homeowners; population density; residential stability (average length of residence of residents); racial/ethnic composition (percent Asian, black, Latino or White); percent immigrants; median household income; education (percent with at least a bachelor's degree); median home value; unemployment rate; inequality (Gini coefficient for household income), and average commute time.

This yielded a solution with 4 or 5 factors in each county, and we computed factor scores for each city for these factors. We then performed k-means clustering on these four or five factor scores for each county. We obtained a solution with five clusters and a solution with ten clusters for each county. Based on visual inspection, the five cluster solution was nearly always the best solution. For the final clusters, we combined cities with the same cluster assignment as well as geographic contiguity.

There were instances in which two socially similar but physically distant groups of (usually five) geographically contiguous cities were classified into the same cluster. We assigned the two groups of cities to separate clusters.

Technical Appendix 3

Table A1. Names of cities contained within each city cluster

Name of city cluster (largest city)	**Other cities in cluster (sorted in descending population size)**
Los Angeles County	
Agoura Hills	Calabasas, Malibu, Westlake Village, Hidden Hills, Point Dume
Alhambra	Monterey Park, Rosemead, Arcadia, San Gabriel, Monrovia, Temple City, East San Gabriel, San Marino, South San Gabriel
Altadena	La Canada Flintridge, La Crescenta-Montrose
Carson	Lakewood, Hawaiian Gardens
Cerritos	Artesia
Claremont	
Diamond Bar	Hacienda Heights, Rowland Heights, Walnut, Avocado Heights, La Habra Heights
Downey	Norwalk, Pico Rivera, Montebello, South Whittier, La Mirada, West Whittier-Los Nietos, South El Monte, Santa Fe Springs, Commerce, East La Mirada
East Los Angeles	
El Monte	Baldwin Park
Glendale	Pasadena, Burbank, South Pasadena, Sierra Madre, East Pasadena
Glendora	Azusa, Duarte, Vincent, Citrus, Mayflower Village, North El Monte, Irwindale, Bradbury
Inglewood	Hawthorne, Gardena, Lawndale, Lennox, Del Aire, Alondra Park
Lancaster	Palmdale, Lake Los Angeles, Quartz Hill, East Foothills, West Bishop, Acton, Desert View Highlands, Littlerock, Palmdale East
Long Beach	Compton, Bellflower, Signal Hill
Pomona	Covina, San Dimas, La Verne, Charter, Oak, Westmorland
Rancho Palos Verdes	Palos Verdes Estates, Rolling Hills Estates, Rolling Hills

Santa Clarita	San Fernando
Santa Monica	Culver City, West Hollywood, Beverly Hills, Marina del Rey
South Gate	Lynwood, Huntington Park, Florence-Graham, Paramount, Bell Gardens, Bell, Maywood, Cudahy, Walnut Park, East Compton, Vernon
Torrance	Redondo Beach, Manhattan Beach, Lomita, Hermosa Beach, El Segundo
West Covina	La Puente, West Puente Valley, Valinda, South San Jose Hills, Industry
Whittier	
Willowbrook	Westmont, West Carson, View Park-Windsor Hills, West Athens, Ladera Heights, West Compton
Orange County	
Anaheim	Stanton
Buena Park	Cypress, La Palma
Fullerton	
Garden Grove	Westminster
Huntington Beach	Fountain Valley
Irvine	Costa Mesa, Newport Beach, Laguna Beach, San Joaquin Hills, Newport Coast
La Habra	Brea
Lake Forest	Aliso Viejo, Laguna Woods, Coto de Caza, Foothill Ranch, Portola Hills
Mission Viejo	Laguna Niguel
Orange	Tustin, Foothills, Villa Park
Rancho Santa Margarita	Las Flores
San Clemente	Dana Point, San Juan Capistrano, Laguna Hills
Santa Ana	Tustin
Seal Beach	Los Alamitos, Rossmoor
Yorba Linda	Placentia
Riverside County	
Blythe	Mecca, East Blythe
Hemet	San Jacinto, Banning, Sun City, East Hemet, Beaumont, Valle Vista, Calimesa, Cherry Valley, Idyllwild-Pine Cove, Homeland, Romoland, Cabazon

Indio	Cathedral City, Coachella
Lake Elsinore	Wildomar, Lakeland Village, Murrieta, Hot Springs, Sedco Hills
Moreno Valley	Perris, Canyon Lake, Nuevo, Quail Valley, Lakeview, March AFB
Palm Springs	Palm Desert, La Quinta, Desert Hot Springs, Rancho Mirage, Bermuda, Dunes, Thousand Palms, Indian Wells
Riverside	Corona, Home Gardens, Woodcrest, El Cerrito
Rubidoux	Norco, Mira Loma, Glen Avon, Pedley, Sunnyslope, Highgrove
Temecula	Murrieta
San Bernardino County	
Barstow	Needles, Lenwood, Searles Valley, Big River, Nebo Center, Bluewater
Chino	Chino Hills
Fontana	Rialto, Bloomington
Hesperia	Apple Valley
Ontario	Montclair
Rancho Cucamonga	
Redlands	Loma Linda, Grand Terrace
San Bernardino	Colton, Highland Muscoy
Upland	San Antonio Heights
Victorville	Adelanto, Mountain View Acres
Yucaipa	Mentone
Yucca Valley	Twentynine Palms, Crestline, Lake Arrowhead, Twentynine Palms Base, Big Bear City, Big Bear Lake, Running Springs, Joshua Tree, Wrightwood, Morongo Valley
Ventura County	
Oxnard	Port Hueneme, El Rio, Channel Islands, Beach
San Buenaventura (Ventura)	
Santa Paula	Fillmore, Ojai, Mira Monte, Oak View, Meiners Oaks, Piru
Thousand Oaks	Simi Valley, Camarillo, Moorpark, Casa Conejo, Oak Park

Notes

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