Attracting redevelopment in "inner-ring" municipalities of U.S. metropolitan areas – focusing on Los Angeles and Boston

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1. Abstract

This paper examines the underlying socio-economic conditions that are likely to explain redevelopment activity in the "inner-ring" municipalities of a metropolitan area. The area of study consists of 54 municipalities within Los Angeles county limits and 33 municipalities in the Boston metropolitan area. The time length covered is from 1970 through 2000, focusing on the rate of change in socioeconomic and development conditions from 1970 to 2000 and 1980 to 2000. Among the selected municipalities for the two metropolitan areas, we focused on two groupings based on income - those with median household income within the 20^{th} – 50^{th} percentile and those within the 51^{st} – 100 percentile. The results indicate that local socioeconomic conditions appear to have greater impact on property values in the Los Angeles area than in Boston. Although, new residential activity seems to be influenced by socioeconomic trends in Los Angeles, the empirical analysis in both cities indicates that other factors, such as public incentives, may impact new development activity more significantly.

2. Introduction

This paper is motivated by our quest to understand better why some municipalities attract significant redevelopment activity while other municipalities do not. Because we are interested in redevelopment activity, we focus on municipalities that are within the "inner ring" – suburbs that were approaching full build-out by 1970, and because of the age of their housing and building stock, are undergoing redevelopment rather than green field development. This approach led to the study of 54 municipalities within Los Angeles county limits and 33 municipalities in the Boston Metropolitan area.

The selected municipalities were grouped based on their median household income in those within the 20-50^{th} percentile and those in the 51-100^{th} percentile. This income subdivision allows us to identify if these two income groupings of LA and Boston municipalities produces a

similar or different effect on the socioeconomic parameters affecting property values and new residential activity. The first percentile range included municipalities with a median household income from $31,500 to $46,900 and the second from $47,129 to $71,000, in Los Angeles. The median income levels for Boston ranged from $31,800 – $51,250 in the first percentile range to $52,000 - $72,000 in the second.

A recent literature review indicates that city employment growth has a significant positive effect on suburban house values and negative effect on the rate of suburban house construction, in a study conducted by Voith (1999) on over 88,000 housing sales. Suburban employment growth however, has little aggregate effect on house prices; and suburban growth has a significant effect on construction rates, especially at locations near the urban fringe. A study conducted by Hemphill et al (2002) indicates that transport and mobility, followed by economy and work, and community benefits were considered to represent the most significant contributors to sustainable urban regeneration. Guy et al's (2002) study of the United Kingdom market and the importance of leveraging private finance and investment into urban regeneration argues that the encouragement of institutional investors to invest in inner-city areas will produce only a limited impact upon urban regeneration. However, independent developers can be more easily motivated to re-develop fringe locations and areas with certain local urban cultures or aesthetics, if urban policy incentives are in place. A study by Berry et al (2003) on apartment sub-markets within Dublin, Ireland indicated that different sub-markets responded differently to fiscal incentives in inner-city locations. The outcomes suggest that the reforms only achieve a short-term impact. The role of government intervention within markets, particularly rapidly rising markets, may also have limited effects. Puentes and Orfield (2002) focus on first suburbs – inner-ring communities just outside central cities - in the Midwestern United States. Their analysis led to three main findings: First, these suburbs have their own opportunities and challenges that set them apart from their neighboring central cities or suburbs. Second, they are caught in a policy blind spot unlike central cities. And third, federal and state governments should do more to help strengthen the health and vitality of these suburbs before they start to decline.

In this paper we try to understand which socioeconomic parameters have the greatest explanatory value on the rate of increase in home values and the rate of redevelopment activity. Presumably, those factors that have the greatest positive impact would be most attractive to developers and the ones that municipalities would most like to promote. Ultimately, we want to understand better the policy levers that can enable leaders to positively influence redevelopment activity in their communities. The present paper deals primarily with understanding the underlying socio-economic parameters, leaving the policy levers for future research. Our primary

goal is to determine the significance of the effect that socioeconomic conditions have on median housing prices and new housing activity in a municipality and whether or not the impact is sustained over time.

3. Methodology

We selected fifty-four municipalities within Los Angeles County based on the primary criterion that they were inner-ring suburbs of Los Angeles. These suburbs were identified by examining housing build-out and selecting municipalities that were largely built-out by 1970. Suburbs closer to downtown and to the coast (twelve miles west of downtown) met this criterion. Distance from the ocean also represents one of the key parameters in establishing a property's value in the Los Angeles area. In Map 1, the municipalities studied are highlighted with their boundaries. Map 2 presents the distances (in miles) from the center of the municipality to the ocean.

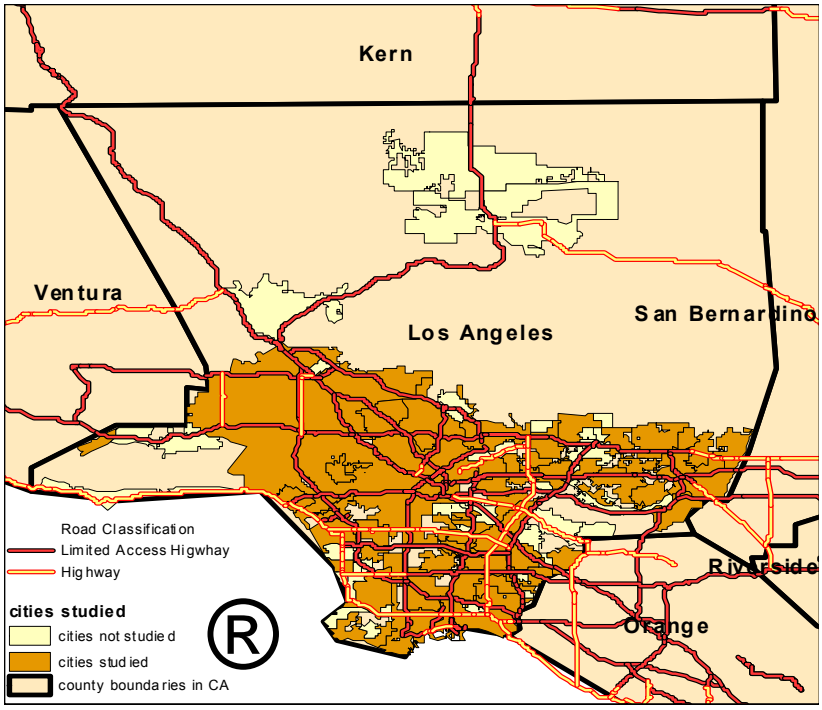
Boston, on the other hand, is among the few USA cities with high residential values closer to downtown. This results from a variety of factors including a large stock of high quality historic housing near downtown, an excellent mass transit system, years of public redevelopment in areas around downtown, high housing demand, and limited supply of entitled land for new development in the suburbs. Establishing location from downtown as the major factor for identifying the municipalities studied, we chose Route 128 as the boundary (Map 3) for inner-ring suburbs. Route 128 is the first ring road in the Boston area. It encompasses all the municipalities that were largely built-out by 1970 and includes all the municipalities bordering, or in immediate proximity to downtown. Map 4 highlights the distances (in miles) from the center of the municipality to the downtown center.

The main data sources for socioeconomic and development parameters were the U.S. Department of Housing & Urban Development, U.S. census, Bureau of Labor Statistics and the Construction Industry Research Board.

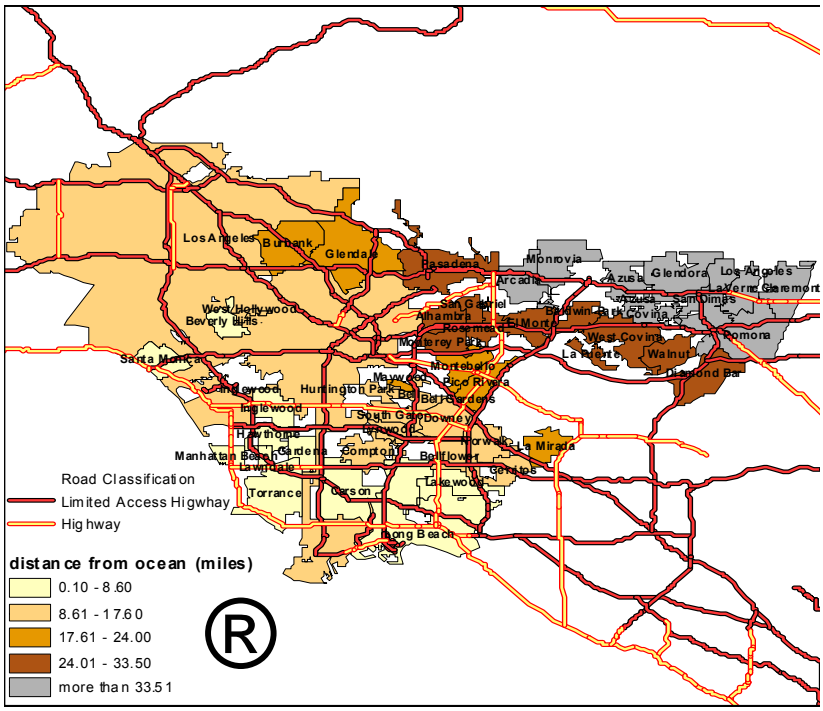
Education level and total housing units are expressed per capita, allowing comparison among the municipalities while avoiding effects generated from differences in total population. Instead of using the actual values of the studied socioeconomic and development parameters for 1970, 1980 and 2000, we decided to use percentage changes[1], between 1970 - 2000 and 1980 – 2000, in order to capture the growth or decline of these parameters within the selected time frame. The municipalities were then classified into three percentile groups, based on their median

[1] All values are in real dollars of 1999. In addition, education level and total housing units are per capita.

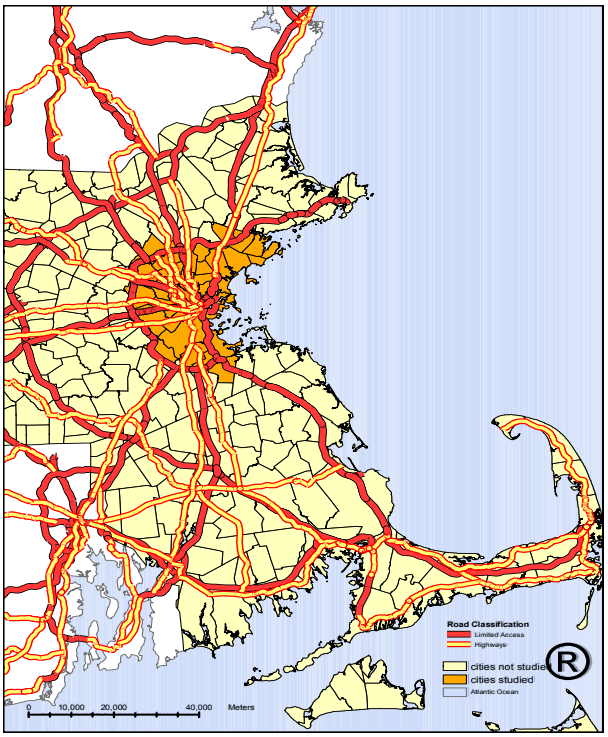
household income for both 1970 & 1980 (Maps 5 through 8). Maps 9 and 10 highlight the Number of New Housing Units from 1970 – 2000.



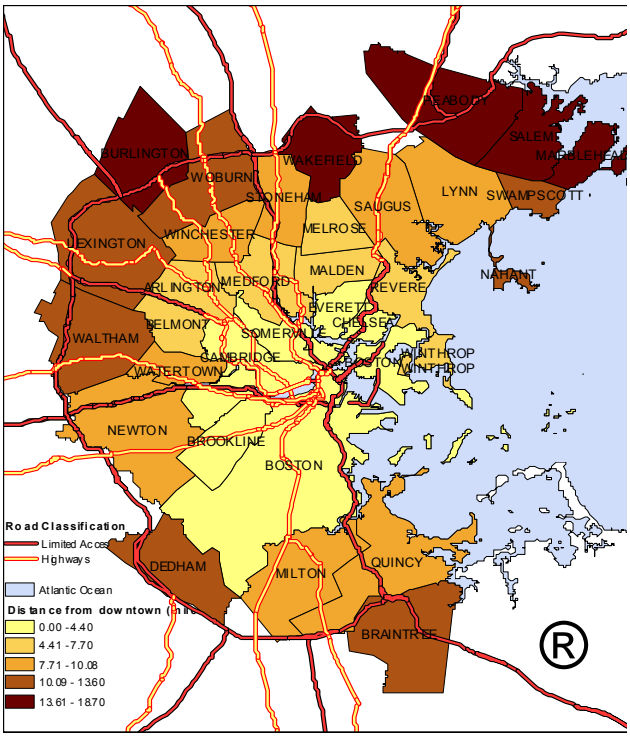
Map1 Los Angeles area of study



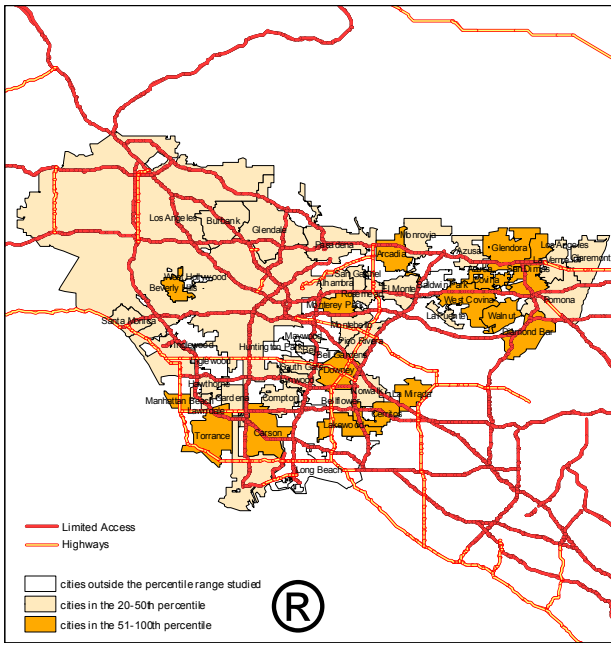
Map2 Los Angeles municipalities' distance from the coast (in miles)



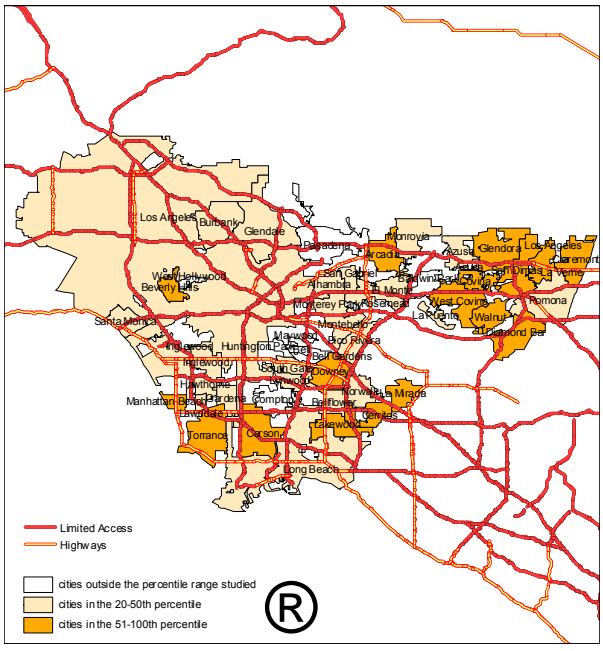
Map3 Boston study area



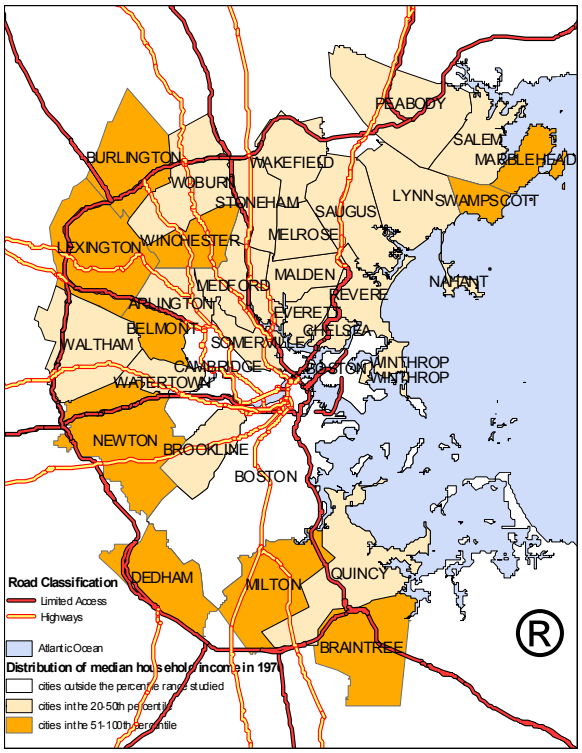
Map 4 Boston municipalities' distance from downtown (in miles)



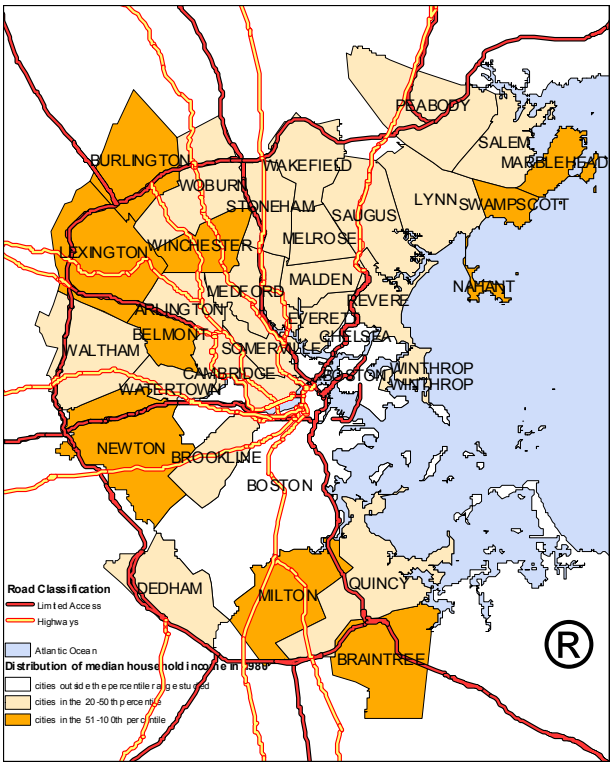
Map 5 Los Angeles municipalities with median household income within the 20-50th & 51-100th percentile ranges in 1970



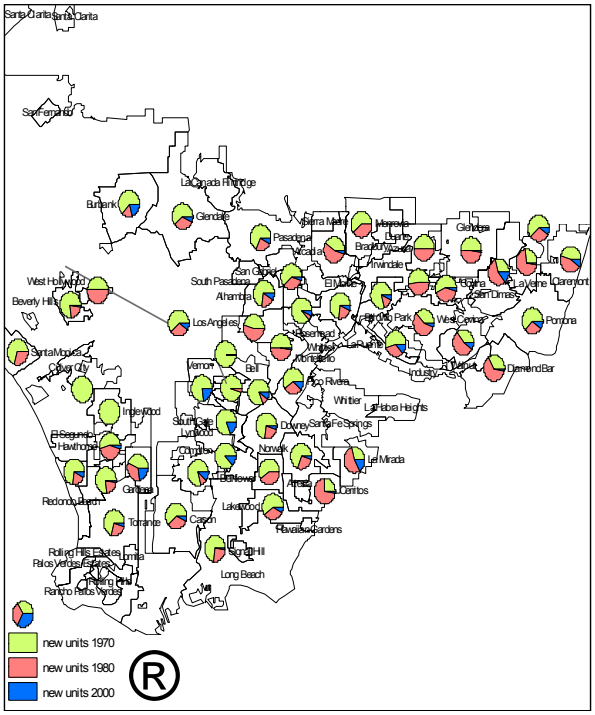
Map 6 Los Angeles municipalities with median household income within the 20-50th & 51-100th percentile ranges in 1980



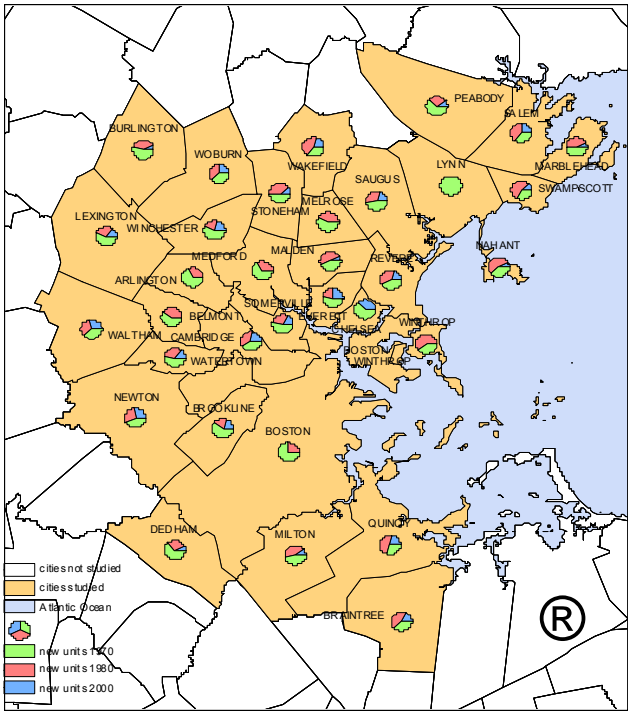
Map 7 Boston municipalities with median household income within the 20-50th percentile range in 1970



Map 8 Boston municipalities with median household income within the 20-50th percentile range in 1980



Map 9 Los Angeles number of new housing units from 1970 - 00



Map 10 Boston Number of new housing units from 1970 - 00

4. Results & Discussion

4.1. Study of Los Angeles socioeconomic & development trends

In an effort to empirically estimate the effect of local socioeconomic conditions on the Percentage Change of Median Household Owner Value (PCMHOV) and the New Residential Activity (NRA), we use a two-stage regression model (2SLS). Two sets of equations were developed; one for municipalities in the 20-50th percentile and the other for those in the 51-100th percentile. In addition, the municipalities within these percentiles were studied for two periods from 1970-2000 and from 1980-2000. Although the total number of equations increased to four the same variables were used to identify similarities and dissimilarities between both the income percentiles and the years of study. The general form of the two-stage model is shown below (Equations 1 &2):

$$PCMHOV = a_0 + a_1 \text{education level}^{*} + a_2 \text{ population} + a_3 \text{ median family income} + a_4 \text{ median household income} + a_5 \text{ distance from the coast} + \varepsilon \quad \text{(stage one)} \quad \text{(Eq.1)}$$

$$NRA = b_0 + b_1 PCMHOV + b_2 \text{education level}^{\dagger} + b_3 \text{ population} + b_4 \text{ median family income} + b_4 \text{ labor force per capita} + b_5 \text{ vacant units} + \varepsilon \quad \text{(stage two)} \quad \text{(Eq.2)}$$

* education level is broken down in 4 levels; from people without a high school degree to college or advanced degree recipients.

† education level is broken down in two levels; those without a high school degree and those with some college or associate degree

Exhibit 1 presents the effect of local socioeconomic conditions on the PCMHOV and NRA for both percentiles and years of study. An increase in college or advanced degree recipients, median household income and distance from the coast is associated with an increase in PCMHOV, when comparing the 20-50th with the 51-100th percentile for 1970-00. This may occur if the residential demand is higher than the available housing supply leading to an increase in residential values. Another possibility is that attraction of highly educated individuals triggers a quicker appreciation of surrounding residential units, because of their financial capability to improve their property. The distance from the coast effect was less expected, but it highlights owners' effort to improve the quality of their residential properties to make them more attractive even though they might be further from the coast. Owners with properties close to the cost are

likely to attract high demand even with an average quality property, in contrast to those further inland who need to offer better quality properties to increase their demand. Focusing on the differences between the two percentiles, the less educated individuals and median family income seem to be the most significant. An increase in less educated individuals has a negative impact on PCMHOV for the 20-50th income percentile, while it has a positive impact on the 50-100th. This effect might be attributed to the different financial background of individuals who live in the highest priced areas versus other areas, regardless of their educational background. Although, an individual might have a high school degree or was not been able to complete his basic education, this might not prevent him from become wealthy and locating in expensive areas. The median family income effect might be attributed to a supply of single family housing in the 20-50th percentile municipalities, which is higher than demand; leading to a house value decrease. This diverse effect may also be capturing a recent phenomenon where people living together who are unmarried as well as immigrant households with more than one family under one room may combine their incomes to be able to afford to buy a home. Municipalities where this is occurring appear to be enjoying above-average property appreciation.

Shifting our focus to the New Residential Activity (NAR), an increase in property values seems to promote greater redevelopment activity. This confirms our expectations that developers are attracted to areas where rising they see property values rising because they forecast even higher values in the future. The effect of the local socioeconomic conditions on NAR, however, does not present any similarities between the two income percentiles in contrast to the PCMHOV. In addition, the majority of these conditions (variables) do not seem to be statistically significant. Both of these results are an indication that there are other underlying factors promoting development that might not be as directly related with socioeconomic conditions as prices. When a developer proceeds with redevelopment projects in inner ring suburbs, they would appear to be focusing on variables that go beyond the socio-economic indicators that we have included here. For example, development activity may be tied to incentives provided by the local municipality to encourage development. Certain municipalities may take a more lenient posture toward up-zoning areas for higher density. Others may give higher priority to NIMBY's who oppose development, making it harder for developers to receive building permissions. Still other may want to encourage redevelopment but may lack the funding for infrastructure improvements, or they may have less land for redevelopment.

Comparing the 20-50th with the 51-100th income percentile results for 1980-00, we find almost identical results to those for 1970-00. Combining this finding with the high R^{2}'s for all the first stage equations, we believe that the selected socioeconomic variables seem to describe the

PCMHOV very well through time. However, this is not the case with NAR. In all cases, with the exception of the 51-100th percentile for 1980-00, the majority of socioeconomic conditions do not seem to have a statistically-significant effect on NAR. Although, a variety of socioeconomic conditions (variables) were tested for their effect on NAR, none of them seem to present a more significant effect than those selected. This leads us to believe that socio-economic variables alone do not explain differences in NAR, and that we need to introduce additional urban growth policy and land use entitlement variables that may have an impact on NAR.

4.2. Study of Boston socioeconomic & development trends

In the case of Boston, we tested a two-stage regression model similar to the one we used for Los Angeles. The general form of the two-stage model is shown in Equations 3 & 4:

$$PCMHOV = a_0 + a_1 \text{education level}^{*} + a_2 \text{ median family income} + a_3 \text{ foreign born population} + a_4 \text{ distance from downtown} + \varepsilon \quad \text{(stage one)} \quad \text{(Eq.3)}$$

$$NRA = b_0 + b_1 PCMHOV + b_2 \text{education level}^{\dagger} + b_3 \text{ median family income} + b_4 \text{ distance from downtown} + \varepsilon \quad \text{(stage two)} \quad \text{(Eq.4)}$$

* education level is broken down in two levels; people with a high school degree and those with a college or advanced degree.

† education level is broken down in two levels; those without a high school degree and those with a high school degree

Exhibit 2 presents the effect of local socioeconomic conditions on the PCMHOV and NRA for both percentiles and years of study. The effect of the socioeconomic conditions on both the PCMHOV and NAR does not seem to share any similarities between the 20-50th and 51-100th income percentiles for 1970-00. In the 1980-00 however, similarities between the two groups are visible, indicating a possibility of non-socioeconomic factors affecting PCMHOV in the 1970s, such as zoning ordinances promoting development in some areas versus others, since the 1970s trends does not continue. For NAR, the effect of other political or development factors are even more evident, since the socioeconomic conditions do not seem to pick them up. Boston, in contrast to Los Angeles, is a metropolitan area with fewer large-scale production homebuilders, and more development constraints on new housing. Even the outer-ring suburbs tend to restrict large-scale subdivision development. While demand for new housing is much lower than in Los

Angeles, onerous suburban permitting processes make it even harder to obtain development permissions than in the outer ring suburbs of Los Angeles.

An increase in high school degree recipients, median family income and distance from downtown seem to affect similarly the PCMHOV for both the 20-50th and 51-100th percentiles in 1980-00. An increase in less educated people, with a high school degree is associated with a decrease in PCMHOV. This effect might be caused by the lower earnings of these individuals, which forces them to occupy poor quality housing or to locate in areas with less residential demand pressure and at greater distance from downtown where house prices are lower. The increase of median family income on the other hand has a positive effect on the PCMHOV, in the second percentile. This effect indicates either a quicker appreciation of property values, or an increase in property demand in these areas without similar increase in supply – leading to value increases. Finally, it seems that distance from downtown affects negatively prices. This is not an indication that better quality housing can be found downtown versus the suburbs, but rather the main reason for the downtown price difference is location – attractiveness and demand.

5. Conclusion

In this study, we have examined socioeconomic parameters to help us understand where and why redevelopment is occurring within two metropolitan areas – Los Angeles and Boston. In particular, we have focused on socioeconomic variables that help to explain the rate of increase in residential values and in new residential activity in a cross section of inner-ring suburbs in each city. The municipalities selected in Los Angeles and Boston were largely built-out by the 1970s and are undergoing redevelopment today, represented by new residential activity in our analysis. In addition, differences in residential values and housing consumption per capita among the various municipalities help to highlight local real estate trends.

The results of this study indicate that socioeconomic conditions are more capable of predicting the Percentage Change of Median Household Owner Value accurately in the Los Angeles area than in Boston. The common characteristic between the two cities is that socioeconomic conditions do not by themselves explain New Residential Activity very well. This result indicates that other factors such as local political attitudes toward development, city interventions, incentives & disincentives, and local fiscal conditions are also likely to be relevant for understanding what encourages redevelopment activity and what motivates developers to build in different municipalities. Our next step will be to attempt to quantify these factors and to introduce them into our empirical model.

6. References

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Exhibit 1. Los Angeles two stage model

Los Angeles - 2SLS - Equation 1												
	1970-00						1980-00					
	20-50th percentile			51-100th percentile			20-50th percentile			51-100th percentile		
Dependent variable:	**coefficient**	**t-statistic**	**Dependent variable:**	**coefficient**	**t-statistic**	**Dependent variable:**	**coefficient**	**t-statistic**	**Dependent variable:**	**coefficient**	**t-statistic**
log(vh7000)			log(vh7000)			vh8000			log(vh8000)		
Independent variables:			**Independent variables:**			**Independent variables:**			**Independent variables:**		
constant	-0.9	-7.16	constant	0.62	1.95	constant	0.19	3.71	constant	-4.5	-9.65
nh7000	-0.51	-5.44	nh7000	0.56	1.97	1/nh8000	-0.01	-2.8	nh8000	0.16	0.99
h7000	-0.61	-3.24	1/h7000	0.21	2.48	h8000^2	-0.54	-1.54	h8000	-5.48	-6.34
sca7000	-0.062	-0.65	sca7000	-0.04	-0.3	sca8000^2	-0.05	-0.61	sca8000	0.2	0.54
ca7000	0.15	2.82	ca7000	0.18	2.09	(1/ca7000)^2	7.39*10-6	2.19	log(ca8000)	0.26	2.26
pop7000	-0.14	-1.19	pop7000	-0.28	-4.3	(1/pop8000)^2	0.001	1.66	log(pop8000)	-0.25	-9.04
fi6999^2	1.87	3.07	fi6999	-2.25	-2.25	fi7999^2	-3.63	-3.54	fi7999	-5.95	-5.83
hi6999	0.95	8.34	hi6999	2.56	3.18	hi7999	1.12	3.89	hi7999	8.56	7.54
log(dcost)	0.07	2.18	dcost^2	0.0001	2.16	dcost^2	-0.00003	-0.66	dcost^2	0.0002	2.51
Number of observations	28		Number of observations	19		Number of observations	26		Number of observations	19	
R^2	90%		R^2	94%		R^2	79%		R^2	96%	

Los Angeles - 2SLS - Equation 2											
	1970-00						1980-00				
	20-50th percentile			51-100th percentile			20-50th percentile			51-100th percentile	
Dependent variable:	**coefficient**	**t-statistic**	**Dependent variable:**	**coefficient**	**t-statistic**		**coefficient**	**t-statistic**	**Dependent variable:**	**coefficient**	**t-statistic**
da70a00			da70a00			da80a00			da80a00		
Independent variables:			**Independent variables:**						**Independent variables:**		
constant	-1.06	-9.93	constant	-1.19	-13.78	constant	-0.49	-1.09	constant	-0.79	-14.2
(1/vh7000)^2	0.13	1.74	vh7000	0.12	2.2	(1/vh8000)^2	0.0001	0.93	vh8000	0.16	1.65
nh7000	-0.005	-0.09	(1/nh7000)^2	-0.00005	-0.53	1/nh8000	0.44	1	(1/nh8000)^2	-0.0001	-1.91
sca7000^2	0.01	0.51	sca7000	0.1	4.09	(1/sca8000)^2	0.08	0.84	(1/sca8000)^2	-0.002	-2.3
pop7000^2	-0.18	-1.62	(1/pop7000)^2	-0.00002	-1.43	(1/pop8000)^2	0.01	0.77	pop8000	-0.12	-2.04
fi6999	0.34	1.02	fi6999	-0.22	-1.59	fi7999	0.65	0.17	fi7999	0.19	2.01
1/lf7000	0.0007	0.76	1/lf7000	0.002	0.67	1/lf8000	-0.03	-1.09	lf8000	-0.03	-0.11
vu7000	-0.29	-1.72	vu7000^2	0.14	1.1	(1/vu7000)^2	-0.0001	-0.06	vu8000	-0.0001	-0.11
Number of observations	28			19		Number of observations	26		Number of observations	19	
R^2	28%			73%		R^2	27%		R^2	77%	

Variable abbreviations (refer to percentage change either from 1970 to 2000 or 1980 to 2000):
vh7000: household owner's value in 1999 dollars 70-00
nh7000: non-high school graduates per capita 70-00
h7000: high school graduates per capita 70-00
sca7000: some college or associate degree recipients per capita 70-00
ca7000: college or advanced degree recipients per capita 70-00
pop7000: population 70-00
fi6999: median family income in 1999 dollars 69-99
hi6999: median household income in 1999 dollars 69-99
dcost: distance from the coast
lf7000: labor force 70-00
vu7000: vacant units 70-00
da70a00: new units per total units 70-00

Exhibit 2. Boston two stage model

Boston - 2SLS - Equation 1											
	1970-00						1980-00				
	20-50th percentile			51-100th percentile			20-50th percentile			51-100th percentile	
Dependent variable:	**coefficient**	**t-statistic**	**Dependent variable:**	**coefficient**	**t-statistic**	**Dependent variable:**	**coefficient**	**t-statistic**	**Dependent variable:**	**coefficient**	**t-statistic**
log(vh7000)			log(vh7000)			log(vh8000)			log(vh8000)		
Independent variables:			**Independent variables:**			**Independent variables:**			**Independent variables:**		
constant	0.08	0.83	constant	-0.07	-0.29	constant	-0.21	-1	constant	-0.29	-1.4
h7000	-0.77	-3.77	h7000	0.04	0.03	(1/h8000)^2	-0.004	-4.01	1/h8000	-0.03	-1.9
ca7000^2	0.007	2.67	ca7000^2	-0.006	-0.12	(1/ca8000)^2	0.07	1.38	(1/ca8000)^2	0.06	2.33
fi6999	0.09	0.21	fi6999	1.18	0.95	fi7999	1.42	3.68	fi7999	1.01	2.5
fbp7000^2	-0.1	-2.9	fbp7000^2	0.16	3.29	fbp8000^2	-0.01	-0.35	fbp8000	0.17	1.77
dboston^2	0.00004	0.1	dboston^2	-0.0008	-2.2	dboston	-0.03	-2.89	dboston^2	-0.001	-5.17
Number of observations	21		Number of observations	10		Number of observations	21		Number of observations	10	
R^2	81%		R^2	81%		R^2	82%		R^2	93%	

Boston - 2SLS - Equation 2											
	1970-00						1980-00				
	20-50th percentile			51-100th percentile			20-50th percentile			51-100th percentile	
Dependent variable:	**coefficient**	**t-statistic**	**Dependent variable:**	**coefficient**	**t-statistic**		**coefficient**	**t-statistic**	**Dependent variable:**	**coefficient**	**t-statistic**
da70a00			da70a00			da80a00			da80a00		
Independent variables:			**Independent variables:**						**Independent variables:**		
constant	-0.79	-2.73	constant	-1.69	-3.36	constant	-0.13	-0.2	constant	-0.74	-1.85
vh7000^2	0.04	0.73	vh7000^2	0.02	0.33	(1/vh8000)^2	0.49	2.58	vh8000^2	0.42	1.9
(1/nh7000)^2	-0.003	-0.09	(1/nh7000)^2	-	-	(1/nh8000)^2	-0.16	-2.15	nh8000^2	-0.85	-1.2
h7000^2	-	-	h7000^2	1.77	2.59	h7000^2	-	-	h7000^2	-	-
fi6999	-0.71	-1	1/fi6999	0.26	1.84	fi7999^2	-0.38	-0.18	fi7999	-0.24	-0.66
dboston	0.01	0.98	1/dboston	-0.93	-0.41	dboston	0.002	0.12	1/dboston	-2.63	-0.63
Number of observations	21			10		Number of observations	21		Number of observations	10	
R^2	18%			60%		R^2	57%		R^2	52%	

Variable abbreviations (refer to percentage change either from 1970 to 2000 or 1980 to 2000):
vh7000: household owner's value in 1999 dollars 70-00
nh7000: non-high school graduates per capita 70-00
h7000: high school graduates per capita 70-00
ca7000: college or advanced degree recipients per capita 70-00
fbp7000: foreign born population 70-00
dboston: distance from downtown
da70a00: new units per total units 70-00