JOINT CENTER FOR HOUSING STUDIES
of Harvard University

Home Price Appreciation in Low- and Moderate-Income Markets

LIHO-01.7

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August 2001

Low-Income Homeownership
Working Paper Series

Joint Center for Housing Studies

Harvard University

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This paper was prepared for the Joint Center for Housing Studies' *Symposium on Low-Income Homeownership as an Asset-Building Strategy* and an earlier version was presented at the symposium held November 14-15, 2000, at Harvard University. The Symposium was funded by the Ford Foundation, Freddie Mac, and the Research Institute for Housing America.

This paper, along with others prepared for the Symposium, will be published as a forthcoming book by the Brookings Institution and its Center for Urban and Metropolitan Policy.

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I. Introduction

At the turn of the millennium, fully two-thirds of American households were owner-occupants. In addition, through the middle of the year in 2000, real home prices were rising in all but a handful of major metropolitan areas in the United States. In such a climate, the benefits of homeownership seem obvious. Owners whose property appreciates accumulate wealth, and most are protected from rising out-of-pocket housing costs by fixed or slowly adjusting mortgage rates. Renter households, on the other hand, are hurt by rising real rents, and they see the dream of homeownership becoming ever more elusive.

But is homeownership the solution for all? Clearly, there are periods of time and locations where owning a home has been a liability. Examples of substantial decreases in home values have occurred in Texas, New England, California, Alaska, and Hawaii in recent years. Homeowners are also leveraged, and a home purchase is the biggest investment that most households ever make. A household that puts 10 percent down to purchase a home doubles its money if the home appreciates 10 percent. That same household sees its investment wiped out if home prices fall 10 percent.

Clearly, home price appreciation is only part of the return to an investment in an owner-occupied unit. The bulk of the return to owning accrues to the owner household in the form of valuable housing services. In addition, there are costs to be considered. The physical structure must be maintained, and even with maintenance, systems become obsolete; property taxes must be paid; mortgage interest rates and origination fees vary with time and by borrower; heating bills and insurance costs can be substantial; and, of course, there may or may not be income tax advantages to owning. Nonetheless, whether or not home prices rise or fall over time will determine to a large extent whether the investment was a good one.

This paper will begin with a broad-brush look at state and metropolitan area housing markets over the last quarter-century. The available state and metropolitan area data reveal substantial differences in the pattern of price appreciation across time and space. While some

areas have experienced dramatic boom and bust cycles, other areas have experienced relatively low variance, strong trend appreciation. The second part of the paper will look in detail at ZIP code level price changes over a period of 17 years in three major metropolitan areas: Boston, Chicago, and Los Angeles. While the experiences in three metropolitan areas cannot be generalized to the nation as a whole, we believe that much can be learned from studying patterns of price movement across neighborhoods within cities.

II. Methodology

The patterns of change in home value described in the paper are estimated with repeat sales price indexes. Case-Shiller weighted repeat sales indexes (See Case and Shiller [1987 and 1989]) were used where available. In addition, the Office of Federal Housing Enterprise Oversight (OFHEO) makes available state level repeat value indexes produced using Fannie Mae and Freddie Mac data. While OFHEO uses a similar index construction methodology (the WRS method of Case and Shiller [1987]), their indexes are in part based on appraisals rather than exclusively on arms-length transactions. CS indexes are estimated only with arms-length transactions and use controls, to the extent possible, for changes in property characteristics. Nonetheless, to capture broad movements over long time periods, the indexes tend to track each other quite well.

Changes in aggregate OFHEO indexes are presented in Figure 1, along with changes in the CPI for the same time periods. On average, house prices in the United States have risen 137.8 percent since 1980, while prices in general increased 105.9 percent. In addition, price increases have exceeded inflation in eight of the nine Census regions. Over 20 years, the largest increases have been in New England, the Mid-Atlantic, and the Pacific regions. Only in the West South Central region have prices fallen in real terms since 1980.

Real rates of increase have accelerated during the last five years. For the United States as a whole, prices are up 27.3 percent versus 12.4 percent for the CPI. During the last year, home price increases were 6.5 percent while the CPI was up only 3.2 percent. During the last year and the last five years, real prices have increased in all nine Census regions.

Figure 1: Percent Change in House Prices Period Ended March 31, 2000

Division	Division Ranking	1-Yr.	5-Yr.	Since 1980
New England	1	10.2	33.4	242.8
West North Central	2	7.8	31.1	110.0
Pacific	3	7.1	28.5	166.8
Middle Atlantic	4	6.5	21.3	186.1
East North Central	5	6.3	30.8	139.1
Mountain	6	5.9	30.3	123.4
South Atlantic	7	5.7	25.1	129.4
West South Central	8	5.3	23.4	60.2
East South Central	9	3.9	26.2	117.2
United States**		6.5	27.3	137.8
CPI-U		3.2	12.4	105.9

Note: **United States figures based on weighted division average. Source: Office of Federal Housing Enterprise Oversight, House Price Index, First Quarter 2000; Bureau of Labor Statistics, All Urban Consumers.

III. ZIP Code Level Indexes

To explore intra-city variations in the pattern of appreciation over time, we used ZIP code level indexes produced by Case Shiller Weiss Inc. CSW produces an index for an area only when the number of paired sales is sufficient to produce reasonable confidence intervals on the coefficient estimates. A total of 428 indexes were available from the three metropolitan areas chosen. The Boston data are made up of 235 ZIP code indexes with observations between the first quarter of 1983 and the second quarter of 1998. The Chicago data represent 84 ZIP codes with observations between the first quarter of 1987 and second quarter of 1998. The Los Angeles data contain information on 109 ZIP codes between the first quarter of 1983 and the second quarter of 1998.

It is important to reiterate that the three metropolitan areas being examined here do not represent a random sample of the U.S. housing market. In some ways they were chosen not to be representative, but rather because their housing markets have behaved very differently over time.

Figure 2 presents the characteristics of the ZIP code samples for each of the three metropolitan areas. The figure breaks the ZIP codes into quintiles based on income and shows data for the highest and lowest deciles. The data are from the 1990 Census.

Median income figures show the same pattern for all three cities. Boston had higher median income than either Los Angeles or Chicago, and income was higher in every quintile. Chicago had a slightly more even distribution of income than either Boston or Los Angeles. The ratio of income in the wealthiest 10 percent of ZIP codes to income in the poorest 10 percent of ZIP codes was 3.0 in Los Angeles, 2.8 in Boston, and 2.5 in Chicago.

Los Angeles was the most expensive of the three housing markets, for both rental and owner-occupied units. Median monthly rent in Los Angeles was nearly $700, while median rent in Boston was $638 and in Chicago $577. The ratio of rent in the highest decile to rent in the lowest decile was between 1.6 and 1.7 in all three cities. The median price of owner-occupied units in Los Angeles was more than twice the median value of owner-occupied units in Chicago and nearly 1.5 times the median value of owner-occupied units in Boston.
The two right-hand columns of Figure 2 show interesting ratios for the three metropolitan areas in 1990. Column 4 shows the ratio of median monthly rent to owner-occupied house value for each quintile/decile. The ratio was substantially higher in Chicago in all sub groupings than in the other two cities and was lowest in Los Angeles. Not surprisingly, the ratio of income to house value, a crude measure of affordability, was more than twice as high in Chicago as in Los Angeles. In addition, the ratio of income- to-house value was the lowest in the poor areas of Los Angeles and the highest in the middle-income areas of Chicago.

While its housing market was the most expensive among the three, Los Angeles had the highest percentage of households in poverty at 11.1 versus 5.6 for Chicago and 5.5 percent for Boston. In all three cities, there was a larger percentage of African-Americans in the lower income ZIP codes, with substantially more concentration apparent in the low-income ZIP codes of Chicago.

Finally, Los Angeles had a substantially larger percentage of recent immigrants. While immigrants were scattered across all income quintiles, the largest proportion of them in all three cities was in the lowest income decile.

Figure 2: Characteristics of Census Tract Groups by Quintile/Decile

Los Angeles

	Median Income	Median Monthly Rent	Median Housing Value	Annual Rent / Housing Value	Income / Housing Value
Top 10%	$69,997.27	$931.27	$418,445.91	0.0280656	0.167279
Top 1/5	$61,228.10	$879.00	$386,186.00	0.0291087	0.158546
2nd 1/5	$44,747.59	$740.73	$259,618.18	0.0364042	0.172359
3rd 1/5	$38,676.36	$671.41	$255,422.77	0.0347135	0.151421
4th 1/5	$33,182.00	$631.77	$215,968.18	0.0363928	0.153643
Bottom 1/5	$25,756.00	$566.09	$179,036.36	0.0402097	0.143863
Bottom 10%	$23,502.64	$546.46	$185,127.27	0.0394882	0.126954
Total	$40,529.84	$696.14	$258,081.72	0.0354232	0.157043

Chicago

	Median Income	Median Monthly Rent	Median Housing Value	Annual Rent / Housing Value	Income / Housing Value
Top 10%	$62,871.63	$702.75	$213,687.50	0.0691433	0.294222
Top 1/5	$57,561.94	$641.69	$184,806.25	0.0570721	0.311472
2nd 1/5	$47,638.59	$658.71	$132,723.53	0.061004	0.358931
3rd 1/5	$43,098.18	$600.24	$123,270.59	0.0615719	0.349623
4th 1/5	$36,970.00	$532.88	$99,558.82	0.0683252	0.371338
Bottom 1/5	$27,972.59	$455.35	$92,235.29	0.0619974	0.303274
Bottom 10%	$24,796.00	$435.63	$83,187.50	0.0662436	0.298074
Total	$42,470.71	$577.01	$125,825.00	0.0620527	0.337538

Boston

	Median Income	Median Monthly Rent	Median Housing Value	Annual Rent / Housing Value	Income / Housing Value
Top 10%	$73,576.58	$805.88	$302,129.21	0.0327019	0.243527
Top 1/5	$65,931.17	$750.68	$258,083.00	0.0361367	0.255465
2nd 1/5	$49,873.94	$686.91	$183,300.00	0.0462082	0.272089
3rd 1/5	$43,330.81	$640.83	$162,302.13	0.0478546	0.266976
4th 1/5	$38,122.87	$592.38	$149,931.92	0.0478222	0.254268
Bottom 1/5	$29,269.64	$519.32	$134,212.77	0.0470045	0.218084
Bottom 10%	$26,142.38	$485.92	$129,166.67	0.0453193	0.202393
Total	$45,305.69	$638.03	$177,566	0.0450053	0.255148

Figure 2 (cont'd): Characteristics of Census Tract Groups by Quintile/Decile

Los Angeles

	Percent of Black population	Percent in Poverty	Percent 1-person household	Percent h/h w/ householder's age over 65	Percent foreign-born persons who entered after 1982	Percent persons who lived in same house in 1985	Percent owner-occupied housing units
Top10%	7.3	3.8	18.9	14.7	24.2	51.5	78.4
Top 1/5	7.9	4.3	20.9	15.2	27.5	52.6	73.6
2nd 1/5	5.2	6.7	22.3	16.8	32.1	53.2	65.8
3rd 1/5	9.4	9.1	26.4	15.7	34.3	49.9	56.1
4th 1/5	7.3	13.3	23.0	13.1	38.2	46.5	45.9
Bottom 1/5	21.3	21.6	23.1	10.6	42.9	43.4	32.6
Bottom 10%	15.6	24.5	22.9	11.2	43.6	43.4	29.1
Total	10.2	11.1	23.2	14.3	35.1	49.1	54.6

Chicago

	Percent of Black population	Percent in Poverty	Percent 1-person household	Percent h/h w/ householder's age over 65	Percent foreign-born persons who entered after 1982	Percent persons who lived in same house in 1985	Percent owner-occupied housing units
Top 10%	1.5	1.9	16.7	13.2	24.4	53.1	84.7
Top 1/5	1.4	2.1	17.7	12.9	22.8	53.4	82.0
2nd 1/5	2.3	2.4	20.8	11.2	27.8	49.8	74.7
3rd 1/5	5.4	3.7	21.7	15.1	24.4	56.3	75.0
4th 1/5	11.1	4.5	25.2	19.9	19.1	60.7	72.0
Bottom 1/5	27.7	15.1	29.5	17.6	28.3	53.6	46.4
Bottom 10%	37.7	19.5	29.1	14.5	31.1	51.6	37.1
Total	9.7	5.6	23.0	15.4	24.5	54.7	69.9

Boston

	Percent of black population	Percent In poverty	Percent 1-person household	Percent h/h w/ householder's age over 65	Percent foreign-born persons who entered after 1982	Percent persons who lived in same house in 1985	Percent owner-occupied housing units
Top 10%	1.1	2.1	14.9	14.4	21.0	66.3	86.0
Top 1/5	1.0	2.3	15.5	13.9	20.2	66.2	84.4
2nd 1/5	0.8	3.1	16.9	13.1	14.0	61.9	80.2
3rd 1/5	1.1	4.1	20.8	15.3	18.2	61.3	72.4
4th 1/5	3.2	5.7	22.4	17.3	18.8	61.4	68.8
Bottom 1/5	4.8	12.4	27.7	17.8	27.8	54.5	46.1
Bottom 10%	6.1	15.5	28.3	18.3	27.3	54.7	40.9
Total	2.2	5.5	20.7	15.5	19.8	61.1	70.4

IV. Appreciation in High and Low-income Areas

This section of the paper will describe patterns of appreciation and depreciation in low- and high-income neighborhoods. The last section of the paper presents some possible explanations for the observed patterns.

Figures 3, 4, and 5 present the main results. Figure 3 presents annualized increases in value, both nominal and real, for Boston's 235 ZIP codes between the beginning of 1983 and 1988. The Boston market experienced a dramatic boom between 1983 and 1988, with home prices rising at a nominal rate of 18 percent annually and at a real rate of 13.8 percent over the five-year period.

During the Boston boom, the low-income portion of the market experienced the highest rates of appreciation. The bottom decile increased at a nominal annual rate of over 20 percent, while the top decile increased at a rate of 17.4 percent. What was remarkable and telling about the price increases in Boston was how uniform and widespread the phenomenon was. Over the period the average house in Eastern Massachusetts appreciated nearly 140 percent, while housing in the poorest 10 percent of ZIP codes increased more than 165 percent. As a result, over $100 billion was added to household net worth over the five-year period (see Case [1993]).

Over the next four years, however, Massachusetts and New England as a whole experienced a severe recession. Homeowners who bought near the peak in late 1988 experienced substantial declines in value. While nominal values fell at a rate of 3.8 percent on average, real declines approached eight percent annually. In nominal terms, the total decline was about 16 percent on average while in real terms it was closer to one-third. The biggest declines occurred in the lowest income ZIP codes. Real declines exceeded eight percent in the bottom quintile but were only 6.7 percent in the highest decile.

Finally, prices turned around early in 1992 and rose steadily through the end of the observation period in 1998. During this period, the high end of the market substantially out-performed the low end. Nominal price increases in the highest income group of ZIP codes were three times greater than price increases in the lowest income group of ZIP codes. In fact, in the bottom decile, real prices actually declined at a rate of 0.5 percent annually over the six-year period.

Figure 3: Annualized Increases in Value (nominal and real, 1983-1998) Boston

	Number of zip codes	Annual percent change in Aggregate C-S Index between periods (CPI-Adjusted in parentheses)			
		83:1-88:2	88:2-92:2	92:2-98:2	83:1-98:2
Top 10%	24	17.4 *(13.3)*	-2.7 *(-6.7)*	5.9 *(3.4)*	7.5 *(4.0)*
Top 1/5	47	17.2 *(13.1)*	-3.0 *(-7.0)*	5.6 *(3.0)*	7.2 *(3.7)*
2nd 1/5	47	17.0 *(12.9)*	-3.8 *(-7.8)*	4.5 *(1.9)*	6.4 *(3.0)*
3rd 1/5	47	17.5 *(13.4)*	-3.8 *(-7.8)*	4.4 *(1.9)*	6.6 *(3.1)*
4th 1/5	47	18.5 *(14.4)*	-3.8 *(-7.7)*	4.0 *(1.5)*	6.8 *(3.3)*
Bottom 1/5	47	19.4 *(15.2)*	-4.3 *(-8.3)*	3.1 *(0.6)*	6.5 *(3.0)*
Bottom 10%	24	20.4 *(16.2)*	-4.3 *(-8.2)*	2.0 *(-0.5)*	6.4 *(3.0)*
Total	235	17.9 *(13.8)*	-3.8 *(-7.7)*	4.3 *(1.8)*	6.7 *(3.2)*

Figure 4: Boston; CSW Index (nominal values, 1983:1=100)

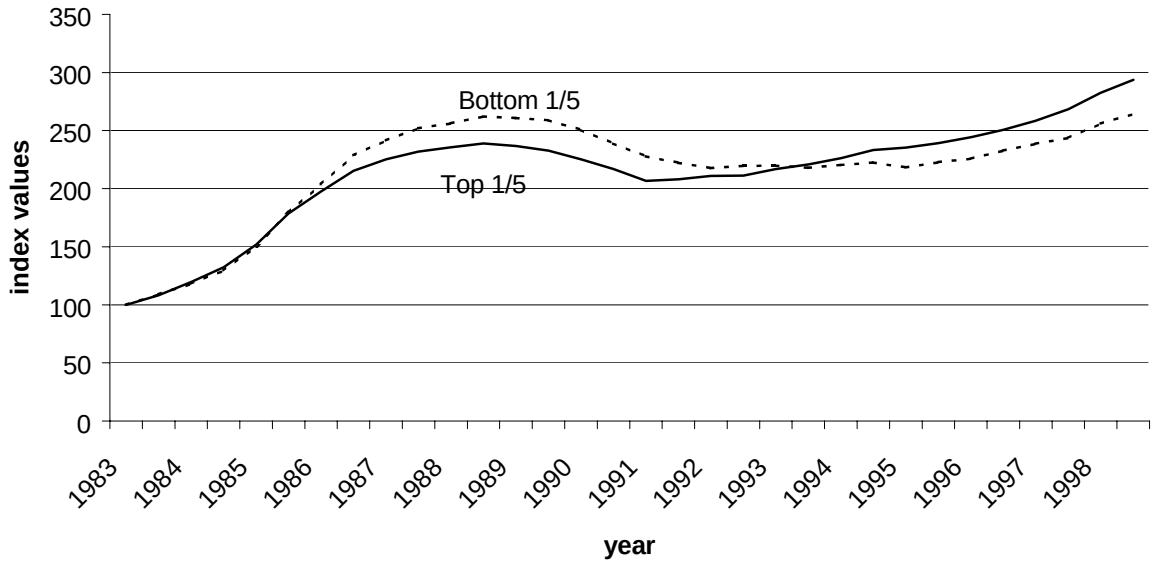


Figure 4 shows the pattern for the entire period for the top and bottom quintiles. Over the entire boom-bust-recovery cycle, the high-end market did somewhat better than the low-end market but the differences were relatively minor. The highest quintile appreciated in real terms at a rate of 3.7 percent annually; the lowest quintile appreciated in real terms at a rate of 3.0 percent annually.

As shown in Figure 5, the pattern is completely different in Chicago. Real rates of appreciation have been steady with only modest signs of cyclicality. Between 1987 and 92, housing appreciated at an average annual rate of 7.3 percent in nominal terms or 2.9 percent in real terms. As in Boston, the top end of the distribution lagged the bottom with the bottom decile appreciating nominally at nearly twice the rate of the top decile.

The same pattern continued although at a somewhat slower rate between 1992 and 1998. Nominal increases averaged 6.7 percent annually in the lowest income decile while nominal increases averaged just 3.8 percent in the highest income decile.

Figure 5: Annualized Increases in Value (nominal and real, 1983-1998) Chicago

	Number of zip codes	Annual percent change in Aggregate C-S Index between periods (CPI-Adjusted in parentheses)		
		87:1-92:1	92:1-98:2	87:1-98:2
Top 10%	8	5.8 *(1.5)*	3.8 *(1.3)*	4.8 *(1.4)*
Top 1/5	16	5.9 *(1.5)*	3.6 *(1.1)*	4.7 *(1.3)*
2nd 1/5	17	5.9 *(1.6)*	3.5 *(1.0)*	4.7 *(1.3)*
3rd 1/5	17	6.8 *(2.5)*	3.9 *(1.4)*	5.3 *(1.9)*
4th 1/5	17	8.0 *(3.5)*	4.4 *(1.9)*	6.1 *(2.7)*
Bottom 1/5	17	9.8 *(5.3)*	6.1 *(3.5)*	7.8 *(4.4)*
Bottom 10%	8	10.6 *(6.1)*	6.7 *(4.1)*	8.5 *(5.1)*
Total	84	7.3 *(2.9)*	4.3 *(1.8)*	5.7 *(2.3)*

Figure 6 shows indexes for the top and bottom quintiles over the 11 year period. Overall, between 1987 and 1998, the poorest neighborhoods did substantially better than the more wealthy neighborhoods. Real appreciation averaged 5.1 percent annually in the bottom decile and 4.4 percent annually in the bottom quintile while averaging only 1.4 percent annually in the top decile and 1.3 percent in the top quintile.

Figure 6: Chicago; CSW Index (nominal values, 1987:1=100)

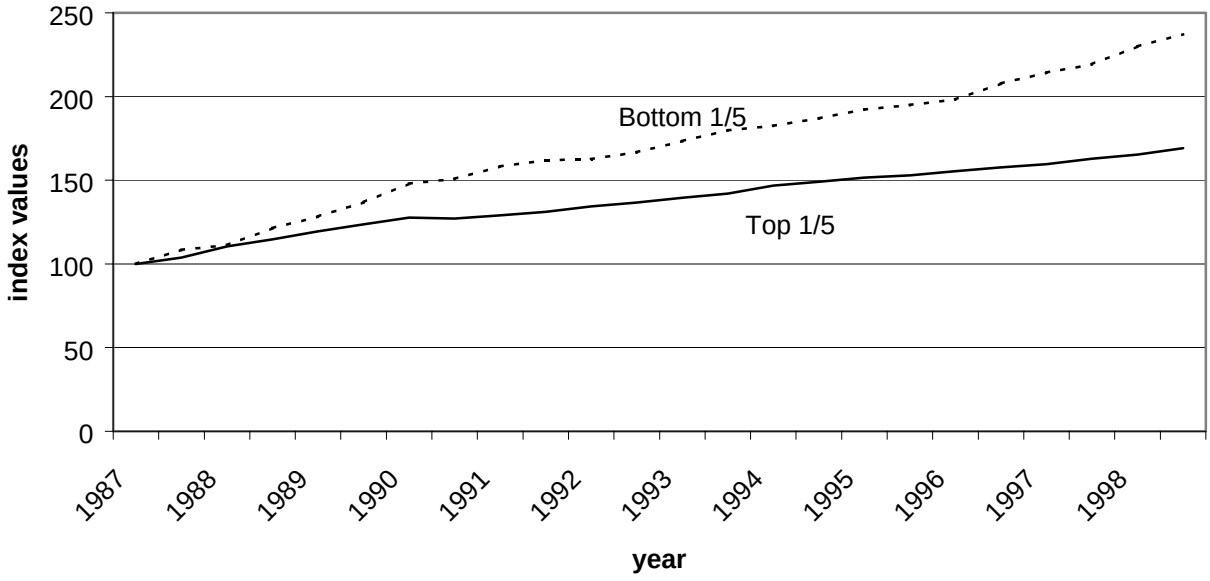
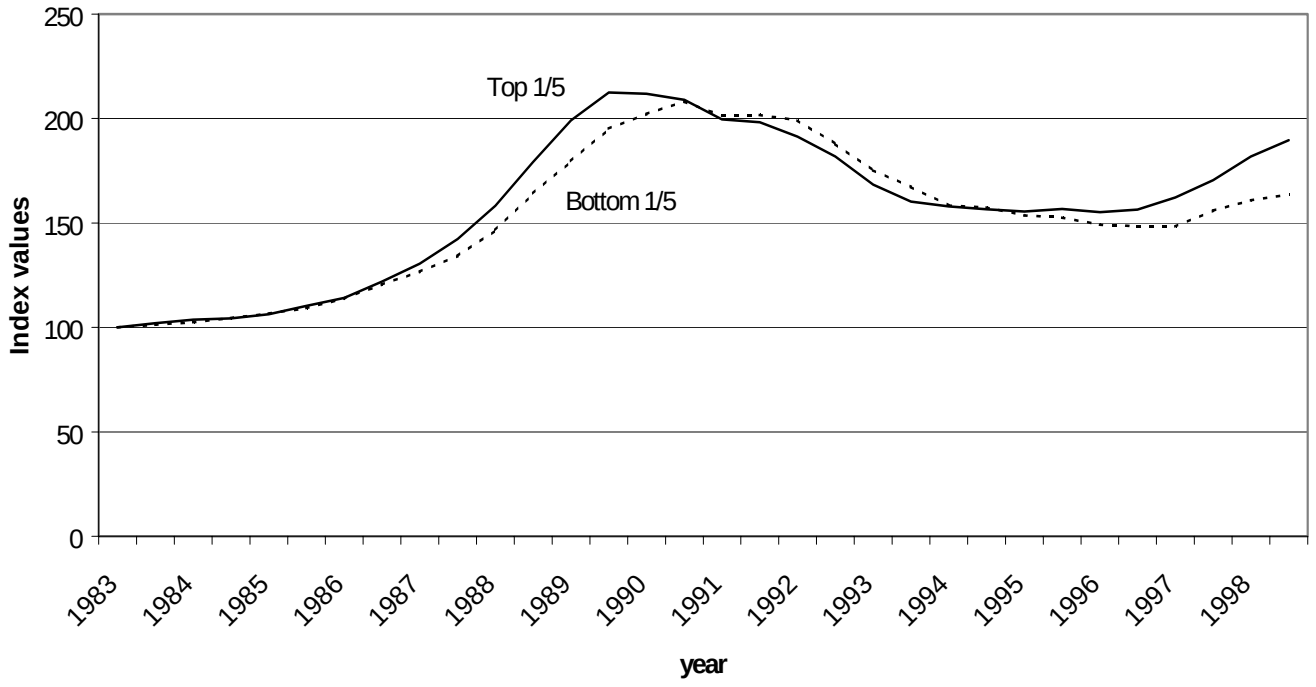


Figure 7 presents the results of tabulations for Los Angeles. Los Angeles experienced a substantial boom between 1983 and 1990, with annual appreciation rates averaging over 10 percent in nominal terms and nearly six percent in real terms. The pattern was remarkably uniform with no statistically significant difference between increases in any of the quintiles. Virtually all of the 109 ZIP codes appreciated at approximately the same rate. Between 1990 and 1993, real home prices declined by more than a third in Los Angeles with the largest drop occurring at the high-end of the distribution. In nominal terms, the top 10 percent of ZIP codes fell at an annual rate of 9.1 percent while the bottom 10 percent of ZIP codes fell at an annual rate of 7.5 percent.

Figure 7: Annualized Increases in Value (nominal and real, 1983-1998) Los Angeles

	Number of zip codes	Annual percent change in Aggregate C-S Index between periods (CPI-Adjusted in parentheses)			
		83:1-90:2	**90:2-93:2**	**93:2-98:2**	**83:1-98:2**
Top 10%	11	10.6 *(6.3)*	-9.1 *(-11.8)*	4.0 *(1.6)*	4.4 *(1.0)*
Top 1/5	21	10.4 *(6.1)*	-8.5 *(-11.2)*	3.4 *(0.9)*	4.2 *(0.8)*
2nd 1/5	22	9.9 *(5.6)*	-7.3 *(-10.0)*	1.5 *(-0.9)*	3.6 *(0.3)*
3rd 1/5	22	10.3 *(6.0)*	-8.2 *(-10.9)*	1.8 *(-0.6)*	3.7 *(0.4)*
4th 1/5	22	10.4 *(6.0)*	-8.0 *(-10.7)*	1.5 *(-0.9)*	3.7 *(0.4)*
Bottom 1/5	22	10.3 *(6.0)*	-7.1 *(-9.9)*	-0.4 *(-2.7)*	3.2 *(-0.1)*
Bottom 10%	11	10.7 *(6.4)*	-7.5 *(-10.2)*	-0.1 *(-2.5)*	3.4 *(0.1)*
Total	109	10.2 *(5.9)*	-7.8 *(-10.5)*	1.6 *(-0.8)*	3.7 *(0.3)*

Figure 8: Los Angeles; CSW Index (nominal values, 1983:1=100)



Between 1993 and 1998 in Los Angeles, home prices in all but the top quintile stagnated in real terms. In the top quintile and in the top decile nominal appreciation was just over four percent, while real appreciation was about one percent annually. The bottom quintile and the bottom decile experienced virtually no nominal appreciation with real values falling at a rate of about 2.5 percent.

Figure 8 shows the pattern in Los Angeles for the top quintile and bottom quintile over the 15 years. During the first seven years of the cycle, top and bottom quintiles experienced similar booms; during the bust, the low-end fell the least; over the last five years of the observation period, the high-end did somewhat better than the low end.

To summarize, while substantial differences in the pattern of home price appreciation/depreciation can be observed across time and across the three metropolitan areas, by and large lower income neighborhoods have done reasonably well in comparison with higher income areas of the same cities.

V. Equity Accumulation from Homeownership

Figures 9, 10, and 11 present the results of an exercise designed to estimate the potential wealth accumulation of ownership during different time periods in the three metropolitan areas. First of all, median home value was estimated for each ZIP code grouping from the American Housing Survey. The American Housing Survey (AHS) contains cross-tabulations of income and house value which were smoothed into continuous cumulative distributions by fitting spline functions to the data. The most recent releases of AHS data were for 1993 in Boston and 1995 in Los Angeles and Chicago. Figures for 1993 and 95 were then inflated/deflated with CSW ZIP code indexes back to 1987 and forward to 1998.

Figure 9 shows equity buildup for the median homebuyer in each of the ZIP code groupings assuming a homebuyer purchased in 1987 with an 80 percent mortgage. For example, the median value of houses in the top decile in Boston was estimated to be $390,642 in 1987. A household purchasing that house in 1987 would begin with equity of $78,028. By 1991, that equity would have fallen by nearly 40 percent to $48,889. By 1995, however, the household equity would have risen to over $100,000, and by 1998 to nearly $200,000.

Figure 9: Increase in Equity: Hypothetical Home Purchase

(1987-1998, by city, by income)

Boston

Distribution of Households	Median House Value 1987	Equity in House 1987 (20% Down)	Equity in House 1991	Equity in House 1995	Equity in House 1998
Top 10%	$390,642	$78,128	$48,889	$130,734	$194,752
Top 1/5	299,822	59,964	35,119	93,145	136,131
Second 1/5	212,006	42,401	21,807	51,226	71,415
Third 1/5	171,824	34,365	18,930	40,491	55,863
Fourth 1/5	130,908	26,182	17,238	27,293	41,957
Bottom 1/5	82,511	16,502	11,781	12,281	21,393
Bottom 10%	59,426	11,885	9,630	7,322	13,323

Chicago

Distribution of Households	Median House Value 1987	Equity in House 1987(20% Down)	Equity in House 1991	Equity in House 1995	Equity in House 1998
Top 10%	$249,083	$49,817	$120,342	$178,974	$215,374
Top 1/5	184,068	36,814	90,209	131,815	157,154
Second 1/5	119,312	23,862	59,813	85,898	101,377
Third 1/5	84,473	16,895	46,293	68,162	81,613
Fourth 1/5	57,692	11,538	36,532	53,513	66,200
Bottom 1/5	31,332	6,266	24,540	35,176	46,948
Bottom 10%	20,800	4,160	17,978	25,582	34,915

Los Angeles

Distribution of Households	Median House Value 1987	Equity in House 1987(20% Down)	Equity in House 1991	Equity in House 1995	Equity in House 1998
Top 10%	$372,103	$74,421	$286,407	$151,541	$238,306
Top 1/5	333,757	66,751	243,212	130,403	197,791
Second 1/5	207,409	41,482	148,260	79,763	101,843
Third 1/5	163,956	32,791	122,132	61,692	81,194
Fourth 1/5	132,152	26,430	98,237	52,292	67,598
Bottom 1/5	85,640	17,128	67,554	35,380	40,261
Bottom 10%	60,987	12,197	49,241	26,410	30,260

Figure 10: Increase in Equity: Hypothetical Home Purchase
(1991-1998, by city, by income)

Boston

Distribution of Households	Median House Value 1991	Equity in House 1991 (20% Down)	Equity in House 1995	Equity in House 1998
Top 10%	$361,402	$72,280	$130,734	$218,144
Top 1/5	274,977	54,995	93,145	156,007
Second 1/5	191,411	38,282	51,226	87,890
Third 1/5	156,390	31,278	40,491	68,210
Fourth 1/5	121,964	24,393	27,293	49,112
Bottom 1/5	77,789	15,558	12,281	25,171
Bottom 10%	57,170	11,434	7,322	15,128

Chicago

Distribution of Households	Median House Value 1991	Equity in House 1991(20% Down)	Equity in House 1995	Equity in House 1998
Top 10%	$319,608	$63,922	$122,553	$169,858
Top 1/5	237,464	47,493	89,099	121,263
Second 1/5	155,262	31,052	57,137	77,478
Third 1/5	113,872	22,774	44,643	61,739
Fourth 1/5	82,685	16,537	33,518	47,468
Bottom 1/5	49,605	9,921	20,557	34,652
Bottom 10%	34,618	6,924	14,528	25,626

Los Angeles

Distribution of Households	Median House Value 1991	Equity in House 1991(20% Down)	Equity in House 1995	Equity in House 1998
Top 10%	$584,089	$116,818	$-18,048	$68,717
Top 1/5	510,218	102,044	-10,765	56,622
Second 1/5	314,187	62,837	-5,659	16,421
Third 1/5	253,297	50,659	-9,781	9,721
Fourth 1/5	203,958	40,792	-5,153	10,153
Bottom 1/5	136,066	27,213	-4,961	-79
Bottom 10%	98,030	19,606	-3,224	626

Figure 11: Increase in Equity: Hypothetical Home Purchase
(1995-1998, by city, by income)

Boston

Distribution of Households	Median House Value 1995	Equity in House 1995 (20% Down)	Equity in House 1998
Top 10%	$419,855	$83,971	$171,381
Top 1/5	313,127	62,625	125,487
Second 1/5	204,355	40,871	77,536
Third 1/5	165,603	33,121	60,840
Fourth 1/5	124,864	24,973	46,792
Bottom 1/5	74,513	14,903	27,792
Bottom 10%	53,059	10,612	18,417

Chicago

Distribution of Households	Median House Value 1995	Equity in House 1995 (20% Down)	Equity in House 1998
Top 10%	$378,240	$75,648	$112,048
Top 1/5	279,070	55,814	81,153
Second 1/5	181,347	36,269	51,749
Third 1/5	135,740	27,148	40,599
Fourth 1/5	99,667	19,933	32,620
Bottom 1/5	60,241	12,048	23,821
Bottom 10%	42,222	8,444	17,777

Los Angeles

Distribution of Households	Median House Value 1995	Equity in House 1995 (20% Down)	Equity in House 1998
Top 10%	$449,223	$89,845	$176,610
Top 1/5	397,409	79,482	146,869
Second 1/5	245,690	49,138	71,218
Third 1/5	192,857	38,571	58,073
Fourth 1/5	158,014	31,603	46,909
Bottom 1/5	103,892	20,778	25,660
Bottom 10%	75,200	15,040	18,890

At the other end of the income distribution, the median value of houses in the bottom decile in Boston was estimated to be $59,426 in 1987. A household purchasing that house in 1987 would begin with equity $11,885. By 1991, that equity would have eroded to $9,630, and by 1995 it would stand at just $5,518. Finally, by 1998, the investment would have increased to $13,323, producing a nominal leveraged rate of return of just one percent. Recall that in 1987, Boston was approaching a cyclical peak in home prices.

In Chicago, rates of appreciation have been more steady, and lower income neighborhoods have consistently outperformed higher income neighborhoods. In Chicago a homebuyer in the top decile in 1987 would begin with equity of $49,817 which would have grown to $120,342 by 1991, to $179,000 by 1995 and $215,000 by 1998. Equity would have grown at 14.2 percent annually. But the leveraged appreciation in equity is even greater at the low-end. A homebuyer in the bottom decile in 1987, would have seen equity grow from $4,160 in 1987 to $18,000 in 1991, to $25,600 in 1995 and to nearly $35,000 by 1998. Equity growth in the lowest decile averaged over 20 percent annually.

During the same period, a 1987 Los Angeles homebuyer with an 80 percent mortgage would have experienced quite a ride. In the top decile between 1987 and 1991, equity would have increased from $74,421 to $286,407; in the bottom decile equity would have increased from $12,197 to $49,241, a fourfold increase. For the same homebuyers, the gains from the boom were roughly cut in half by the bust in Los Angeles. Equity in the highest decile eroded from $236,407 in 1991 to just $151,541 by 1995; equity in the lowest decile eroded from $49,241 in 1991 to $26,410 in 1995. Gains in equity over the last three years of the observation period in Los Angeles were largely concentrated in the upper income brackets.

Figure 10 shows the experience of hypothetical homebuyers who purchased in 1991. High-end homebuyers in Boston saw their equity grow by more than 80 percent between 1991 and 1995 while those who purchased in the lower income ZIP code groups lost more than a third of theirs.

Households who purchased houses in Los Angeles in 1991 had negative equity by 1995 in both higher income and lower income neighborhoods. A homebuyer in the top 10 percent of neighborhoods by income would have had to put down over $100,000; by 1995 that buyer would have -$18,048 in equity. Similarly, a household buying in the lower income

ZIP code grouping in Los Angeles in 1991 would see equity decline from $19,606 to –$3,224 by 1995.

In Chicago, the same period of time, 1991 to 1995, was very good one for building equity through homeownership at both ends of the income distribution. Equity more than doubled for homebuyers in lower income ZIP codes and nearly doubled for homebuyers in the higher income ZIP codes.

The same figure shows the equity buildup or loss of equity for 1991 homebuyers by 1998. Once again, low-income homebuyers in Chicago and high-income homebuyers in Boston built substantial equity over the seven-year period, low-income homebuyers in Boston built modest equity over the seven-year period, while homebuyers in Los Angeles, particularly in lower income ZIP code groupings, saw equity substantially eroded.

Finally the same exercise is shown in Figure 11 for homebuyers who purchased property in 1995. Since house prices have been rising in real terms in all three cities, homeownership was an unambiguously good strategy for accumulating wealth. For homebuyers in lower income neighborhoods, the buildup was the greatest in Chicago where equity more than doubled over the three years, and least in Los Angeles, where equity increased by 25.6 percent.

There's no question that in some areas and during some periods of time leveraged investment in homeownership is a good strategy for building equity for low-income households. It is also, however, true that leveraged investment in homeownership can lead to serious losses.

VI. The Causes of Changes in House Prices

An extensive literature exists on the causes of changes in house prices. A few studies explore the performance of low versus high-end markets. Case and Shiller (1994) focus attention on the pattern of price appreciation and depreciation in Los Angeles in Boston between 1982 in 1985. They conclude that prices of property at the low-end of the distribution in Boston did better than prices at the high-end in part because the economic growth of the 1980s reached farther down into the income distribution than it did in California. Unemployment in Boston fell much more sharply in Boston than it did in Los Angeles in the mid-1980s. As a result, first-time homebuyers entered the market, driving up ownership rates among lower income

households in Boston substantially faster than was true in Los Angeles. In addition, housing prices on average in Los Angeles were 70 percent above the U.S. median at the beginning of the boom while housing prices in Boston were only 17 percent above the U.S. median. Thus, economic expansion lead initially to a substantial increase in affordability at the low-end of the distribution in Boston, but the gap remained large at the low-end in Los Angeles.

While the overall decline in the early 90s in Los Angeles was deeper and longer than the corresponding decline in Boston, the low-end of the distribution in Los Angeles declined less than the high-end, while the opposite was true in Boston. Case and Shiller conclude that the explanation lies in the relative expansion of low-income demand in Los Angeles due to immigration and the relative expansion of low-income supply in Boston due to massive conversions of rental property to condominium units, many in low-income areas.

Other studies that compare price movements in upper and lower price tiers include Poterba (1991) and Mayer (1993). Using data from 1970–1986 for four cities (Atlanta, Chicago, Dallas, and Oakland), Poterba shows that properties in the upper tier appreciated faster than properties in the lower tier. He attributes the pattern to high marginal tax rates and expectations of rising inflation.

Mayer, using the same data, argues that Poterba's focus is too narrow and looks at several alternative explanations for the observed patterns. Finding that prices in the upper tier in the four cities are more volatile than prices in the lower tier, he focuses on changes in user cost and other cyclical factors.

Smith and Tesarek (1991) show that the patterns of decline in Houston during the 1985 through 1987 bust were similar to the declines in California in the early 90s. In Houston, "high-quality" houses lost nearly 30 percent of their value. Houses in the middle-quality tier lost 24 percent of their value and houses in the lower tier lost only 18 percent of their value. Smith and Tesarek suggest several reasons for the pattern in Houston. First, the upper end of the market experienced the greatest appreciation during the boom. Second, building was concentrated of the upper end of the quality range, glutting the market. Third, sharp reductions in "entrepreneurial and professional income" led to steeper declines in demand in the top markets.

A major concern in looking at appreciation in low-income neighborhoods is that increases may be driven by large changes in value in neighborhoods that are gentrifying.

First of all it should be noted that, to the extent possible, CS repeat sales indexes are quality controlled. That is, when a significant portion of the stock in a neighborhood is upgraded, either the upgraded properties are excluded from the sample or the index will not compute due to high standard errors on the coefficients.

In order to determine whether gentrification is a problem in our sample of ZIP codes, we did two things. First, we looked specifically at the most rapidly appreciating individual ZIP codes in the bottom quintile at the bottom decile of each of the three cities. Second, we looked at the variance of home price changes across our quintiles/deciles. If home price changes in the bottom decile were driven by only a few neighborhoods, the variance would be high.

Since there are no current time series data on demographics or income at the ZIP code level for our cities, we had to rely on "local knowledge" and press reports to identify gentrifying neighborhoods. While we found examples of neighborhoods in which the housing stock had been upgraded and where significant displacement was likely to have occurred in our lower income ZIP code clusters (Roslindale in Boston, Pasadena in Los Angeles and Logan Square in Chicago) appreciation and depreciation of property values has taken place at roughly the same rates across the bulk of ZIP codes in our lowest income quintile.

VII. Exploratory Regressions

While a structural model of price adjustment across neighborhoods is beyond the scope of this paper, Figures 12-14 present the results of three preliminary and exploratory regressions to see if there is any systematic variation in the pattern of price appreciation across the ZIP code groupings and cities. The dependent variable is the annualized rate of appreciation in home value over the entire sample period and the unit of observation is the ZIP code.

Not surprisingly, the regressions seem to reflect some of the patterns observed in the discussion above. For example, neighborhoods with higher median home price and lower levels of poverty in Boston did better over the entire period *ceteris paribus* while neighborhoods with concentrations of poverty in Chicago seem to have done somewhat better *ceteris paribus*. On the other hand, no variables were statistically significant in the Los Angeles regression. Clearly no consistent pattern seems to emerge across the three cities.

Figure 12: Exploratory Regressions

Description of variables:

an_grHV -- annual growth rate of house price indices (CSW Index), 1983:1-1998:2
All other variables are from Census 1990:
medY -- median household income in 1989
medR -- median gross rent
medHV -- median housing value (owner-occupied housing units)
P_black -- percent of black population
P_pov -- percent in poverty
P_1phh -- percent of 1-person households
P_mcfam -- percent of married-couple families
P_hh65 -- percent of households with householder's age over 65
P_ent82 -- percent foreign-born persons who entered after 1982
P_sameh -- percent of persons who lived in the same house in 1985
P_oohun -- percent of owner-occupied housing units

Boston:

```
. regress an_grHV medY medR medHV P_black P_pov P_1phh P_mcfam P_hh65
P_ent82 P_sameh P_oohun

  Source |       SS       df       MS                  Number of obs =     235
---------+------------------------------                F( 11,   223) =   30.27
   Model |  188.353815    11  17.1230741                Prob > F      =  0.0000
Residual |  126.157759   223  .565729859                R-squared     =  0.5989
---------+------------------------------                Adj R-squared =  0.5791
   Total |  314.511573   234  1.34406655                Root MSE      =  .75215

------------------------------------------------------------------------------
 an_grHV |      Coef.   Std. Err.       t     P>|t|       [95% Conf. Interval]
---------+--------------------------------------------------------------------
    medY |  -.0000351   .0000172     -2.041   0.042      -.0000691   -1.21e-06
    medR |   .0001101   .0006047      0.182   0.856      -.0010815    .0013017
   medHV |   .0000145   2.81e-06      5.162   0.000       8.97e-06    .0000201
 P_black |   .0211985    .009187      2.307   0.022         .003094     .039303
   P_pov |  -.1034841   .0270506     -3.826   0.000      -.1567916   -.0501766
  P_1phh |   .0134009   .0235157      0.570   0.569      -.0329406    .0597424
 P_mcfam |   -.083241   .0208528     -3.992   0.000      -.1243346   -.0421473
  P_hh65 |   .0086444   .0179746      0.481   0.631      -.0267773    .0440661
 P_ent82 |    .004478   .0055299      0.810   0.419      -.0064197    .0153756
 P_sameh |   .0610079   .0098604      6.187   0.000       .0415765    .0804393
 P_oohun |   -.003019   .0100607     -0.300   0.764      -.0228452    .0168073
   _cons |   9.057834   2.240632      4.043   0.000       4.642312    13.47336
------------------------------------------------------------------------------
```

Figure 13: Exploratory Regressions

Description of variables:

an_grHV -- annual growth rate of house price indices (CSW Index), 1983:1-1998:2
All other variables are from Census 1990:
medY -- median household income in 1989
medR -- median gross rent
medHV -- median housing value (owner-occupied housing units)
P_black -- percent of black population
P_pov -- percent in poverty
P_1phh -- percent of 1-person households
P_mcfam -- percent of married-couple families
P_hh65 -- percent of households with householder's age over 65
P_ent82 -- percent foreign-born persons who entered after 1982
P_sameh -- percent of persons who lived in the same house in 1985
P_oohun -- percent of owner-occupied housing units

Chicago:

```
. regress  an_grHV medY medR medHV P_black P_pov P_1phh P_mcfam P_hh65 P_ent82
P_sameh P_oohun

  Source |       SS       df       MS                  Number of obs =      84
---------+------------------------------                F( 11,    72) =   25.86
   Model |  148.790809    11  13.5264372                Prob > F      =  0.0000
Residual |  37.6577479    72  .523024277                R-squared     =  0.7980
---------+------------------------------                Adj R-squared =  0.7672
   Total |  186.448557    83  2.24636816                Root MSE      =   .7232

------------------------------------------------------------------------------
 an_grHV |      Coef.   Std. Err.       t     P>|t|       [95% Conf. Interval]
---------+--------------------------------------------------------------------
    medY |  -.0000667   .0000343     -1.947   0.055       -.000135    1.59e-06
    medR |  -.0000914     .00099     -0.092   0.927       -.002065    .0018822
   medHV |   .0000107   5.34e-06      2.012   0.048       9.89e-08    .0000214
 P_black |   .0000489   .0000417      1.172   0.245      -.0000343     .000132
   P_pov |   .0893462    .044584      2.004   0.049       .0004697    .1782228
  P_1phh |  -.0214235   .0248529     -0.862   0.392      -.0709668    .0281199
 P_mcfam |  -.0000661   .0247528     -0.003   0.998      -.0494099    .0492777
  P_hh65 |   .0672546   .0268051      2.509   0.014       .0138196    .1206897
 P_ent82 |  -.0079565   .0115689     -0.688   0.494      -.0310188    .0151057
 P_sameh |   .0061722   .0175496      0.352   0.726      -.0288123    .0411566
 P_oohun |  -.0266043   .0183991     -1.446   0.153      -.0632822    .0100736
   _cons |   7.924335   3.204113      2.473   0.016       1.537052    14.31162
------------------------------------------------------------------------------
```

Figure 14: Exploratory Regressions

Description of variables:

an_grHV -- annual growth rate of house price indices (CSW Index), 1983:1-1998:2
All other variables are from Census 1990:
medY -- median household income in 1989
medR -- median gross rent
medHV -- median housing value (owner-occupied housing units)
P_black -- percent of black population
P_pov -- percent in poverty
P_1phh -- percent of 1-person households
P_mcfam -- percent of married-couple families
P_hh65 -- percent of households with householder's age over 65
P_ent82 -- percent foreign-born persons who entered after 1982
P_sameh -- percent of persons who lived in the same house in 1985
P_oohun -- percent of owner-occupied housing units

Los Angeles:

```
. regress  an_grHV medY medR medHV P_black P_pov P_1phh P_mcfam P_hh65 P_ent82
P_sameh P_oohun
```

```
  Source |       SS       df       MS                  Number of obs =     109
---------+------------------------------                F( 11,    97) =    4.56
   Model |  33.1803996    11  3.01639996                Prob > F      =  0.0000
Residual |   64.223658    97  .662099567                R-squared     =  0.3406
---------+------------------------------                Adj R-squared =  0.2659
   Total |  97.4040576   108  .901889422                Root MSE      =   .8137

------------------------------------------------------------------------------
 an_grHV |      Coef.   Std. Err.       t     P>|t|       [95% Conf. Interval]
---------+--------------------------------------------------------------------
    medY |   .0000117   .0000239      0.491   0.625      -.0000357    .0000592
    medR |   .0010593   .0015446      0.686   0.494      -.0020064     .004125
   medHV |   3.72e-06   2.30e-06      1.620   0.108      -8.37e-07    8.28e-06
 P_black |  -.0154297   .0081698     -1.889   0.062      -.0316445    .0007851
   P_pov |  -.0001457   .0005092     -0.286   0.775      -.0011563    .0008649
  P_1phh |    .027537   .0184539      1.492   0.139      -.0090888    .0641628
 P_mcfam |  -.0355932   .0288797     -1.232   0.221      -.0929114    .0217249
  P_hh65 |  -.0198291   .0281944     -0.703   0.484      -.0757872    .0361291
 P_ent82 |   .0090896   .0125617      0.724   0.471      -.0158419    .0340211
 P_sameh |   .0279873   .0193595      1.446   0.151       -.010436    .0664106
 P_oohun |  -.0008464   .0134792     -0.063   0.950      -.0275989     .025906
   _cons |   2.364437    2.11532      1.118   0.266      -1.833888    6.562762
------------------------------------------------------------------------------
```

VIII. Conclusion

The results of the tabulations presented here reveal a complex pattern of house price changes from which generalization is difficult. Several things, however, can be concluded. First of all, whether homeownership is a good or bad investment clearly depends on the time of purchase, conditions in the regional economy, and the dynamics of supply and demand at the local level. Second, since home purchase is almost always leveraged, particularly among low-income households, effects of price changes on equity accumulation over particular periods of time can be dramatic.

Among low-income households, homeownership has been excellent vehicle for asset accumulation since 1987 in Chicago. The same can be said for low-income homebuyers who purchased in the early 1980s in Boston and for homebuyers who purchased in 1995 in any of the three cities. However, significant periods of decline have led to substantial losses for low-income households in Boston and to periods of substantial negative equity for low-income households in Los Angeles.

Clearly from these data, one cannot conclude that homeownership for low-income households is in general a good or bad strategy for accumulating wealth. As we argued above, home appreciation is but one component of the overall return to an investment in housing. But appreciation is an important component, and the results presented here are at least somewhat encouraging.

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