

## INTERNATIONAL REAL ESTATE REVIEW

2014 Vol. 17 No. 2: pp. 223 – 240

# Why Are Some Home Values Resistant and Others Resilient?

### **Gary Smith**

Department of Economics, Pomona College, 425 North College Avenue, Claremont CA 91711. E-mail: [gsmith@pomona.edu](mailto:gsmith@pomona.edu). Phone: 909-624-7935; Fax: 909-621-8576.

Data for 116 California communities reveal considerable variation in changes in the value of owner-occupied homes during 2005-2010, variation that is related to the price/rent ratios that existed in 2005, number of rental properties in the community, increase in home values between 2000 and 2005, and a variety of socioeconomic factors.

### **Keywords**

Housing Bubble; Home Prices; Residential Real Estate

## 1. Introduction

It is widely believed that the Great Recession that began in the United States in 2008 was at least partly due to the deflation of a nationwide housing bubble and the subsequent disappearance of lending to small businesses and homebuyers—an abrupt change from No Income, No Jobs and no Assets (NINJA) loans to No Loans to Anyone (NLA) loans. Yet, home prices increased in some communities during the financial meltdown and rebounded quickly in others. Why were some home prices resistant and others resilient?

Smith and Smith (2006, 2008) argue that the economic value of a house depends on its rent savings less the mortgage payment and other expenses—a difference that they call the “home dividend”. They argue that 2005 home prices in some communities (like Fishers, Indiana) were well justified by substantial home dividends, while prices in other communities (like Las Vegas) were far above the economic values. If this analytic framework is correct, then the home dividend may help to explain resistance and resilience.

California is one of the largest and most diverse areas in the United States. Home prices collapsed in many California communities between 2005 and 2010, but there was enormous heterogeneity (think Victorville and San Marino), which makes California a valuable source of information for identifying the factors that affected housing prices during the 2005-2010 collapse.

## 2. Bubbles

A corporate stock can be thought of as a money machine that generates a cash flow every year. The *economic value*  $V$  of this machine is the amount that you would pay to receive this cash flow:

$$V = \frac{X_1}{(1+R)^1} + \frac{X_2}{(1+R)^2} + \dots \quad (1)$$

where  $X$  is the cash flow and  $R$  is the required rate of return, which depends on the returns available on a safe investment and any characteristics (including risk) that make this money machine more or less desirable than the safe alternative investments.

For dividend-paying stocks, the  $X$  are the dividends. More generally, the  $X$  values are the free cash flow, or equivalently, the economic value added—the firm’s earnings net of the cost of financing the capital that produced these earnings (for example, Saint-Pierre, 2009).

A stock bubble occurs when speculators push the price of a stock far above its economic value. In contrast to investors who buy stock for the cash flow, speculators buy stock to sell soon afterward for a profit. To speculators, a stock is worth what someone else will pay for it, and the challenge is to guess what others will pay tomorrow for what you buy today. This guessing game is the greater fool theory: buy something at an inflated price, hoping to sell it to an even bigger fool at a still higher price.

In a speculative bubble, the price of the money machine rises far above its economic value because people are not buying the machine for the cash flow, but so that they can sell the machine to someone else for a higher price. They expect the price to go up in the future simply because it went up in the past. The bubble pops when speculators stop thinking that the price of the machine will keep going up forever. They start selling and the price collapses because people will not pay a speculative price unless they believe that they can sell it for an even higher price. When they stop believing, the party is over.

A good example is Beanie Babies, which are stuffed animals made by Ty Warner with a heart-shaped hang tag. The beanie name refers to the fact that these toys are filled with plastic pellets called beans. Around 1995, Beanie Babies came to be viewed as “collectibles” because buyers expected to profit from rising Beanie Baby prices. Delusional individuals stockpiled Beanie Babies, thinking that these would pay for their retirement or the college education of their children.

What is the economic value of a Beanie Baby? It does not pay dividends. It does not pay anything! You cannot even play with a Beanie Baby. To preserve their value as a collectible, Beanie Babies must be stored in air-tight containers in a dark, cool, and smoke-free environment. Yet, the hopeful and greedy paid hundreds of dollars for Beanie Babies that were originally sold in toy stores for a few dollars. People saw how much prices had increased in the past and assumed the same would be true in the future. They had no reason for believing this, but they wanted to believe.

The Beanie Baby Princess that honored Diana, Princess of Wales, sold for \$500 in 2000. Then the bubble popped. Once prices started to fall, there was no longer any reason to buy Beanie Babies, except as toys or a reminder of the Beanie Baby madness. By 2008, the Beanie Baby Princess could be purchased on Amazon or eBay for less than \$10.

## **2.1 Dot-Com Bubble**

In the mid-1990s, the spread of the Internet sparked the creation of hundreds of Internet-based companies, popularly known as dot-coms. Some dot-coms had good ideas and have matured into strong, successful companies. However,

many did not. In too many cases, the idea was simply to start a company, sell it to someone else, and then walk away with pockets full of cash.

A dot-com company proved that it was a player not by making profits, but by spending money, preferably other people's money. One rationale was to be the first-mover by getting big fast (a popular saying was "get large or get lost"). The idea was that, once people believe that your web site is the place to go to buy, sell, or learn something, you have a monopoly that can crush the competition and reap profits. The problem is that, even if it is possible to monopolize something, there is not room for hundreds of monopolies. Of the thousands of companies trying to get big fast, very few can ever be monopolies.

Most dot-com companies had no profits. So, wishful investors thought up new metrics for the so-called New Economy to justify ever higher stock prices. Instead of looking at profits, they looked at a company's sales, spending, and web-site visitors. Helpful companies found ways to give investors what they wanted. Investors want more sales? I will sell something to your company and you sell it back to me. No profits for either of us, but higher sales for both of us. Investors want more spending? Order another 1,000 Aeron chairs. Investors want more web-site visitors? Give gadgets away to people who visit your web site. Buy Super Bowl ads that advertise your web site. Remember, investors want web site visitors, not profits. Two dozen dot-com companies ran ads during the January 2000 Super Bowl game, at a cost of \$2.2 million for 30 seconds of ad time, plus the cost of producing the ad. They did not need profits. They needed traffic.

Stock prices tripled between 1995 and 2000, an annual rate of increase of 25 percent. Dot-com stocks rose even more. The tech-heavy NASDAQ index more than quintupled during this 5-year period, an annual rate of increase of 40 percent. A fortunate person who bought \$10,000 of AOL stock in January 1995 or Yahoo stock when it went public in April 1996 would have had nearly \$1 million in January 2000. Stock market investors and dot-com entrepreneurs were getting rich and believed that it would never end; but, of course, it did.

Once it ended, it ended with a bang. There is no reason to pay a high price for stock in an unprofitable company unless you think that you can sell it for an even higher price. The NASDAQ peaked on March 10, 2000 and fell by 75 percent over the next three years. AOL fell 85 percent, Yahoo, 95 percent. During the dot-com bubble, most people did not use dividends or earnings to gauge whether stock prices were too high, too low, or just right. Instead, they watched stock prices go up and hoped that the supply of bigger fools would never end.

The key to recognizing a bubble is compare the price to the cash flow—to think of a stock as a money machine and what this money machine is really worth.

### **3. 2000-2005 Housing Bubble**

U. S. home prices increased by almost 50 percent between 2000 and 2005, and more than 100 percent in some hot markets, leading many knowledgeable people to argue that this was a speculative bubble that rivaled the dot-com bubble in the 1990s.

The evidence of a bubble in residential real estate prices was suggestive, but indirect, in that it did not compare housing prices to the cash flow provided by houses. For example, Case and Shiller (2003) used the ratio of housing prices to household income to gauge whether houses are affordable. However, the affordability of a house does not tell us whether the price is above or below its economic value. Berkshire Hathaway stock sells for more \$100,000 a share. It is not affordable for most investors, but it may be worth the price!

In addition, the ratio of housing prices to income does not really measure affordability. A better measure would be the ratio of mortgage payments to income. Mortgage rates fell dramatically in the 1980s and 1990s, and the ratio of mortgage payments on a constant-quality new home to median family income fell steadily too, from 0.35 in 1981 to 0.13 in 2003 (McCarthy & Peach 2004).

The Local Market Monitor, which was widely cited in the popular press, compared residential home prices in different cities by using a variation on the Case-Shiller approach. They calculated the ratio of an area's relative home prices (the ratio of a local home price index to a national home price index) to the area's relative income (the ratio of average local income to average national income). The extent to which the value of this ratio deviates from the historical average for this area is used to gauge whether homes are overpriced or underpriced. As with Case-Shiller, this ratio tells us nothing about whether prices justify the cash flow.

The National City Corporation used a multiple regression model that relates the ratio of housing prices to household income in a metropolitan area to historical prices, population density, mortgage rates, and the ratio of household income in this area to the national average. The amount by which actual market prices deviated from the prices predicted by the regression model was interpreted as the extent to which homes were overpriced or underpriced.

The National City approach assumes that past home prices fluctuated randomly around economic values. However, if current market prices are higher than the

values predicted by a multiple regression model that is based on historical prices, it may be because past prices were consistently below economic values. For example, Indianapolis had relatively stable housing prices that were easy to “explain” with multiple regression models. In the National City Corporation model, Indianapolis home prices varied between 11% underpriced and 17% overpriced during the years of 1985-2005. As National City considered deviations within plus or minus 15 percent to represent “fair value”, they concluded that Indianapolis houses have almost always been fairly valued.

In reality, the regression model does not tell us whether Indianapolis home prices were close to economic values. Smith and Smith (2006) directly estimate the economic value of Indianapolis homes and conclude that Indianapolis home prices have generally been far below economic value.

To estimate the economic value of a home, we have to look at the cash flow—what is being generated by the money machine. The cash flow from a house is not as obvious as the dividends and earnings of a company, but it is there. We all have to live somewhere. As shelter can be obtained by renting or buying, the implicit cash flow from an owner-occupied house includes the rent that would otherwise be paid to live in the house. If a household has the opportunity to buy or rent very similar properties (perhaps even the same property), then the relevant question is whether to pay for these housing services by buying or renting the house.

The annual cash flow from a home, what Smith and Smith (2006, 2008) call the “home dividend”, depends on the rental savings, mortgage payments, property taxes, tax savings, insurance, and maintenance costs. Once the projected cash flow is estimated, homes can be valued by using Equation 1, in the same way as stocks, bonds, and other assets, by discounting the cash flow by the required rate of return.

Admittedly, there are other considerations that make renting and owning different experiences. Renters may have different preferences (in paint colors and furnishings, for example) than do their landlords; renters cannot reap the full benefits of improvements they make to the property inside and out; and renters may have less privacy than owners. These are all arguments for why owning is better than renting, and to the extent that they matter, calculations based solely on the home dividend underestimate the value of homeownership.

A complete cash flow analysis from the perspective of a prospective buyer would also take into account the down payment and transaction costs when the home is purchased and sold (Smith & Smith, 2007). For cross-section studies of communities within a state (such as California), there is less variation in mortgage rates, property taxes, tax savings, insurance, and maintenance costs than there is in rents. So, price/rent ratios are a convenient proxy for comparing residential home prices to the annual cash flow (Leamer 2002; Krainer & Wei 2004).

However, just as stock prices over time are not a constant multiple of dividends or earnings, we should not expect the economic value of a house to be a constant multiple of rents over time. Among the many factors that affect the price/rent ratio are interest rates, risk premiums, growth rates, and tax laws (including property, income, and capital gains taxes). Just as with price-earnings ratios in the stock market, price-rent ratios in the housing market can rise without signaling a bubble, if for example, interest rates fall or there is an increase in the anticipated rate of rent growth. Nonetheless, price/rent ratios are a useful shorthand metric for gauging the housing market in the same way that price/earnings ratios are a useful shorthand metric for gauging the stock market.

### **3.1 Economic Value**

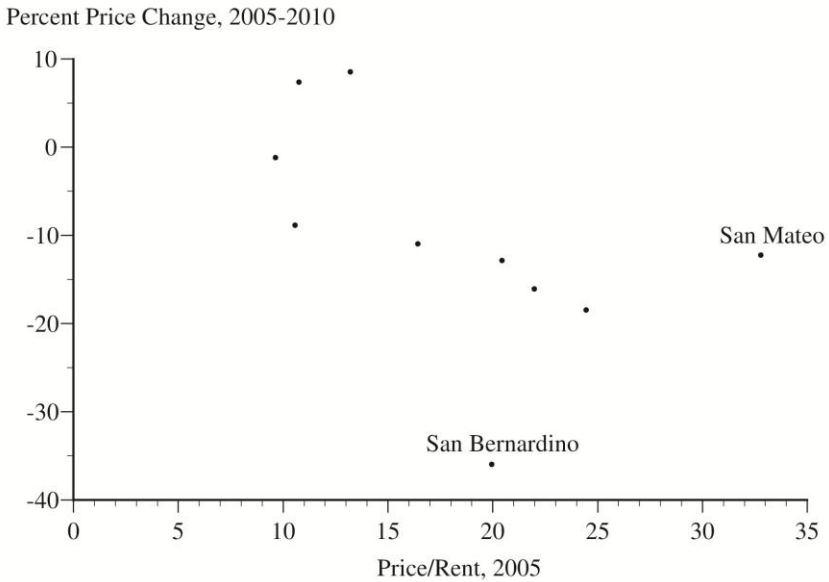
Smith and Smith (2006) estimate the cash flow and economic value of homes in ten U.S. metropolitan areas (Atlanta, Boston, Chicago, Dallas, Indianapolis, Los Angeles, New Orleans, Orange County, San Bernardino, and San Mateo) by using a unique set of data for matched single-family homes. By using a variety of plausible assumptions about economic factors, they conclude that buying a home in 2005 appeared to be an attractive long-term investment in many of these cities.

### **3.2 The Aftermath**

U.S. housing prices declined after 2005, in some areas calamitously, with disastrous effects on the economy. However, the nationwide House Price Index (HPI data, n.d.) of the Federal Housing Finance Agency fell by only 7.5 percent between 2005 and 2010. Collapsing home prices, foreclosed homes, and dried up lending were real and painful in Las Vegas, Miami, Phoenix, and many other cities, but home prices increased in Albany, Oklahoma City, Seattle, and elsewhere.

There was similar variations in the 2005-2010 price changes among the ten metropolitan areas studied in Smith and Smith (2006). Home prices fell by 36 percent in San Bernardino, but increased by 7 percent in Dallas and 9 percent in New Orleans. One possible explanation for these differences is the differing price/rent ratios. Figure 1 shows a clear inverse relationship in that those areas with the highest price/rent ratios in 2005 tended to experience the biggest price declines between 2005 and 2010, while those areas with the lowest price/rent ratios (Indianapolis, Atlanta, New Orleans, and Dallas) experienced only modest price declines, or even price increases. The two outliers are two very different communities, San Bernardino and San Mateo, which suggest that factors other than price/rent ratios matter, too.

**Figure 1 Relationship between 2005 Price/Rent Ratios and 2005-2010 Price Changes**



#### 4. California Communities

To investigate the role of price/rent ratios and other factors in the 2005-2010 changes in home prices, data were gathered from the American Community Survey, an annual survey of approximately three million randomly selected households conducted by the U. S. Census Bureau. These data have several advantages, including consistent definitions and methodology. Survey data are available for 116 California communities, mostly cities, but occasionally parts of large cities (for example, East Los Angeles). The complete list of California communities is in Appendix 1.

For owner-occupied homes, the survey determined housing values by asking the respondents to estimate how much their property would sell for if it was for sale. The variable HomeValue used in this paper is the median of these housing values, in thousands of dollars. My two measures of changes in home values are:

$$\begin{aligned} \% \text{ Value}_{2005} &= \text{percent change in HomeValue between 2000 and 2005} \\ \% \text{ Value}_{2010} &= \text{percent change in HomeValue between 2005 and 2010} \end{aligned}$$

The variable, Rent, is the median gross annual rent for renter-occupied housing units, in thousands of dollars. Rent includes contract rent plus utilities and fuel if these are paid by the renter.



Figure 2 shows the distribution among these 116 communities of the percentage change in the median value of owner-occupied housing units between 2000 and 2005. Home values increased in every single community, which ranged from 21 percent in Mountain View to 198 percent in Santa Maria. The average change is 134 percent, and the median change is 139 percent.

**Figure 2 Percentage Changes in Home Values in 116 California Communities, 2000-2005**

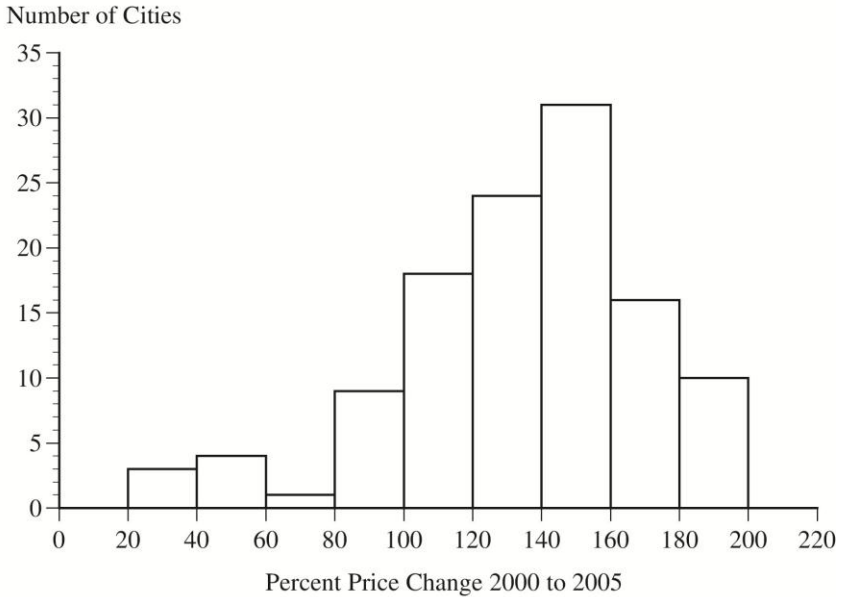
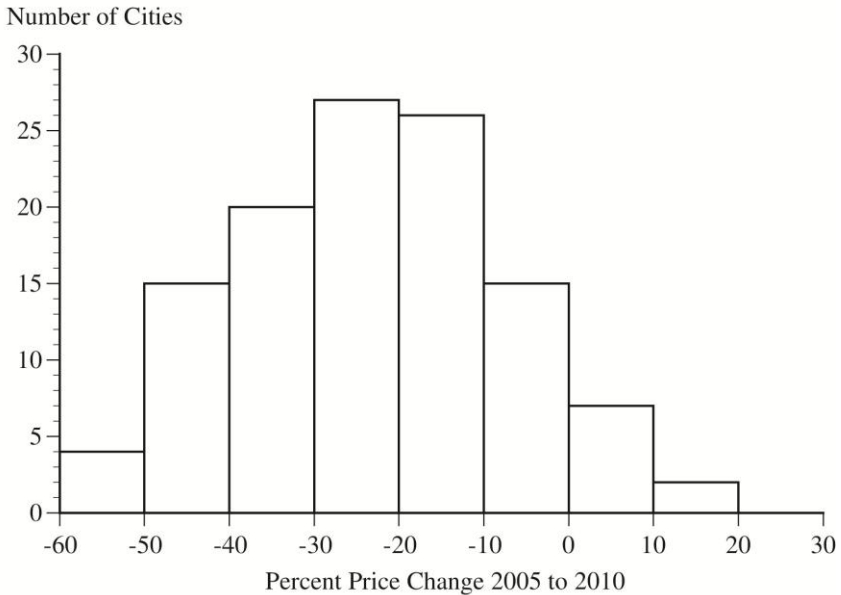


Figure 3 shows that California home values generally went the other way between 2005 and 2010. Median home values fell in 106 of these 116 communities, with the values falling by 50 percent or more in five communities: Antioch, Merced, Salinas, Moreno Valley, and Stockton. On the other hand, home values increased by 16 percent in Santa Monica, 11 percent in Alhambra, and 7 percent in Berkeley. Overall, both the average and median changes in home values are a 23 percent decline.

**Figure 3** Percentage Changes in Home Values in 116 California Communities, 2005-2010



**4.1 The Model**

My goal is to use a multiple regression model to explain the diverse experiences in the 116 California communities—specifically to see the extent to which (a) the decline in home values between 2005 and 2010 simply reversed the increases between 2000 and 2005; (b) the changes in home values between 2005 and 2010 were related to the price/rent ratios in 2005; and (c) the changes in home values between 2005 and 2010 depended on socioeconomic factors.

The dependent variable in the regression model is %Value2010, the percent change in home values between 2005 and 2010. The two financial explanatory variables are the 2005 price/rent ratio (HomeValue in 2005 divided by Rent in 2005) and %Value2005, the percent change in home values between 2005 and 2010. In addition, the model uses the eleven socioeconomic explanatory variables defined in Table 1. Since the purpose of the model is to explain the changes in home values across communities between 2005 and 2010, all the explanatory variables are measured in 2005.

**Table 1 Socioeconomic Factors Used in the Regression Model, 2005 Data**

Homeowner	percent of housing units that are owner-occupied, as opposed to rentals
Married	percent of population 15 years or older that is now married
Size	average household size
Children	percent of households with at least one person under the age of 18
Senior	percent of households with at least one person over the age of 59
High School	percent of persons over age 24 with a high school diploma
College	percent of persons over age 24 with a bachelor's degree
Professional	percent of persons over age 24 with a professional degree
Income	median annual earnings of persons over age 24 with earnings, thousands of dollars
Preschool	percent of children 3-4 years old enrolled in school
Public School	percent of children in grades 1-4 attending public schools

## 5. Results

The multiple regression results are in Table 2. The first two numerical columns show the mean and standard deviation of the variable. For example, Price/Rent, the 2005 price/rent ratio, has a mean of 38.61 and a standard deviation of 7.72.

The third column shows the estimated coefficients of the explanatory variables; for example, a one-point increase in the price/rent ratio is predicted to reduce the change in home values between 2005 and 2010 by 0.37.

The fourth column shows the standardized values of the coefficients, which are the predicted effects on the change in home values between 2005 and 2010 of a one standard deviation increase in each explanatory variable. For example, if the price/rent ratio was to increase by 7.72, which is one standard deviation, the estimated equation predicts that the percent change in home values between 2005 and 2010 would be reduced by 2.80 percent (there is no standardized-coefficient entry for the coefficient of % Value2005 because this variable has the same units as the dependent variable % Value2010).

The last column in Table 2 gives the two-sided p values for testing the null hypothesis that changes in each explanatory variable have no effect on the change in home values between 2005 and 2010. Variables are conventionally considered to be statistically significant if the p value is less than 0.05. The statistically significant variables are bold-faced.

**Table 2 Regression Results, Dependent Variable %Value2010 (mean -22.87, std. dev. 15.98)**

<b>Variable</b>	<b>Average</b>	<b>Standard Deviation</b>	<b>Coefficient</b>	<b>Standardized Coefficient</b>	<b>Two-Sided P value</b>
<b>Price/Rent</b>	38.61	7.72	-0.37	-2.80	0.007
<b>Homeowner</b>	58.70	12.14	-0.60	-7.26	< 0.0001
Married	51.80	5.99	0.21	1.24	0.2658
<b>Size</b>	3.07	0.52	29.03	15.19	< 0.0001
<b>Children</b>	42.35	10.21	-0.85	-8.67	0.0004
Senior	27.74	5.17	0.35	1.82	0.054
High School	81.18	11.68	0.21	2.41	0.0832
<b>College</b>	17.93	8.06	1.07	8.64	< 0.0001
Professional	1.82	1.29	1.35	1.72	0.093
Income	36.53	9.10	-0.16	-1.47	0.4398
Preschool	45.13	15.27	0.09	1.40	0.1158
Public School	89.40	7.26	0.15	1.08	0.225
<b>%Value2005</b>	133.54	35.40	-0.22		< 0.0001
Number of observations:	116				
R-squared:	0.83				

The six statistically significant variables all have plausible coefficients and paint an interesting picture of the California communities that were the most resistant and resilient during the 2005 to 2010 meltdown in residential home values.

First is the 2005 Price/Rent ratio. When Beanie Baby prices fell, there was nothing to cushion the fall because there was no reason to buy a Beanie Baby except to sell it to someone else at a higher price. When home prices fall, there is a good reason to buy if owning a home becomes cheaper than renting. As predicted by Smith and Smith (2006), communities with relatively high price/rent ratios were the most vulnerable to a collapse in home values. A one standard deviation increase in the 2005 price/rent ratio predicts an additional 2.80 percent decline in home values between 2005 and 2010.

Second is Homeowner, the percent of housing units that are owner-occupied homes. Communities with many owner-occupied homes (and few rental properties) are more vulnerable to price declines. A one standard deviation increase in the homeowner percentage predicts an additional 7.26 percent decline in home values between 2005 and 2010. Communities with a large number of rental properties evidently have more of a cushion for falling home prices because there are more residents who might consider switching from renting to buying as home prices fall.

Third is Average Household Size and fourth is Children, the percent of households with at least one person under the age of 18, with the former having a positive effect and the latter a negative effect. To untangle these coefficients, we have to remember that they are *ceteris paribus*. The Size coefficient is the predicted effect on home values of an increase in the average household size, holding constant the percent of households with at least one person under the age of 18. So, for a given percentage of the households that have children, an increase in average household size is predicted to have a positive effect on changes in home values. The larger household size could be due to the presence of more children or parents per household.

The Children coefficient is the predicted effect on home values of an increase in the percent of households with at least one person under the age of 18, holding constant the average household size. So, for a given average household size, having more households with children is predicted to have a negative effect on changes in home values.

Fifth is College, the percent of persons over the age of 24 with a bachelor's degree. A one standard deviation increase in the 2005 college percent predicts an additional 8.64 percent increase in home values between 2005 and 2010. Perhaps communities with more college-educated residents are more stable?

Sixth is the percentage increase in home values between 2000 and 2005. A one percentage point increase in home values between 2000 and 2005 is

predicted to reduce home values by an additional 0.22 percent between 2005 and 2010. It makes sense that communities that experienced large run ups between 2000 and 2005 would be more vulnerable to declines between 2005 and 2010. It is perhaps surprising that the effect is relatively modest.

Although not quite statistically significant at the 5 percent level, the Senior variable is interesting. A one standard deviation increase in the percentage of households with at least one person over the age of 59 is predicted to increase home values between 2005 and 2010 by 1.82 percent. Just as home values tended to fall more in communities filled with children, they tended to fall less in communities filled with seniors.

It is remarkable that the value of R-squared is 0.83, which means that the variables in Table 2 explain 83 percent of the variation in changes in home values among these 116 diverse communities. This is very high for a cross section regression, particularly for residential real estate, where the three most important factors are said to be location, location, location.

Perhaps the success of this equation is due to the inclusion of the variable %Value2005. Maybe the magnitudes of the price declines between 2005 and 2010 are mostly explained by the size of the price increases between 2000 and 2005. To investigate this possibility, Table 3 shows the consequences of omitting the explanatory variable %Value2005.

The value of R-squared is only slightly affected, declining from 0.83 to 0.75. The variables that were statistically significant in Table 2 (Price/Rent, Size, Children, Homeowner, and College) are still statistically significant, with only modest changes in the magnitudes of the estimated coefficients. In addition, two other variables (Senior and Income) are now statistically significant, with plausible estimated coefficients. A one standard deviation increase in the percentage of households with at least one person over the age of 59 is predicted to increase the change in home values between 2005 and 2010 by 4.08 percent. A one standard deviation increase in the median annual earnings of persons over the age of 24 with earnings is predicted to increase the change in home values between 2005 and 2010 by 5.38 percent.

## **6. Conclusion**

The California communities that were the most resistant and resilient during the 2005 to 2010 meltdown in residential home values were those that had relatively low price/rent ratios in 2005, a large number of rental properties, large households, few children, many seniors, a large number of college educated residents, and modest increases in home values between 2000 and 2005. The last factor, while important, was far from decisive. The other enumerated factors were important, too.

**Table 3 Regression Results with %Value2005 Omitted**

<b>Variable</b>	<b>Average</b>	<b>Standard Deviation</b>	<b>Coefficient</b>	<b>Standardized Coefficient</b>	<b>Two-Sided P value</b>
<b>Price/Rent</b>	38.61	7.72	-0.45	-3.42	0.0066
<b>Homeowner</b>	58.70	12.14	-0.98	-11.86	< 0.0001
Married	51.80	5.99	0.18	1.06	0.435
<b>Size</b>	3.07	0.52	31.09	16.30	< 0.0001
<b>Children</b>	42.35	10.21	-0.77	-7.85	0.0076
<b>Senior</b>	27.74	5.17	0.79	4.08	0.0002
High School	81.18	11.68	-0.02	-0.19	0.9086
<b>College</b>	17.93	8.06	1.34	10.82	< 0.0001
Professional	1.82	1.29	1.13	1.44	0.2448
<b>Income</b>	36.53	9.10	0.60	5.38	0.0078
Preschool	45.13	15.27	0.09	1.28	0.2364
Public School	89.40	7.26	-0.05	-0.35	0.7366
Number of observations:	116				
R-squared:	0.75				

To some extent, local governments can move towards policies that will make their communities more immune to housing collapses; for example, by encouraging rental properties and attracting college-educated residents.

Homeowners may also benefit from knowing something about the vulnerability of their biggest investment. Not that they would never buy a home in a vulnerable community (after all, everything has an attractive price), but homebuyers may be better equipped to gauge a fair price to pay for a home if they understand the importance of price/rent ratios and various local socioeconomic factors. It is also an important lesson that past price increases do not guarantee future price increases. If anything, *ceteris paribus*, past price increases make an area more vulnerable.

## Acknowledgement

This research was supported by the John Randolph Haynes and Dora Haynes Foundation.

## References

- Case, K.E. & Shiller, R.J. (2003). Is There a Bubble in the Housing Market? An Analysis, *Brookings Papers on Economic Activity*, **2003**, 2, 299-342.
- HPI data. Available from <<http://www.fhfa.gov/Default.aspx?Page=87>>. [10 March 2013].
- Krainer, J. & Wei, C. (2004). House Prices and Fundamental Value, *FRBSF Economic Letter*, **2004**, 27, 1.
- Leamer, E. (2002). Bubble Trouble? Your Home Has a P/E Ratio Too, *UCLA Anderson Forecast*.
- McCarthy, J. & Peach, R.W. (2004). Are Home Prices the Next “Bubble”?, *FRBNY Economic Policy Review*, **10**, 3, 1-17.
- Saint-Pierre, J. (2009). Integration of Net Present Value (NPV), Economic Value Added (EVA), and Free Cash Flows (FCF), unpublished manuscript.
- Smith, M.H. & Smith, G. (2006). Bubble, Bubble, Where’s the Housing Bubble?, *Brookings Papers on Economic Activity*, **2006**, 1, 1-50.
- Smith, M.H. & Smith, G. (2008). *Houseonomics*. Pearson/Financial Times: Upper Saddle River, NJ.
- Smith, M.H. & Smith, G. (2007). Homeownership in an Uncertain World with Substantial Transaction Costs, *Journal of Regional Science*, **47**, 5, 881-896.



## Appendix 1 California Communities with American Community Survey Data

Alameda	Daly City	Lakewood	Redding	Simi Valley
Alhambra	Downey	Lancaster	Redlands	South Gate
Anaheim	East Los Angeles	Livermore	Redondo Beach	Stockton
Antioch	El Cajon	Long Beach	Redwood City	Sunnyvale
Apple Valley	Elk Grove	Los Angeles	Rialto	Temecula
Arden-Arcade	El Monte	Lynwood	Richmond	Thousand Oaks
Bakersfield	Escondido	Merced	Riverside	Torrance
Baldwin Park	Fairfield	Mission Viejo	Roseville	Tracy
Bellflower	Folsom	Modesto	Sacramento	Turlock
Berkeley	Fontana	Moreno Valley	Salinas	Tustin
Buena Park	Fremont	Mountain View	San Bernardino	Union City
Burbank	Fresno	Murrieta	San Buenaventura	Upland
Carlsbad	Fullerton	Napa	San Diego	Vacaville
Carson	Garden Grove	Norwalk	San Francisco	Vallejo
Chico	Glendale	Oakland	San Jose	Victorville
Chino	Hawthorne	Oceanside	San Leandro	Visalia
Chino Hills	Hayward	Ontario	San Marcos	Vista
Chula Vista	Hemet	Orange	San Mateo	West Covina
Citrus Heights	Hesperia	Oxnard	Santa Ana	Westminster
Clovis	Huntington Beach	Palmdale	Santa Clara	Whittier
Compton	Indio	Pasadena	Santa Clarita	
Concord	Inglewood	Pleasanton	Santa Maria	
Corona	Irvine	Pomona	Santa Monica	
Costa Mesa	Lake Forest	Rancho Cucamonga	Santa Rosa	

