The Behavior of Home Buyers in Boom and Post-Boom Markets

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A recent development in the United States market for single-family homes has provided an ideal laboratory in which to study the sources of volatility in home prices: prices have been moving in dramatically different ways at the same time in different parts of the country. A boom in housing prices has appeared in California, with price increases from late 1987 to mid-1988 exceeding 20 percent in many cities. At the very same time, a post-boom market exists in the Northeast. A remarkable boom occurred between 1983 and mid-1987 in many places from New York to Boston, where housing prices more than doubled in those three and one-half years. That boom appears to be over, with prices actually falling in late 1987. At the same time, it is possible to observe a housing market in the Midwest that has had no sign of a boom for the past five years.

We exploited this opportunity by collecting data about the behavior of home buyers in these different markets using questionnaire survey methods. Identical questionnaires were sent to those who bought homes in May of 1988 in each of four markets: Anaheim (Orange County) and San Francisco, California (two "boom" markets); Boston, Massachusetts (a "post-boom" market); and Milwaukee, Wisconsin (a "control" sample, representing more normal housing market conditions). Since the questionnaires were identical and were sent out at the same time, differences in answers across cities can be attributed only to differences in the local market for housing and not to differences in the wording or order of questions or to national economic conditions.

We sought information that would help answer some nagging questions about the nature and causes of booms in housing markets. Most fundamentally, what causes sudden and often dramatic and sustained price movements? Although questionnaire survey methods can never provide a definitive answer to such a question, they can provide information that helps us begin to understand the process: What are home buyers thinking about, and what sources of information are used to

decide how much to pay for a house? How motivated are they by investment considerations, and how do they assess investment potential? Is destabilizing speculation affecting housing prices?

Second, why does a state of excess demand tend to occur in boom markets, where some people reportedly stand in line to make offers on the day that a house is listed for sale, often making bids that are above the asking price? Why don't sellers just increase their asking prices until the excess demand disappears?

Third, why does a state of excess supply seem to occur in post-boom markets, where people reportedly take substantial periods of time to sell their homes? Why don't people just cut their asking prices to eliminate the excess supply?

Housing price booms have raised a number of concerns. A boom in housing prices represents a major redistribution of wealth. Those who own see their equity increase while those who do not face higher rents and reduced probability of owning. This redistribution seems capricious and unfair to many. Some have also expressed concern that high housing prices have made it more difficult for firms to attract labor to the boom regions. A special report in the *Harvard Business Review* spoke of a "convulsion in U.S. housing" that has begun to affect American business.[1] The report cites examples of firms in Boston and New York that have experienced severe problems recruiting. Many have chosen to relocate outside the region as a result.

Others are concerned that if speculators are pushing housing prices up temporarily, then housing prices may fall rapidly, creating turmoil among homeowners and homebuilders and in the banking system. On August 22, 1988, the front page of *Barron's* contained a full-page sketch of a home falling off a cliff with the headline "The Coming Collapse of

Table 1
Median Price of Existing Single-Family Homes, 1983–88

Year	Orange County	San Francisco	Boston	Milwaukee
1983	$134,900	$129,500	$82,600	$68,000
1984:1	133,500	126,600	89,400	69,800
2	135,100	130,500	95,600	68,100
3	134,900	132,600	102,000	69,600
4	130,600	130,400	104,800	64,100
1985:1	132,100	134,500	108,600	66,600
2	135,400	141,100	131,000	66,700
3	137,800	143,800	138,800	66,700
4	139,600	n.a.	144,800	68,100
1986:1	138,000	n.a.	145,600	67,600
2	149,400	n.a.	156,200	71,000
3	149,600	164,900	163,000	70,800
4	152,400	164,800	167,800	69,200
1987:1	156,100	161,300	170,000	67,800
2	167,300	169,900	176,200	71,700
3	167,700	175,900	182,200	70,900
4	174,500	176,000	177,500	70,800
1988:1	183,800	178,800	176,900	72,600
2	204,000	196,300	182,900	71,500

n.a. = not available.
Source: National Association of Realtors, *Home Sales*, monthly.

Table 2
Annual Increases in Median Prices of Single-Family Homes, 1983–88
Percent

Metropolitan Area	1983–84[a]	1984–85	1985–86	1986–87	1987–88
Orange County	.1	.2	10.3	12.0	21.9
San Francisco	.8	8.1	8.5[b]	11.0[b]	15.5
Boston	15.7	37.0	19.2	12.8	3.8
Milwaukee	0	−2.2	6.6	1.0	−.3

[a] All changes are from second quarter to second quarter except the change for 1983–84, which is the change from the 1983 annual figure to the 1984 second quarter figure.
[b] Data for San Francisco were not available for the second quarter of 1986; the changes presented are estimates.
Source: National Association of Realtors data shown in table 1.

Home Prices." A few cities in recent years have in fact witnessed falling home prices. The best known example is Houston, where the median price of existing single-family homes dropped 24 percent in two years, contributing to the insolvency of large savings and loan institutions and multi-billion-dollar payouts by the Federal Savings and Loan Insurance Corporation.

Given the seriousness of the problems associated with rising and falling housing prices, surprisingly little research has been done on the questions we pose here. Most models of housing price movements have focused on macroeconomic variables such as interest rates, income, and national demographic trends. But the simple fact that the most dramatic examples of price booms have taken place in well-defined geographic areas while prices were not rising in most of the country suggests that macro variables offer only a partial explanation.

The causes of these booms are still not understood. A study by one of us suggests that housing booms cannot be attributed to rational fundamental factors. In a 1986 article in this *Review*, Case sought to explain the Boston experience using data on economic fundamentals. His model included such demand-side and supply-side variables as population growth, employment growth, interest rates (short-term and long-term), construction costs, income growth, tax rates, and the like. Estimated with data from 10 cities over a 10-year period, that model failed to explain more than a fraction of the observed increase in Boston housing prices. Case then put forward a conjecture that the boom was essentially driven by expectations.

Part I of this paper describes the behavior of prices in the four metropolitan areas surveyed. Part II describes the survey, including samples and response rates for each city. Part III summarizes the results of the survey, and part IV presents some interpretations and conjectures.

I. Housing Prices in Four Metropolitan Areas

The survey (described in Section II) was sent to people who bought homes or condominiums during the month of May 1988. By selecting buyers from a narrow time window, we sought to control for national macroeconomic factors such as interest rates and national income growth. Four metropolitan areas were targeted for the survey. The four were chosen because of what we perceived to be dramatic differences in recent price behavior.

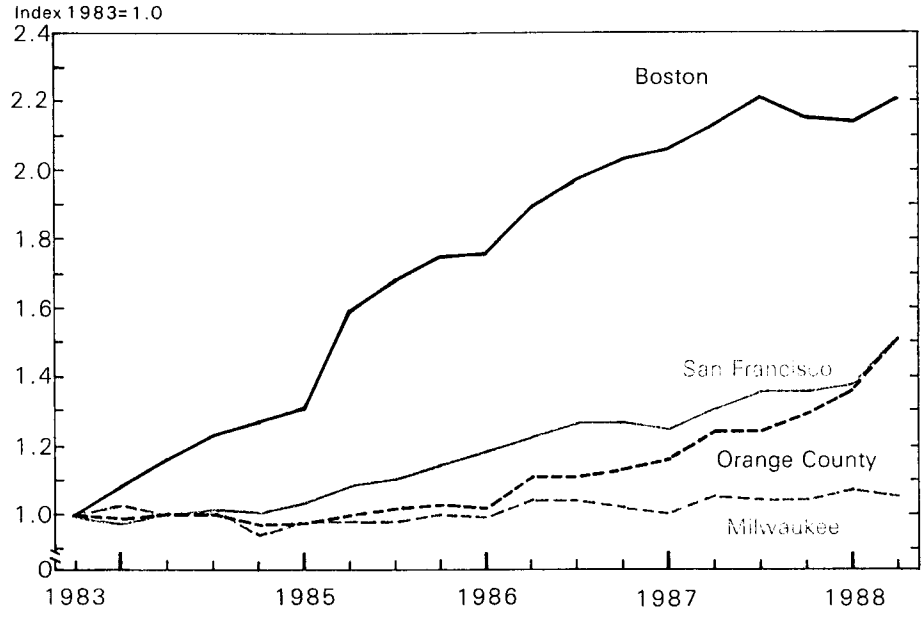
Table 1 presents National Association of Realtors data on the median price of existing single-family homes in each metropolitan area quarterly since 1983 and table 2 shows annual price increases. Chart 1 plots indexes derived from table 1 for the same time period. Although we have shown in earlier work (Case and Shiller 1987) that these are less than perfect measures of appreciation, they are the only source consistent enough to allow such a cross-city comparison.

Orange County and San Francisco

The experience of these two very different California metropolitan areas has been similar. Both experienced a period of rapid increases in home prices during the late 1970s. That came to an end in 1981. Beginning in late 1984, prices began rising again in

Chart 1

Median Price of Existing Single-Family Homes, 1983-88



Source: National Association of Realtors, *Home Sales*, monthly.

San Francisco; Orange County picked up in late 1986. While prices in Boston were cooling in 1987 and 1988, San Francisco and Orange County began booming. Table 3 and chart 2 show the pattern in Orange County, and table 3 gives annual figures for several other areas in California as well.

The height of the boom seems to have come in May 1988. Between May and June, a single month, the California Association of Realtors reported a 10.2 percent increase in the median price of single-family homes in San Francisco and a 4.1 percent increase in Orange County. Such rates of increase drew national attention. On June 1, 1988, the *Wall Street Journal* carried a headline on the front page reading "Buyers' Panic Sweeps California's Big Market in One-Family Homes." The *Journal* article speaks of "a buying frenzy that extends to every segment of the market" and describes lines of 150 cars waiting to buy houses. Ar-

Table 3
Home Prices, Sales Activity in California

	Median Sale Price			June Sales Activity	
Region	June 1988	June 1987	Percent Increase	Percent Change from May	Percent Change from Year Ago
Orange County	$211,038	$170,163	24.0	+25.2	+18.6
Los Angeles	182,364	148,670	22.7	+6.4	+5.8
San Francisco	209,687	173,098	21.1	+9.4	-2.6
San Diego	147,605	125,488	17.6	+14.3	+15.1
Sacramento	92,708	87,276	9.7	+15.7	-8.5
Riverside/San Bernardino	108,567	96,922	12.0	+7.3	+15.8
Ventura	195,209	160,303	21.8	+2.6	-13.3
California	167,428	140,620	19.1	-7.8	+4.8

Source: California Association of Realtors, as presented in the *Los Angeles Times*, July 26, 1988.

ticles on the real estate market appeared in the *Los Angeles Times* and the *San Francisco Chronicle* an average of more than four times per week during the summer of 1988, carrying such leads as "The real estate market is getting so frenzied, prospective home owners are offering more than asking price" (*Chronicle*, 7/6/88). The president of the Alameda County Board of Realtors is quoted in the same article: "The market is hotter than a pistol. . . . I went to a presentation last night in Fremont for a $400,000 home that had been on the market for five days. There were five offers, and the winning bid was more than the asking price."

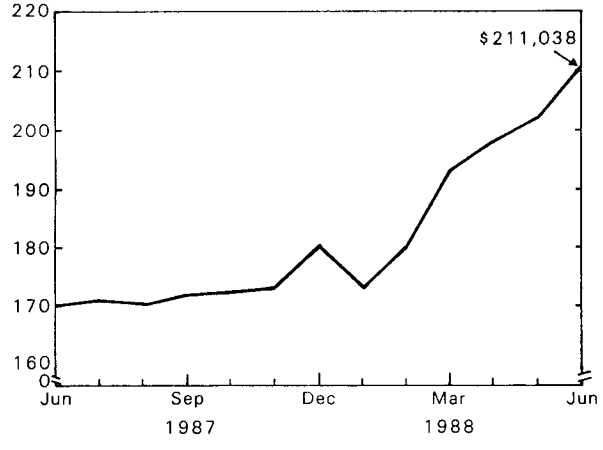
Boston

The Boston housing price boom began in 1983. The most rapid growth occurred between 1984 and 1985 when growth rates neared 40 percent per year. Multiple sales data presented in Case (1986) confirmed rapid acceleration of prices beginning in the first quarter of 1984, peaking in the third quarter of 1985, and slowing steadily through 1986 and 1987. Housing prices doubled between the beginning of 1984 and mid-1987.

Median price fell in Boston in both the fourth quarter of 1987 and the first quarter of 1988. The *Boston Globe* reported the dip with great fanfare. On February 17, 1988 the business page carried the full-page headline "Boston-area houses register a $3,000 price drop." It was also reported in that article that "the inventory of single-family homes offered for sale through [the Greater Boston Real Estate Board's] multiple listing service has increased from 2,512 to 4,814. The average stay on the market has increased from 58 to 80 days. . . . Long gone are the days when asking prices were extremely exuberant but home buyers met them anyway."[2]

Chart 2

Median Resale Price of Homes in Orange County, California 1987-88



Source: California Association of Realtors, as published in *Los Angeles Times*, July 26, 1988.

Milwaukee

Milwaukee was chosen for its remarkable record of price stability. The median home price series for Boston presented in table 1 has a standard deviation of $34,743. The same statistic for the Milwaukee series is $2,210. Since 1983, median price has risen an average of less than 1 percent per year, from $68,000 to $71,500.

II. The Survey

The universe, the samples and the response rates on the survey are described in table 4. A mailing list of 3,871 persons who bought homes in May 1988 was purchased from Dataman, Inc., a research and marketing firm in Atlanta. Dataman collects names, addresses and selling prices from public records of closings. The data are made available by 3-digit zip code. The lists for Boston and Milwaukee contained addresses drawn from the entire metropolitan areas. The California zip codes were for the cities of San Francisco and Anaheim in Orange County.

From the universe, samples of 500 were drawn at random for Boston, Anaheim and Milwaukee; 530 were drawn for San Francisco. The survey followed methods described by Dillman (1978). Each household in the sample was sent a 10-page questionnaire with a personalized cover letter hand-signed by both authors. The original mailing was sent on July 17 and 18. This was followed up with a post card reminder mailed to the entire sample on July 26. A third mailing to those who did not respond was sent on August 16 and 17. The third mailing contained a duplicate questionnaire (for those who had misplaced the first) and a new personalized cover letter. As an incentive to participate, we offered to send survey results to those who requested them.

Table 4
Survey Universe, Samples and Response Rates

City/Metropolitan Area (3-Digit ZIP)	Universe	Sample	Bad Address	Returned Unusable[a]	Net Sample	Returns Tabulated	Response Rate (Percent)
Anaheim (928)	576	500	21	12	467	241	51.6
San Francisco (941)	1,297	530	18	6	506	199	39.3
Boston (021)	1,383	500	67	12	421	200	47.5
Milwaukee (532)	615	500	36	7	457	246	53.8
	3,871	2,030	142	37	1,851	886	47.9

[a] Returned unusable included numerous notes that the property had only been refinanced; several cases where properties were out of state, but the owner resided in state; three land deals; and several replies that claimed never to have bought a home.

A total of 142 surveys (7 percent) were returned "delivery attempted—not known" by the Post Office. Another 37 were returned by recipients but were inappropriate for use in the survey. Among these were replies from several who had only refinanced their homes, some who had bought land only, others who had actually bought property out of state and a few who claimed not to have been involved in a sale at all. With these excluded, the net sample size was 1,851.

In total, 886 responses were coded and tabulated. Response rates were above 50 percent in Milwaukee and Anaheim, close to 50 percent in Boston and 39.3 percent in San Francisco. Such response rates are about what we would expect given the extensive follow-up and personalized format. The questionnaire was long and fairly detailed, taking close to half an hour to complete, but the subject of the questionnaire was likely to be of interest to recent home buyers.

The Questionnaire

We did some pre-test interviews of a small number of home buyers in the cities in our sample. We used some of their responses as the base for adding questions to the survey.

The questions are worded in everyday language. In some cases questions may seem, to an economist, to be ill-defined or to suggest fallacious concepts. We included such questions purposely, as a way of documenting how people express themselves. We will discuss the results of the survey in several parts. First, we will explore what the responses suggest about the spread of high expectations for investment potential during booms. Second, we will describe how people seem to interpret the booms. Third, we discuss the question of upward rigidity and excess demand. Finally, we turn to the issue of excess supply and downward price stickiness, focusing on seller behavior.

Table 5 presents a brief description of the respondents' purchases. In two of the cities, Milwaukee and Anaheim, about 70 percent of the properties were single-family homes. Boston had the lowest percentage at 39.7, while San Francisco stood at 55.9. Boston had the largest proportion of condominiums and cooperatives. What was not a single-family home, a cooperative or a condo was either a duplex or "other." The properties listed as "other" included triple deckers, three- and four-family homes, apartments and town houses. In all cities except San Francisco, nearly 90 percent of the properties were bought as primary residences. A significant number in San Francisco were purchased to rent to others.

Expectations and Investment in the Housing Market. Without question, home buyers in all four cities looked at their decision to buy as an investment decision. Table 6 presents tabulations of three questions that shed some light on the extent to which home buyers were motivated by investment considerations.

In both California cities, over 95 percent said that they thought of their purchase as an investment at least in part. In Boston, the figure was 93.0 percent and in Milwaukee, 89.7 percent. A surprisingly large number in San Francisco, 37.2 percent, said that they bought the property "strictly" for investment purposes.

Clearly, one's willingness to pay for an asset depends in part on the perceived degree of risk associated with it. Very few home buyers in any of the four cities thought that the housing market involved a

Table 5
General Description of Survey Respondents' Home Purchases
Percent of Responses

Description	Anaheim	San Francisco	Boston	Milwaukee
Single-Family Home	70.0	55.9	39.7	71.1
Condo or Coop	22.1	20.5	43.7	11.4
First-Time Purchase	35.8	36.2	51.5	56.9
Bought to Live In as a Primary Residence	88.4	72.7	92.0	88.2
Bought to Rent to Others	3.7	12.1	3.0	4.1

great deal of risk. Even in Boston, where newspapers have been openly speculating about the possibility of a crash, 37.1 percent said that buying a home involves little or no risk. The degree of risk perceived is clearly lowest in the boom markets. Rising prices seem to dampen fears, and that may well fuel the boom. In Anaheim a full 63.3 percent said that their purchase was essentially risk-free.

It is important to keep in mind from the outset that the sample is a sample of actual *home buyers*. That is, the people who were surveyed were the ones who went out and bought homes in May. It can be assumed that they would have significantly higher expectations than the general population of *potential* home buyers. In addition, they are likely to have a lower perception of risk than the general population of potential buyers. We did not sample, and indeed could not have sampled, those who decided not to buy because they were worried about future losses and risks.

Table 7 presents responses to a number of questions designed to probe the actual price expectations of buyers. First, virtually every buyer in our California cities and the vast majority of buyers in Boston and Milwaukee believe that prices will rise. As you would expect, those in the boom cities are more opti-

Table 6
Housing as an Investment
Percent of Responses in Each Category

	Boom Markets		Post-Boom	Control
Question	Anaheim	San Francisco	Boston	Milwaukee
"In deciding to buy your property, did you think of the purchase as an investment?"	(N=238)	(N=199)	(N=200)	(N=243)
"It was a major consideration"	56.3	63.8	48.0	44.0
"In part"	40.3	31.7	45.0	45.7
"Not at all"	4.2	4.5	7.0	10.3
"Why did you buy the home that you did?"	(N=238)	(N=199)	(N=199)	(N=246)
"Strictly for investment purposes"	19.8	37.2	15.6	18.7
"Buying a home in ____ today involves:"	(N=237)	(N=192)	(N=197)	(N=237)
"A great deal of risk"	3.4	4.2	5.1	5.9
"Some risk"	33.3	40.1	57.9	64.6
"Little or no risk"	63.3	55.7	37.1	29.5

Table 7

Current Price Expectations

Percent of Responses (except as indicated)

Question	Boom Markets		Post-Boom	Control
	Anaheim	San Francisco	Boston	Milwaukee
"Do you think that housing prices in the ____ area will increase or decrease over the next several years?"	(N=240)	(N=199)	(N=194)	(N=233)
"Increase"	98.3	99.0	90.2	87.1
"Decrease"	1.7	1.0	9.8	12.9
"How much of a change do you expect there to be in the value of your home over the next 12 months?"	(N=217)	(N=185)	(N=176)	(N=217)
Mean	15.3	13.5	7.4	6.1
(Standard Error)	(.8)	(.6)	(.6)	(.5)
"*On average* over the next 10 years, how much do you expect the value of your property to change each year?"	(N=208)	(N=181)	(N=177)	(N=211)
Mean	14.3	14.8	8.7	7.3
(Standard Error)	(1.2)	(1.4)	(.6)	(.5)
"Which of the following best describes the trend in home prices in the ____ area since January 1988?"	(N=239)	(N=196)	(N=198)	(N=230)
"Rising rapidly"	90.8	83.7	3.0	8.7
"Rising slowly"	8.8	12.8	34.3	53.0
"Not changing"	.4	3.1	37.4	23.9
"Falling slowly"	0	.5	22.2	11.7
"Falling rapidly"	0	0	3.0	2.6
"It's a good time to buy because housing prices are likely to rise in the future."	(N=206)	(N=180)	(N=171)	(N=210)
"Agree"	93.2	95.0	77.8	84.8
"Disagree"	6.8	5.0	22.2	15.2
"Housing prices are booming. Unless I buy now, I won't be able to afford a home later."	(N=200)	(N=167)	(N=169)	(N=194)
"Agree"	79.5	68.9	40.8	27.8
"Disagree"	20.5	31.1	59.2	72.2
"There has been a good deal of excitement surrounding recent housing price changes. I sometimes think that I may have been influenced by it."	(N=230)	(N=191)	(N=181)	(N=233)
"Yes"	54.3	56.5	45.3	21.5
"No"	45.7	43.5	54.7	78.5
"In conversations with friends and associates over the last few months, conditions in the housing market were discussed."	(N=238)	(N=195)	(N=198)	(N=235)
"Frequently"	52.9	49.7	30.3	20.0
"Sometimes"	38.2	39.0	55.1	50.2
"Seldom"	8.0	9.7	12.1	25.1
"Never"	.8	1.5	2.5	4.7

mistic than those in Boston and Milwaukee. Of 440 respondents from California, only two said prices were falling and five thought prices were not changing.

When asked how much they thought that their property would appreciate over the next 12 months and over the next 10 years, the respondents' answers were enormously varied. There were significant modes at 5, 10 and 15 percent in all four cities for both questions. In California, there were significant modes at 10, 15 and 20 percent. The average expected annual increase for buyers in California was in the 15 percent range, while for Milwaukee and Boston, the figures were roughly half as high.

Three questions probed whether expected price increases actually influenced the decisions to buy. The answer seems to be an overwhelming "yes." Even in Boston, 77.8 percent reported that it was a good time to buy because prices were likely to rise in the future. For Milwaukee the figure was 84.8 percent, while it was well over 90 percent in both California cities. At least one-quarter of the buyers in all markets and at least two-thirds of the California buyers expressed a fear of being unable to afford to buy a home in the future. Over half of the buyers in the boom cities worried that they might have been influenced by the excitement surrounding recent housing price movements.

Finally, the enthusiasm expressed in the boom cities seems to have a social basis. There is significantly more discussion among friends and associates in the California markets surveyed.

Interpretations of Booms. A number of specific questions were designed to probe people's interpretations of price movements and possible triggers that changed their opinions. It is critical to distinguish between mob psychology, excessive optimism and a situation in which a solid reason to expect price increases exists. Since most people expressed a strong investment motive, one would assume significant knowledge of underlying market fundamentals. The efficient markets hypothesis assumes that asset buyers make rational decisions based on all available information and based on a consistent model of underlying market forces.

The survey reveals little real knowledge of or agreement about the underlying causes of price movements. Rather than citing any concrete evidence, people retreat into clichés and images. Table 8 presents a tabulation of two important open-ended questions. Respondents were asked to explain recent price changes and also to report on any specific events that changed the trend in prices. Nearly all respondents read these questions to be asking for the same information, so we tabulated them together.

In all four cities, interest rate changes are cited as a major factor. First of all, interest rates are virtually identical everywhere, and housing prices have been relatively stable in the regions between the coasts. Second, while there has been some recent movement upwards in interest rates, forecasters are hardly unanimous in their predictions about future movements. Finally, housing price movements in Boston and Milwaukee have been dramatically different from price movements in California. It is hard to understand how price changes in all four cities can be driven by interest rates.

Second in overall frequency were general comments about the local economy, such as "strong local economy" or "growing regional economy." None of these references cited any specific evidence of such strength or any detail about its character. It may be that further probing was needed to expose more specifics, but since there was plenty of space to write on the questionnaire we must take the responses at face value.

The survey reveals little knowledge of or agreement about the underlying causes of price movements.

The responses to questions in this section leave the strong impression that people look to observed price movements to form their expectations and then look around for a logic to explain and reinforce their beliefs: "It's a nice place to live;" "Asians are buying up our land;" "The economy is strong." Irrelevant stories that make a vivid impression tend to be cited: "There is just too much traffic around here."

Among the most popular clichés were "The region is a good place to live" and "there is not enough land." Neither of these is news and neither could explain a sudden boom. We also asked *explicitly* whether the boom was due to the area's being a desirable place to live, and whether the real problem was that there was not enough land available (table 9). (We asked these questions because we had observed in pretesting telephone interviews that people in boom

Table 8

Popular Themes Mentioned in Interpreting Recent Price Changes

Percent of All Tabulated Questionnaires, by City

Question[a]	Boom Markets: Anaheim	Boom Markets: San Francisco	Post-Boom: Boston	Control: Milwaukee
"What do you think explains recent changes in home prices in ____? What ultimately is behind what's going on?"				
"Was there any event (or events) in the last two years that you think changed the trend in home prices?"				
References to Fundamentals				
National				
Interest rate changes	31.7	39.5	24.5	27.0
Stock market crash	1.7	2.1	25.0	2.0
Demographics—baby boom	1.3	5.1	4.0	1.2
Tax law changes	1.3	4.1	3.0	2.0
Other national economic changes	1.7	5.1	8.5	2.9
Regional				
Region is a good place to live	16.7	17.9	6.0	2.4
Immigration or population change	20.4	8.2	11.0	2.4
Asian investors	2.9	27.2	0	0
Asian immigrants	2.1	13.8	.5	0
Income growth	2.5	1.5	2.0	1.2
Anti-growth legislation	10.8	3.1	0	0
Not enough land	7.5	18.5	2.0	.4
Local taxes	2.9	0	4.0	9.8
Increasing black population	.4	0	0	6.6
Rental rates and vacancies	.8	2.6	6.5	2.0
Traffic congestion	3.8	7.2	0	0
Local economy—general	25.4	4.6	29.5	18.4
Psychology of the housing markets[b]	5.4	7.1	18.0	.8
Quantitative evidence[c]	0	0	0	0
No answer	15.8	17.9	20.0	18.4

[a] To tabulate these two open-ended questions, 60 questionnaires from each of two cities, Anaheim and San Francisco, were independently coded by two coders. In addition, 60 questionnaires from the Boston sample were coded by three coders. Intercoder reliability was tested by calculating the simple correlation coefficient between the raw number of responses in each category across coders. The correlation for Anaheim was .986 and for San Francisco .969. For Boston, three coefficients could be calculated: .953, .976 and .985. For cities used in the reliability test, the final score in each category is the simple average across coders. The remaining questionnaires were coded by just one coder.

[b] Any references to panic, frenzy, greed, apathy, foolishness, excessive optimism, excessive pessimism or other such factors were coded in this category.

[c] Coders were asked to look for any reference at all to any numbers relevant to future supply or demand for housing or to any professional forecast of supply or demand. The numbers need not have been presented, so long as the respondent seemed to be referring to such numbers.

cities tended to say this.) Respondents in boom cities very largely answered "yes" to these questions. We were careful to ask the open-ended questions at the beginning of the questionnaire and the explicit ones at the end to ensure that we did not suggest answers. It should be noted, moreover, that it is one of the strengths of our method that the same questionnaire was distributed in the different cities. Very few people mentioned these clichés in Milwaukee.

Most participants in housing markets do not attribute market events to the psychology of other investors. We see from table 8 that "psychology of the market" was mentioned by housing market participants in fewer than 10 percent of the responses, except for Boston where the figure was 18 percent. We also asked explicitly whether respondents preferred to describe their own theory about recent trends as one about psychology or one about economic funda-

mentals (table 9). In all four cities fewer than a quarter picked psychology. This is also consistent with evidence in Pound and Shiller (1987) about institutional investors in corporate stocks, most of whom thought that prices were driven by fundamentals, even in a stock whose price had boomed and had high price-earnings ratios. However, a similar question was put to investors right after the stock market crash of October 1987, and the answers were quite different. About two-thirds of both individual and institutional investors in the United States thought the crash was due to market psychology (Shiller 1987), while three-quarters of Japanese institutional investors thought the crash was due to market psychology (Shiller, Konya and Tsutsui 1988). Perhaps popular boom theories emphasize fundamentals as causes of upward price movements (despite the fact that irrational behavior is thought to be present), while sudden crashes are thought to be due to panic.

An especially striking feature of the coded answers in table 8 is that not a single respondent referred to explicit quantitative evidence relevant to

Table 9
Buyers' Interpretations of Recent Events
Percent of Responses

Question	Boom Markets: Anaheim	Boom Markets: San Francisco	Post-Boom: Boston	Control: Milwaukee
"Housing prices have boomed in ____ because lots of people want to live here."	(N=210)	(N=178)	(N=181)	(N=193)
"Agree"	98.6	93.3	69.6	16.1
"Disagree"	1.4	6.7	30.4	83.9
"The real problem in ____ is that there is just not enough land available."	(N=197)	(N=174)	(N=168)	(N=192)
"Agree"	52.8	83.9	54.2	17.2
"Disagree"	47.2	16.1	45.8	82.8
"When there is simply not enough housing available, price becomes unimportant."	(N=197)	(N=165)	(N=171)	(N=193)
"Agree"	34.0	40.6	26.9	20.7
"Disagree"	66.0	59.4	73.1	79.3
"Which of the following better describes your theory about recent trends in home prices in ____?"	(N=226)	(N=180)	(N=188)	(N=215)
"It is a theory about the psychology of home buyers and sellers."	11.9	16.7	21.3	10.7
"It is a theory about economic or demographic conditions, such as population changes, changes in interest rates or employment."	88.1	83.3	78.7	89.3
"In a hot real estate market, sellers often get more than one offer on the day they list their property. Some are even over the asking price. There are also stories about people waiting in line to make offers. Which is the best explanation?"	(N=210)	(N=177)	(N=176)	(N=211)
"There is panic buying, and price becomes irrelevant."	73.3	71.2	61.4	34.6
"Asking prices have adjusted slowly or sluggishly to increasing demand."	26.7	28.8	38.6	65.4

Table 10
Upward Rigidity in Asking Prices
Percent of Responses (except as indicated)

Question[a]	Boom Markets: Anaheim	Boom Markets: San Francisco	Post-Boom: Boston	Control: Milwaukee
"Did you finally settle on a price that was:"	(N=237)	(N=194)	(N=200)	(N=242)
"Above the asking price"	6.3	9.8	.5	3.3
"Equal to the asking price"	38.0	26.8	23.5	22.7
"Below the asking price"	55.7	63.4	76.0	74.0
"If you had asked 5 to 10 percent more for your property, what would the likely outcome have been?"	(N=89)	(N=64)	(N=61)	(N=43)
"It wouldn't have sold."	21.3	23.4	31.1	32.5
"It would have sold, but it would have taken much more time."	44.9	46.9	54.1	37.2
"If buyers had to pay that much, they might not be able to obtain financing (a buyer cannot obtain financing unless an appraiser confirms the worth of the property)."	7.9	9.4	0	9.3
"It probably would have sold almost as quickly."	24.7	17.2	11.5	16.3
"Other"	1.1	3.1	3.3	4.7
"If you answered that it would have sold almost as quickly, which of the following (you can check more than one) explains why you didn't set the price higher?"[a]	(N=37)	(N=22)	(N=26)	(N=16)
"The property simply wasn't worth that much."	32.4	27.3	38.5	25.0
"It wouldn't have been fair to set it that high; given what I paid for it., I was already getting enough for it."	16.2	22.7	15.4	31.3
"I simply made a mistake or got bad advice; I should have asked more."	21.6	18.2	19.2	25.0
"Other"	29.7	31.8	26.9	18.8
"In the six months prior to the time you first listed the property, did you receive any unsolicited calls from a real estate agent or any one else about the possibility of selling your house?"	(N=89)	(N=61)	(N=62)	(N=48)
"Yes"	71.9	59.0	38.7	52.1
"No"	28.1	41.0	61.3	47.9
Approximate number of calls				
Mean	8.7	5.0	3.9	2.7
(Standard Error)	(1.2)	(.3)	(.4)	(.2)

[a] Some respondents answered this question even though they had not replied "It probably would have sold almost as quickly" to the previous question. All the responses to this question have been included in the tabulation.

future supply of or demand for housing. We did not ask explicitly for such evidence, but among 886 responses one would expect some to volunteer such evidence if it figured prominently in their views.

Excess Demand and Upward Rigidity in Asking Prices. In boom cities, newspaper accounts feature stories of homes that sold well above the asking price, interpreting this phenomenon as evidence of investor frenzy or panic. Recall the examples of such newspaper accounts from our discussion of the current boom in California. The view that excess demand is evidence of investor panic is also very popular among

market participants in the boom cities, as the last question in table 9 indicates. It is likely that the local media had some success in spreading the notion that prices above asking prices are evidence of panic, since this view was much more common in the boom cities than in the control city.

The news media seem to exaggerate the importance of such sales above asking price. In fact, houses selling above the asking price were reported in all our cities (table 10), so the fact that a newspaper reporter can find examples is not much evidence of a boom market. The incidence of such sales was higher in the boom cities than in our control city, but was still only about 6 to 10 percent. The prevalence of such examples is better at discriminating between boom and post-boom cities; fewer than 1 percent of houses in our sample sold above the asking price in Boston.

We also sought evidence why some sellers did not raise their asking price more (table 10). Those who thought they might have asked more often agreed that notions of intrinsic worth or fairness played a role in their decision.

Real estate agents in the boom cities told us that, because of the excess demand situation, they found it profitable to spend more time soliciting listings, rather than showing houses to potential buyers. The responses to the last question in table 10 largely confirm that real estate agents were behaving as this would suggest.

Excess Supply and Downward Rigidity in Asking Prices. A third important aspect of behavior in housing markets is seller behavior in post-boom markets or generally soft markets. There is a good deal of worry that these booms will end, as most stock market booms end, in collapse. If, indeed, what we are observing in Orange County and San Francisco can appropriately be called "bubbles," won't they inevitably burst?

One theory holds that housing prices are downwardly rigid, and that this rigidity is likely to prevent major real estate collapses in the absence of a general economic collapse. Significant reasons exist to predict such rigidity. First, the housing market is very different from the stock market. In the stock market, people can exit their equity positions quickly and almost without cost. The analog of a Treasury Bill in the housing market is moving to a rental unit. For those with considerable equity this would mean paying large capital gains taxes and a 6 percent brokerage fee, as well as putting up with the aggravation of a move. Thus, the transactions costs are very large.

Second, investors have an alleged psychological disposition to sell their winning investments (to have the satisfaction of getting their money), and to hold on to losing investments (to avoid the pain of regret; see Shefrin and Statman 1985). Ferris, Haugen and Makhija (1988) have found evidence for this "disposition effect" by documentation that the volume of trade in stock whose value has declined is lower than in stocks that have increased in value.

In addition, the popular impression is that past experience has shown that waiting may pay off, perhaps the best example being California in 1981. After four years of boom, housing prices stopped rising. While it is clear that some people lost money in the real estate market, many simply decided to wait it out; the number of transactions dropped to very low levels, and median price never fell in nominal terms. Since 1983, prices have again been on the rise.

Table 11 presents evidence on seller behavior in markets with excesss supply. All respondents were asked to react to the first statement on table 11. Nearly 70 percent of respondents in California agreed with the statement that the best strategy in a slow market is to hold on until you get what you want. In Boston and Milwaukee more than half agree.

The remaining questions were asked of those who had sold or tried to sell a property immediately prior to buying the one that they bought. This relatively small sample is likely to be a biased sample of all sellers. Recall that these sellers are the ones who actually bought new homes. If a seller was unable to sell her house, did not lower her price, and ultimately decided not to buy a new house, she is not in our sample. Thus, those who were at least somewhat flexible are likely to be over-represented.

The popular impression is that waiting may pay off in the housing market.

Buyers who had sold or tried to sell a home prior to buying their present unit were 39.6 percent of the total respondents in Anaheim, 32.6 percent in San Francisco, 32.8 percent in Boston, and 21.3 percent in Milwaukee. Since the vast majority of this group (over 90 percent in all cities except Milwaukee where the figure was 84.3 percent) had actually sold their

Table 11

Excess Supply and Downward Rigidity in Asking Prices

Percent of Responses

Question[a]	Boom Markets: Anaheim	Boom Markets: San Francisco	Post-Boom: Boston	Control: Milwaukee
"Since housing prices are unlikely to drop very much, the best strategy in a slow market is to hold on until you get what you want for a property."	(N=174)	(N=148)	(N=160)	(N=180)
"Agree"	69.0	69.6	57.5	50.6
"Disagree"	31.0	30.4	42.5	49.4
"If you had not been able to sell your property for the price that you received, what would you have done?"	(N=88)	(N=62)	(N=61)	(N=43)
"Left the price the same and waited for a buyer, knowing full well that it might take a long time"	42.0	38.7	32.8	32.6
"Lowered the price step by step hoping to find a buyer"	20.5	38.7	42.6	20.9
"Lowered the price till I found a buyer"	4.5	3.2	4.9	7.0
"Taken the house off the market"	18.2	17.7	11.5	27.9
"Other"[a]	14.8	1.6	8.2	11.6
"If you responded that you *would have* lowered your price, is there a limit to how far you would have gone if the property still hadn't sold?"[b]	(N=33)	(N=38)	(N=29)	(N=16)
"Yes"	81.8	78.9	93.1	87.5
"If you answered yes to the above question, can you say how you arrived at that limit?" (Open-ended)	(N=24)	(N=28)	(N=21)	(N=10)
"Based on what I paid"	29.2	21.4	19.0	30.0
"Based on price of another home that I want to buy"	33.3	35.7	38.1	20.0
"Based on what other, similar homes have sold for"	37.5	42.9	42.9	50.0
"If your property did not sell, presumably it would have if you had lowered your asking price more. If you considered doing so but decided not to, can you say why?"	(N=19)	(N=18)	(N=13)	(N=13)
"My house is worth more than people seem to be willing to pay right now"	15.8	11.1	7.7	38.5
"I can't afford to sell at a lower price"	26.3	33.3	23.1	15.4
"By holding out, I will be able to get more later"	31.6	44.4	15.4	7.6
"Other"[c]	26.3	11.1	53.9	38.5

[a] The most frequently mentioned "other" categories were company buy-out provisions and that sellers would rent the property out.

[b] Includes responses by those who did not answer the previous question by saying they would have lowered the price.

[c] Many of the "other" responses made reference to time, as in "I was in no hurry," "I was not anxious about selling," or "I had no need to sell."

properties, the only way to probe the issue was with a hypothetical question. We asked, "If you had not been able to sell your property for the price that you received, what would you have done?" Only a very small fraction said that they would lower their price until they found a buyer—the market-clearing solution.

A significant percentage (between 20 and 40 percent) in each city said that they would lower the price step by step, looking for a buyer. However, when probed further, more than three-quarters in all cities reported that there was a limit to how far they would drop the price: surprisingly the figures were highest in Boston and Milwaukee, 93.1 percent and 87.5 percent respectively. Most of them seemed to have some knowledge of what comparable homes had sold for, and they did not want to sell for less.

The "other" category in the second question reported in table 10 reveals two additional sources of downward rigidity. Several respondents mentioned that their employer had a buy-out program for employees who could not sell. What they really meant was a buy-out plan for employees who could not sell at the price that they wanted to get. A number of others reported simply renting out their first property.

Finally, the small group of sellers who had not sold their properties were asked why they did not simply drop their price. Some of the same notions of fairness or intrinsic worth that played a role in the upward rigidity studied above appear to play a role here. Others said they could not afford to sell, and still others expressed optimism that they could sell at a higher price eventually.

IV. Interpretations and Conjectures

What have we learned about sources of the booms that from time to time appear in local housing markets? Evidence in this paper supports the view that the suddenness of booms has to be understood in terms of investor reactions to one another, to past price increases, or to other evidence of boom markets, rather than to economic fundamentals. Of course, we did not look at data on fundamentals in this paper, and the paper that one of us did on the impact of fundamentals on city housing prices (Case 1986) is certainly not the last word on the subject. But we have in this paper provided some evidence that investors in housing markets do not know fundamentals. They tend to interpret events in terms of hearsay, clichés, and casual observations. Moreover, we have seen that investment motivations are high on their list of incentives, and that home buyers in booms expect still more appreciation of housing prices and are worried about being priced out of the housing market in the future. It is certainly plausible that expectations heavily influence the prices people are willing to pay in these markets. Because these expectations do not appear to make much sense except as extrapolations of past price changes, we cannot expect prices to be rationally determined.

But what *starts* a housing boom; why does it occur in one year and not another? We asked home buyers what they thought was going on, and whether they could name an event that they thought changed the behavior of housing prices. The most popular answer in all cities was a change in interest rates, but interest rates do not differ much across cities and so cannot be the explanation of the differing price behavior. Moreover, interest rates were cited as the cause of the boom in California and as the cause of stagnation in Boston. For the most part, respondents did not produce another event. The most plausible-sounding event in Anaheim (proposed anti-growth legislation) was quite different from the most plausible-sounding event in San Francisco (the entrance of Asian investors into the market), and yet the pattern of price changes was similar in the two cities. The events may instead be after-the-fact rationalizations of the price movements, just as the October 1987 stock market crash was brought up mainly in Boston, where an explanation of a slump was needed.

Investors do not know economic fundamentals. Expectations heavily influence the prices people are willing to pay.

The trigger is apparently an event or sequence of events not observed by most home buyers. Since the ultimate trigger is not the factor in the minds of investors, it could even be something that was not observed by *any* investors, except through price. For example, demographic change or income growth could cause an initial price increase, to which home

buyers reacted. Perhaps home buyers in California in 1987 and 1988 were also more primed to react to a price increase, having heard stories of the boom in the Northeast.

Another puzzle concerns the slowness of the booms: why do booms extend over years, and not accelerate and terminate very quickly? Our survey results offer only marginal help in conjectures regarding this question. The notion expressed by some investors that they were motivated by a sense of intrinsic worth and comparisons with past prices may suggest that there is a psychological resistance to very rapid price increases. It is of course true that there are barriers to professional speculators entering and closing off profit opportunities in the market for single-family homes; that is why we were not surprised to find persistence in price changes in our earlier study of the efficiency of housing prices (Case and Shiller 1989). Ordinary individuals, who are not investment professionals, should be expected to take more time before investing. Such action may involve a change in living arrangements, and may well take months or years.

Evidence of price rigidity appeared to be more significant in falling markets than in rising markets.

Respondents were somewhat inconsistent in their reporting of their impression that psychological factors were responsible for the booms. We saw that about half of respondents in boom cities thought they themselves were influenced by the excitement, and that most interpreted houses selling above asking prices as evidence of panic. Yet other evidence in tables 8 and 9 indicates that most investors do not think that market psychology is the best explanation for booms, citing fundamentals instead. Perhaps we should conclude that social psychology is an important factor in the transmission of booms, but that individuals' perceptions of the psychology of others are less so.

Some houses sell above asking price in all cities. Apparently newspapers feature such stories in boom cities because they are perceived as relevant to the big story of area-wide price increases. In a city not experiencing such price increases, such occurrences are more likely to be interpreted as evidence of simple errors in setting the asking price, and are not thought to be particularly newsworthy.

If such occurrences reflect mistakes by a small minority of sellers in setting the asking price, then it is to be expected that such errors will occur more frequently in cities that are currently experiencing increases if some sellers are slow to adjust their price. Perhaps occurrences of sales price above asking price ought to be interpreted as nothing more than that. On the other hand, some of the answers reported in table 10 suggest that notions of a fair price or of intrinsic worth may also play a role in the sluggishness of price changes. Kahneman, Knetsch and Thaler (1986) have documented the importance of notions of fairness in many economic decisions. The same notions of fairness arise also in answers to questions as to why those who had trouble selling houses did not cut their prices more.

Evidence of price rigidity appeared to be more significant in falling markets than in rising markets. Only about 5 percent of the respondents in the post-boom city Boston who had not sold their former property said they would continue to lower the price until a buyer was found. One possible explanation of the downward rigidity in housing prices comes from the prospect theory of Kahneman and Tversky (1979). In their theory, losses and gains are viewed very differently, and the point from which individuals measure whether they have made a gain or loss may be determined by the frame of reference that attracts their attention.[3]

The regret theories of Bell (1982) and Loomis and Sugden (1982) have similar implications. However, as we saw above, other interpretations of the rigidity are possible. Popular impressions as to the likely course of future prices are also at work here. The fact that a high a proportion of home buyers in all cities thought there was little risk in the housing market reflects a popular view that one cannot lose in this market; houses are always a safe investment, so long as one holds out long enough.

Another reason chosen by those who could not sell was that "I can't afford to sell at a lower price." Since all of the respondent sellers had subsequently bought another house, it is likely that an important factor in this judgment was the price of the other house they bought. If all real estate prices are too high, one may find it difficult to cut the asking price on one's own house, since one cannot coordinate this price cut with the seller of the house one wishes to

purchase. Part of the problem in downward rigidity of housing prices may then be a coordination problem of the kind that economic theorists have stressed in other contexts.[4] If we could all agree at once to cut the prices of our houses, we might all be happy, but I can't be the first one to cut.

All these reasons for downward rigidity in prices may be interrelated. If the coordination problem prevents prices from falling, this creates an impression that they should not fall and therefore an impression that it pays us to hold out; this impression heightens the regret experienced if one cuts price.

Conclusions

All of this suggests a market for residential real estate that is very different from the one traditionally discussed and modeled in the literature. In a fully rational market, prices would be driven by fundamentals such as income, demographic changes, national economic conditions and so forth. Investors in such a market would use all available information on potential changes in fundamentals to forecast future price movements, making prolonged price swings impossible and profit opportunities rare. Resources including access to popular regions would be efficiently allocated.

The survey results presented here and actual price behavior together sketch a very different picture. While the evidence is circumstantial, and we can only offer conjectures, we see a market driven largely by expectations. People seem to form their expectations on the basis of past price movements rather than any knowledge of fundamentals. This increases the likelihood that price booms will persist as home buyers in essence become destabilizing speculators.

We also found significant evidence that in the absence of a severe economic decline, housing prices are inflexible downward. Combined with upward volatility, this inflexibility has produced a ratcheting effect in some boom cities with complicated distributional consequences, as owners gain at the expense of non-owners at all levels of income.

At this point we are not prepared to offer or even speculate about possible policy conclusions. We only hope that further research will help shed more light on this still puzzling market.

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[1] See Dreier, Schwartz, and Greiner (1988).

[2] *The Boston Globe*, February 17, 1988, p. B1.

[3] Kahneman and Tversky write that "This analysis suggests that a person who has not made peace with his losses is likely to accept gambles that would be unacceptable to him otherwise" (1979, p. 287).

[4] For example, Keynes's theory of the downward rigidity in wages in a depression was that "since there is, as a rule, no means of securing a simultaneous and equal reduction of money-wages in all industries, it is in the interest of all workers to resist a reduction in their own particular case" (1936, p. 264).

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