

## Have Housing Prices Risen Faster in Portland Than Elsewhere?

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### *Abstract*

The Portland, OR, region has had a strong urban growth boundary (UGB) since 1979, so observers have focused on the relationship between its UGB and home prices, which rose sharply there during the 1990s. Many concluded that UGBs force home prices upward. But detailed analyses of home price movements from 1980 to 2000 show that prices did not rise nearly as fast in Portland as in many other regions in the 1980s, that home prices rose faster in Portland only from 1990 to 1994 or 1996, and that home prices in several other regions without UGBs were also rising rapidly.

Multiple regression analyses of 85 large metropolitan areas showed that a dummy variable measuring the effect of Portland's UGB had statistically significant effects on home prices only in the first half of the decade. So it is erroneous to conclude from Portland's experience that UGBs inevitably cause home prices to rise faster.

**Keywords:** Growth management; Housing; Land use/zoning

### **Introduction**

Because Portland, OR, is one of the few large U.S. metropolitan areas that has had an effective regional urban growth boundary (UGB) for many years, what has happened to housing prices there is of great interest to many groups. Some critics of "contained growth" claim that the UGB has caused home prices to rise faster in the Portland region than elsewhere.<sup>1</sup> Defenders of Portland's attempt to control sprawl claim that increases in home prices have resulted from higher levels of amenities caused by superior planning, not from shortages of land or housing (Nelson 2000a). Before either side can develop its arguments further, it would be desirable to know just how fast housing prices have risen in the Portland region, compared with other regions across the nation. This article focuses on that factual question and examines some

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<sup>1</sup> Professor Edwin S. Mills (1999) has stated that "[t]he result of controls on housing supply is high price.... Land use controls contribute to home prices that are not only high, but unstable as well...by limiting supply.... Advocates of controls should face the fact that an inevitable implication of the government actions they espouse is much more expensive and unstable metropolitan area housing."

factors that may have influenced home prices in the Portland region and elsewhere. Its main purpose is simply to explain what happened to Portland's home prices, not why it happened.

### **Some theoretical issues**

Before turning to the facts, it is desirable to explore briefly some theoretical issues concerning how the effects of a UGB on home prices might be measured. The first issue is, What alternative should be compared with a UGB to measure its effects? The clock cannot be turned back to 1979 in Portland and the past two decades rerun without a UGB. But some alternative scenario must be compared with what has actually happened. One possibility is to examine the course of land and housing prices from 1980 to 2000 in other similar regions of the country that did not have UGBs. A second approach is to speculate what impact adoption of a UGB ought to have had according to economic theory and then to compare those theoretical results with what has actually taken place. This approach will be briefly examined before turning to the first, which is the focus of this article.

According to pure economic theory, if there were no uncertainty about the future, the moment a UGB was adopted—or as soon as people believed it surely would be—land prices within the boundary would immediately jump to a higher level, while those outside the boundary would fall. These changes would reflect the higher potential future earning power of land within the boundary compared with land outside it. The impact of those changes in potential future revenue streams would be capitalized into existing land prices. After that initial jump, prices of land both inside and outside the UGB would rise gradually as future development or farming possibilities became more imminent, so their benefits could be discounted to a lesser degree. But in reality, there is a lot of uncertainty about the future, and there were no large instant changes in housing or land prices when Portland's UGB was adopted. Consequently, this article does not consider that purely theoretical scenario as relevant.

Therefore, again according to economic theory, in an uncertain world, land prices inside the UGB would rise gradually over time, especially relative to prices outside it, as absorption of more and more of the limited supply of developable land inside the UGB occurred, uncertainty about curtailment of that supply slowly dissipated, and shorter discounting periods could be applied to future revenue streams. In this scenario, land prices might rise faster as the available supply of developable land

became more acute. This article will consider how well such a scenario corresponds to what has actually happened to land and housing prices.

A third theoretical issue is differentiating between *land prices* and *housing prices*. Unless it is not stringent and is quite expandable over time, a UGB directly limits the future supply of developable land in a region. However, a UGB does not directly limit the future supply of housing units there. Many more housing units could be built per square mile of land than normally occurs in U.S. metropolitan regions. In 1990, only 14 out of the 162 largest urbanized areas in the United States contained central city population densities of more than 7,500 persons per square mile, but densities of over 20,000 persons per square mile are both technically and culturally feasible (New York is the only U.S. city with such a high density) (U.S. Bureau of the Census 2000). Hong Kong even contains some sizable neighborhoods whose densities exceed 200,000 persons per square mile.

Economic theory indicates that, as land prices rise, developers will build new single-family units on smaller lots or shift higher proportions of new units to multifamily units with higher densities and (normally) smaller floor areas. Even though rising land prices are typically accompanied by rising per unit prices of newly built housing, that is not necessarily the case. The per unit market prices of smaller new housing units (including land) may not be higher than those of the larger units built before land prices rose (although the price per “housing amenity” is usually higher). Yet the information available about residential prices is mainly limited to combined prices of both existing housing units and the land under them. Moreover, the number of already built housing units sold each year normally exceeds the number of new units built by at least three to one. Therefore, most housing units sold after a UGB is adopted are existing ones attached to lots created before the UGB existed. For these reasons, this article will assume that housing prices are indeed influenced by land prices.

Another important theoretical issue is this: Did a region adopt its UGB in response to some preexisting factor other than housing prices (such as rapid population growth) that might be an underlying cause of rising housing prices and therefore would be correlated with them? If so, omitting that factor from the analysis would improperly bias the results. However, this source of error can be minimized by identifying as many such factors as possible and including them as independent variables in a multiple regression analysis that has the rate of change of housing prices as the dependent variable. This will be discussed later in this article.

A final theoretical issue is as follows: Why should anyone care about the *rate of increase* in home prices, as compared to the *level* of home prices? It is true that the level and rate of increase are mathematically related. Yet it is the level of housing prices that acts as a major determinant of the affordability of a region's housing. Even if regional housing prices and rents are rising rapidly, if they are still low enough so that even poor people can afford them without difficulty, that region would have superior housing affordability compared with another region with stable or falling prices at very high levels. But the level of home prices is high enough in every U.S. region that many people cannot afford shelter there without spending inordinate amounts of their incomes on housing. Therefore, increases in the prevailing level of housing prices make housing affordability worse in all regions. The faster those increases occur in any given time period, the worse off non-home-owning households at the bottom of the income distribution become.

Rapidly increasing home prices also benefit owners of existing homes, who comprise about two-thirds of all U.S. households overall and even bigger majorities in many regions. But existing homeowners as a group have significantly higher incomes than nonhomeowners, including potential home buyers.<sup>2</sup> Society should at least care about any trends that make its poorer households worse off than they would be otherwise (Downs 1994).

## Sources of information

The analysis uses two sources of information on home prices; both are based on sales of existing single-family homes. One is the National Association of Realtors (NAR) series published in *Real Estate Outlook: Market Trends and Insights*, which provides quarterly median prices for 139 metropolitan areas. However, the mix of units sold in any region during each period can differ greatly from that sold in other periods. Such possible changes in the mix mean that these statistics are somewhat contaminated by variations in the size and quality of the units sold over time. I used data from this source for 86 large metropolitan areas about which I had compiled a lot of other variables for another purpose, since I could then analyze some causal relationships between those other variables and changes in home prices across these regions.

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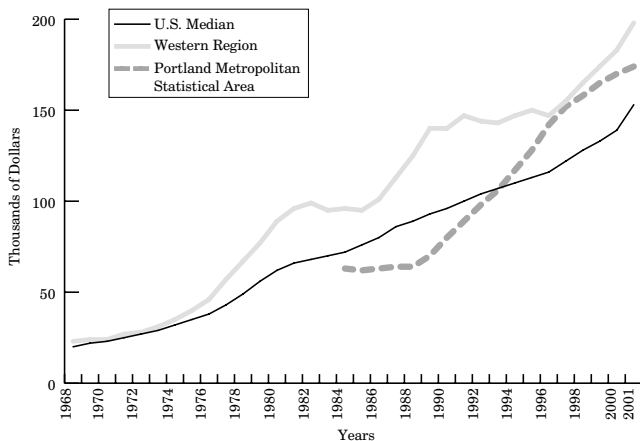
<sup>2</sup> According to the 1999 American Housing Survey, median household incomes were \$45,945 for owner-occupants and \$23,350 for renters—in other words, renters had just over half the income of homeowners. Data are from the U.S. Bureau of the Census Web site (1999).

The second source of data is a price index maintained by Freddie Mac from sales of the same units in transactions occurring at different dates. This index is available on Freddie Mac's Web site (2001) and gives quarterly indices of home prices for a number of metropolitan areas from 1975 to 2000. Data from this source are relatively free from biases due to changes in the mixtures of units sold, although some changes in the quality of a given home can occur between sales.

### Price movements in the 1990s based on NAR data

Figure 1, which is based on NAR data from various months and years, shows movements of median prices of existing single-family homes sold in three areas: the entire United States, the West, and the Portland metropolitan area. Information for the first two areas covers the period from 1968 through 2001; that for the Portland region is available only from 1984 through 2001. This figure shows why some people have concluded that home prices in the Portland area rose faster than elsewhere, including the rest of the West, in the 1990s. But this graph does not present the whole story.

Figure 1. Median Home Prices, the United States, the West, and Portland: 1968 to 2001



Source: NAR, various months and years.

Conclusions about how fast home prices have risen in the Portland region, compared with elsewhere, depend enormously on exactly which periods of time are being measured. Table 1, also based on NAR data, shows the 10 metropolitan areas (out of the 86 in my sample) with the highest housing price increases in each of five different time periods in the 1990s. The first ranking is for the entire decade (1990 to the second quarter of 2000), in which the Portland–Vancouver, WA metropolitan area had the nation’s second fastest increase in home prices: 110.3 percent. Significantly ahead of Portland was the Denver area at 122.89 percent. Significantly behind were Salt Lake City, Louisville (KY), and Des Moines (IA) clustered between 98.45 and 96.47 percent. Of those five regions, only Portland had a strong UGB, and only three were growing rapidly in population. Rather surprisingly, 4 of the top 10 home price appreciators (including Louisville, KY) were in the Midwest, though the top 3 were in the West.

Portland homes ranked second in percentage appreciation for the entire decade of the 1990s because of rapid price increases from 1990 to 1994, when Portland’s prices outpaced those everywhere else, as shown in the second panel. But after 1994, Portland’s ranking dropped markedly. From 1994 to 2000 and 1996 to 2000, Portland was not even in the top 10. This change occurred in part because the California recession ended around 1994, and home prices in that state, especially in the Bay Area, began to rise again. Midwestern home prices were also stimulated by the strong economy there. The last panel in table 1 covers 1994 to 2000 and shows that 4 of the 10 fastest-appreciating regions were in the Midwest.

Although Portland had the fastest-rising home prices in the first four years of the 1990s, its housing was by no means the most expensive in the nation or even in the West. Figure 2 shows actual median home prices for six regions in the West, based on NAR data, for 1990, 1994, 1996, 1999, and 2000. The San Francisco region clearly has the highest home prices; in fact, they are the highest in the nation. Although those prices remained flat from 1990 to 1996, they rose sharply from 1996 to 2000 during the Silicon Valley boom. Los Angeles home prices actually declined from 1990 to 1996 and surpassed their 1990 level by only 4.7 percent in 2000. Yet in every year shown, they were higher than Portland’s prices, and that difference was rising until recently in California’s strong prosperity. Seattle’s home prices rose steadily throughout the 1990s and accelerated faster than Portland’s from 1999 to 2000. Denver’s prices were almost identical to those in Portland from 1990 to 1999, but accelerated faster from 1999 to 2000. Salt Lake City’s prices have also risen analogously, but are noticeably lower than those in Denver and Portland and flattened from 1999 to 2000.

Table 1. Top 10 Median Home Price Increases in Various Periods in the 1990s

Rank	Metropolitan Area	Percent Gain 1990–2000	Rank	Metropolitan Area	Percent Gain 1990–1994
1	Denver	122.89	1	Portland–Vancouver, WA	47.04
2	Portland	110.33	2	Salt Lake City	41.21
3	Salt Lake City	98.45	3	Madison, WI	40.95
4	Louisville, KY	97.42	4	Denver	35.19
5	Des Moines, IA	96.47	5	Des Moines, IA	35.04
6	Birmingham, AL	92.74	6	Peoria, IL	34.72
7	Lincoln, NE	87.56	7	Louisville, KY	32.40
8	Charleston, SC	84.91	8	Albuquerque, NM	30.18
9	Kalamazoo–Battle Creek, MI	84.47	9	Milwaukee	29.15
10	Spokane, WA	82.57	10	Lincoln, NE	26.82

Rank	Metropolitan Area	Percent Gain 1994–1996	Rank	Metropolitan Area	Percent Gain 1996–2000
1	Detroit	28.05	1	San Francisco	74.70
2	Salt Lake City	25.20	2	San Diego	54.67
3	Portland–Vancouver, WA	21.04	3	Charleston, SC	48.47
4	Greenville–Spartanburg, SC	20.71	4	Denver	46.70
5	Kalamazoo, MI	20.32	5	Fort Myers, FL	42.06
6	Mobile, AL	19.03	6	Seattle	39.91
7	South Bend–Mishawaka, IN	18.55	7	Tampa–St. Petersburg, FL	38.13
8	Omaha, NE	16.80	8	Houston	36.84
9	Nashville, TN	16.79	9	Louisville, KY	34.06
10	Akron, OH	16.37	10	Baltimore	33.89

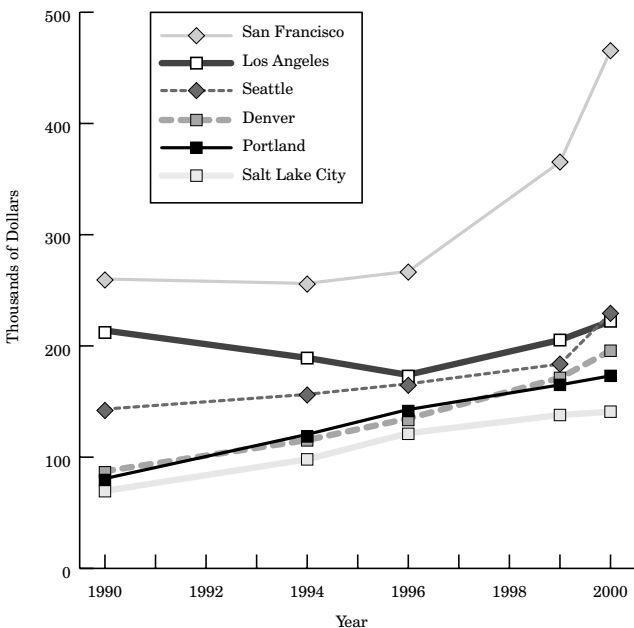
  

Rank	Metropolitan Area	Percent Gain 1994–2000
1	San Francisco	82.08
2	Denver	67.55
3	Detroit	59.20
4	Charleston, SC	53.82
5	San Diego	53.35
6	Louisville, KY	52.05
7	Omaha, NE	51.59
8	Birmingham, AL	51.00
9	New Orleans	49.02
10	Grand Rapids–Muskegon, MI	48.24

Source: NAR, various months and years.

Note: Prices for 2000 are for the second quarter.

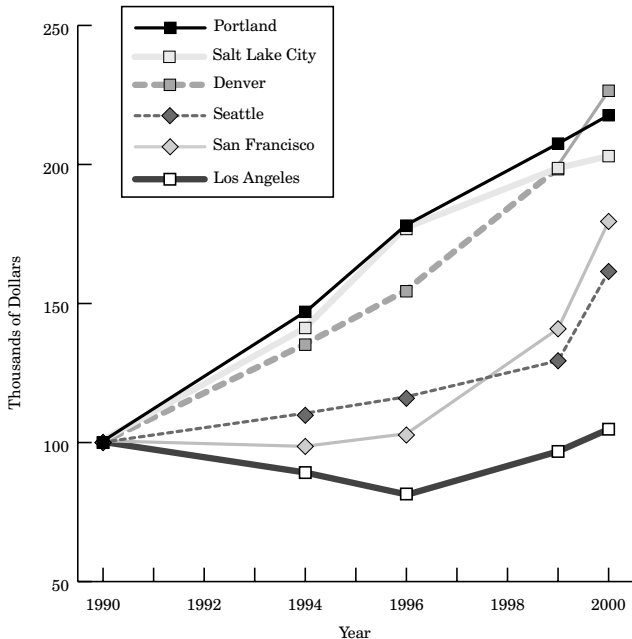
**Figure 2. Median Home Prices in Six Metropolitan Statistical Areas: 1990 to 2000**



Source: NAR, various months and years.

Figure 3, which sets 1990 prices at an index value of 100, shows the relative home price increases in the same six metropolitan areas from 1990 to 2000. Home prices in Portland remained relatively ahead of all the other cities shown from 1990 through 1999, but Denver passed Portland by 2000. In both those regions, home prices more than doubled over the decade. Prices also doubled in Seattle. Examination of the slopes of the lines on the graph confirms that home prices were rising faster in Portland than anywhere else only from 1990 to 1994. Home prices in the San Francisco area were flat in the beginning of the decade, but accelerated faster than anywhere else after 1996. Los Angeles home prices actually declined at first before starting back up after 1996 and just barely surpassed their 1990 level by 2000.

**Figure 3. Relative Home Price Changes in Six Metropolitan Statistical Areas: 1990 to 2000**



Source: Freddie Mac 2001.

Note: Median 1990 house price = 100.

In an uncertain world, it seems logical that home prices in Portland should have risen faster in the last part of the 1990s, when more of the land within the UGB was already developed, rather than in the first part of the decade, when less land was developed. However, the opposite actually occurred, as shown by table 2, which summarizes rates of home price increases stated as compound annual percentage growth rates (CAGRs) for the top 10 metropolitan areas during various periods in the 1990s. Portland had the second highest CAGR for the entire decade—7.72 percent, which was second only to Denver's at 8.35 percent. Portland also had a high CAGR for the 1994–96 period (10.02 percent), but two other regions—Detroit and Salt Lake City—had higher CAGRs in that period. From both 1994 to 2000 and 1996 to 2000, Portland was not among the top 10 fastest home-price-rising regions.

**Table 2. Top 10 Median Home Price Increases in Various Periods in the 1990s:  
Rates of Increase Stated as CAGRs**

Rank	Metropolitan Area	Percent Gain 1990–2000	Rank	Metropolitan Area	Percent Gain 1990–1994
1	Denver	8.35	1	Portland–Vancouver, WA	10.12
2	Portland	7.72	2	Salt Lake City	9.01
3	Salt Lake City	7.09	3	Madison, WI	8.96
4	Louisville, KY	7.04	4	Denver	7.83
5	Des Moines, IA	6.99	5	Des Moines, IA	7.80
6	Birmingham, AL	6.78	6	Peoria, IL	7.74
7	Lincoln, NE	6.49	7	Louisville, KY	7.27
8	Charleston, SC	6.34	8	Albuquerque, NM	6.82
9	Kalamazoo–Battle Creek, MI	6.31	9	Milwaukee	6.60
10	Spokane, WA	6.20	10	Lincoln, NE	6.12

Rank	Metropolitan Area	Percent Gain 1994–1996	Rank	Metropolitan Area	Percent Gain 1996–2000
1	Detroit	13.16	1	San Francisco	14.97
2	Salt Lake City	11.89	2	San Diego	11.52
3	Portland–Vancouver, WA	10.02	3	Charleston, SC	10.38
4	Greenville–Spartanburg, SC	9.87	4	Denver	10.05
5	Kalamazoo, MI	9.69	5	Fort Myers, FL	9.17
6	Mobile, AL	9.10	6	Seattle	8.76
7	South Bend–Mishawaka, IN	8.88	7	Tampa–St. Petersburg, FL	8.41
8	Omaha, NE	8.07	8	Houston	8.16
9	Nashville, TN	8.07	9	Louisville, KY	7.60
10	Akron, OH	7.88	10	Baltimore	7.57

Rank	Metropolitan Area	Percent Gain 1990–2000
1	San Francisco	10.50
2	Denver	8.98
3	Detroit	8.06
4	Charleston, SC	7.44
5	San Diego	7.39
6	Louisville, KY	7.23
7	Omaha, NE	7.18
8	Birmingham, AL	7.11
9	New Orleans	6.87
10	Grand Rapids–Muskegon, MI	6.78

Source: NAR, various months and years.

Note: Prices for 2000 are for the second quarter.

What might have happened in the Portland region in the early 1990s to stimulate rising home prices there? Two factors are relevant. According to the Oregon state employment office in Portland, job growth in that region during the 1990s was slowest in 1991 and 1992 and strongest from 1993 to 1997; it then slowed from over 4 percent per year to below 2 percent for the last two years of the decade. This is congruent with the fact that the annual rate of increase in home prices in Portland was over 10 percent from 1990 through 1996, then fell to 5.17 percent from 1996 to 2000 (compared with an average CAGR of 4.86 percent in that period among all 80 areas with data for 2000). That is still a healthy growth rate, but it is well below the growth rates of other regions that did not have UGBs.

Some observers have argued that rising incomes in Portland may also have contributed to rising home prices there in the early 1990s. But the CAGR for wages and salaries in Portland (without correcting for inflation) was actually lower from 1990 to 1995 (4.19 percent) than it was from 1980 to 1990 (4.37 percent) (Bureau of Economic Analysis, Regional Economic Information System 2001). From 1995 to 1999, that rate fell further to 3.96 percent, although a decline in inflation made real wages and salaries rise slightly faster in the late 1990s than in the early part of the decade. The impacts of income changes are discussed later in this article.

The second factor that may have helped escalate home prices is that the Portland Metro (metropolitan government) made a policy decision in its five-year review of the UGB in 1992 not to expand the boundary significantly. Until then, it had been widely believed within the Portland real estate industry that Metro would add considerably more land to the UGB to replace that which had already been absorbed by growth. Developers who had been expecting to be able to develop outside the initial boundaries could no longer look forward to that prospect. This unexpected change in conditions could have caused land prices within the UGB to rise suddenly.<sup>3</sup> That might help explain why Portland's housing prices rose so much faster from 1990 to 1996 than either before or after that period.<sup>4</sup>

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<sup>3</sup> Two Oregon analysts who used 1996 data for 37 cities to evaluate the impact of the UGB on Portland housing prices concluded that speculative movements in land prices, rather than the supply restriction resulting from the UGB, were the main cause of rapid home price increases in the Portland region during this period (Phillips and Goodstein 2000).

<sup>4</sup> Information obtained by telephone on September 24, 2001, from Mary Kyle McCurdy of 1000 Friends of Oregon.

## **Price movements over a longer period based on Freddie Mac data**

The Portland metropolitan area first adopted UGBs in 1979 as part of Oregon's statewide land use planning system. Therefore, such boundaries were in place all during the 1980s, as well as the 1990s. However, home prices in the Portland region did not increase nearly as fast in the 1980s as in the 1990s, both absolutely and relative to other regions, as indicated by table 3, which shows CAGRs for seven different time periods from 1975 to 2000. (The data are derived from Freddie Mac's indices of constant-quality home prices for individual metropolitan areas, as noted earlier.) The 36 metropolitan areas in this chart have been ranked in order of their home price CAGRs for the entire 1975–2000 period. The ranking of each region has been placed next to its CAGR for each period. Over the entire 25 years, Portland's CAGR for home prices ranks eighth—almost the same as its rank during the 20-year period from 1980 to 2000 and the 5 years from 1975 to 1980. (If all the metropolitan areas in Freddie Mac's total sample had been included in this analysis, Portland would rank slightly lower than it does among these 36 regions.) It ranked first in the 1990s, thereby confirming the conclusion derived from NAR data.

These data imply that the mere presence of a UGB is not enough to cause home prices in a region to rise faster than they do in other regions without such boundaries. Portland had such a boundary throughout the 1980s, but home prices grew much faster during that decade in 29 other regions out of these 36. Only in the 1990s did Portland's CAGR for home prices rise above those in most other regions, and then it exceeded analogous CAGRs in several other regions only slightly. Perhaps other factors—such as faster job growth—combined with a UGB pushed Portland's housing prices up faster in the 1990s than the boundary alone would have. It is impossible to be sure from these simple sets of data.

Table 3. Compound Annual Percentage Rates of Change in Fixed-Quality Home Prices

Metro Area	1975-		1980-		1990-		1980-		1990-		1975-		1990-		1995-		
	1980	Rank	1990	Rank	2000	Rank	2000	Rank	2000	Rank	2000	2000	Rank	2000	Rank	2000	Rank
1. Albuquerque, NM	11.66	18	0.51	36	3.58	22	2.03	35	4.12	35	5.82	35	5	5.82	5	2.11	36
2. Atlanta	7.64	34	5.24	15	4.17	16	4.71	17	5.29	27	1.95	27	23	1.95	23	6.44	10
3. Baltimore	10.00	26	7.22	11	2.34	29	4.75	15	5.78	19	1.36	19	24	1.36	24	3.34	29
4. Boston	8.65	33	12.44	2	3.26	25	7.75	1	7.94	5	-1.25	5	30	-1.25	30	7.97	4
5. Charlotte, NC	11.48	20	5.12	16	4.34	14	4.73	16	6.05	16	2.90	16	20	2.90	20	5.82	17
6. Chicago	10.47	24	6.21	14	4.14	17	5.18	8	6.21	15	3.91	15	15	3.91	15	4.37	25
7. Cleveland	8.79	32	3.73	22	5.15	9	4.43	21	5.29	26	4.84	26	8	4.84	8	5.45	19
8. Dallas	13.31	12	2.44	29	3.19	26	2.82	33	4.83	31	1.25	31	25	1.25	25	5.17	21
9. Denver	14.26	10	2.33	31	7.49	3	4.88	12	6.69	10	7.07	3	3	7.07	3	7.92	5
10. Des Moines, IA	9.22	28	3.01	27	4.67	13	3.84	27	4.89	30	5.36	6	6	5.36	6	3.99	28
11. Detroit	11.36	22	3.90	19	6.19	4	5.04	10	6.27	13	4.35	10	10	4.35	10	8.06	3
12. Grand Rapids, MI	9.80	27	4.70	17	5.23	8	4.96	11	5.91	18	3.94	14	6.52	3.94	14	6.52	9
13. Houston	12.90	13	0.51	35	3.58	21	2.03	36	4.12	36	2.05	22	22	2.05	22	5.13	22
14. Kalamazoo, MI	11.54	19	3.39	24	5.34	7	4.36	22	5.76	20	4.53	20	9	4.53	9	6.15	12
15. Las Vegas	11.75	17	4.04	18	2.88	27	3.46	30	5.07	29	2.93	19	2.84	2.93	19	2.84	35
16. Los Angeles	20.19	1	9.77	5	0.09	36	4.81	13	7.73	6	-4.44	6	36	-4.44	36	4.84	24
17. Louisville, KY	9.03	29	3.85	20	5.03	11	4.44	20	5.34	25	5.03	7	7	5.03	7	5.03	23
18. Miami	12.41	15	3.80	21	3.95	19	3.88	25	5.53	22	3.87	16	16	3.87	16	4.03	27
19. Minneapolis	10.37	25	3.68	23	4.98	12	4.32	23	5.51	23	3.28	18	18	3.28	18	6.78	8
20. New York	3.28	36	12.93	1	2.32	30	7.50	2	6.64	12	-1.15	29	29	-1.15	29	5.92	15
21. Oakland, CA	18.37	7	9.00	7	2.67	28	5.79	6	8.19	4	-1.58	31	31	-1.58	31	7.10	6
22. Omaha, NE	11.03	23	2.56	28	5.13	10	3.84	26	5.24	28	4.32	11	11	4.32	11	5.95	14
23. Peoria, IL	8.85	31	0.92	34	5.68	5	3.27	32	4.36	34	6.08	4	4	6.08	4	5.27	20
24. Philadelphia	6.63	35	9.22	6	1.68	32	5.39	7	5.63	21	0.19	26	26	0.19	26	3.23	32
25. Phoenix	8.99	30	3.13	25	4.30	15	3.71	29	4.75	32	2.51	21	21	2.51	21	6.13	13
26. Portland	16.84	9	2.38	30	7.79	1	5.06	9	7.32	8	9.78	1	1	9.78	1	5.83	16
27. Reno, NV	13.52	11	3.11	26	3.71	20	3.41	31	5.36	24	4.22	12	12	4.22	12	3.23	31
28. Riverside, CA	18.98	6	7.25	10	0.43	35	3.79	28	6.66	11	-3.31	35	35	-3.31	35	4.31	26
29. Sacramento, CA	17.28	8	7.14	12	1.44	34	4.25	24	6.74	9	-0.29	28	28	-0.29	28	3.23	30
30. Salt Lake City	12.83	14	1.71	32	7.65	2	4.64	18	6.23	14	9.78	2	2	9.78	2	5.55	18

Table 3. Compound Annual Percentage Rates of Change in Fixed-Quality Home Prices (continued)

Metro Area	1975–		1980–		1990–		1980–		1975–		1990–		1995–	
	1980	Rank	1990	Rank	2000	Rank	2000	Rank	2000	Rank	1995	Rank	2000	Rank
31. San Antonio, TX	12.40	16	1.64	33	3.56	23	2.60	34	4.49	33	4.09	13	3.04	33
32. San Diego	19.01	5	7.51	9	2.16	31	4.80	14	7.50	7	-1.82	32	6.31	11
33. San Francisco	19.28	3	10.40	3	3.49	24	6.89	4	9.26	2	-2.07	33	9.36	2
34. San Jose, CA	19.86	2	10.31	4	4.02	18	7.12	3	9.55	1	-2.29	34	10.74	1
35. Seattle	19.22	4	6.28	13	5.41	6	5.85	5	8.39	3	3.78	17	7.05	7
36. Washington, DC	11.42	21	7.88	8	1.46	33	4.62	19	5.94	17	-0.07	27	3.02	34

Source: These figures are based on home price indices from same-home sales prepared by Freddie Mac (2001).

## Testing the influence of Portland's UGB through multiple regression analysis

Statistical analysis of the impact of UGBs on home prices across the nation is limited by the fact that only the Portland area has had a strong UGB for a long time.<sup>5</sup> If a dummy variable were used to represent the presence of a strong, long-term UGB, the Portland region would be the only one that had a positive value (of 1.0) for that variable, so it would statistically pick up the influence of *all characteristics of any kind that were unique to Portland*. It is impossible to be certain what other traits, in addition to Portland's UGB, that variable would be measuring.

Nevertheless, if this dummy variable produces a sizable *t* score, it is likely that this outcome at least partially reflects the UGB's influence. Therefore, a multiple regression approach was used to measure the statistical import of such a dummy variable. The analysis used percentage increases in home prices during various time periods as the dependent variables and tested a wide variety of independent variables for each period, not including the dummy variable for Portland. The time periods were 1990 to 2000, 1990 to 1994, 1990 to 1996, 1994 to 2000, and 1996 to 2000. (These irregular periods were used because home price data were more readily available for them.)

Two regression methods were used. First, 25 key variables that seemed most likely a priori to have some influence on home prices were used simultaneously as independent variables, and  $r^2$  was computed for all five periods. Second, a best regression for percentage changes in home prices in each period was calculated by trying out numerous independent variables, gradually removing those with low *t* scores, and retaining the set that met two criteria: (1) Every remaining independent variable was significant at the  $p = 0.10$  level, and (2) the resulting adjusted  $r^2$  was higher than similar scores for any other combination of similarly significant independent variables. In general, the adjusted  $r^2$  results for these best regressions were slightly better than the highest that could be attained by leaving in more independent variables that were not significant at the  $p = 0.10$  level. The results of these two approaches for all five periods are set forth in table 4. The 25 independent variables

<sup>5</sup> The Lexington, KY, metropolitan area has had a UGB since 1954, and it is also rigorously enforced. However, Lexington is surrounded by several smaller outlying cities around which growth has been clustered. If in addition to Portland, the Lexington region is also awarded a 1.0 for the UGB variable, that reduces the  $r^2$  score of all the regressions in which this change is made and eliminates the statistical significance of the UGB variable in the three regressions where it is significant without Lexington.

are listed along the left side, each comprising a row of the chart. The five time periods form columns across the top. For each time period, two different regression results are shown. The column labeled “All” is based on retaining all 25 of these variables in the analysis, while the column labeled “Best” is based on retaining only those variables that are significant at the  $p = 0.10$  level after the winnowing process described above. The next-to-last row of the table shows the adjusted  $r^2$  for each regression. In each cell, the word **SIGNIF** means that variable was statistically significant, and the algebraic sign indicates the sign of its coefficient.

After these regressions were completed, the dummy variable for Portland was entered into the “best” regressions for each of the five time periods, and new regressions were run. For the last two periods—1994–2000 and 1996–2000—the adjusted  $r^2$  values declined when the Portland variable was included, and that variable had a  $t$  score far below 2.0. Thus, it was not statistically significant. But for the first three periods—1990–94, 1990–96, and 1990–2000—the adjusted  $r^2$  values rose notably when the Portland variable was included, and that variable had  $t$  scores well over 2.0, so it was statistically significant. These results can be interpreted as indicating that Portland’s UGB had a significant impact on raising prices during these three periods, but not during the other two. However, this interpretation must be qualified because any other factors unique to Portland that were in effect from 1990 to 1994 (and therefore within the periods 1990 to 1996 and 1990 to 2000) could also be exerting some or all of the indicated statistical effect.

All three of these periods included the time from 1990 to 1994, when home prices in Portland were rising faster than anywhere else in the United States. During the last part of this period, job growth in Portland was especially strong. In fact, job growth from 1990 to 1994 was a statistically significant independent positive variable in 4 of the 10 regressions for all regions described in table 4, including 3 of the 4 covering 1990 to 1994.

Why would a UGB have a more powerful impact on raising home prices during periods of rapid job growth than during periods of slower job growth, even though the latter occurred after the former? Rates of population growth in the metropolitan area in either 1990 to 1994 or 1990 to 2000 were not statistically significant in influencing home prices in these regressions. The percentage change in metropolitan population from 1980 to 1990 was statistically significant in 6 of the 10 regressions, but had a negative sign in all 6. This implies that rapid population growth in the 1980s had a restraining impact on housing prices in the 1990s. Hence, population increases caused by rapid job growth were not the cause of rising home prices.

Table 4. Summary of Regression Analyses for Different Time Periods

Independent Variables	Regressions for Percentage Home Price Changes in the Various Time Periods Shown											
	1990-94		1990-96		1990-2000		1994-2000		1996-2000			
	All	Best	All	Best	All	Best	All	Best	All	Best	All	Best
1 Central-city population in 1990	INCL+	INCL-	INCL+	INCL+	INCL+	INCL-	INCL-	INCL+	INCL+	INCL+	INCL+	INCL+
2 Percent change in the central-city population, 1980 to 1990	INCL+	INCL+	INCL+	INCL+	INCL+	INCL+	INCL+	INCL+	INCL+	INCL+	INCL+	INCL+
3 Central-city population density in 1990	INCL+	INCL-	INCL+	<b>SIGNIF+</b>	<b>SIGNIF+</b>	<b>SIGNIF+</b>	<b>SIGNIF+</b>	<b>SIGNIF+</b>	<b>SIGNIF+</b>	<b>SIGNIF+</b>	<b>SIGNIF+</b>	<b>SIGNIF+</b>
4 Central-city percentage of minorities in the 1990 population	INCL+	INCL+	INCL+	INCL-	INCL-	INCL-	INCL-	INCL-	<b>SIGNIF-</b>	<b>SIGNIF-</b>	<b>SIGNIF-</b>	<b>SIGNIF-</b>
5 Central-city violent crimes per 100,000 residents in 1990	INCL-	<b>SIGNIF-</b>	INCL-	INCL+	INCL+	INCL+	INCL+	<b>SIGNIF+</b>	<b>SIGNIF+</b>	INCL+	INCL+	INCL+
6 Central-city percentage of high school graduates in 1990	INCL+	<b>SIGNIF+</b>	<b>SIGNIF+</b>	<b>SIGNIF+</b>	<b>SIGNIF+</b>	<b>SIGNIF+</b>	<b>SIGNIF+</b>	<b>SIGNIF+</b>	<b>SIGNIF+</b>	<b>SIGNIF+</b>	INCL+	INCL+
7 Central-city unemployment rate in 1990	INCL-	INCL+	INCL+	INCL-	INCL-	INCL+	INCL+	INCL+	INCL+	INCL+	INCL+	INCL+
8 Central-city median household income in 1989	<b>SIGNIF-</b>	<b>SIGNIF-</b>	INCL-	<b>SIGNIF-</b>	INCL-	<b>SIGNIF-</b>	INCL-	<b>SIGNIF+</b>	INCL-	<b>SIGNIF+</b>	INCL+	INCL+
9 Central-city percentage of 1990 population in poverty	INCL-	INCL+	INCL+	INCL+	INCL+	INCL+	INCL+	INCL+	<b>SIGNIF+</b>	<b>SIGNIF+</b>	INCL+	INCL+
10 Mean January temperature within the central city	INCL-	INCL-	INCL-	INCL+	INCL+	INCL+	INCL+	<b>SIGNIF+</b>	<b>SIGNIF+</b>	<b>SIGNIF+</b>	<b>SIGNIF+</b>	<b>SIGNIF+</b>
11 Numerical increase in housing units, 1980 to 1990	INCL-	INCL-	INCL-	INCL-	INCL-	INCL+	INCL+	INCL+	INCL+	INCL+	INCL+	INCL+
12 Percentage of 1990 city housing built before 1940	INCL-	INCL+	INCL+	INCL-	INCL-	INCL-	INCL-	INCL+	INCL+	INCL+	INCL+	INCL+
13 Population density in the fringe of the urbanized area	INCL-	INCL+	INCL+	INCL-	INCL-	INCL-	INCL-	INCL-	<b>SIGNIF-</b>	<b>SIGNIF-</b>	<b>SIGNIF-</b>	<b>SIGNIF-</b>
14 Total MSA population in 1990	INCL-	INCL-	INCL-	<b>SIGNIF-</b>	<b>SIGNIF-</b>	<b>SIGNIF-</b>	<b>SIGNIF-</b>	<b>SIGNIF-</b>	<b>SIGNIF-</b>	<b>SIGNIF-</b>	INCL-	INCL-
15 Percent change in the MSA population, 1990 to 2000	INCL+	<b>SIGNIF+</b>	INCL+	INCL+	INCL+	INCL+	INCL+	INCL+	INCL+	INCL+	INCL+	INCL+
16 Percentage of the 1990 MSA population outside the urbanized area	INCL-	INCL-	INCL-	INCL-	INCL-	INCL-	INCL-	INCL-	<b>SIGNIF-</b>	<b>SIGNIF-</b>	INCL-	<b>SIGNIF-</b>

Table 4. Summary of Regression Analyses for Different Time Periods (continued)

Independent Variables	Regressions for Percentage Home Price Changes in the Various Time Periods Shown													
	1990-94			1990-96			1990-2000			1994-2000			1996-2000	
	All	Best	All	Best	All	Best	All	Best	All	Best	All	Best		
17 Percentage of the 1990 MSA population within the central city	INCL+	INCL+	INCL+	SIGNIF-	INCL+	SIGNIF-	SIGNIF-	SIGNIF-	SIGNIF-	SIGNIF-	SIGNIF-	SIGNIF-	SIGNIF-	SIGNIF-
18 Degree of MSA segregation of African Americans	INCL+	INCL+	INCL+	INCL+	INCL+	INCL+	INCL+	INCL+	INCL+	INCL+	INCL+	INCL+	INCL+	INCL+
19 Percent increase in the MSA population, 1980 to 1990	INCL-	SIGNIF-	INCL-	SIGNIF-	SIGNIF-	SIGNIF-	SIGNIF-	SIGNIF-	SIGNIF-	SIGNIF-	SIGNIF-	SIGNIF-	SIGNIF-	INCL-
20 Percent change in the central-city area, 1980 to 1990	INCL-	INCL-	INCL-	INCL-	INCL-	INCL-	INCL-	INCL-	INCL-	INCL-	INCL-	INCL-	INCL-	INCL+
21 Whether the area is in the Northeast region	SIGNIF-	SIGNIF-	SIGNIF-	SIGNIF-	SIGNIF-	SIGNIF-	SIGNIF-	SIGNIF-	SIGNIF-	SIGNIF-	SIGNIF-	SIGNIF-	SIGNIF-	SIGNIF-
22 Index of nine factors related to urban decline	INCL-	INCL-	INCL-	INCL-	INCL-	INCL-	INCL-	INCL-	INCL-	INCL-	INCL-	INCL-	INCL-	INCL+
23 Percent increase in average MSA incomes, 1990 to 2000	INCL+	INCL+	INCL+	INCL+	SIGNIF+	SIGNIF+	SIGNIF+	SIGNIF+	SIGNIF+	SIGNIF+	SIGNIF+	SIGNIF+	SIGNIF+	INCL+
24 Percent increase in area jobs, 1990 to 1994	SIGNIF+	SIGNIF+	SIGNIF+	SIGNIF+	SIGNIF+	SIGNIF+	SIGNIF+	SIGNIF+	SIGNIF+	SIGNIF+	SIGNIF+	SIGNIF+	SIGNIF+	INCL-
25 Percent increase in area jobs, 1994 to 2000	INCL-	INCL-	INCL-	INCL-	INCL-	INCL-	INCL-	INCL-	INCL-	INCL-	INCL-	INCL-	INCL-	SIGNIF+
Adjusted $r^2$ of regression	0.524732	0.626620	0.618926	0.644712	0.546004	0.641285	0.641285	0.641285	0.484297	0.532280	0.428321	0.428321	0.428321	0.378784
Number of cases	79	85	79	83	78	83	83	83	78	81	77	77	77	78

Note: **SIGNIF** means statistically significant at the  $p < 0.10$  level. **INCL** means that the variable was included but was not statistically significant. **MSA** = metropolitan statistical area.

However, this entire analysis suffers from uncertainty about whether the specific quality incorporated in the Portland dummy variable that has been affecting home prices is really the UGB or one or more other unique traits of that region.

To test the reliability of the analytic method used above, separate regressions were run using each of 86 regions in turn as a single dummy variable and adding that variable to the Best regressions for two periods, 1990 to 1994 and 1996 to 2000. For example, the Portland dummy variable was changed to a Denver dummy variable by moving the only 1.0 value for that variable from Portland to Denver and then adding that variable to the Best regressions and computing the results. For the regressions covering the 1990–94 period, only the Portland dummy variable was statistically significant (that is, had a  $t$  score of 2.0 or higher) and notably raised the  $r^2$  of the regression. This indicates that none of the other 85 regions had unique traits that significantly influenced the rate of increase of housing prices from 1990 to 1994. This finding increases the likelihood that the Portland dummy variable was indeed measuring the impact of the UGB.

But for the regressions covering the 1996–2000 period, six other regions (San Francisco; San Diego; Denver; Charleston, SC; Honolulu; and Houston) had dummy variables that were statistically significant and notably raised the  $r^2$  of their regressions: Houston's dummy variable had a negative sign, which indicates that Houston had one or more unique traits that were *slowing down* the rate of increase of housing prices from 1996 to 2000. The most likely candidate is the decline in world oil prices that occurred during much of that period, a factor that negatively affected the Houston economy. But the other five regions all had positive coefficients on their dummy variables. Apparently, in each of these regions, one or more specific traits other than a UGB that had not been operating there from 1990 to 1994 operated to accelerate housing price increases from 1996 to 2000. For both the San Francisco region (which includes the Oakland and San Jose areas) and the San Diego region, that factor is undoubtedly the rapid expansion of the California economy after its recovery from the serious recession of the early 1990s. In both these California regions, strong increases in jobs and incomes in the late 1990s were combined with traditionally stringent local land use controls that made building new housing difficult, especially in the San Francisco area. Those stringent controls had some of the same effects as the Portland UGB, although they were based on local government regulations rather than regional ones. Such tight controls had been in existence during the first part of the decade as well as the last part in these regions, but affected the rate of increase of housing prices only during the last part.

These findings indicate that containment programs such as a UGB do not inevitably influence a region's rate of housing price increase, but are most likely to do so when combined with strong surges in local incomes or employment—and therefore in housing demand. The Denver region is more puzzling, since it does not have similarly stringent land use controls. However, it did experience strong increases in jobs and incomes during the last half of the 1990s. I do not know what unique factors were operating in the Honolulu region, which was economically depressed throughout most of the 1990s, or the Charleston (SC) region.

On balance, these additional regressions with other regional dummy variables tend to reinforce the credibility of the earlier findings based on a dummy variable for Portland. But some uncertainty remains about whether Portland's dummy variable measures mainly the impact of the UGB or also encompasses other factors not discerned in this study.<sup>6</sup>

## Reconciling apparently conflicting regression results

Portland's UGB seems to have had a statistically significant impact in accelerating increases in housing prices in that region from 1990 to 1994, but not during other periods between 1980 and 2000. Why not? Three factors probably kept the UGB from influencing the rate at which home prices increased for many years after it was established.

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<sup>6</sup> Arthur C. Nelson (2000b) has developed a typology of what he calls containment programs among American metropolitan areas, and his analysis indicates that quite a few other metropolitan regions besides Portland also have UGBs of various types. Nelson states that 79 U.S. metropolitan areas in 31 states now have containment programs of three types. *Closed region containment* “preserves land around boundaries for open space uses and consciously shifts the regional demand for development to areas within the boundary” (11). His examples are Portland, Seattle, and Miami-Dade County. *Open region containment* “may or may not include efforts to absorb the regional development demand but does not actively preserve land outside the boundary” (11–12). His example is the Twin Cities region. *Isolated containment* occurs where “open space preservation beyond boundaries is not accompanied by significant efforts to absorb the displaced demand for development by the central city, resulting in displacing development to areas far removed from the boundary” (12). His examples are San Jose (CA) and Boulder (CO). A comparison of housing price CAGRs in these three groups of regions with regions that had no type of containment showed slightly faster growth of housing prices in areas with containment than in areas without it. However, regression analyses of 18 regions in his categories that were included in my set of 86 cities, using dummy variables for his three containment categories, showed no statistically significant positive influence of containment on home prices in any of the five time periods covered by this study. Because Nelson's classification of regions is subject to considerable controversy, I did not include these analyses in the main body of my own analysis.

1. The UGB initially contained an estimated 20-year supply of developable land, so its constraining impact on housing markets was not felt for quite a while until a lot of that land had been absorbed.
2. Portland's job growth was not rapid during the initial period after the UGB was founded. But in the early 1990s, a decade after the UGB was created and considerable development had occurred within it, a spurt of rapid job growth stimulated strong demands for more housing that ran up against the UGB. So home prices rose rapidly from 1990 to 1994. Then job growth in the Portland region slowed down, and housing developers adjusted to using smaller lots and building more multifamily housing. So the UGB did not generate the same upward pressure on housing prices in the last half of the 1990s as it did in the first half. This hypothesis implies that a UGB—even a stringent one—in itself does not always make housing prices rise. It does so mainly when there is some strong stimulus on the demand side of the market as well as the UGB's strong constraint on the supply side.
3. In the 1980s, wage and salary incomes in the Portland region (not corrected for inflation) rose relatively slowly compared with such incomes in 35 other major metropolitan areas, as shown in table 5.<sup>7</sup> During that decade, Portland's compound annual rate of wage increase (CAGR) of 4.37 percent ranked 31st out of 36 major regions compared. This situation changed in the early 1990s. Although Portland's absolute CAGR of wages and salaries actually slowed to 4.19 percent, wage growth in other regions declined even more because of the recession of the early 1990s. The average CAGR for wages and salaries for all 36 regions fell from 5.15 percent in the 1980s to 3.60 percent from 1990 to 1995. Hence, Portland's ranking rose to 6th among the 36 regions. Then from 1995 to 1999, Portland's rate of increase of such incomes both declined absolutely to 3.96 percent and fell in rank to 17th. Over the whole 19 years, Portland's wage CAGR of 4.45 percent ranked 20th.

The timing pattern of wage increases is consistent with housing prices rising faster in Portland than elsewhere during the early 1990s, but not during the remainder of the 1980–2000 period.

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<sup>7</sup> The 36 metropolitan areas include 20 of the 25 largest in the United States and all 10 of the western region metropolitan areas with 2000 populations over 1 million. Data are from the Bureau of Economic Analysis (2001).

Table 5. Wages and Salary Incomes in Portland

Time Period	Compound Annual Growth Rate of Wages and Salaries (%)	Rank among 36 Selected Metropolitan Areas
1980-90	4.37	31
1990-95	4.19	6
1995-99	3.96	17
1980-99	4.45	20

In the multiple regression analysis cited earlier, the percentage increase in average household incomes from 1990 to 2000 exhibited positive statistical significance for housing prices in the last half, but not the first half of the decade. Perhaps rising incomes and buoyant consumer attitudes caused by rapid job growth stimulated strong demands for homeownership. Those demands in turn raised housing prices in an environment when developers could not move far out to build new, less costly housing because of the UGB. That is at least a reasonable set of hypotheses.

Another regression analysis of the same 86 metropolitan areas was conducted using the level of housing prices in each metropolitan area in the second quarter of 2000 as the dependent variable. An initially long list of independent variables was winnowed down to nine with *t* scores over 2.0, and an adjusted  $r^2$  of 0.59595. The factor with the highest beta score was median central city income in 1989; second was total regional population in 2000. The unemployment rate had a high negative beta, while the percentage increase in regional household incomes from 1990 to 2000 had a high positive one. These findings imply that a large region enjoying strong prosperity with high and rising incomes is likely to experience high housing prices. Portland is not a really populous region, but all the other factors fit its situation during the early 1990s.

Another consideration concerns the supply side of the Portland housing market. During the 1990s, new housing construction in the region barely kept up with population growth. Not counting manufactured housing, the number of housing units granted permits in the 10 years from 1991 through 2000 was only 0.92 times the number of households added to the region between 1990 and 2000. Only 21 of the 86 metropolitan areas analyzed had ratios of less than 1.0 to 1; the average ratio was 1.379 to 1. When an allowance is made for manufactured housing units, total housing permits equaled about 102 percent of estimated added households. Thus, relatively low housing production may well have contributed to rapidly rising home prices in the Portland area during early 1990s (data on building permits from the U.S. Bureau of the Census 1990 through 2000).

## Conclusion

The following factual findings emerge from this study:

1. Between 1980 and 2000, housing prices in the Portland region increased faster than those in comparable areas elsewhere only from 1990 to 1994. During the rest of that 20-year period, especially during the 1980s, Portland's housing prices increased less rapidly than those in many other regions, including some comparable regions in the West.
2. A multiple regression analysis using rates of increase of housing prices in five subperiods between 1990 and 2000 as the dependent variables, and up to 25 independent variables, indicated that a Portland dummy variable representing the Portland UGB had a positive, statistically significant impact on the rates of increase of housing prices in three periods containing the subperiod 1990 to 1994, but not in two periods from 1994 to 2000.
3. However, that regression finding is made problematical by the fact that the dummy variable used to represent Portland's UGB also captured all the impacts on housing prices of any other traits unique to Portland during each period. Thus, the conclusion that Portland's UGB helped raise housing prices during the early 1990s but not during other periods from 1980 to 2000 is suggestive rather than definitive.

These findings imply the following further conclusions:

1. The mere existence of a UGB, even a stringently drawn one, does not necessarily cause housing prices in a region to rise faster than those in other comparable regions without any type of UGB.
2. However, a stringently drawn and tightly enforced UGB, or its equivalent in the form of restrictive and widespread local land use controls in a region, can at least for a short period exert upward pressure on the rate of increase of housing prices, if it is combined with factors strongly stimulating the demand for housing in the region.
3. These findings imply that if a region with a tightly drawn and strongly enforced UGB is enjoying great prosperity—including high and fast-rising incomes—and encounters rapid increases in housing prices, this region should seriously consider adding more developable land to the territory inside its UGB to improve affordability.

4. Relatively weak or open UGBs or other forms of nonstringent growth containment programs will probably not have any positive impact on the rate of increase of housing prices in the regions involved, even if combined with strong demand.

Only one thing seems crystal clear: There is no simple relationship between containment programs and housing prices. Therefore, condemnations of UGBs and other containment programs as always undesirable because they inevitably cause higher housing prices are as unwise and unreliable as unqualified claims that UGBs never accelerate rates of housing price increase. The truth lies somewhere in between.

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